Series of Publications of I.O.M.S.

Islamic Organization
for Medical Sciences
(I.O.M.S.)

Kuwait Foundation for
Advancement of Sciences
(K.F.A.S.)

Bulletin of Islamic Medicine
Vol. 3

Proceeding of
The Third International Conference on

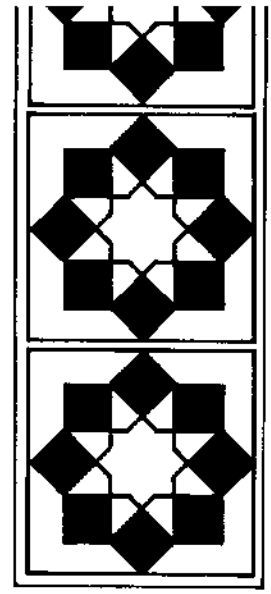
Islamic Medicine

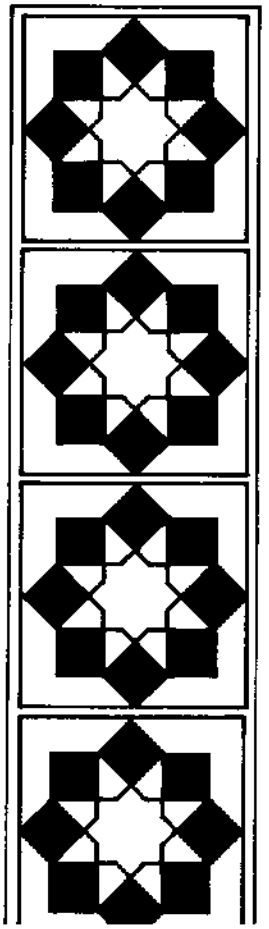
Supervised by
H.E. Dr. Abdul Rahman Abdullah Al-Awadi

The Minister of Public Health
Minister of planning and
President of Islamic organization
For Medical Sciences

Edited by
Dr. Ali Al-Saif
Dr. Ahmed Ragai El-Gindy
Hakeem Mohammad Zahoorul Hasan

Muharram 1405/September -October 1984
State of Kuwait





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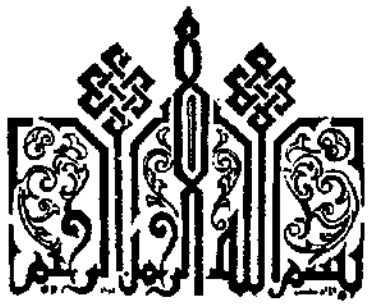

English *In the name of Allah, Most Gracious, Most Merciful.*

Hindi 'अल्लाह' के नाम से, जो अत्यन्त कृपाशील और दयावान् है।

Japanese

Burmese

Sinhalese

Chinese 奉普慈特慈安拉之名。

Во имя Аллаха милостивого, милосердного! Russian

Urdu

Au nom de Dieu le Très Miséricordieux, le Tout Miséricordieux. French

Im Namen Allahs, des Barmherzigen! German

Tamil

Bangla

Persian

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IN THE NAME OF ALLAH, MOST GRACIOUS, MOST MERCIFUL

FOREWORD

H.E. Dr. Abdul Rahman Al-Awadi

Minister of Public Health & Minister of Planning
President of Islamic Organization for Medical Sciences

By God's grace, His help and His great care, the Third International Conference of Islamic Medicine was held in Istanbul upon a kind invitation from Turkey. This conference has a special importance as it had been held after the completion of the Islamic Medicine Organization, following the issuance of Law No. 18/1984 which determined the legal shape of the Organization. Of course, this legislation has provided a great impetus for the fulfilment of the objectives of the Organization in accordance with its constitution. Moreover, it supports the medical Islamic achievements.

No doubt, the convening of the conference in Istanbul is of greater significance as it is convened in the capital of the Othmani Caliphate which had witnessed the flourishment of the Islamic nation for a long period.

Therefore, the good seeds in this field have begun to spread its fruits all over the world, adding a brick to the structure. All are cooperating together, hand in hand, aiming to have God's satisfaction and to serve the cause of *Islam.*

The concern over the issue of Islamic Medicine has been reflected in many domains. New departments for Islamic Medicine have been established in some universities. Also, societies for Islamic Medicine have been organized. At some universities, many theses on Islamic Medicine have been submitted for obtaining scientific degrees. Moreover, many conferences on Islamic Medicine were held.

The successful fruits of this good idea are likened to the definition given by *Allah* in His Holy book:

> *SEEST THOU NOT HOW ALLAH COINETH A SIMILITUDE: KALIMA TAYYIBA IS LIKE A GOODLY TREE, ITS ROOTS SET FIRM, ITS BRANCHES REACHING INTO HEAVEN. EVERY MOMENT IT GIVES ITS FRUITS BY PERMISSION OF ITS LORD. ALLAH COINETH THE SIMILITUDES FOR MANKIND IN ORDER THAT THEY MAY REFLECT.*

This is a strong evidence that the faithful moslems' hearts are full of righteousness and devotion. *Islam* is the religion of instinct. Therefore, those who have the least of faith are always sincere and open-hearted.

On this occasion, we would like to express our gratitude to the State of Kuwait, especially to His Highness the Amir of Kuwait, its people, and the government for the support it offered for establishing the Islamic Medicine Organization and its contribution in maintaining it which has reflected on the activities of the Organization. We are very grateful to the government of the Republic of Turkey for hosting the Third International Conference of Islamic Medicine and providing all facilities for its success. We wish to thank most heartily the scholars and scientists who enriched the conference with their valuable contributions. Our great thanks are also due to the Organizing Committee of the conference.

We pray to God that we always meet for the good of *Islam;* asking the Almighty *Allah* to guide us along the straight path to realize glory and prosperity for our Arab and Islamic nation.

IN THE NAME OF ALLAH, MOST GRACIOUS, MOST MERCIFUL

EDITORIAL

We have pleasure to present the Proceeding of the Third International Conference on Islamic Medicine which was held at Istanbul, jointly by State of Kuwait and Republic of Turkey, from 28th September to 2nd October 1984. In this Conference there were nearly 13 seminars in which scholars, scientists and professors of different countries contributed their valuable papers on various aspects of Islamic Medicine and participated in the delebration. There were some papers which could not be presented in the conference but selected for publication. So, the whole material is collected, edited and presented in this Proceeding of the Conference with other many important and useful speeches, delivered in the inaugural function and the recommendations as finalised and declared by the participants in the closing session. Some papers and speeches which were in Arabic are translated in English and included in this book. At this juncture, we regret to write that inspite of our best efforts we could not receive some papers in English and full texts of few papers from the authors, so we are presenting their abstracts only. Further, some invited scholars did not attend the conference, but as their papers were selected for presentation, these are printed according to the original programme. The audiography of the discussion of seminars was not clear, due to which the tape-recording could not be transcribed properly. However, it is being presented after editing by addition or deletion of few words to create some good sense.

This book is arranged according to the programme of the Conference, in Parts and Chapters. To make the Parts, Chapters and Discussions distinct, we have used red, yellow and green coloured papers for them respectively. We have tried our best to check all the references of the Holy *Quran*, present in the papers for their correctness and presented both *Quranic* and *Hadith* Quotations in distinct manners, i.e. *Verses* in capital italics and *Hadith* in small italics.

We are highly grateful to H.E. Dr. Abdul Rahman A. Al-Awadi, Minister of Public Health and Minister of Planning of Kuwait and the President of Islamic Organization for Medical Sciences, for his keen interest in Islamic Medicine and his full support to the editors in presenting this book. We also thank him on contributing his Foreword to be included in it.

We are truly thankful to Dr. Nail Al-Naqeeb, Under-Secretary of the Ministry of Public Health and Dr. Ali Al-Shamlan, Director of Kuwait Foundation for Advancement of Sciences for their kind co-operation and help.

We are thankful to Government and people of Turkey for their generous hosting of the Conference. We are also thankful to Prof. Ihsan Dogramaci and Prof. Yunus Muftu of Turkey for their full co-operation in providing all the required support and facilities to make the Conference a great success.

We are highly appreciative of the organised work of Mrs. Rehana Sufi of our secretariate who was custodian of the whole record of the conference. Without her untired efforts and continuous help, it was difficult for us to complete this work in a short time.

We thank all the participants of the conference and authors of the papers for their necessary co-operation.

We also thank the Al-Assriya Printing Press Co. of Kuwait and its representative Mr. Mahmoud Hijjawi for their full cooperation, hard labour and sincere efforts to make this volume good and beautiful.

My Allah Al-mighty give us courage and patience to serve the mankind in general and the Muslim world in particular.

Editors:
Dr. Ali Al-Saif
Dr. Ahmed R. El-Gindy
Hakeem Mohd. Zahoorul Hasan

PROGRAMME OF THE THIRD INTERNATIONAL CONFERENCE ON ISLAMIC MEDICINE 28th September - 2nd October 1984 ISTANBUL, TURKEY

FRIDAY, 28TH SEPTEMBER, 1984

ADMINISTRATIVE SESSION (9.00-9.45)

— Opening Statement by H.E. Dr. Abdul Rahman Al-Awadi
Minister of Public Health and Planning of the State of Kuwait and President of the Islamic Organization for Medical Sciences.

— Report by the Secretary General of the Conference

— Discussion on Administrative Matters.

INTERVAL

INAUGURAL SESSION: Istanbul University (10.00-10.45)

— National Anthem

— Recitation from Glorious Quran

— Welcome Message by H.E. Kenan Evren, President of the Republic of Turkey, read by H.E. Turgut Ozal, Prime Minister of Turkey.

— Speech by H.E. Dr. Abdul Rahman Abdullah Al-Awadi, Minister of Public Health and of Planning of the State of Kuwait and President of the Islamic Organization for Medical Sciences.

— Speech by H.E. Mehmet Aydin, Minister of Health and Social Assistance of Turkey.

— Speech by Prof. Ihsan Dogramaci, on behalf of the Third International Conference on Islamic Medicine.

— Opening Speech by H.E. Turgut Ozal, Prime Minister of Turkey.

— Visit to the Suleymaniye Library and opening ot the Islamic Art Exhibition. (11.00-12.30)

FRIDAY PRAYER: Suleymaniye Mosque (12.30 -)

HERITAGE

FIRST SESSION (15.30-18.00)

Title: THE INFLUENCE OF ISLAMIC CIVILIZATION ON EUROPEAN CIVILIZATION DURING THE RENAISSANCE PERIOD, IN THE FIELD OF MEDICINE OR ITS ALLIED SUBJECTS.

Chairman: Prof. Dr. Mahmoud Al-Jaleeli

Co-Chairman: Prof. Dr. Ekmeleddin Ihsanoglu

Moderator: Dr. Kandil Shakir Shubair

Speakers: 1. **Prof. Allen G. Debus**
Islamic Scientific History: Where to Next?

2. **Prof. Saeed Abdul Fattah Ashour**
   Islamic Medicine In European Universities at the Dawn of Renaissance.
3. **Prof. Michael McVaugh**
   Islamic Medicine in the Kingdom of Aragon in the Early Fourteenth Century.
4. **Dr. Rushdi Rashed**
   Burning Mirrors and the Perspective.
5. **Dr. Ali Haydar Bayat**
   The Contributions of Islamic Pharmacy to Europe and Comparative Study of Medical Aspects, Relating to Christian and Muslim Civilization in Middle Ages.
6. **Prof. Zuhair Al-Baba**
   Quality Control: Past and Present.
7. **Dr. Abdul Aziz Bin Abdullah**
   Medical Information.
8. **Dr. Mohd. Taha Jasser**
   Anaesthesia in Islamic Medicine and its Influence on Western Civilization.

DISCUSSION

SATURDAY, 29TH SEPTEMBER, 1984

SECOND SESSION

INVITED LECTURE (8.30-915)

Chairman: H.E. Dr. Abdul Rahman Abdullah Al-Awadi

Moderator: Dr. Attla Hincal

Speaker: Prof. Ihsan Dogramaci
Breastfeeding in Islam

ISLAMIC BEHAVIOUR AND HEALTH

SECOND SESSION

Part I (9.30-11.30)

Title: THE INFLUENCE OF ISLAM AND ITS TEACHINGS ON HEALTH OF HUMAN BEING AND THE SOCIETY.

Chairman: Prof. Dr. Ibrahim Badran

Co-Chairman: Counsellor Abdullah Al-Isa

Moderator: Dr. Aysegil Demirhan Erdemir

Speakers:
1. **Dr. Omar A. Schroedter**
   Islamic Medicine - Retrogression or Progress?
2. **Dr. Ahmed Aroua**
   Community Health in Islamic Perspectives.
3. **Dr. Kandil Shaker Shubair**
   The Influence of Islamic Teachings on the Safety of the Health of Individual and Society.

4. **Dr. Ghulam Mohd. Karim**
   Health and Medicine in the West From an Islamic Perspective.
5. **Dr. Abdul Sattar Abu Ghuda**
   Psychological Diseases and Their Treatment in Islam.
6. **Dr. M.N. Saadi**
   Pairing in Living Things.
7. **Dr. Ahmed El-Kadi**
   Documentation of Physiologic *Effect of the Quran in Man Utilizing Biofeedback Monitoring Techniques.*
8. **Dr. Aysegul Demirhan Erdemir**
   A General View of Medical Ethics in the Islamic World and Anatolian Turks.

DISCUSSION

ISLAMIC BEHAVIOUR AND HEALTH

SECOND SESSION

Part II (11.45-13.45)

Title: CERTAIN DISEASES, TRANSMITTED DUE TO UN-ISLAMIC BEHAVIOUR.

Chairman: Prof. Ihsan Dogramaci

Co-Chairman: Dr. Khaled Al-Mazkoor

Moderator: Dr. Mehmet Munip Yegin

Speakers:

1. **Dr. Allie Moosa**
   Cerebral Cysticercosis in Children.
2. **Prof. Abdul Hafiz Helmi**
   Balantidiosis, Cysticercosis and Trichinellosis as Serious Potential Threats to Muslim Countries - An Epidemiological Study and a Warning Message.
3. **Dr. Abdullah Hussain Ba-Salama**
   Islamic Teachings and Their Influence on the Prevention of Serious Diseases.
4. **Dr. Ahmed Shawky Al-Fanjary**
   The Impact of Islam and Its Teachings on Preservation of Individual and Public Health.
5. **Dr. Faisal Ibrahim Zahir**
   The Role of Marriage in Preserving the Health of the Individual and the Society.
6. **Dr. Mehmet Munip Yegin**
   A Biochemical Research on Islamic Fast (IF).
7. **Dr. Ahmed Sharafuddin**
   Reproduction in the Light of Islam and Law

SUNDAY, 30TH SEPTEMBER, 1984

THIRD SESSION

INVITED LECTURE (8.30-9.15)

Chairman: Dr. Reda Saeed Al-Obaid

Moderator: Prof. Abdul Hafez Helmy

Speaker: **Prof. Dr. Abdul Aziz Kamel**
Medicine in Islam Through Jurisdiction, Practice and Planning

APPLIED RESEARCH — PLANTS

THIRD SESSION

Part I (9.30-12.30)

Title: PHARAMCOLOGICAL EVALUATION FOR SOME PLANTS MENTIONED BY THE MUSLIM SCIENTISTS.

Chairman: Hk. Mohammed Said

Co-Chairman: Dr. Matin Tanker

Moderator: Dr. Shehab Ahmed Shehab

Speakers:

1. **Dr. Erendiz Atasu**
   A Survey of Researches on the Active Principals of Turkish Medicinal Plants.
2. **Dr. Fahim Abdel Rahim**
   Effects of Some Folk Medicines on the Ureter.
3. **Dr. Mohd. Abdulaziz Al-Yahya**
   Saudi Medicinal Plants and Their Contribution to Islamic Medicine.
4. **Dr. Abdul Waheed**
   Studies on Hypoglycemic Activity of Poterium Spinosum Linn.
5. **Dr. Nazire Ozkal**
   Researches on the Antimicrobial Activity of the Varieties of Glycyrrhiza glabra L. Growing in Turkey.
6. **Dr. Turhan Baytop**
   The Islamic Contribution to the Knowledge of Opium and Papaver Species.
7. **Dr. Abdul Rahman M. Al-Ageel**
   Use, Abuse and Present State of Scientific Knowledge of Khat.

DISCUSSION

APPLIED RESEARCH — PLANTS

THIRD SESSION

Part II (13.30-15.00)

Title: CLINICAL EVALUATION FOR SOME PLANTS MENTIONED BY THE MUSLIM SCIENTISTS.

Chairman: Dr. Bayhan Cubukcu

Co-Chairman: Dr. Yusuf Ahmed

Moderator: Dr. Unazy Al-Unazy

Speakers:

1. **Prof. Dr. Mohd Darwaish Sayed**
   Therapy With Drug Plants.
2. **Prof. Jerzy Lutomski**
   Components and Biological Proprieties of Garlic - Allium Sativum.
3. **Dr. Yusuf Ahmed**
   A Model Scientific Research on a Drug of Islamic Medicine. Hypocholesterolemic Effect of Allium Sativum Linn. and Its Potential Protective Action Against Coronary Heart Disease.
4. **Dr. Mohd. Jamil Al-Habbal**
   A Double Blind Trial of Mastic (Saladin) and Placebo in Treatment of Duodenal Ulcer.
5. **Dr. Bayhan Cubukcu**
   Herbal Drugs in Turkey
6. **Dr. Ayhan Ulubelen**
   Cytoxic Effect of the Glycosides Obtained from Ecballium Elaterium on the S-Phase of L-Strain Cells.
7. **Dr. Sevil Oksuz**
   Isolation and Structure Determination of Active Compounds From Centaurea Species.
8. **Dr. Ekrem Sezik**
   Pharmacognostical Investigations on the Plants Used as Folk Medicine in Turkey - I
9. **Dr. M. Tanker**
   A Pharmacognostical Research on Turkish Tilia Species.

APPLIED RESEARCH — PSYCHIATRY

THIRD SESSION

Part III (15.30-17.30)

Title: PSYCHIATRY AND ITS TREATMENT IN ISLAM

Chairman: Prof. Dr. Mehdi Ben Aboud

Co-Chairman: Prof. Dr. Abdullah Ba-Salama

Moderator: Dr. Najib Al-Osman

Speakers:

1. **Prof. Osman Najaty**
   The Concept of Mental Health in the Holy Quran and the Hadeeth.
2. **Dr. Jamal Mady Abul Azayem**
   The Islamic Model in the Field of Mental Health
3. **Dr. Salim Ammar**
   Islam's Psychological Therapeutics.

4. **Prof. Basheer Ahmed**
   Depression - Psychosocio Biological Factors. Role of Muslim Physician.
5. **Prof. Dr. Ayhan Songar**
   Socio-Psychiatric Institutions in Old Turks Under Islamic Tradition.
6. **Dr. Taha Baashar**
   Islam and Mental Health.

DISCUSSION

MONDAY, 1ST OCTOBER, 1984

FOURTH SESSION

INVITED LECTURE (8.30-9.15)

Chairman: Prof. Dr. Abdul Aziz Kamel

Moderator: Dr. Ekrem Sezik

Speaker: **Prof. Dr. Mahmoud Al-Jaleeli**
The Influence of Islamic Arabic Medicine on European Civilization During the Renaissance Period.

APPLIED RESEARCH — ALCOHOL

FOURTH SESSION

Title: ALCOHOL INDUCED DISEASES. (9.30-11.30)

Chairman: H.E. Dr. Hussain Al-Jazairy

Co-Chairman: Dr. Jamal Mazy Abu El-Azaim

Moderator: Dr. Ali Al-Saif

Speakers:
1. **Dr. Amal Alami**
   Alcohol and its Toxicity in Medicine and Islam.
2. **Dr. Omar Al-Baker Saleh**
   The Phenomenon of Alcoholism.
3. **Dr. Ahmed Abu Wafa**
   Alcohol Free Pharmaceuticals and Medicines.
4. **Dr. Yahya Naser Khawaji**
   The Role of Islam in the Prevention of Use of Alcohol and Narcotics in Drugs.
5. **Dr. Suleiman Ahmed Suleiman**
   Effect of Ethanol on Protein Synthesis and Lysossomal Enzymes in Hepatocytes.

CLOSING SESSION (17.00-19.00)

— Rapporteur's Report & Recommentations

— Discussion

— Speech
H.E. Dr. Abdul Rahman Al-Awadi.

REPORT ON INAUGURAL SESSION

The Inaugural Session of the Third International Conference on Islamic Medicine was arranged by the host country at Istanbul University.

First, there was one Administrative Session from 9.00 to 9.45 a.m., chaired by H.E. Dr. Abdul Rahman Al-Awadi, Minister of Public Health and Minister of Planning of State of Kuwait and President of Islamic Organization for Medical Sciences and co-chaired by Prof. Dr. Ihsan Dogramaci, president of the Council of Higher Education of Turkey and Vice-president of I.O.M.S. In this session, H.E. Dr. Abdul Rahman Al-Awadi introduced the audience with the details of the programme of the conference and nominated a 'Steering Committee' consisting of the following:

1. H.E. Mehmet Aydin
   Minister of Health and Social Assistant of Turkey.
2. Prof. Dr. Ihsan Dogramaci
   President of the Council of Higher Education of Turkey.
3. Dr. Jemmy Damar Oglu
   Rector of Istanbul University, Turkey.
4. Prof. Yunus Muftu
   Director General, Turkish and International Children's Center, Turkey.

Dr. Ahmed Rajai El-Gindy, Secretary General of the Islamic Medicine Conference read the annual report.

The opening session started at 10.00 a.m. with the recitation from the Glorious *Quran*. First, the Welcome Message of the President of Republic of Turkey, H.E. Kenan Evren was read by the Prime Minister of Turkey, H.E. Turgut Ozal. Then H.E. Dr. Abdul Rahman Al-Awadi delivered his speech. He thanked the President of Turkey and his Government under whose auspices the conference was held and also thanked the Prime Minister of Turkey on his personal participation in the opening session and Prof. Dr. Ihsan Dogramaci for his continuous help to hold the conference at Turkey. He conveyed the best wishes of the State of Kuwait: the Amir and the Government whose sponsorship and continuous support could establish the Islamic Organization for Medical Sciences and push it in action. He welcomed all the participating scholars, scientists and professors and local V.I.P.S., Ambassadors and other dignitaries attending the function. He also discussed some vital problems in the light of the Holy *Quran* and the *Hadith,* advocated the Islamic conception of Medicine and stressed on study of our valuable heritage.

Later on, H.E. Mehmet Aydin and also Professor Dr. Ihsan Dogramaci delivered their speeches. At the end H.E. Turgut Ozal gave his Opening Speech. He welcomed all the participants in Turkey and said, "We must help in creating a better world which will progress in peace and wealth. This can be accomplished through International co-operation, an idea expressed by the Great Ataturk, the founder of the Turkish Republic in his mottos". He also said, "The purpose of this conference is to shed light on the past and at the same time, strengthen our confidence in the future which will be a source of inspiration for future progress in the medical field in the Islamic world and which will make people content". In this session Prof. Yunus Muftu was the rapporteur.

After the Inaugural Session, the Prime Minister of Turkey, H.E. Turgut Ozal held a meeting with the Board of Trustees and the participating scholars. Then he went with all of them to the Sulemaniye Library and inaugurated the Islamic Art Exhibition, containing old and valuable manuscripts. From there all the hosts and guests went to Suleymaniye Masjid to have Friday Prayer.

Editors

Kenan Evren
Cumhurbaşkanı

28 EYLÜL 1984

Sayın Dr. Abdul Rahman Al-Awadi
Kuveyt Sağlık ve Planlama Bakanı
İslâm Tıp Bilimleri Kurumu Başkanı
Sheraton Oteli
İSTANBUL

3'ncü İslâm Tıp Konferansı'nın açılış töreninde, yoğun çalışma programım dolayısıyla bulunamadığım için üzgünüm.

Öncelikle, dost ve kardeş İslâm Ülkelerinden gelen değerli Tıp adamlarını bu toplantı vesilesiyle memleketimizde görmekten duyduğumuz memnuniyeti belirtmek isterim.

Bu konferansın ülkelerimiz arasında zaten var olan dostluk, kardeşlik ve dayanışmayı daha da kuvvetlendireceği şüphesizdir.

Bilindiği gibi, Tıp Bilimi, insanlara ve insanlığa hizmet gibi kutsal ve onurlu bir görevi temel amaç edinmiştir.

Çağlar boyu çeşitli medeniyetleri sinesinde barındıran İslâm dünyası da, her zaman Tıp Bilimine gerekli önemi vermiş ve uzun bir süre bu dalda önderlik yaparak çok değerli ilim adamları yetiştirmiştir.

Her alanda olduğu gibi, Tıp alanında da çağdaş buluşların ve gelişmelerin giderek yoğunluk kazandığı bir dünyada yaşıyoruz.

İslâm Tıp aleminin bu buluşları ve gelişmeleri çok yakından takip ederek, bölgede yaşayan milletlerin sağlık sorunlarını çözme konusunda, imkânlar ölçüsünde büyük çaba gösterdiğini biliyoruz.

Tıp alanında İslâm ülkeleri arasında gerçekleştirilen bu işbirliğiyle, sağlık hizmetlerinde önümüzdeki yıllarda mutlaka daha da etkin çalışmalar yapılacağına ve hedef alınan sonuçlara ulaşılacağına içtenlikle inanıyoruz.

Bu duygu ve düşüncelerle, 3'ncü İslâm Tıp Konferası süresince değerli bilim adamlarının ortaya koyacakları görüş ve önerilerin, alınacak kararların Tıp alanındaki sorunlara ışık tutacağı ve yeni çözümler getireceği inancıyla çalışmalarınızda başarılar diler, Kurumunuzun Sayın mensuplarına ve davetlilere sevgiler sunarım.

* Letter of Message from H.E. Kenan Evren, the president of Republic of Turkey — in Turkish language — addressed to H.E. Dr. Abdul Rahman Al-Awadi, president of I.O.M.S.

Editors.

MESSAGE OF THE PRESIDENT OF REPUBLIC OF TURKEY H.E. KENAN EVREN - READ AT INAUGURAL CEREMONY

By H.E. Turgut Ozal

Prime Minister of Republic of Turkey

TURKEY

YOUR EXCELLENCY: DR. ABDUL RAHMAN AL-AWADI

MINISTER OF HEALTH AND PLANNING OF THE STATE OF KUWAIT.
PRESIDENT OF THE ISLAMIC ORGANIZATION FOR MEDICAL SCIENCES, ISTANBUL.

I WISH I COULD PARTICIPATE IN THE PROCEEDINGS OF THE THIRD INTERNATIONAL CONFERENCE ON ISLAMIC MEDICINE, BUT MY ENGAGEMENTS AND PREVIOUS COMMITMENTS STOOD IN THE WAY. IT IS MY PLEASURE TO SEIZE THE OPPORTUNITY OF THE CONVENING OF THIS CONFERENCE TO WELCOME THE DISTINGUISHED MEN OF MEDICINE WHO HAVE COME FROM THE FRIENDLY ISLAMIC COUNTRIES AND EXPRESS MY GREAT JOY FOR YOUR PRESENCE WITH US. YOUR CONFERENCE, I AM QUITE SURE, WILL HELP ESTABLISH THE BASIS OF THE BROTHERLY RELATIONS THAT BIND OUR COUNTRIES. THE MEDICAL SCIENCES WITH ALL ITS BRANCHES PERFORM A SACRED AND HONOURABLE DUTY IN THE SERVICE OF MAN WHEREVER HE MAY BE. FOR MANY CENTURIES, THE ISLAMIC WORLD HAD POSESSED THE MEANS OF A FLOURISHING CIVILIZATION AND INCESSANT PROGRESS THE LANDMARKS OF WHICH WERE THE SCHOLARS OF ISLAMIC MEDICINE WHO WERE ALSO ITS FIRST PIONEERS. AS OUR WORLD TODAY IS OVERWHELMED WITH A SUCCESSIVE WAVE OF DISCOVERIES AND INNOVATIONS AND WITNESSES TREMENDOUS ADVANCES IN A WIDE RANGE OF MEDICAL FIELDS, THE SCHOLARS OF ISLAMIC MEDICINE ARE REQUIRED TO DO THEIR VERY BEST TO MAKE THE MOST OF THESE ADVANCES IN OVER-COMING THE PRESENT HEALTH PROBLEMS IN OUR AREAS.

WE ARE QUITE CONFIDENT THAT THE EXISTING COOPERATION AMONG THE ISLAMIC COUNTRIES IN THE FIELD OF MEDICINE WILL BE MORE AND MORE CONSOLIDATED IN THE COMING YEARS AND THAT THE HOPES TARGETED FOR THE ESTABLISHMENT OF THIS ORGANIZATION WILL BE REALIZED.

WITH THESE FEELINGS AND THOUGHTS I WISH YOUR CONFERENCE SUCCESS IN ACHIEVING ITS OBJECTIVES AT THE END OF ITS PROCEEDINGS IN A WAY THAT WILL CLEARLY POINT UP THE MOST FEASIBLE MEANS OF POSITIVELY SOLVING OUR PRESENT HEALTH PROBLEMS.

WITH MY BEST WISHES TO YOU AND TO THE DISTINGUISHED CONFERENCE MEMBERS.

SEPTEMBER 28, 1984

KENAN EVREN
PRESIDENT

SPEECH DELIVERED AT INAUGURAL CEREMONY GLANCES AT ISLAM, MAN AND MEDICINE*

H.E. Dr. Abdul-Rahman Al-Awadi
Minister of Public Health & Minister of Planning
President of Islamic Organization for Medical Sciences
KUWAIT

IN THE NAME OF GOD, MOST GRACIOUS, MOST MERCIFUL

Praise be to *Allah* Whom we supplicate for help and guidance, and peace be upon His Apostle, Muhammed (ﷺ), Seal of Prophets and Messengers.

Your Excellency, Deputy of H.E. President of Turkey,
Ministers, distinguished brothers:

I welcome you most warmly to the Third International Conference on Islamic Medicine that has been graced by H.E. the President of the Turkish Republic, for which I should like to express my deepest thanks and gratitude. My thanks also go to H.E. the Prime Minister who kindly made a point of participating in the inaugural ceremony of this conference despite his many engagements and tight schedule.

As for my brother and friend, Dr. Ihsan Dogramaci whom I cannot thank deeply enough no matter what I say, he has lived with us every moment of bringing the Islamic Organization for Medical Sciences (IOMS) into being and has always contributed his thoughts and efforts to laying down its foundation, doing his very best in spite of his heavy load of work and world commitments. But he would not allow these to stand in the way of his participation because he strongly believed in the idea, He was the first to ask that Turkey should play host to the first Islamic Medicine Conference convening outside the base country. In my name and on behalf of my colleagues in the Board of Trustees, and in the name of all participating researchers, I thank him. I would also like to thank all the brothers who have strenuously worked day and night to prepare for the convention of this conference. Let me also acknowledge the contributions made by the distinguished scholars, Muslims and non-Muslims alike whom I deeply thank for taking the trouble of attending the conference. I wish you all a happy stay.

My special thanks go to the Turkish Government and to the friendly Turkish people for hosting the Third Conference on Islamic Medicine.

It gives me great pleasure to convey to you the best wishes of the State of Kuwait; Amir, government and people, which spares no effort in establishing and supporting the Organization because of its firm belief in the fact that all Muslims should be committed to Islam both in words and in action in every domain of our life.

Brothers and Sisters:

Perhaps it is a good omen that the convention of the first conference on Islamic medicine outside the base country, Kuwait, co-occurs with two important occasions:

First, the beginning of the new Hijri year in the month of Muharram which is blessed by *Allah*. May this and the coming years be years of abundance, peace and unity among the Muslims.

Second, the convention of the conference in the capital of the Islamic caliphate which witnessed the heyday of the Islamic civilization. When Muhammed II Ben Murad conquered the invincible capital of the Bezantine State, he renewed Islamic aspirations and filled Muslims with great

* *Translated by Mr. Mahmoud Abdel Nabi.*

hopes. For Turks, led by the Ottomans, were trusted to be capable of leading the Islamic nations and restoring for all Muslims their influence and high prestige in the world. This was evidence enough of the Ottomans' competence, power and diligence in all academic and practical fields of life.

Perhaps our meeting today is a hopeful sign that *Allah* will bring all Muslims together again as the ties that bind them are stronger than any boundaries or barriers of colour, language, homeland or nationality. These strong ties are based on something that transcends such barriers, viz., the Islamic faith. In this connection, God says:

IF THOU HADST SPENT ALL THAT IS IN THE EARTH THOU COULDST NOT HAVE ATTUNED THEIR HEARTS, BUT ALLAH HATH ATTUNED THEM.

(S8:V63)

God also says in His Holy Writ:

AND REMEBER ALLAH'S FAVOUR UNTO YOU: HOW YE WERE ENEMIES AND HE MADE FRIENDSHIP BETWEEN YOUR HEARTS SO THAT YE BECAME AS BROTHERS BY HIS GRACE; AND (HOW) YE WERE UPON THE BRINK OF AN ABYES OF FIRE, AND HE DID SAVE YOU FROM IT. THUS ALLAH MAKETH CLEAR HIS REVELATIONS UNTO YOU, THAT HAPLY YE MAY BE GUIDED.

(S3:V103)

Brothers and Sisters:

The decision to have Turkey host the Third Islamic Medicine Conference has aroused in me feelings of sadness about the present condition of the Islamic world. It was a moment of deep contemplation about the long, deeprooted history of this Islamic nation. A succession of questions came to my mind, one after the other. Today, I intend to put forward these questions so that we may think aloud together in the hope that we, or future generations, can revive the glories of an old past era by pondering over them and trying to pinpoint weaknesses and strengths. Let us try to find out why our Islamic civilization flourished in its early ages and how we have ended up to this state of affairs in which we have become like strangers in this jungle of a world where the strong devours the weak.

Here, then, are the questions that came to my mind:

Where does man stand in *Islam?* What is the method advocated by *Islam* for the upbringing of the individual, the family and the society? Is *Islam* just a theory? And is it, like most other theories, unamendable to application, which makes it necessary to dichotomize into religious and secular? What is the attitude of *Islam* towards the material advances accomplished by mankind today? How does Islam relate to medicine?

If we could find answers to these queries taking them one by one in an objective and scientific way, we will then be able to accurately diagnose the ailment and easily prescribe the appropriate remedy with the grace and help of *Allah.*

MAN'S PLACE IN ISLAM

Brothers and Sisters:

As we are all aware of the world circumstances in the pre-Islamic history, I feel I needn't talk much about them. Those bleak circumstances are evidenced by the story of man's journey on earth. God has sent prophets and messengers to call people to worship Him. Most of these calls were privately addressed to delimited nations or categories of people. When *Islam* dawned upon this world, it was globally addressed to all kinds of people with no discrimination between white or

black, Arab or non-Arab. The Quranic procedure it laid down has aimed to guide all of mankind. Thus, God revealed the *Holy Quran* to His Messenger, Muhammad (ﷺ). Throughout the 13 years of Quranic revelations in *Makkah,* the Quranic procedure focused on the three-sided issue of faith, the upbringing of the Muslim individual, and investing the humanity of the human-being. There were hardly any legislations, yet. It was not until faith and firmly taken root, and the Muslim personality had adequately taken shape, and humanity had clearly materialised in its Islamic meaning that the *Quran* moved to the phase of legislations which were then taken in true faith. This is evidence by the fact that when the *Quran* prohibited adultery, usury, gambling and drinking, which were practised by a multitude of people, everybody, with no exceptions or argumentations, immediately ceased the practice and abided by the commands. Here lies the main difference between that Muslim generation, who had faith in God and complete trust in what He revealed and commanded, and the individual living in our modern societies. We can see now this universal inability to stop the continuous and ever increasing waste in individuals in terms of values and productivity despite the enormous funds earmarked to educational campaigns and the enacting of many laws.

Again, let us compare this with what happened in the United States when, in January 16, 1919, the American Congress passed a law prohibiting the distillation, exportation, importation or selling of alcoholic drinks. The law carried a penalty of imprisonment for various terms for those who did not abide. No sooner had the wine factories shut down and the law put into effect than clandestine distillers went into business. The uncontrolled production of liqours in unhealthy ways led to the poisoning of many people. In the course of about 13 years, over half a million citizens were convicted for dealing in the contraband, consumption of alcoholic drinks exceeded the pre-prohibition period, and demonstrations marched against the law forcing the Congress to rescind it. This is the difference between faith and lack of it. By building up the Islamic nation on this solid base of faith in accordance with the Quranic procedure, and by basing the existence of this nation on an organo-kinetic rally the core of which is faith, *Islam* has aimed to emphasise the humanity of the human being, i.e. to strengthen it and sublimate it over all his mundane aspects. This trend is quite obvious in all the rules, commands and canonical laws of *Islam* contained in the *Holy Quran*.

Everything in the universe has been created for man, but man himself has been created for *Allah,* Glorified be His Name:

> *HAS THOU NOT SEEN THAT UNTO ALLAH PAYETH ADORATION WHOSOEVER IS IN THE HEAVENS AND WHOSOEVER IS IN THE EARTH, AND THE SUN, AND THE MOON, AND THE STARS, AND THE HILLS AND THE TREES, AND THE BEASTS AND MANY OF MANKIND, WHILE THERE ARE MANY UNTO WHOM THE DOOM IS JUSTLY DUE. HE WHOM ALLAH SCORNETH, THERE IS NONE TO GIVE HIM HONOUR. LO! ALLAH DOETH WHAT HE WILL.*
>
> (S22:V18)

Islam was the seal of all heavenly messages. It has finally crowned all prophethoods and become the source of pride for man as well as for humanity. *Allah* the Almighty, has chosen man to be His viceroy on earth:

> *AND WHEN THY LORD SAID UNTO THE ANGELS: LO! I AM ABOUT TO PLACE A VICEROY IN THE EARTH.*
>
> (S2:V30)

The He ordered everything in the universe to be in his service so that he may be happy and content both in this world and in the Hereafter:

> *SEE YE NOT HOW ALLAH HATH MADE SERVICEABLE UNTO YOU WHATSOEVER IS IN THE SKIES AND WHATSOEVER IS IN THE EARTH.*
>
> (S31:V20)

Then He set for him both the means and end of his existence. He did not let him live in vain, but to worship Him, reconstruct and populate the earth, and be His viceroy on it:

AND HE TAUGHT ADAM ALL THE NAMES, THEN SHOWED THEM TO THE ANGELS, SAYING: INFORM ME OF THE NAMES OF THESE, IF YE ARE TRUTHFUL. THEY SAID: BE GLORIFIED! WE HAVE NO KNOWLEDGE SAVING THAT WHICH THOU HAST TAUGHT US. LO! THOU, ONLY THOU, ART THE KNOWER, THE WISE.

(S2:V31–32)

The *Ouran,* which is the Divine doctrine, states that the purpose of man's existence on earth is to worship God:

I CREATED THE JINN AND THE HUMANKIND ONLY THAT THEY MIGHT WORSHIP ME. I SEEK NO LIVELIHOOD FROM THEM, NOR DO I ASK THAT THEY SHOULD FEED ME. LO! ALLAH! HE IT IS THAT GIVETH LIVELIHOOD, THE LORD OF UNBREAKABLE MIGHT.

(S51:V56–58)

God has set man above many of His creatures and honoured him by making everything in the universe serviceable to him:

VERILY WE HAVE HONOURED THE CHILDREN OF ADAM. WE CARRY THEM ON THE LAND AND THE SEA, AND HAVE MADE PROVISIONS OF GOOD THINGS FOR THEM, AND HAVE PREFERRED THEM ABOVE MANY OF THOSE WHOM WE CREATED WITH A MARKED PREFERMENT.

(S17:V70)

Yet, in spite of all this, man has become so oppressive and ignorant that he filled the earth with evil, and so arrogant that he though he could penetrate the earth or rise to the height of mountains. But he only threatens himself of annihilation. Instead, that is, of worshipping God and using his knowledge for the good of mankind, he has haughtily turned against his God. The inevitable result is this distruction inflicted by an arsenal of lethal weapons.

It is appalling to know that the money spent in the production and possession of these weapons far exceeds what is allocated for world health and food programmes. So, how miserable we should feel when we see our brothers in humanity literally starve while on the other side of the globe they celebrate the accomplishment of the most sophisticated means of bringing about death and destruction.

THE INVESTMENT OF MAN IN ISLAM

Today, man is on the brink of an abyss, not because of the annihilation threat hanging over him, as this is just the symptom of the disease and not the disease itself, but because of his bankruptcy in terms of values. Therefore, there must be a leadership capable of retaining and developing the material civilization attained by man through his ingenuity and creativity, and, in addition, keen to provide the people with a new set of values as well as an original, positive and realistic method of living. Only *Islam* is in a position to provide these values and this method as it is not opposed to material creativity on earth, but considers it one of the first and foremost functions of man since he was placed on earth as God's viceroy. What is more, *Islam* considers this creativity, under cetain provisos, a form of worship for God and a justification for man's own existence.

Man, animal and matter have certain qualities in common. Some people go so far as to imagine that because of these common qualities man is also an animal or that he is essentially a physical substance just like other substances. These people, however, forget or seem to forget that man has, besides these common qualities, other qualities that distinguish him from other beings and

render him uniquely different by virtue of his supramundane attributes which are endowed upon him by God. Referring to those who think of themselves as just physical or animal-like the *Holy Quran says:*

> *SAY: SHALL WE INFORM YOU WHO WILL BE THE GREATEST LOSERS BY THEIR WORKS? THOSE WHOSE EFFORT GOETH ASTRAY IN THE LIFE OF THE WORLD, AND YET THEY RECKON THAT THEY DO GOOD WORK. THOSE ARE THEY WHO DISBELIEVE IN THE REVELATIONS OF THEIR LORD AND IN THE MEETING WITH HIM. THEREFORE, THEIR WORKS ARE VAIN, AND ON THE DAY OF RESURRECTION WE ASSIGN NO WEIGHT TO THEM. THAT IS THEIR REWARD: HELL, BECAUSE THEY DISBELIEVED, AND MADE A JEST OF OUR REVELATIONS AND OUR MESSENGERS.*

(S18:V103–106)

A moment of mediation over what is going on round us and what our life has become with all the products of modern technology in addition to the thoughts propagated by the Orientalists and by the enemies of *Islam* will reveal that all these factors have done their part in distorting the human-being qua human-being. For these enemies have exploited only two aspects of the human-being completely neglecting his third and most distinguishing one. These two aspects are:

First, the physical aspect which has been reflected in the overwhelming technological revolution in all the fields of life making those enemies abjectly conceited.

Second, the animal side in man which made him, either consciously or un-consciously, fall a prey to their conspiracies. By giving free rein to his indulgence in pleasure to the point of satiety they think they are making him happy and ridding him of loneliness, depression, anxiety and confusion. This complete immersion in satiating the instincts is acclaimed to be congruent with the so-called 'absolute freedom' which is wrongly taken to mean a complete breakup from responsibilities and commitments. Consequently, women also followed suit and took this freedom to mean shaking off all family duties. Both men and women misunderstood the nature of sexual relations and thought that freedom here meant indulgence in animal-like behaviour and crazy response to the burning anxiety of the instincts, Thus, families have broken up, children got lost, and we have on hand now a new prostrate generation of young men and women who do not know what is right and what is wrong for lack of proper guidance and care and because society itself has come to understand personal freedom to mean uncurbed behavioural practices. No wondering, then, that these young people go to extremes in drinking liqours and using all sorts of narcotics so that many societies have now turned into masses of addicts, alcoholics, and perverts.

It is this dreary state of affairs that makes moral values and Islamic guarantees more appropriate for the human-being. When one truly understands Islamic values, one must come to the conclusion that *Islam* is THE civilization, and that the Islamic society is THE civilized society in which the individual is really worthy of being God's viceroy on earth as *Islam* values the right to live and work and disavows monasticism and seclusion.

HISTORY AND ISLAM

The Islamic society is not a historical concept. In other words, it is not the product of history in its chronological sense. The nature of this society is something revealed to mankind by a divine source based on human reality and material existence. This, is a word, represents how a human-being is viewed by *Islam* and why he is honoured by the *Holy Quran.*

ISLAM AND CIVILIZATION

It may be useful now to move to an important point related to this human-being, viz., civilization, and try to define it in Islamic terms. Is the civilization of any nation a combination of its sciences,

literature, fine arts, artefacts, innovations, ways of civil and social life, and styles of political life? The answer to this query lies in the following:

First: The fact is that all these things are not civilization itself, but the product of civilization; they are not the roots of civilization, but its leaves and fruits. If this is true, we should not assess the real value of a civilization on the basis of these superficial phenomena and accidental attires. We have to go deeper to reach its core and determine its origin. The first thing to look for is: what is its concept of life? how does this civilization envisage life in this world? For such a concept has the deepest effect on man's acts. A change in this concept will lead to an overall change in the quality of such a civilization.

Secondly: What is the ultimate aim of man's life in this world? For what purpose is all that struggle, conflict, effort, toil, and hard work? What should man aspire to get or realize? To which target should man direct all his endeavors? What is the end that man should never lose sight of in every thing he does and in every moment of his life? It is this question about the purpose of life that determines the direction of man's practical life and the route towards this direction. In light of the answer to such a question man can map out his course of action and select his means of realizing that purpose.

Thirdly: What are the essential thoughts and ideologies on which civilization is based for assessing man's conduct and judging his behaviour in this world? How does such a civilization mould man's mentality? What views, feelings and attitudes does this civilization establish in his mind?

Fourthly: What kind of a human-being qua human-being does this civilization produce? In other word, what kind of moral education does it adopt for preparing a human-being to lead the kind of happy and successful life conceived by such a civilization? What traits, attributes, psychological characteristics that this civilization tries to develop in the human-being's mind and heart?

Fifthly: On what basis has this civilization defined man's relation to other people taking into account a wide range of situations in life?

- How has it organized his relations with his family and society?
- What are his rights and duties?
- To what extent does it allow him to practise his freedom?
- If it imposes certain restraints, how far do they go?

From an Islamic perspective, the answers to these questions are unequivocally satisfactory. Since the beginning of the Islamic call, *Islam* has mapped out the appropriate path. Consequently, it has managed to build up a realistic and effective civilization that prevailed in a world which had been deteriorating. Therefore, manners greatly improved, souls became righteous and people began to be pure in heart. All this happened with hardly any need to resort to the bounds and restrictions that God has placed on man's freedom of action because control emanated from man's conscience and because hope in *Allah's* consent and rewards and fear of His wrath and punishment replaced secular control and penalties. The net result was that humanity, in terms of its system, manners and whole life, was elevated to a zenith it had never reached before and will never reach again unless it adheres to the Islamic values and teachings.

In short, *Islam* has set a purpose for man's existence, a well-defined destination for his journey on earth, and a mission for his life. Thus, he can feel that his life is meaningful and invaluable and that he is not a trivial molecule floating astray in the vast cosmos or a neglected creature that gropes in the dark as must be felt by such people who doubt the existence of God and end up not knowing why they have ever existed and why they die. How can one find oneself if one ignores it? And how can one know oneself if such knowledge is blocked by one's conceit and pride?

The real secret of the Islamic civilization in the early ages lies in the fact that *Islam* has acknowledged the human-being qua a human-being created by God in components of a body, a soul, a mind, a heart, a will, and a sentiment, neglecting no component on the account of his other ones. That is why God has ordered man to work and toil for his sustenance in the world as earnestly as He ordered him to worship Him alone and ponder over the creation of the skies and the earth and what is between them of plants and animals.

How similar are our times with the pre-Islamic period! We have seen what sort of sublime life the first generation of Muslims used to lead, what about the twentieth century? Don't we live in similar conditions that were prevalent in the pre-Islamic paganism. The Arabic word *jahiliya* which is usually interpreted as 'pre-Islamic times' may not be confined to a certain timing, after all. It can also be interpreted as 'state of ignorance'. Thus, *jahiliya* is in fact a matter of behaviour and a way of conceiving things.

ISLAM AND SCIENCE

As for the subject of *Islam's* relationship to science, it has been adequate-covered by many people. I would not even have the necessary time to go into much detail of such a rich topic, but allow me to touch upon certain points in this connection:

1. I have said before that *Islam* is not opposed to the material civilization attained by man, provided it is not looked upon as the ultimate aim but only as the product of an Islamic, scientific civilization.
2. When *Allah*, praised be His name, placed man in the earth as His viceroy, He meant that he should reconstruct it in line with the Islamic morals. This reconstruction is considered by *Islam* a form of worshipping God if it is carried out according to the rules laid down by *Islam*.
3. When *Allah*, praised be His name, created Adam and assigned to him the role of His viceroy, He taught him utterance and all the names. The first *sura* revealed by the *Quran* was: *READ IN THE NAME OF THY LORD* (S96–V1). In this respect, it should be clear to everybody that the command to read is tantamount to a command to worship God. So reading is constrained by that which is useful to the reader and to mankind in general. It follows that man's knowledge should be directed to the benefit of humanity so that it could be one of God's means of mercy on earth.
4. The *Quran*, which is God's Holy Writ, mentions words like 'knowledge' and 'learning' over 500 times and refers to God as 'The Knower' or 'The Omniscient'. If this is one of God's attributes, it flies in the face of anyone who alleges that *Islam* is opposed to science, or denies the fact that being usefully knowledgeable is part and parcel of the formation of the Muslim individual.
5. God has enjoined us to consider his creations and to endeavour to do what is useful to the people. We should try to find out about the secrets of God's creations. If this is done for the love of God and for His consent, then He will open up for us vast horizons of knowledge.

In fact, there is so much to say in this connection. But time is too short to allow greater details about *Islam's* keenness to pay tribute to science and to scientists and scholars and how they are considered heirs to prophets and that the ink of their pens is not less in value than the blood of martyrs. True knowledge leads man to faith in God, and true faith in turn leads to knowledge which is called for and accepted by *Islam*.

The early Muslims were committed to these divine concepts. Therefore, the Islamic civilization comprised all sorts and fields of knowledge. Perhaps the best evidence of this fact is found in George Sartin's five-volume work about the history of sciences which he divided into five epochs of half a century each and marked by a central scholar. Thus the first epoch, 400–450 B.C. was con-

sidered Plato's age, followed by the epoch of Aristotle, Auclides and Archimedes. The period between 600 A.D. and 700 A.D. was called the Chinese era of Hian Sing. But a long period which extended for an uninterrupted epoch of 350 years from 750 A.D. to 1100 A.D. witnessed the activities of Al-Razi, Ibn-Sina, Jaber Ben Hayyan, Khwarizmi, Al-Masoudi, Al-Bayrouni, Ibnil-Haytham, and Omar Khayyam, that is, scholars belonging to the Islamic nation who were a mixture of Arabs, Afghans and Persians.

In Sartin's book, it was not until 1100 A.D. that Western names began to make their appearance. But the day was then carried for a long period of 250 years by such notables as Ibn-Rushd, Nasiruddin Al-Tousi and Ibnul-Nafees.

These were very brief hints about *Islam's* attitude towards knowledge and the scholars. As for medicine in *Islam,* it will be the next topic to which I now turn.

ISLAM AND MEDICINE

When *Allah,* praised be His name, created man, placed him in the earth as His viceroy, honoured him and made everything in the universe serviceable to him, He also provided him with security. So much so that any aggression against a human-being is considered by *Islam* tantamount to an act of aggression against the whole of society:

WHOSOEVER KILLETH A HUMAN BEING FOR OTHER THAN MANSLAUGHTER OR CORRUPTION IN THE EARTH, IT SHALL BE AS IF HE HAD KILLED ALL MANKIND, AND WHOSOEVER SAVETH THE LIFE OF ONE, IT SHALL BE AS IF HE HAD SAVED THE LIFE OF ALL MANKIND.

(S5:V32)

In the mid '50s, the World Health Organization put forward a comprehensive definition of health as: "The state of physical, mental and social soundness". But 14 centuries before, Prophet Mohammed (ﷺ) had clarified the concept of sound health as: *"The state of having peace in mind and heart, strength in body, and enough food for a day's sustenance".* which means security and faith for soul, body and society.

Allah has blessed humanity with *Islam* which is a comprehensive religion covering matters of spiritual and secular nature. *Islam* was the point of departure from the age of magic, charlatanry and amulets to the age of medicine and treatment based on scientific bases and sparked off by the words of prophet Muhammad (ﷺ): *"O slaves of Allah, seek remedy if you get sick; for there is a remedy for every malady, and when the remedy is applied to the disease it is cured with the permission of Allah".* This historical fact cannot be denied except by an ungrateful or a spiteful person. The *Holy Quran* lists various methods of treatment. The list, however, is not meant to be exhaustive but represents a call for people to seek all possible means of recovery. About the treatment of Job:

(AND IT WAS SAID UNTO HIM): STRIKE THE GROUND WITH THY FOOT. THIS (SPRING) IS A COOL BATH AND A REFRESHING DRINK.

(S38:V42)

About honey, the *Quran* says:

THERE COMETH FORTH FROM THEIR BELLIES A DRINK DIVERSE OF HUES, WHEREIN IS HEALING FOR MANKIND. LO! HEREIN IS INDEED A PORTENT FOR PEOPLE WHO REFLECT.

(S16:V69)

There are also several verses about the creation and embryos which invite one to think and consider. God the Almighty says:

WE SHALL SHOW THEM OUR PORTENTS IN THE HORIZONS AND WITHIN THEMSELVES UNTIL IT WILL BE MANIFEST UNTO THEM THAT IT IS THE TRUTH. DOTH NOT THY LORD SUFFICE, SINCE HE IS WITNESS OVER ALL THINGS?.

(S41:V53)

This verse provides evidence for the fact that *Islam* is always opened up for all sorts of knowledge. The verse invites Muslims to continuously apply their minds to the different phenomena of the universe surrounding them so that the phrase "We shall show them" becomes a standing call to conduct more research work for the attainment of knowledge.

Disease in the *Quran* has two dimensions: disease of the hearts and disease of the bodies. Both dimensions are mentioned in the *Holy Quran.* The former dimension is divided into two types: disease related to suspicion and doubt, and another related to lust and seduction. About the disease of suspicion God says:

IN THEIR HEARTS IS A DISEASE, AND ALLAH INCREASETH THEIR DISEASE.

(S2:V10)

As for the disease of lust, He says:

O YE WIVES OF THE PROPHET! YOU ARE NOT LIKE ANY OTHER WOMEN. IF YE KEEP YOUR DUTY (TO ALLAH), THEN BE NOT SOFT OF SPEECH, LEST HE IN WHOSE HEART IS A DISEASE ASPIRE (TO YOU), BUT UTTER CUSTOMARY SPEECH.

(S33:V32)

Concerning disease in the body the *Holy Quran* states that:

NO BLAME IS THERE UPON THE BLIND NOR ANY BLAME UPON THE LAME NOR ANY BLAME UPON THE SICK.

(S24:V61)

The bodily diseases were mentioned in connection with pilgrimage, fasting and ablution, because the rules of bodily hygiene are three: keeping the health, protection against what is harmful, and voiding the body from any waste matters. Thus we find that these hints are mentioned in the Seal of Heavenly Scriptures for the preservation of God's viceroy on earth, namely, the human being.

Then the *Prophetic Sunna* came to lay down the bases of practical application of these rules and hints for treatment by using medicines. That is the origin of what has come to be known as *'Al-Tibb Al-Nabawi'* (The Prophetic medicine) in the treatment of some diseases. According to the *Holy Quran,* when the Prophet (ﷺ) says anything:

NOR DOTH HE SPEAK OF (HIS OWN) DESIRE. IT IS NAUGHT SAVE AN INSPIRATION THAT IS INSPIRED.

(S53:V3–4)

Early Muslims made the most of this prophetic medicine and used it exclusively. But that was in the days when the souls were noble, the hearts were sound, the thoughts were clean, and the faith was genuine.

ISLAM AND PREVENTION

Prevention in its comprehensive sense that covered body, soul and mind was a subject of more interest to *Islam* than remedy. By enjoining us to prays five times a day, our True religion has aimed to make us enjoy purity of soul and peace of mind acquired through trying to get close to *Allah,* Glorified be His name. This may be evidenced by the fact that suicide rate is much lower among Muslims than in the developed countries. Cleanliness is also a matter of extreme interest

to Islam whether at the individual or the social level. Through fasting, Muslims can manage to tame themselves on the one hand and keep healthy, on the other. When *Islam* permitted polygamy and prohibited adultery, it saved humanity from prostitution, atrocities and confusion in kinship and protected Muslims against veneral diseases that threaten the most developed countries nowadays. By prohibiting liqours and narcotics, *Islam* has saved humanity from the disastrous alcoholism and addiction prevalent in these developed societies where the danger is so real that funds allocated for treating alcoholics and addicts are approximately as much as the State budgets of some developing countries. Try as they may, however, such societies will never hit upon the right cure except in the teachings of *Islam* which do not focus on curing the body alone as they do but treat body and soul together. Besides, these teachings treat the individual not qua individual but as part and parcel of the society in which he lives. Hence, cure in *Islam* is obviously a three-dimensional concept: bodily, mental, and psychological. Any ailment in any of these three aspects is considered by *Islam* as a case requiring remedy. In fact, every Muslim is exhorted by Islamic *Sharia* to look after and preserve five central objects: religion, mind, soul, money, and offspring. In other words, a Muslim is required to keep both body and soul in good health.

THE ISLAMIC CONCEPTION OF MEDICINE

Our pride in our highly esteemed *Sharia* may, in fact, be emanating from its permission to Muslims to study medicine and practise it as it helps keep the health and cure the noble body of man from diseases and ailments. This permission implies mercy for man and keenness to preserve the entity and strength of Muslims. It also implies that Muslims firmly believe that a sound mind is in the sound body. The study of medicine, according to Imam Ghazali, is "a duty of sufficiency in Muslim countries". This means that studying medicine is not required of all Muslims but sufficiently of those who are capable of undertaking it. In cases where no one voluntarily undertakes the study and practice of medicine, the Ruler in the given country is required to assign the job to a team so that the rest of the community may be exempted from performing that duty. Hence, the importance of Islamic medicine as a comprehensive kind of medicine that takes care of man's body and soul. *Islam* has thus laid the foundation of the modern medical profession which is based on science and knowledge, not on quackery. The Muslim scholars have enriched the world with an immortal heritage in all various fields of science. This heritage is still held in high esteem by present scientists. No wonder it is; for those Muslim scholars were true to themselves and honest in their work. And how could they be otherwise when the school of Muhammad (ﷺ) has been based on truthfulness and honesty, never on false propaganda.

THE MEDICAL HERITAGE

The call to study heritage is not a call to stop short at boasting about a glorious past and freeze in a state of inertia at present. Heritage for a nation is like roots for a tree. If these were cut off, the tree would wither away. As the present is the offspring of the past, and as the future is the hope of the present, so a nation without heritage is like a plant without roots. Therefore, we should proudly remember the early pioneers of a long line of great Muslim scholars to whom civilization and humanity owe much. Up till the 18th century, their works were still studied in Europe after they had been translated into the living languages in the whole world in recognition of their excellence. So, it is incumbent on us to study their medical works and benefit from their experience in this field.

Ours is an Islamic civilization, expressed in an Arabic, Quranic language and characterised by treating all people on equal footing. "An Arab is no better than a non-Arab except to the extent that he is God-fearing and a doer of good work". This Islamic civilization has therefore thrived on the minds of its Muslim and free non-Muslim subjects alike. This is the greatness of *Islam* that we must spotlight for the whole world.

ISLAM AND THE MODERN INNOVATIONS

The world in our modern times has witnessed a great revolution in all fields of science, including medical sciences. There is hardly a day when we do not hear about a new event in genetics, genetic engineering, transplantation, etc. Many scientific Academies and world organizations have come to realize the disorder that has developed as a result of applying the technological revolution to the field of medicine. Several seminars have therefore ensued in a bid to restrain the group of researchers who are blinded by their own personal interests and care for nothing beyond establishing the findings of their researches of any complications that such findings may bring about to family or social relations. Unfortunately, no Academy or Organization in the Islamic World has so far come forth to address such serious matters, although our religion is very clear and specific about what is allowed and what is prohibited and is also characterised by the duty required of every Muslim to exhort others to do good and dissuade them from objectionable acts.

The Islamic Organization for Medical Sciences (IOMS) has therefore decided that one of its most important objectives and duties is to handle these matters since the initiatives in the Islamic World have so far been at the individual level and the endeavours have also been one-sided, that is, either only legal or only medical. So, the IOMS has tried to get both sides together so that the medical side may present its scientific views without negligence or exaggeration and the Islamic legal side may put such views and concepts, or findings, in a jurisprudent, Islamic perspective and judge them accordingly. Our experiment in this field was the first of its kind in the Islamic World and, Thank God, proved to be quite successful. The vast capacity of Islamic *Sharia* and the complete cooperation between the two sides in an amicable spirit of Islamic brotherhood have encouraged us to hold further seminars on these topics in the hope that some jurisprudents may be more involved in the medical sepcialism while some medical scientists may be interested in developing their legal education. In this way a minimum common ground can be reached concerning many medico-legal affairs whenever the need arises for a joint meeting between the two sides to discuss the extent to which certain medical researches or innovations are Islamically permitted or prohibited. Such meetings, however, should not come in reaction to research findings, i.e., the formation of legal opinion should not be delayed until the scientific findings have already been reached, but discussions should forestall such findings in order to make things easier for our scientists and encourage them to earnestly pursue their work with no fear of running against public interest or religious considerations.

The IOMS also published the Islamic Code of Ethics for the Medical Professions in the course of the First International Conference on Islamic Medicine in recognition of the utmost importance of this matter. We should not neglect the world opinion in this regard. People around the World should always be kept informed about our progress in this field through the systematic dissemination of news of such progress. In this way, the world opinion will be made ready to accept the Islamic legal views about medical innovations and will not see any contradiction between science and Islamic *Sharia*.

We seek to enlighten the young generation of the medical profession before they plunge into the hard experiences of life. Such young doctors are very close to the patient when he most needs them. Our purpose, therefore, is to make *Islam* the basis of our conduct, life, and knowledge with each giving as much as he can according to the nature of his position and the abilities granted to him by God. So, we seek to graduate a Muslim doctor who has faith in his God and in his religion and is committed to his esteemed *Sharia*.

As for our external activities in the IOMS, the basis of action is the *Hadith* (Tradition) of Prophet Muhammad, (ﷺ), which states that: *"In dealing amicably and sympathetically with each other, the faithful are like one body that responds to a disorder in one of its organs with sleep-*

lessness and fever". The IOMS will never spare any efforts in extending aid, whether financial, in kind or in manpower, to the Muslims anywhere in the world to relieve their suffering from any form of natural or human disasters.

THE ISLAMIC ORGANIZATION FOR MEDICAL SCIENCES (IOMS)

The IOMS was established out of the necessity that there should be a certain organization to undertake the achievement of all these objectives. It has also arisen out of our belief that *Islam* looks upon medicine as a distinguished kind of service based on faith and heavenly morals, aiming to do good to people, and comprehensive in performance in terms of caring for body and soul; individual and society. Islamic medicine is thus universal in nature, trying to make use of all sources of knowledge and information and offering its services to the whole of mankind.

The faithful person must fight odds with odds, as *Imam* Ibnul-Qayyim said. A skilful skipper employs wind velocity and the direction of currents in facing gales and high waves, all of which are God's predestinations. People will continue to suffer from tension. hunger and thirst until they believe in God and turn to Him. Then and only then will they wind down, quench their thirst, get rid of their fears, become well guided instead of being perplexed, settle down instead of getting lost, be reassured instead of being worried, find themselves a home and a family after long estrangement in a vast diaspora. How miserable a human-being can be and how fruitless are his efforts if he does not truly believe that God is closer to him than his jugular vein.

Man should not let himself be misled or turned away from his God and from God's rights. Some people, however, have been misled by the pleasures of life in this world and allured away from their Creator. Thus they deserve to be rebuked by God in the following word:

O MAN! WHAT HATH MADE THEE CARELESS CONCERNING THY LORD, THE BOUNTIFUL, WHO CREATED THEE, THEN FASHIONED, THEN PROPORTIONED THEE? INTO WHATSOEVER FORM HE WILL, HE CASTETH THEE.

(S82:V6–8)

Perhaps the greatest evidence of *Islam's* concern for man is that the *Holy Quran* mentions him by that name 63 times in addition to referring to him by such other names as "Sons of Adam". The first verse to be revealed to *Islam's* Messenger consists of five verses two of which mention Man and all of which deal with caring for man.

Dear brothers:

The decline of Muslims; their failure, their loss of the leading position in the world and their withdrawal from the spheres of activity and work is not the same as the oft repeated event of declining that had always beset many other nations across history. The history of each nation has recorded many such events, and the history of man in general is full of ups and downs. But what is happening now to the Islamic nation is unprecedented. It does not affect Arabs alone or just those countries which have embraced *Islam.* It is rather a tragedy affecting humanity in general, more miserable and more general than ever witnessed in history before. If the world could realize the extent of this catastrophe and the extent of the loss involved it would have declared the day when that disaster took place a day of general mourning, and the peoples of the world would have exchanged condolences. But the decline did not happen overnight. It was gradually shaping up across decades but the world underestimated the developing deterioration and lacked the right criteria to perceive the extent of its resulting misery and loss.

Then the Western civilization started to appear in a nation that had been caught up in the tight grip of religious fanaticism which controlled everything in its life. The church had the last say about all sorts of concepts, and science was the monopoly of a very limited category of people. Daring to come up with a scientific innovation that contradicted the so-called established facts approved

by the priesthood could jeopardise the life of the innovator who might be excommunicated, hanged, or burnt alive. The inevitable outcome was a counter-movement that rejected all kinds of religions and called for materialism and secularism. The body was thus cut off from the soul and life became exclusively materialistic.

Western civilization has flourished in communities where religious leaders have failed to persuade the people to follow a straight-forward path in thought and action. So, they did not hit upon the right track when they stepped into the various fields of their activities and were easily allured into atheism and materialism. They abandoned the worship of God for self-adoration in every domain of thought and action and were enticed by falsely attractive styles of living that in fact lead to self-destruction.

That is how sciences have been marred and converted into a machine destined to bring about the total annihilation of mankind. The influence of all these factors on people's manners has been even worse. People have become overpowered by desires, hypocrisy, dissipation and licentiousness. Power has become the new god, which constitutes the greatest calamity of humanity. In a nutshell, religion has been separated from the State.

ANTICIPATED OBJECTIVES

Brothers and Sisters:

Many researchers and scientists have earnestly tried to explain the decline of the Islamic civilization. Each one has looked at the phenomenon from his own point of view which is naturally the product of his own school of thought. Therefore, views have varied along a continuum that extends between the two extremes of negligence and exaggeration. The question now is: Can we go back to what we were and become once more pioneers of science? Modestly, I would venture to say that this is quite possible on condition that:

1. We invest the humanity of the Muslim human being. This should be our main target. If we have true Muslims with well-established faith in God, we can rest assured that this Muslim community will generate distinguished scholars and scientists in medicine, engineering, literature, arts, etc. Material civilization, in fact, stands to lose every means of viability sooner or later if it loses the human being. If it does, evil and destructive tendencies will be the main motive power behind whatever such a human being thinks of and does.
2. We have to realize that there is not a short cut in the route leading to science. Research is a long and costly process. So, 1–2% of our GNP should be earmarked to research and development.
3. In the golden age of the Islamic civilization, there was what was called "The Community of Learning". This was realized both theoretically and practically. Ibnul Haitham, for instance, ventured to emigrate from his birthplace, *Basra*, which was part of the kingdom of the Abbasside Caliph, to the court of that Caliph's rival, the Fatimite Ruler. In spite of the political and communal disputes between the two courts, Ibnul Haitham was quite sure that he would be equally respected and esteemed in the new court. There are many other examples including the emigration of Al-Razi and Ibn-Sina to where they could write and publish their works in Arabic instead of their mother-tongues.
4. Can we revive this devotion to knowledge and establish, in imitation of that glorious past, what may be designated "The Islamic Community of Learning?" Can we provide our scholars and scientists with such immunity, as was provided in the past, so that they may not be caught up in the crossfires of political, internal, or communal conflicts?.
5. Let me set before you a small-scale model of our work in the field of medicine that can hopefully be applied to other fields. The model is set by the Islamic Organization for Medical

Sciences which has no political objectives, nor is it the monopoly of a certain group, nor does it compete with other organizations whether Islamic or non-Islamic. Its main target is the Muslim human being, doctor and patient alike. Can we all work in unity? That was the challenge. We have meant the IOMS to be effectively beneficial at the international, rather than the limited local, level. I have lived through the experience of recue work in Muslim countries to relieve the people there from sufferings caused by all kinds of disasters some of which are natural while others are man-made in the form of internal and external wars. Everybody, indeed, promptly subscribed. But lack of coordination has resulted in many cases in repeating the same consignments of aid. So, can we rectify such a situation by introducing carefully studied plans for future rescue activities?.

6. There are still serious differences in opinions related to medico-religious matters. This happens from one country to another. How can we continue like this, same religion but diverse applications? And mind you, the disputed matters have nothing to do with politics. Can't there be a minimum common ground so that we can all speak the same language when we discuss such matters?

7. There is an obvious trend in the world today to depend more on medical plants and herbs for treatment than on chemical drugs because the former have the advantage of causing far less side effects. Our Islamic world is abundant in these plants. Besides, we were the pioneers in this field. Can't we propagate the slogan: "Drug Security" and start by making a wide-scale survey of these plants in our Islamic countries so as to accomplish a sort of integrated economy in the pharmaceutical production? In this way, we can help reduce medicare costs and make it available to the needy in our countries. Moreover, such integration in the production of drugs could be an important economic resource in many Islamic countries.

8. Doesn't our heritage deserve to be unshelved and collected? If there is reason for the West to take pride in its scientists, we are in no way less than Westerners either in the theoritical or the practical fields. We also have many scientists to be proud of. So, we should carefully and intensively study our heritage and present it in the best possible form.

Brothers:

This is the small-scale model I wanted to set before you. If *Islam* has established that scholars are the heirs to prophets, it must be that these scholars are indeed the cream of the Islamic community. As scholars and researchers, we have been entrusted with great responsibilities. Great hopes are pinned on our scientists and researchers to measure up to their responsibility and join our growing organization. We hope that you will encourage the establishment of branches for the IOMS in your countries. These branches will be to the base in Kuwait like arteries to the hearts.

It is no cheap gain that man finds the way to his nature and thus live in peace with himself. Man's nature, in fact, is a void that no amount of knowledge or culture can aspire to fill. It can only Man's nature, in fact, is a void that no amount of knowledge or culture can aspire to fill. It can only filled by faith in *Allah,* Glorified be His name.

Let me end by the divine words of the *Holy Quran:*

BY THE DECLINING DAY, LO! MAN IS IN A STATE OF LOSS SAVE THOSE WHO BELIEVE AND DO GOOD WORKS, AND EXHORT ONE ANOTHER TO TRUTH AND EXHORT ONE ANOTHER TO ENDURANCE.

(S103:V1–3)

SPEECH DELIVERED AT INAUGURAL CEREMONY

H.E. Mehmet Aydin
Minister of Health and Social Assistance of Turkey
TURKEY

IN THE NAME OF GOD, MOST GRACIOUS, MOST MERCIFUL

Your Excellency the Prime Minister,
Excellencies and the Distinguished Participants
of the Third International Conference on
Islamic Medicine,
My brothers and sisters.

I would like to express, the greatest happiness I feel, at this moment. It is indeed a great honor for me, that this Third International Islamic Medicine Conference is convening in Turkey. Allow me to say, how much pleased I am, to see so many distinguished scholars gathered here. I welcome you all, most warmly, to the Third International Conference on Islamic Medicine.

I am sure that all of you, who are here today, are aware of the fundamental characteristics of our Islamic Heritage in the field of medicine. However, I believe it will be useful to mention some of them, here in this conference.

The first fundamental characteristic of Islamic medicine arises from the fact that, *Islam* is open to scientific understanding. As we know, the Prophet Mohammed (ﷺ) said

"go and get science, even if it is far out, in China".

It was because of this scientific base, that Islamic medicine has made its well recognized and glorious achievements throughout the centuries. It is not until very recently that the Western Medicine has realized the importance of some of the health issues that the scientific foundations of *Islam* laid down centuries ago. for example, we observe principles of hygiene and cleanliness and measures for prevention of infectious diseases in many aspects of daily life. In *Islam*, safety and wholesomeness of food are very important. *Islam* places great attention to the conservation of natural resources, which in turn maintains environmental sanitation. In *Islam* parents do have great responsibilities in having and raising children. Today this is called family planning.

Scientific character of *Islam* gives it the possibility to accept all kinds of innovations and technology from non Islamic world; provided that these are proved to be beneficial for the mankind. It is due to this fundamental that we can see many hospitals, with latest technology in Islamic countries which we are proud of.

The second fundamental characteristic of Islamic medicine relates to the attitudes of the sick. *Islam* requires the sick behave rationally and seek treatment accordingly. We can say that the historical achievements of Islamic Medicine were, somewhat due to such attitudes. In Islamic understanding

> *"There is a remedy for every malady and when the remedy is applied to the disease, it is cured with the permission of God"; and "whoever goes to a fortuneteller or a diviner, and asks him about anything and has believed what he said, he becomes a non believer in the revelation by Mohammed".*

We should remember that, many civilizations had passed through dark ages, at which attitudes of the sick were not rational.

The third fundamental characteristic of *Islam* relates to the attitude of the medical personnel. It is quite natural that any physician treating the sick is actually furnishing a service which is demanded by the sick. This service has a cost, because it requires equipment, human capital and other inputs. Out of these inputs, physician creates a special kind of service which is directed towards saving of human life, the most honored of the created. In economics everything supplied to the market are called goods and services. These include medical services as well. In *Islam* however, medical services reserve a distinct place. The Holy *Quran* prominates this by citing

IF ONE SAVED A LIFE, IT WOULD BE AS IF HE SAVED ALL HUMANITY.

From these considerations, it can be seen that a muslim physician performs a mission which is not only aimed at a gain in the form of compensation and self interest, but at the same time to gain the consent of God. Referring to the version of Holy *Quran,* we can say that "it is part of the mercy of God, that the physician deals with the sick"; while a capitalist view of supply of any service or good, is only for self interest. This unbridled competition was fostered especially during the early days of capitalism. *Islam* permits competition as well. However this competition cannot be a "cut throat" competition in any way. Because in that case, the quality of the services will be jeopardized and will not be compatible with the mission of life saving.

These considerations are particularly relevant to designing health systems. In doing so, while retaining the competitive elements, we should consider socio-political factors and resource conservation. Any health system, which does not create enough impetus to serve the best at the interest of the sick or uses manpower and material resources wastefully is against Islamic understanding.

The last fundamental characteristic that I want to mention today, relates to raising and utilization of funds for health purposes. I believe *Islam* is more apt than any other system to raise funds for financing hospitals and other health services. In fact, muslim countries should come together and build common facilities, in order to create borther institutions, exchange of experts and other health personnel.

Excellencies, ladies and gentlemen, so far I tried to point out some general considerations, defining the circumstances in which the *Islamic* medicine operate. I am of the opinion that further discussion in these issues are important and may contribute to the understanding of Islamic medicine more comprehensively.

With these words, I wish the conference every success and hope it will be to the benefit of the whole of the Islamic world, and of the entire humanity. While reiterating my happiness, I extend to everyone of you, my appreciation for your being here with us.

My respects to you all and I say PEACE BE UPON YOU.

SPEECH DELIVERED AT INAUGURAL CEREMONY

Prof. Dr. Ihsan Doqramaci
President, Council of Higher Education of Turkey
TURKEY

My Prime Minister,
My dear brother Dr. Abdul Rahman Al-Awadi,
Ministers, Ambassadors and Destinguished
Participants of the Conference,
Ladies and Gentlemen,

Since I have had the privilege and the honor of being part of the Islamic Medicine Conferences from their very beginning, you will appreciate the joy I feel at having this third conference, and indeed the first to take place outside Kuwait, convene here in Istanbul. There had been a longstanding need to see the Islamic Medical heritage, the glorious contributions of Muslim scientists, brought to our attention at regular intervals. Another real need was some means of making us more immediately aware of the achievements of present-day medical advances in the Islamic countries. It was felt that these two needs could be answered together in regularly convened conferences; the initiative was taken by Dr. Abdul Rahman Al-Awadi, and the first of a line of Islamic Medicine Conferences was held in Kuwait in January 1981. The Conference was soon to be followed by another concrete step in the same direction, for in February 1984, a law establishing the Islamic Organization for Medical Sciences was passed by the State of Kuwait. This again was a product of the tireless efforts of Dr. Abdul Rahman Al-Awadi, to whom we are all most grateful.

Our appreciation and thanks also go to His Highness the Emir of Kuwait and to the State of Kuwait itself for all their support given to these Conferences and to the furthering of Islamic Medicine.

Today it is customary to look to the West for innovations in science. I am not exaggerating when I tell you that at one time Islamic Medicine was, in many respects, 1000 years ahead of its time. Within a century of the death of the Prophet Mohammed (ﷺ) Muslims had not only pushed forward physically into new lands but had become scientific innovators with originality and productivity.

By the 9th century Islamic Medicine had advanced from talismans and theology to hospitals with wards. Scholars of Islamic Medicine from Turkistan, Afghanistan, Iran and Arab countries were leading in the medical sciences. The then Baghdad General Hospital incorporated innovations which even now sound amazingly modern: fountains cooled the air near the wards of those afflicted with fever; the insane were treated with tenderness; and at night the pain of the restless was soothed by story-telling and soft music. Prince and pauper received identical attention. The destitute upon discharge received 5 gold pieces to sustain them during convalescence. While Paris and London were places of mud streets and hovels, Baghdad, Cairo and Cordoba had hospitals open to both male and female patients staffed with attendants of both sexes.

The contribution of the Turks was not restricted to the extension of the Islamic territory. They were also instrumental in the advancement of medicine and of medical teaching. Indeed, one of the first medical schools in the world was the one established in Kayseri by the Seljuk Sultan Giyassiddin Keyhusrev in 1206. This comprised two separate but connected buildings: one was for teaching medicine and the other was fitted out as a hospital for the practice of it. This institution, which was established in memory of the Sultan's sister Princess Gevher Nesibe, was in being for more than six

centuries. The building itself still stands and has been converted into an institute for the history of medicine within the context of the university's faculty of medicine at Kayseri. Another medical school and hospital had been established by the Seljuk Izzeddin Keykavus in 1217 in Sivas and other hospitals were established by the Seljuks in Divrik, Konya, Cankiri, Kastamonu, Tokat, as well as in Aksehir, Erzurum, Konya-Aksaray and Erzincan. With the papers to be presented during the coming few days there will be more occasions for us to be informed of further Turkish contributions to Islamic medicine.

As the topic for my speech tomorrow I have chosen breastfeeding in *Islam*. The West has only learned to appreciate the immense importance of breastfeeding during the past decade whereas *Islam* has valued it for some 1400 years. With regard to this I am going to read you two verses from the Holy *Qoran*, the first is from *Al-Ahqaf:*

﴿ ووصينا الانسان بوالديه احسانا حملته أمه كرها ووضعته كرها وحمله وفصاله ثلاثون شهرا ﴾

the second is from *El Baqharah*:

﴿ والوالدات يرضعن أولادهن حولين كاملين لمن أراد أن يتم الرضاعة وعلى المولود له زرقهن وكسوتهن بالمعروف ﴾

The interpretation of the first verse I read is:

> We have enjoined man to show kindness to his parents. With much pain his mother bears him, and with much pain she brings him into the world. He is born and weaned in thirty months.

The second verse tells us that:

> Mothers shall suckle their children for two whole years; that is, for those who wish to complete the suckling. The duty of feeding and clothing nursing mothers in a seemly manner is upon the father of the child.

During the next few days at this Conference we shall have the opportunity of learning more about Islamic teachings in medicine and health sciences and the current progress in Islamic countries; at the same time, and this I believe is extremely important, it will afford us an occasion to renew old friendships and make new ones.

Finally, I have to admit that it will be very difficult for us to live up to the most generous hospitality with which we were surrounded in Kuwait, but since one of the teachings of *Islam* is tolerance I know I can rely on your forgiveness for any inadvertent shortcomings on our part. May I add my voice to other Turkish speakers in wishing all of you a pleasant stay in our country.

OPENING SPEECH DELIVERED AT INAUGURAL CEREMONY

H.E. Turgut Ozal
Prime Minister of Turkey
TURKEY

EXCELLENCIES,
DISTINGUISHED PARTICIPANTS,
LADIES AND GENTLEMEN,

IT IS WITH WARMEST FEELINGS THAT I WELCOME YOU TO THE THIRD INTERNATIONAL ISLAMIC MEDICINE CONFERENCE IN ISTANBUL. THIS HOST CITY WHICH OWES SO MUCH TO THE TURKISH ISLAMIC CULTURE, HAD IN TURN SERVED FAITHFULLY THE CAUSE OF ISLAM FOR MANY CENTURIES AS THE CAPITAL OF THE OTTOMAN EMPIRE.

THEREFORE, THE VENUE IS ALSO A PERFECT MATCH FOR THE DISTINCTION OF THIS CONFERENCE. I DO HOPE THAT YOUR DELIBERATIONS WILL ATTAIN YOUR OBJECTIVES.

THE FOLLOWING ISLAMIC QUOTATION FROM THE PROPHET MOHAMMED, (ﷺ)
"ILMUL-EBDAN, SUMME ILMUM-EDYAN"
INDICATES THAT MEDICAL SCIENCES PRECEDES RELIGIOUS SCIENCES, REFLECTS THE GREAT IMPORTANCE ISLAM ATTACHES TO MEDICAL SCIENCE.

IT MUST SURELY BE MENTIONED THAT BESIDES THE DISCOVERY OF NEW MEDICAL THEORIES AND RESEARCH, THE PRACTICE OF MEDICINE WAS ALSO DEVELOPED IN THE ISLAMIC WORLD.

BEGINNING IN THE 8TH CENTURY, FIRST AID TREATMENT WAS FIRST DEMONSTRATED TO THE CONGREGATION IN THE GREAT MOSQUE IN CAIRO. IN THE 12TH AND 13TH CENTURIES MANY HOSPITALS WERE FOUNDED IN CAIRO AND DAMASCUS AND IN THE SAME PERIOD IN ANATOLIA, THE SELJUKS, WHO ATTRIBUTED GREAT IMPORTANCE TO MEDICAL EDUCATION, BUILT MEDICAL FACULTIES ALONGSIDE THEIR MEDICAL SCHOOLS. THIS PERIOD CAN BE REFERRED TO AS-THE " GOLDEN ERA" OF ISLAMIC SCIENCE AND CIVILISATION.

THESE GREAT INNOVATIONS IN MEDICAL SCIENCE AND SERVICES, PARALLELING THE DEVELOPMENTS IN ISLAMIC CIVILISATION AND CULTURE IS A CLEAR EVIDENCE THAT ISLAM HAS NEVER BEEN CONTRADICTORY TO POSITIVE SCIENCES.

THE ISLAMIC WORLD WHICH HAD BEEN A PLACE OF ENLIGHTENMENT DURING THE "DARK AGES", LATER DUE TO FANATIC CURRENTS, WAS DIVERTED FROM ITS NOBLE THOUGHTS AND PRINCIPLES OF RELIGION AND STAYED ISOLATED FROM THE RENAISSANCE MOVEMENT WHICH HAD STARTED IN EUROPE IMPLEMENTING DEMOCRATIC AND SCIENTIFIC DEVELOPMENTS RESULTING IN TECHNOLOGICAL PROGRESS AND INDUSTRIALISATION.

AT THIS TIME, THE ISLAMIC WORLD, INFLUENCED BY THE IDEAS OF FANATICISM AND FATALISM AND ALSO BY THE PRESSURE EXERTED BY COLONIALIST STATES, WHO ENCOURAGED THIS REGRESSION, BECAME COMPLETELY OPPOSED TO SCIENTIFIC DISCOVERIES UNDER THE GUISE OF RELIGION. THUS, IT REMAINED A PLACE OPPOSED TO NEW DEVELOPMENTS AND CONCEPTS, WHICH COMPLETELY CONFLICTED WITH THE IDEAS OF THE GREAT ISLAMIC PHILOSOPHER, AVICENNA, WHO CENTURIES AGO, DEVELOPED THE OBSERVATION, EXPERIMENTATION AND RESEARCH METHODS IN SCIENCE.

IF THIS CONFERENCE, WHICH CONVENED TODAY. DISCUSSING THE VALUES WHICH WERE THE SOURCE OF PRIDE IN THE PAST, CAN INSPIRE AND AWAKEN IN US, GREAT HOPES AND FAITH IN THE BRIGHT FUTURE OF SCIENCE AND MEDICINE IN THE ISLAMIC WORLD, THEN, WE WILL BE VERY PLEASED.

WE MUST HELP IN CREATING A BETTER WORLD WHICH WILL PROGRESS IN PEACE AND WEALTH. THIS CAN BE ACCOMPLISHED THROUGH INTERNATIONAL COOPERATION, AN IDEA EXPRESSED BY THE GREAT ATATURK, THE FOUNDER OF THE TURKISH REPUBLIC IN TWO OF HIS MOTTOS, "PEACE AT HOME, PEACE IN THE WORLD" AND "THE BEST GUIDE IN LIFE IS SCIENCE". WE SINCERELY BELIEVE THAT THE ISLAMIC WORLD MUST TAKE ITS PLACE AMONG THE WORLD NATIONS IN THE FIELD OF CONTEMPORARY SCIENCE.

THE PURPOSE OF THIS CONFERENCE IS TO SHED LIGHT ON THE PAST AND AT THE SAME TIME, STRENGTHEN OUR CONFIDENCE IN THE FUTURE WHICH WILL BE A SOURCE OF INSPIRATION FOR FUTURE PROGRESS IN THE MEDICAL FIELD IN THE ISLAMIC WORLD AND WHICH WILL MAKE PEOPLE CONTENT.

I WISH TO TAKE THIS OPPORTUNITY TO WELCOME ONCE AGAIN OUR DISTINGUISHED MUSLIM BROTHERS ATTENDING TO THE THIRD INTERNATIONAL ISLAMIC MEDICINE CONFERENCE. MAY YOUR EFFORTS BE CROWNED WITH SUCCESS.

THANK YOU.

PART ONE

INVITED LECTURE

CHAPTER ONE

(Invited Lecture)

REPORT ON THE SESSION

This session was held in the morning hours from 8.30 to 9.15 under the chairmanship of Prof. Dr. Abdul Aziz Kamel. Dr. Ekrem Sezik was the moderator. At this session, Prof. Dr. Mahmoud Al-Jaleeli delivered his lecture in Arabic on "THE INFLUENCE OF ISLAMIC ARABIC MEDICINE ON EUROPEAN CIVILIZATION DURING THE RENAISSANCE PERIOD". This lecture could not be made available in English to be printed and included in this proceeding.

Editors

PART TWO

THE INFLUENCE OF ISLAMIC CIVILIZATION DURING THE RENAISSANCE PERIOD IN THE FIELD OF MEDICINE OR ITS ALLIED SUBJECTS

Part Two: *The Influence of Islamic Civilization During the Renaissance Period in The Field of Medicine or its Allied Subjects.*

CHAPTER ONE

(Papers Presented)

1. REPORT ON THE SESSION
   The Editors
2. ISLAMIC SCIENTIFIC HISTORY: WHERE TO NEXT?
   Prof. Allen G. Debus
3. ISLAMIC MEDICINE IN EUROPEAN UNIVERSITIES AT THE DAWN OF RENAISSANCE
   Prof. Saeed Abdul Fattah Ashour
4. ISLAMIC MEDICINE IN THE KINGDOM OF ARAGON IN THE EARLY FOURTEENTH CENTURY
   Prof. Michael McVaugh
5. BURNING MIRRORS AND THE PERSPECTIVE
   Dr. Rushdi Rashed
6. THE CONTRIBUTIONS OF ISLAMIC PHARMACY TO EUROPE AND COMPARATIVE STUDY OF MEDICAL ASPECTS, RELATING TO CHRISTIAN AND MUSLIM CIVILIZATION IN MIDDLE AGES
   Dr. Ali Hyder Bayat
7. QUALITY CONTROL: PAST AND PRESENT
   Prof. M. Zuhair Al-Baba
8. ANAESTHESIA IN ISLAMIC MEDICINE AND ITS INFLUENCE ON WESTERN CIVILIZATION
   Dr. Mohd. Taha Jasser
9. DISCUSSION

REPORT ON THE SESSION

This session was held from 15.30 to 18.00 under the chairmanship of Prof. Dr. Mahmoud Al-Jaleeli and co-chairmanship of Prof. Dr. Ekmeleddin Ihsanoqlu. At this session, eight papers were presented on various aspects of the topic, "INFLUENCE OF THE ISLAMIC CIVILIZATION ON THE EUROPEAN CIVILIZATION DURING THE RENAISSANCE PERIOD IN THE FIELD OF MEDICINE OR ITS ALLIED SUBJECTS". In the end the participants were allowed to have discussion on the papers.

Editors

ISLAMIC SCIENTIFIC HISTORY: WHERE TO NEXT?

Prof. Allen G. Debus

U.S.A.

Recent research in the History of Science has shown the importance of Islamic achievements of the eighth through the thirteenth centuries A.D. as well as the essential contribution of Islamic science to the Scientific Revolution of the sixteenth and seventeenth centuries, but the rapid development of the history of science in recent decades has shown us that there is much to be learned by moving outside of the traditional internalist and positivistic viewpoint that characterized the history of science when it was dominated by George Sarton and Alexander Koyré. I was encouraged by the work of the organizers of the recent conference on "Science in Islamic Polity" held in Islamabad. They wrote that their conference would:

> serve its real purpose only if the delegates, instead of dwelling on the past and merely reflecting the erstwhile glory of *Islam*, would concentrate on the present and recommend concrete action program for the resurgence of scientific thought and the spirit of discovery in Islamic Polity, with a view to bringing the Islamic countries at par with the West in the matter of Science and Technology, in as short a time as possible[1].

I am not one who believes that the purpose of history is to forecast the future. However, I do believe that history is essential for an understanding of the present and if we do not understand the present it will be very difficult for anyone to plan for the future. If our interest in the past remains positivistic in the sciences then we will continue to comb the older Arabic texts primarily for precursors to the moderns. Such research will surely lead to other discoveries of great importance for our understanding of the background to modern science, but it will do little to help us to understand the long period of decline and if we do not understand this how can we possibly suggest remedies for the future.

Let me suggest then that historical methodology is important. For this reason I will discuss some interpretations of the Scientific Revolution of the sixteenth and seventeenth centuries and- on the basis of this research make some suggestions for future research in the history of Arabic science.

The history of science as an academic subject in this century is due largely to the efforts of George Sarton. But Sarton had a strong personal view of what this subject should be. He wrote that science is "systematized positive knowledge"[2] and that the main object of historians of science should be "not simply to record isolated discoveries, but rather to explain the progress of scientific thought, the gradual development of human consciousness, that deliberate tendency to understand and to increase our part in the cosmic evolution"[3]. In short, as a positivist Sarton sought a history of real science - that is, science as we know it today.

Sarton also believed in a hierarchy of the sciences. Mathematics stood at the top since it was necessary for the mathematical sciences; astronomy, physics and chemistry. Only eventually as we followed this scheme would we descend to the life sciences. And, as he believed that the biological sciences stood far below the mathematical sciences, he belived that medicine was lower still[4]. Indeed, he felt that medical historians had presented a warped version of scientific history because of their insufficient scientific knowledge.

George Sarton died in 1956, but by that time his view of the history of science was already on the wane. The most recent writings in the field then were critical of Sarton and the author most frequently referred to as a model was Alexander Koyré, the Russian philosopher of science. It is understandable that Koyré should have insisted on a close linkage between scientific and philosophical thought, but history was also important for him because through it we would be given a sense of the "glorious progress" of the evolution of scientific ideas[5]. Like most other scholars in the field

Koyré centered his research on the development of physics and astronomy in the period from Copernicus to Newton. He explained the Scientific Revolution as a fundamental change in world views from Aristotelian to Copernican. This revolution was not to be explained by changes in society, a move from contemplation to active research, or even "the replacement of the teleological and organismic pattern of thinking and explanation by the mechanical and causal pattern"[6]. In a sense the Scientific Revolution was for Koyré the triumph of the mathematical influence of Plato over the anti-mathematical influence of Aristotle. And yet, if Sarton would have disagreed with Koyré over the importance of Plato for the rise of modern science, both would have agreed that the subject of the historv of science was science and that this was the story of progress.

The development of the field in the past quarter century has been characterized for the most part by a rejection of the internalist and positivistic viewpoints of both Sarton and Koyré. For instance, Sarton had dismissed alchemy, astrology and natural magic as "pseudo-sciences" which could be ignored by historians[7]. A series of books by Walter Pagel, beginning with his magisterial paracelsus in 1958 pointed out that religious motives as well as Sarton's "pseudo-sciences" were major factors in the crystallization of modern science. Recognizing the fallacy of Sarton's positivism for historical research, Pagel argued that such an approach "based on the selection of material from the modern point of view, may endanger the presentation of historical truth"[8]. Indeed, histories in which "discoveries and theories of the past are taken from their original context to be judged alongside modern scientific and medical entities" are likely to be dangerously misleading[9]. Pagel's answer was a call for historical context. When this has been done, he explained:

> it will then appear that not only certain standards of technical equipment made discoveries possible, but that these can be seen also as the offspring of certain non-scientific ideas and of a particular cultural background.
>
> ... [The History of Science] will then appear much more complicated than it does in the usual perspective of straight lines of progress. Yet we will have to embark on the cumbersome task of reconstructing ancient thought if we wish to write history - and not best sellers[10].

The work of Pagel was seconded by that of the late Dame Frances Yates who wrote a series of books relating the Scientific Revolution to the mystical Hermetic texts to which she described the Renaissance interest in natural magic and the rise of experimental method[11]. In short, both Pagel and Yates argued that the Western Scientific Revolution could not be explained without an understanding of religious themes and mysticism evident in the works of the period.

More recently there has been an increased interest in the social context of science. Thus, Keith Thomas' *Religion and the Decline of Magic* (1971) is a monumental contribution to our understanding of the early modern intellectual scene in England while Christopher Hill has used the recent studies of alchemy and the Paracelsians as an integral key to his understanding of the English Civil War[12]. Margaret Jacob has gone much further to argue that the triumph of Newtonian physics may have been due less to the internal worth of Newton's science than it was to the fact that English theologians sought a powerful ally through their espousal of the Newtonian synthesis. For her, the social explanation of the triumph of Newtonianism is to be found in "its usefullness to the intellectual leaders of the Anglican Church as an underpinning for their vision of what they liked to call the "world politick". The ordered, providentially guided, mathematically regulated universe of Newton gave a model for a stable and prosperous polity, ruled by the self-interest of men[13]". In short, we see here an explanation of the Newtonian triumph on grounds totally divorced from the fact that Newton's work represents the culmination of nearly a century and a half of scientific discussions and research leading from the *De revolutionibus orbium* (1543) of Copernicus to the *Principia mathematica* (1687).

Of course those who seek to maintain the dominance of traditional internalist studies in the field have been distressed by these developments. At a meeting of the American Association for the Advancement of Science held in December, 1979, Charles C. Gillispie lashed out against those who accepted the new methodologies in the field. As reported in *Science*. Gillispie complained that "the history of science is losing its grip on science, leaning heavily on social history, and dabbling with shoddy scholarship"[14]. He attacked those who discussed scientific problems but who had little or no scientific training. Of course Gillispie's plea for a return to the values of Koyré has been dismissed by the social historians of science who have replied that:

> The social history of science has by now established itself within the discipline as a legitimate method of approaching the past. Despite recent rearguard action, notably by C.C. Gillispie, most historians accept that the traditional practices of analyzing theoritical developments within the sciences need to be supplemented by the study of the changing social foundations of scientific activity. The "internal vs. external" debates of the late 1960s are, one hopes a thing of the past[15].

My point has been to indicate that historical methodology in the history of science is currently in a state of flux. The field is moving far beyond its earlier emphasis on internalist, technical developments. A rising new interest in science and religion, the social setting of science and even the pseudo-sciences is doing much to broaden our understanding of the complex nature of scientific growth.

But how does this affect the history of Arabic science - to date, very little. If we turn to the *Journal of the History of Arabic Science* we note that the great bulk of current research is devoted to technical aspects of Arabic science in the period from the eighth through the thirteenth centuries A.D.[16]. The papers we read there deal with mathematics, astronomy, technology and medicine. All too seldom do we find an author such as Seyyed Hossein Nasr who indicates the religious substrate of the science he discusses. Anton Heinen has criticized the current state of this subject in noting that.

> the available source material is exploited and interpreted in a somewhat naive, isolated manner. Thus writings of a primarily theological or mystical nature are left to the theologians, while natural scientists, for their historical studies, concentrate on the early books on mathematics, astronomy, medicine and the like[17].

In fact, he adds, physical questions are often enmeshed in theological ones and should be studied in that context.

The situation described by Heinen is similar to that relating to the study of the Scientific Revolution a quarter century ago. At that time scholars confined themselves almost exclusively to science as we understand it today. The fact that Newton wrote almost as much on alchemy as he did on mechanics, that he published a book on the prophecies of Daniel, and that he discoursed on the chronology of ancient kingdoms could be ignored because these subjects were not "science". Today we know better. We cannot understand Newton unless we understand the total Newton - the mystic as well as the founder of classical mechanics. Indeed, it would seem that his search for world order, world harmony, was spurred by his mystical bent. There are those who argue that his physics may have been dependent upon it.

In a larger sense, the Western Scientific Revolution itself was part of a very broad intellectual spectrum. Even if we turn solely to the scientific and medical texts of the sixteenth and seventeenth centuries we soon become aware that the concerns of authors interested in a new philosophy of nature went far beyond astronomy and the physics of motion. No group was more insistent on change than the followers of Paracelsus (1493–1541), the Swiss-German chemist and physician

who sought to overturn the Aristotelianism and Gelenism of the universities[18]. Both he and his disciples hoped to return to a pristine theology imparted by God to Adam and to a certainty that could be found through divine Revelation seen in the Holy Scriptures and in God's created book of nature. These Paracelsians were deeply influenced by the Reformation as well as by their search for a new science. Their works cannot be understood without taking into account their religious motives. Their insistence on this very point became a subject of debate between them and the mechanists for well over a century after the death of Paracelsus. In sharp contrast with the Paracelsians, the mechanical philosophers sought to divorce the study of science from religious consideration. This separation of science and religion has been a characteristic of Western science since the late seventeenth century and any attempt to explain the development of European science without taking this into account would necessarily be incomplete.

In a paper I prepared for the International Congress of the History and Philosophy of Science held in Islamabad in 1979 I rapidly reviewed the confrontation between the Mechanical Philosophers and the more mystical Chemical Philosophers who followed Paracelsus and then went on to compare the outcome of this debate with the contemporary scene in *Islam*[19]. In Europe we witness at this time the foundation of the first modern scientific academies with their attendant journals while a series of discoveries lead from Copernicus to Kepler, Galileo, Isaac Newton and classical mechanics. In the biological sciences we have a similar progression in anatomy from Vesalius to Harvey's discovery of the circulation of the blood. The Paracelsians, however, determined as they were to overturn the traditional science and medicine of Aristotle and Galen, were eventually discredited by the mechanists because of their religious enthusiasm and their mystical approach to nature.

In Islam during this crucial period we find very few references to the monumental discoveries that led to the Scientific Revolution. An understanding of nature apart from religious considerations was not appealing to Islamic authors. There are very few references to those Western astronomers and mechanists whose work led to the new science of Isaac Newton[20]. However, as I have pointed out earlier, there is one significant exception: the work of Paracelsus and his followers was known in the Arabic speaking world.

The *Gayat al-itqan fi tadbir badan al insan* was completed no later than 1640 by the Aleppan physician, Salih Ibn Nasr Allah Ibn Sallum (d. 1669/1670)[21]. He is one of the very few Arabic texts reflecting the events of the contemporary Western European Scientific Revolution - and although this is evident throughout the work it is seen especially in the fourth section titled "New Chemical Medicine invented by Paracelsus". The work is indeed what it purports to be, a treatise on the chemical medicine of the Paracelsians. Ibn Sallum rejected the humoral pathology of Galen and placed reliance on the three Paracelsian principles, Salt, Sulphur and Mercury. He accepted the concept of a universal medicine and went on to describe the occult properties of plants and minerals as well as their connection with the planets and the parts of the human body. He also discussed the doctrine of signatures and cited the works of several other western followers of Paracelsus. An appendix to this work claims to be a translation of Oswald Croll's *Basilica chymica* (1609) which was one of the most important discussions of chemical medicine produced in this period.

Julio Samso has published a paper on the effect of Spanish-Tunisian contacts in science and medicine in the Renaissance and he has noted a number of Paracelsian translations that exist in Tunis[22]. The point to be made here is that references to Paracelsus and his mystical religiously oriented medicine are not uncommon in Arabic texts. This is in stork contrast to the very few references to western physicisists and astronomous.

There seem to be very few studies on the lack of Arabic references to the Western Scientific Revolution. And those who have touched on the work of Ibn Sallum have emphasized that this

text represents the introduction of modern medicine and chemistry in Islam. This conclusion may well be so, but is this the only question we want to ask? If we are truly interested in the present state of Islamic science I think that we should also be asking why Paracelsus was of interest to Islamic scholars and Galileo was not. This involves the question of the transmission of science as well as broader cultural factors that either promote or discourage science. Considerable time and effort has been spent on the problem of the transmission of Greek science to *Islam*... and similarly there has been much interest in the transmission of Islamic science to the West in the Middle Ages. However, cultural influences are normally mutual exchanges. Interest in Islamic scientific texts in the West of the twelfth and thirteenth centuries is now well documented. On the other hand why should there have been relatively little interest in Western science in *Islam* in the sixteenth and seventeenth centuries even though that science and technology were making it possible for Western European nations to dominate the rest of the world. If we want to assess Islamic science today we should be trying to understand why *Islam* did not turn to the new developments in the West in the sixteenth and seventeenth centuries. Nor need we limit ourselves to that particular period. We may choose other more recent crucial developments in the sciences. Here I am thinking particularly of Darwinian evolution. This is a subject with distinct religious overtones as we see today in the Creationist debate. If we are interested in understanding the relationship of religion to science in *Islam* the case of evolutionary theory is surely a significant one for historians to examine in detail.

There are as yet few studies relating the history of Islamic science to the present. One exception is an article by Ahmad Y. Hassan, titled "Some Obstacles Hindering the Advance of Science and Technology in the Arab Countries"[23]. Here he writes of the great achievements of the medieval period and of the importance of Islamic science for the rise of Western science. But then he continues by discussing the prevention of *Arab* Progress which he ascribes to Western injustice and persecution, *Arab* disunity, cultural domination and the use of foreign languages, economic dominance and the isolation of one *Arab* Country from another.

There is surely truth to some of Hassan's arguments, but I think that it will be necessary to go beyond accusing the West of domination and complaining of Arab disunity if we are to seek remedies for the future. I believe that there is a real role for History to play in all of this. To be sure history is playing an important role in resurrecting the importance of the great period of Islamic science. There is no longer any question of the crucial role played by the transmission of Greek and Arabic science and medicine in the rise of Western science in the Middle Ages and the Renaissance. However, if we are to understand the present it may be less important to rediscover the high points of medieval Islamic science than it is to examine the later period.

To what can we attribute the lesser interest in the sciences in *Islam* in the period after the thirteenth century?. A key to this may well be found in religion. Surely the work of Al-Gazzali (eleventh century A.D.) pointed away from the sciences. He questioned the value of mathematics, complained that logic was being overestimated and said that the natural sciences were not to be rejected, but that they were peripheral subjects for the true believer[24].

I think that at least some Islamic historians should be concentrating on the course of the sciences after the twelfth and thirteenth centuries. Instead of asking whether sixteenth century anatomists used the work of Ibn al-Nafis in regard to the lesser circulation, without crediting him, they should be asking whether the scientific achievements of the West were known to Arabic scientists. Why was there so little reaction to the Scientific Revolution?. At that time there was little Western domination to contend with. We should be looking for cultural and religious change that may have affected interest of the sciences. Surely we want to know what works in the sciences were being copied and being read at this time.

Only a few years ago the situation in Iran had significant scientific overtones. There the Shah sought a rapid technological modernization. But there was over-whelming cultural and religious reaction to this program. I think that the lesson is clear, scientific progress must be acceptable with the desires of the people. I believe that gifted youths can be eductaed at the most advanced research laboratories of Western universities, but unless the desired results correspond to what the people of a country want, there is little hope for their acceptance. I think it is necesssary to give the benefits of a European education to the best students, but the resultant excellence in a new "golden era" of Islamic science will occur only if it proceeds within the traditional Islamic culture and religion. To accomplish this difficult task Islamic scientists, statesmen and religious leaders must work together in harmony for the future.

FOOTNOTES

1. *"International Conference on Science in Islamic Polity - Its Past, Present & Future"* (Islamabad: Pan Graphics, 1983), p.1.
2. GEORGE SARTON, *"Introduction to the History of Science"* (3 vols. in 5, laltimore: Published for the Carnegie Institution of Washington by Williams and Wilkins, 1927–1947), 1 p. 3.
3. Ibid., p. 6.
4. GEORGE SARTOB, *"A History of Science: Ancient Science Through the Golden Age of Greece"* (Cambridge: Harvard University Press, 1952), PP. xi-xii.
5. ALEXANDRE KOYRE, *"Etudes Galileennes"* (3 parts, 1935–1939; reprinted in one volume, Paris, Hermann, 1966), p. 11.
6. ALEXANDRE KOYRE, *"From the Closed World to the Infinite Universe"* (New York: Harper Torchbook, 1957), p. v.
7. SARTON, *"Introduction"*, 1, p. 19.
8. WALTER PAGEL, *"The Vindication of Rubbish"*, Middlesez Hospital Journal (Autumn, 1945), 1–4[1].
9. Ibid.
10. Ibid., 4.
11. See particularly FRANCES A. YATES, *"Giordano Bruno and the Hermetic Tradition"* (Chicago: The University of Chicago Press; London: Routledge & Regan Paul; Toronto: The University of Toronto Press, 1964) and *"The Rosicrucian Enlightenment"*, (London and Boston: Routledge & Regan Paul, 1972).
12. CHRISTOPHER HILL, *"The World Turned Upside Down: Radical Ideas During the English Revolution"* (1972; New York: The Viking Press, 1973), see especially pp. 231–246.
13. MARGARET C. JACOB, *"The Newtonians and the English Revolution 1689–1720"* (Ithaca: Cornell University Press, 1976), p. 18.
14. WILLIAM J. BROAD, *"History of Science Losing Its Science"*, Science, 297 (January 25, 1980), 389.
15. PAUL WOOD, *"Recent Trends in the History of Science: The dehumanisation of history"*, BSHS Newsletter, No. 3 (September, 1980), 19–20[19].
16. See the *"Brief Index to Volumes 1 through 5"* (1977–1981), Journal for the History of Arabic Science, 5 (nos. 1 and 2).
17. ANTON M. HEINEN, *"Mutakallimun and Mathematicians: Traces of a controversey with lasting consequences"*, Der Islam, 55 (1978), 57–73[57].
18. See ALLEN G. DEBUS, *"The Chemical Philosophy: Paracelsian Science and Medicine in the Sixteenth Centuries"* (2 vols., New York: Science History Publications, 1977).
19. ALLEN G. DEBUS, *"Mysticism and the Rise of Modern Science"*, History and Philosophy of Science: Proceedings of the International Congress of the History and Philosophy of Science Islamabad, 8–13 December, 1979 (Karachi, Hamdard Foundation Press, 1983), pp. 46–61.

20. An exception will be found in JUAN VERNET's Astrologia Y Astronomia en el Renacimento: La revolucion copernicana (Barcelona: Ariel, 1974) and his *'Copernico Y los Arabes"* in Actas del II Coloquio Hispano Tunecino de Estudios Historicos (Madrid/Barcelona, mayo 1971) Instituto Hispano-Arabe de Cultura, Madrid, 1973), pp. 191–208.
21. See DEBUS, *"Mysticism and the Rise of Modern Science"*, pp. 56–57; SAMI K. HAMARNEH, *"Arabic-Islamic Alchemy. Three Interwined Stages"*, Ambix, 29 (1982), 47–87 (83–84); Owsei Temkin, Galenism: Rise and Decline of a Medical Philosophy (Ithaca and London: Cornell University Press, 1973), p. 132; Manfred Ullmann, Die Die Medizin im Islam (Leiden: E.J. Brill, 1970) pp. 106–107, 182–184: Paul Richter, *'Paracelsus im Lichte des Orients"*, Archiv für Geschichte der Naturwissenschaften und der Technik, 6, (1913).
22. JULIO SAMSO, ETHNICA (Barcelona), 9 (1975), 243–254.
23. AHMAD Y. HASSAN, *"Some Obstacles Hindering the Advance of Science and Technology in the Arab Countries"*, Historia Scientiarum, 19 (1980), 31–46.
24. SEYYED HOSSEIN NASR, "Science and Civilization in Islam"(Cambridge, Mass.: Harvard University Press, 1968).

ISLAMIC MEDICINE IN EUROPEAN UNIVERSITIES AT THE DAWN OF RENAISSANCE

Prof. Dr. Said A.F. Ashour

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To call the Medieval Ages the "Dark Ages" must be ascribed to the fact that the fall of the Roman Empire in the West - in 476 A.D. - had been concomitant with the coming of the Germans and other tribes of Barbarians into the territories of the Empire together with the decline of towns and the decadence of ancient cultural institutions, such as schools. Further more, the first half of the medieval ages - which extends from the late fifth century to about the end of the tenth - was characterized by the increase of influence of the church and the clergymen, and their dominance over all field of life, private and public alike. In performing this role, clergymen were so extremely priggish that they did not only call for rejecting the pagan legacy, but for corrupting and setting fire to it. They also imposed very severe restrictions on people's intellectual, social and economic life. As regards education, it was so limited to monastic and cathedral schools, that it hardly went beyond theology, saintly autobiographies, and some superficial sciences that can be classified under what was known as the "Seven Liberal Arts".

Now at the time when civilization was at its poorest in West Europe, during the nineth and tenth centuries, Islamic civilization reached the peak of its glory. Under Islam this renaissance was distinguished by its prevalence over all Islamic countries, eastern and western alike. It was also distinguished by the fact that it encompassed all kinds of human activities, intellectually, spiritually and materially. Such a renaissance was capable of flourishing by virtue of the spirit of Islam which urged the Muslem to adopt the goldenmean when it comes to indulgence in the joys and luxuries of this life, and to let reason and rational thinking prevail in handling the affairs of this world. Further more, the tolerance with which *Islam* treated, and looked upon, other religions and beliefs, called upon non-Muslems, Christians and Jews in Particular, to participate in the cultural activities of the Islamic State, by virtue of the rights which Islam conferred on them and the security and safety it provided them.

In this tolerant spirit Muslems respected the legacy of other preceding nations; they did not set fire to their books as monastic works had done in many cases. On the contrary, Muslems were not only busily engaged in translating Greek books in chemistry, medicine, astronomy, and philosophy, but they also took care of the legacies of Persia, India, China and of other nations famous for ancient civilizations. Muslems knew how to select the beneficial elements in the legacies of these nations; they did not accept at random all they offered, but rather contemplated and discussed the knowledge they found which they either rejected, corrected or accepted in accordance with its suitability to their objectives. Nor was the Muslems' role limited to translation, but it went beyond that into research, investigation, experimentation, correcting the errors committed by preceding nations, and finally creating, originating and contributing. Again, Muslems had a role to perform in preserving preceding nations' legacies, so much so that many of the books they translated from Greek have survived their Greek origins which were lost, and which are now known only through the translated versions.

By the eleventh century, West Europe had started to awaken from the plight of the Dark Ages, and began a new phase of renaissance which flourished and whose features became during the successive century. Consequently it came to be known in history as the "Renaissance of Twelfth Century". Scholars who dealt with the history of European Civilization think that this Renaissance

has never eclipsed until modern times; in the sense that Italian Renaissance of the 15th century emerged from the European Renaissance of the 12th Century. However various the causes of this Renaissance might have been, one of its major causes is exposure to Muslems' Civilization and benefiting from their learnings. Of the main tributaries through which Islamic civilization made its way to West Europe were Spain, Sicily, and the Near East during the Crusades period. In these very centres, translation movement from Arabic into Latin was active, in science, literature, and arts.

When Islamic learnings outflowed over West Europe it turned out that traditional schools affiliated to monasteries and cathedrals - the only schools West Europe had known in Dark Ages - did not have the capacity for the quality and quantity of learnings in all fields of knowledge. As a result universities were established for the first time in West Europe, in the 12th Century to keep pace with new science. The earliest of these were the University of Salerno in South Italy, the University of Bologna at its middle, Paris at Mid-France, and Montpellier at its south. Salerno University acquired a reputation for medical Studies Bologna for law, Paris for philosophy and logic, while Montpellier became a great seat for the study of Medicine. As the academic life developed, the fields of study each university provided increased.

In most cases, the science of medicine had a special status in developing universities since the dawn of Renaissance in Europe, in view of the considerable profit medicine offers to those who make it their profession, on the one hand, and as a result of the importance of the science of Medicine in the well-being of man, on the other hand. At that time, European Universities did not find a source upon which to draw for the science of medicine, or a basis to built upon for this science, other than Islamic Medicine. Since West Europe had not left, during the first part of medieval ages, any legacy that might be called Christian Medicine; as a matter of fact, it had not preserved, during the Dark Ages, the legacy of the Ancient Greeks and Romans. Consequently, scholars in developing universities in West-Europe - learning and teaching alike - restored to Arabic books translated into Latin to find in them an immense treasure including much of the Greeks' legacy which Muslem scholars had corrected, verified, augmented, and renewed - so that they had created out of it a medicine which must inevitably be called Islamic Medicine.

Although the origin of the University of Salerno is obscure, it is almost unanimously agreed its establishment coincided with the acquisition of a great deal of learning in Islamic Medicine at such an area in south Italy. Many are those who link the availability of Islamic Medicine in Salerno region to the efforts of Constantine Africanus, a man had come from North Africa where he had acquired aspects of Islamic Medicine at its prosperity, then he left for some countries of Islamic east, to learn further about Muslems' achievements in Medicine, so that when he finally settled down in famous Monte Cassino Monastery - near Salerno - he devoted himself to translating into Latin some Arabic books in medicine, and then he died late in the eleventh century.

Some scholars had doubts as to the real character of Constantine Africanus, in an attempt to make the medical School of Salerno appear to have no connection with Islamic Medicine. We have already proved, in this study, that the reach of Islamic learning in Medicine into South Italy and the Salerno region is not associated with Constantine alone, but is a historic fact which had started prior to Constantine period and continued after his death. For Muslems conquered Sicily in 827, and extended their dominance into South Italy, whence they carried along with them the seeds of their great Renaissance from North Africa into those parts of South Europe. Medicine in particular was the most prosperous of sciences to the Muslems of North Africa. Of their medical Scientists at the time Isaac Ben Omran acquired a high reputation. The science of medicine kept flourishing in North Africa through out the 9th and 10th centuries, that is at the time when the impact of Arabic-Islamic civilization increased in Sicily and South Italy, prior to the period of Constantine

Africanus. It is to be born in mind that the influence of Islamic civilization did not shrink with the end of Muslem political supremacy in Sicily, as the Normans who replaced Muslems in the government of this Isle took care of Islamic civilization, and extended their sympathy, concern, and encouragement to Muslem scholars. Which led to the continuity of the influence of Islamic civilization on Sicily and South Italy for at least the whole of the twelfth century; that is, after absence of Muslem political influence from the Isle.

The flourishing of Islamic civilization in Sicily and South Italy was, in the age of awakening of Europe, concomitant with the translation into Latin of many Arabic books in all fields of knowledge. In the field of medicine, the name of Constantine Africanus is recurrent as busily engaged in Monte Cassino Monastery in translating a number of Muslems' works. Of these the most popular is "Al-Malaki" by Ali Ben Al-Abbas.

The translation movement from Arabic into Latin continued after Constantine in Sicily and South Italy, where Eugenius of Palermo in the mid – twelfth century, and Faraj Ben Salem (Faragut) in the late thirteenth, and others were contributors. Undoubtedly the outcomes of this movement in translation accumulated in Salerno, where environment and circumstances contributed in the establishment of a school of medicine which acquired such methods of diagnosis and medical treatment that had not been known at the time in any other place of West Europe. The study of Medicine in Salerno was based on sound grounds of Islamic Medicines closely related to the influence of Islamic Medicine is the progress achieved in the science of anatomy, pharmacology and drugs, especially "Antidotaria".

Although the University of Salerno was destined not to continue for long, since it soon faded away by the late thirteenth century, it was certainly a basis out of which the influences of Islamic Medicine emerged into other universities which already started to spread rapidly in West-Mid-Europe. In the fourteenth century, the University of Bologna made it a must that nobody should be allowed to practice the profession of medicine before passing successfully an exam on the works of Ibn Sina, Ibn Rushd, and Al-Razi.

What has been ascribed to South Italy and Salerno can exactly be said about South-France and the University of Montpellier, since the impact of Islam and already made its way to the coasts of South France as early as the beginning of the eight century. With the Islamic conquest of Spain, Muslems started their invasion of South France; an invasion which Charles Martel succeeded to impede in 732 when he won the battle of Tours against the Muslems. Martel followed this victory by destroying the colonies established by Muslems at the coasts of South-France, resulting in the escape of many Muslem refugees to Montpellier region. It is to this very period of time that the very seeds of the Montpellier city should be ascribed, where an environment permeated with Islamic civilization was to be established.

On the other hand, the migration of Muslems to South France did not come to an end after the battle of Tours in 732. After the death of Charlemange in 814, Islamic expansion was activated in the region of Rhone, thus the Muslems' conquest of Marseilles about the mid-nineth century. their expansion near Genoa, and their establishment, late in the century, of a number of colonies and forts in Provence region. These colonies became cultural seats for Islamic civilization which Muslems well cummunicated whenever they settled. Whether the source of these Islamic influences was Andalusia, Sicily, or North Africa, it makes no difference since they all represent Islamic Impact.

In this environment was born the university of Montpellier in the twelfth century, which kept developing rapidly until it acquired a world-wide reputation in the field of medical studies in the thirteenth century. The extent to which this university was influenced by Islamic medicine finds evidence in the famous decree declared by Pope Clement V in 1309 - at the proposal of the profes-

sors of Montpellier University - which makes it a must for those who practice medicine to pass an exam in certain works of which Ibn Sina's and Al-Razi's writings in medicine made some, In 1340 the curricula were specified for the Faculty of Medicine, Montpellier University, which included Ibn Sina's first and fourth books of *Canoon*.

From this University, the influences of Islamic Medicine extended to a great number of French universities, and other in West Europe. The writings of Ibn Sina, Ibn Rushd, and Al-Razi became the basis for teaching medicine at the Faculty of Medicine, University of Paris, since the fourteenth century. This Faculty still adorns its enteries with two big portraits for Ibn Sina and Al-Razi.

As to Spain, though it was a great seat to Arab-Islamic civilization, and the greatest centre for radiating this civilization into West Europe, within its boundaries was translated into Latin the greater number of Arabic books in all fields of knowledge - it should be born in mind that Spanish Universities belonged to the church, on the one hand, and to the developing royalities in the peninsula, on the other hand. Their establishment coincided with the intense currents that uprooted the Muslems' State in Spain, and at which hatred energed at all that was related to Muslems and Islam. Yet it was not in the capacity of Spanish developing Universities to do without the Learnings and sciences of Muslems in medicine and other fields. Thus they continued deriving from this source without showing it: that is, they offered to their students the quintessence of Islamic learnings often without acknowledging the original writers.

To sum-up, we have focused in this paper on three points:-

FIRST:

We do not deny that Muslem scholars found in the Greeks' writings an important base upon which they built up their studies in this science. Yet what need be emphasized here is that the Muslems contribution did not stop at translating from Greek, but indeed went beyond that into correcting and evaluating, on the one hand, and adding and originating, on the other.

SECOND:

If there have been some among the distinguished scholars of Islamic Medicine who are non-Muslems - Jews or Christians or Star Worshippers - these were part and parcel of the Islamic thought and civilization; because they had been born in Islamic society and grown up in Islamic environment which secured for them the freedom of worship, thought, and work. Thus they are indebted for their fame and genius to Islam's civilization, tolerance, ideals, and encouragement. They are one of the landmarks of Islamic civilization and one of its beneficial outcomes.

THIRD:

The impact of Islamic medicine extended rapidly from South Europe Universities into the other developing universities in the mid-west continent. Some scholars liken the expansion of European Universities, at the dawn of Renaissance, to beehives. Out of each university branched out a number of universities as a result of the migration of some of its professors and students to another place. Naturally these carried along with them their learnings and their books, and what they might have collected of the Latin translation of Arabic works. In this respect, Rashdall says, in his popular book about the Universities of Europe in the Middle Ages, that no sooner had the fourteenth century begun than Islamic Medicine became supreme throughout all European Universities.

ISLAMIC MEDICINE IN THE KINGDOM OF ARAGON IN THE EARLY FOURTEENTH CENTURY

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In September 1301 the king of Aragon[1], James II, wrote urgently to his treasurer commanding him to get the royal "librum medicine vocatum Avicenne" out of pawn[2]. As he explained in a second letter in March 1302, he had allowed his favorite surgeon, Berengar de Riaria, to pawn the volume with a Barcelona merchant for 500 sueldos, but now he found a "valda necessarium" and had to have it back[3]. Five hundred sueldos was an enormous amount - the price of fifty meters of Persian cloth, of a good mule or of a ppor horse - and not even the royal treasury always found such sums easy to produce. The king had to repeat his order for the book's redemption for months to come[4]. This volume on which the king placed so much store can only have been Avicenna's *Canon,* the great medical encyclopedia of Ibn Sina translated into Latin by Gerard of Cremona in the twelfth century; from the 1230's on it was increasingly cited by Latin medical writers, and in the fourteenth century it was coming to replace the old *Articella* as the heart of the European medical curriculum. In 1302, as James sought frantically to get his book back, Avicenna was becoming recognized as the greatest medical authority since Galen. The next year, in July 1303, the king ordered that Berengar de Riaria be given 250 sueldos more to buy another volume of Avicenna "ad opus sui"[5] - this time, perhaps, the *Cantica (Urjûza fi 't-tibb)* that Ermengol Blasi had translated in 1283.

Ten years later the king again demonstrated his interest in having the best of Islamic Medicine made available in his kingdom. In November 1313 he commanded his treasurer to pay 1000 sueldos to Jahuda Bonsenyor for translating from Arabic into the vernacûlar (Catalan) "a certain book of medicine called 'halçahahuy'"[6]. Jahuda Bonsenyor, son of Astruch, had since 1294 been responsible for preparing all Arabic-language documents and contracts drawn up in Barcelona; he was also a physician *(metge),* and a friend of the king's own physician, Joan Amell[7]. The title given to the medical work he was to translate for the king, 'halçahahuy', is probably a transliteration of the *nisba* of Abu 'l-Qâsim al-Zahrawî, known to the West as Abulcasis. Only a few sections of Abulcasis' great medical encyclopedia, *al-Tasrif,* had been translated in James' day, even into Latin: the *Surgery* by Gerard of Cremona in the twelfth century, the pharmacology (as *'Liber servitoris")* by Simon of Genoa and Abraham Judeus at the very end of the thirteenth. What portion Jahuda was expected to translate for the king we cannot tell; Cardoner has supposed that Bonsenyor translated only a small part of the *Tasrif,* probably the section dealing with bloodletting, but the huge sum with which the translator was to be rewarded - twice as much as the Avicenna had been pawned for - suggests that he may have translated a major portion of the work. Unfortunately, the Catalan version is not known to exist today[8].

King James, who so obviously appreciated the importance and value of Islamic Medicine had to do what he could to encourage its spread in his kingdom because at this moment early in the fourteenth century it was apparently not easily accessible there to Christian physicians. When the king established the first university in his realms, in Lerida in 1300, he brought in Guillem de Beziers, a master from outside (probably from the medical faculty of Montpellier in France), to lecture on medicine. Guillem soon found that the medical books available in Lerida were defective and would have to be emended by systematically checking them against texts written in the Arabic language. At his request, the king commanded in 1302 that:

> because certain Arabic medical books belonging to Jews in our realms are needed to correct these medical texts ... we command that whatever medical works written in Arabic are needed by this master (Guillem) should be turned over to him by those Jews until he has had them translated or has used them to correct the other texts[9].

Unfortunately, the school did not prosper; it closed briefly between 1305 and 1310, and Guillem left Spain to serve the Popes in Avignon. Islamic medical writings remained difficult for Christians to come by. It was the academically-trained physician who best appreciated the importance of the Islamic scientific tradition, and throughout the first decades of the fourteenth century there were still few such academic physicians in the kingdom of Aragon. Lerida began again to train students after 1310, but it had only one teacher of medicine and probably not many more students at any one time. Even in the largest cities the market for medical writings was limited. When master Gonsalbo Pere of Barcelona drew up his will in 1334, he instructed his executors that since books on his science ("ars sive sciencia") would find no buyers, his library should not be sold in that city but should be shipped as a whole to Montpellier, where the presence of an important medical school would ensure better prices[10].

By this time Montpellier had wholly adopted Greek and Islamic Medicine as the basis for its curriculum, and the principal agent of this change was undoubtedly Arnald of Villanova, who for the last twenty years of his life was the preferred physician of James II. Arnald could read Arabic, and his first appearance in the historical record is in Barcelona, in 1282, as the translator of Hunain Ibn Ishaq's Arabic version of Galen's short work *On tremor;* his translation is in general a faithful and quite competent one[11]. Two other translations from Arabic to Latin can also be attributed to Arnald, a translation of Abu 'l-Salt's *K. al-adwiya al-mufrada* and another of Avicenna's *K. al-adwiya* Arnald, a translation of Abu 'l-Salt's *K. al-adwiya al-mufrada* and another of Avicenna's *K. al-adwiya al-qalbiya* (under the title *De viribus cordis)* - the Avicenna, like the Galen, prepared in Barcelona[12]. During the 1290's Arnald had left Aragon to teach medicine at Montpellier, and after he returned to James's lands he was charged with advising Pope Clement V on the best pattern for medical education at his former school. At Arnald's recommendation, Clement issued new regulations in 1309 that required all bachelors of medicine to possess *(teneantur)* the works either of Avicenna or of Rhazes, Isaac, and Constantine - the last - named undoubtedly including the *Pantegni* pf 'Ali Ibn al-Abbas[13]. When Arnald died in 1311, the inventory of his belongings included works of Rhazes and Isaac in Latin translations, as well as eight codices written in Arabic script - one of them a work on anatomy, with figures, another a *Synonoma,* perhaps the work of Yuhanna ibn Sarafyûn[14].

Arnald was not unique in James's realms as a translator of Arabic medicine for a Latin- reading audience: as we have seen, Ermengol Blasi - Arnald's nephew! - was responsible for translating Avicenna's *Cantica* in 1283. A generation or so later, Berengar Eymerich of Valencia (another physician trained at Montpellier) prepared a Latin version of the dietary sections of Abu 'l-Qâsim's *Tasrif*[15]. Nor was Arnald unique as an educated Christian physician able to read such works in the original language: when master Joan, physician of Barcelona, died in 1302, his estate included "decem libros Sarracenicos de fisica", which his executors then turned over to another physician, Matheu de Suria[16]. And certainly Arnald was not unusual in possessing books on Islamic Medicine in his personal library: Bernat Serra's possessions in 1338 included the *Viaticum* of ibn al-Jazzâr, the *K. al-Mansur* of Rhazes, and the *Surgery* of Abu 'l-Qâsim[17]. Bernat was himself a surgeon, and Christian surgeons tended to depend less on book-learning than did physicians; that a surgeon should have owned such works makes plain that he fully recognized their importance. I think we may conclude that by the 1330's the value of Islamic Medicine was fully acknowledged by the ablest and best-trained Christian physicians in Aragon, and by those patients - like the king - who could afford their services.

In search since 1977 through the Aragonese archives I have drawn up a list of medical practitioners of all sorts - not only physicians and surgeons, but the less important apothecaries and barbers as well. I have 810 names of practitioners on my list for the period 1285–1335: 689 are Christians - the great majority, as you would expect; 108 are Jews; and only 12 are Muslims. Who

were these practitioners in Aragon, and what role did they play in communicating Islamic medical science to the Latin West? One might expect or hope to find learned physicians or surgeons, celebrated for their knowledge and rewarded for their skill; but the reality is quite different. Eight of the thirteen were barbers, with only a limited medical role and no sign of special skills. Almost all the others were described as surgeons, but there is no reason to think they had illustrious careers.

Indeed, the kings themselves - interested as they were in the best of medical care - were still unable to locate trustworthy and capable Islamic physicians. There is no record that James II was ever treated by a Muslim, though certainly he regularly consulted certain learned Jewish practitioners, as did Alfonso III. A Saracen surgeon, who turns up suddenly in 1332 in response to a summons by the ailing Alfonso, was apparently unsatisfactory, for she never appears again; another royal surgeon is mentioned the next year, who was evidently no more successful and likewise is thereafter absent from the record[18]. Incidentally, both these surgeons were women, which again suggests that learned practitioners (who would surely have been men) were hard for even the king to find. In his final illness, in 1335, Alfonso was treated exclusively by (male) Christian physicians, many of them university-trained and one of them, master Jordan of Turre, brought in especially from Montpellier.

Because there is so little evidence of the presence of Islamic practitioners in Aragon, there is understandably little that can be said about the nature of their practice. In only one case do we find any evidence of the sort of treatment carried out by a Muslim practitioner of the kingdom. In December 1311 the king commanded that an investigation be launched against Ali de Lucera, a "Saracen" of Daroca, on the ground that

> when the late Menga Menguez of Daroca was suffering with pains in the head, you promised to cure her of this illness so that you could extort money from the said Menga and her son Bartholomew; and that acting diabolically you made the said Menga wear seals (?caractes) and did other wicked things, because of which she is said to have died[19].

The king had pursued the investigation to keep his subjects from diabolic beliefs, rather than to punish medical malpractice per se, and in any case he agreed in April 1313 that Ali (who had hastily left Daroca after the investigation began) would not be harassed any further by the charge[20]. But one feature of the original accusation bears the ring of truth, namely that Ali was treating illness with seals, and this superstitious remedy is far removed from the wholly unmaterialistic intervention recommended by Islamic medical authorities like Rhazes or Avicenna - the latter, for example, variously prescribing ointments and embrocations, remedies to be taken internally, and bleeding from veins in the head as treatments for headache[21].

Let us consider once again - but in more detail - the level of health manpower in the realms of the Aragonese kings in the fourteenth century.

TABLE 1
PRACTITIONERS IN THE KINGDOM OF ARAGON[22]

	Christian	Jewish	Muslim	Total
Catalonia	308	29	0	337
Aragon	54	49	7	110
Valencia	208	11	5	224
Total	570	89	12	671

The total population of the kingdom at this time was perhaps 800,000 - slightly over half a million in Catalonia, 100,000 in Aragon, 150,000 in Valencia. Muslims made up almost two-thirds of the population of Valencia, Jews only 5% or so; in Aragon the Muslim population may have been 25–30%, the Jews only 10%[23]. Yet in just these two parts of the kingdom we find five times as many Jewish practitioners as Muslims. We must conclude, I think, that there were disproportionately few Muslim physicians of any sort in the Aragonese lands, and that those who were to be found there lacked the familiarity with their medical heritage that their Jewish and even Christian counterparts possessed - it was a Barcelona Jew, after all, Jahuda Bonsenyor, to whom the king had to turn for a translation of the work of al-Zahrawi. Why should this have been so?

The probable answer to this question is furnished by the biography of an Islamic surgeon born in Spain in the late thirteenth century: Muhammad al-Shafra. Al-Shafra's birth place was Crevillente, a Muslim enclave surrounded by Christian Spain - Valencia to the north and Murcia to the south - which maintained an independent existence until 1318. Born perhaps about 1280, al-Shafra studied surgery, not with a Muslim master, but with a Christian, "master Bernat"[24]; he criticized the Muslim surgery of his day as having become the province of mere empirics. At about the time that Crevillente was absorbed into the Valencia of James II, in 1318, al-Shafra moved south to the Muslim kingdom of Granada; later he shifted to Algeciras, and when it too was reconquered by Christians, in 1344, he moved across the straits of Gibralter to Fez[25]. In his repeated moves from Christian territory he was doing what most other members of the learned professions in Islamic Spain seem to have done: so long as there were Muslim lands with wealthy patrons to the south, it was more to a Muslim physician's advantage to sell his services there.

This should not be taken to prove active Christian repression or expulsion of the Muslim population of the northern kingdoms[26]. In fact, while there were certainly severe restrictions imposed on Muslim life in the Aragonese realms, it still seemed attractive enough there that some Muslim physicians migrated into them - like Faraig, a surgeon who moved to Daroca in Aragon from Agreda (in Castile) with his family and household in the 1320's[27]. However, Granada and North Africa were far more attractive to the able, the learned, and the ambitious, with the result that Muslim medicine in Christian Aragon was soon represented by poorly educated or empirically trained practitioners. It has been customary to see this flight of Muslim learning from Christian territories in Spain as a phenomenon continuing until relatively late, but the figures I have quoted suggest that the exodus was already largely accomplished by the early fourteenth century.

Yet even though Muslim practitioners seem to have been scarce in Aragon, their intellectual heritage - Islamic Medicine - had firmly established itself there by 1350. We have observed the first stages of this in the early years of the fourteenth century, as learned Christian physicians and their patients show an increasing conviction that it is in Islamic authors like Ibn Sina and Abu 'l-Qasim that the highest medical wisdom is to be found, and as medieval universities like Montpellier make the writings of such men an integral part of the medical curriculum. The process culminutes in the 1330's, when in Catalonia and Valencia alike an academic background, or at least a thorough familiarity with the Greco-Arabic medical literature, is made a formal requirement for anyone wishing to practice medicine in these realms; and the supremacy of the medical tradition developed and transmitted by Islam would continue to be acknowledged in the kingdom of Aragon for the remainder of the Middle Ages and Renaissance.

FOOTNOTES

1. The term *"king(dom) of Aragon"* here and subsequently refers to the three realms ruled by the monarch - Catalonia, Aragon, and Valencia - considered as a whole.
2. ARCHIVO DE LA CORONA DE ARAGON, *"Cancilleria, Reg."* 268, fol. 217v.
3. A.C.A. *"Canc. Reg."* 269, fol. 26v.

4. A.C.A. *"Canc. Reg."*, 294, fol. 45r.
5. A.C.A. *"Canc. Reg."* 294, fol. 131v.
6. A.C.A. *"Canc. Reg."* 299, fol. 52v.
7. J. CARDONER PLANAS, *"Nuevos datos acerca de Jafuda Bonsenyor"* Sefarad 4 (1944), 287–93.
8. ANTONI CARDONER i PLANAS, *"Historia de la Medicina a la Corona d'Arago"* (Barcelona, .d.), pp. 38–41, discusses translations made in this period from Latin and Arabic into Catalan; see also MANUEL SANCHS GUARNER, *"Antics llibres de medicina en llengua catalana"*, Quart Creixent 3 (1957), 47–51.
9. A.C.A. *"Canc. Reg."* 125, fol. 59r-v.
10. ARCHIVO DE LA CATEDRAL DE BARCELONA, *"Manuel de Bernat de Vilarrubia"*, Testaments 1308, fols 147–48.
11. See the edition by MICHAEL R. MCVAUGH, *"Arnaldi de Villanova Opera Medica Onia, XVI"*, Translatio Galieni de Rigore et Tremore et lectigatione et Spasmo (Barcelona, 1981).
12. JUAN ANTONIO PANIAGUA, *"Las traducciones de textos medicos hechas del arabe al latin por el maestro Arnau de Vilanova"*, Actas del XXVII Congreso Internacional de Historia de la Medicina (Barcelona, 1981), pp. 321–26.
13. On the development of the Montpellier curriculum, see LUKE E. DEMAITRE, BERNARD DE GORDON (ca. 1258–ca. 1318): *"a Representative of the Montpellier Academic Tradition"* (Ph.D. dissertation, City University of New York, 1973), chs. 2 and 3 and references there. The new curriculum is set out in the document printed by Alexandre Germain, ed., Cartulaire de l'Universite de Montpellier, I (Montpellier, 1890), no. 25.
14. ROQUE CHABAS, *"Inventario de los libros, ropas y demas efectos de Arnaldo de Villanova"*, Revista de Archivos. Bibliotecas y Museos, 9 (1903), 189–203, esp. nos. 48, 65, 76, 93, 115, 150, 173, 183; Joaqium Carreras Artau, *"La llibreria d'Arnau de Vilanova"*, Analecta Sacra Tarraconensia 11 (1935), 68–69, The suggested identification of the sinonima with the work of ibn Sarafyun is offeràd by Luis Garcia Ballester, Historia social de la medicina en la Espana de los siglos XIII al XVI, I (Madrid, 1976), p. 18.
15. MS TORINO, H. IV. 29 (cited by Ernest Wickersheimer, *"Dictionaire biographique des medecins en France au Moyen Age"* (Geneva, 1936), p. 69, s.n. Berenger de Thumba), says of his translation that it was *translata de arabico in vulgare Cathalenorum et a vulgari in Latino a Berengario enutrito in Montepessulano"*, which suggests that Berenger dod not read Arabic himself but needed the help of a drogoman; on this technique of translation, see MARIE-THERESE D'ALVERNY, *"Motives and Circumstances, Methods and Techniques of Translation from Arabic into Latin"*, in Collogiuim on the Transmission and Reception of Knowledge (Dumbarton Oaks, 5–7 May 1977). xeroxed typescript, pp. 155–73 (esp. pp. 164 ff.). The Valencian archives show master Berenger to have been active there from at least 1322 (and perhaps 1318) until 1353. See further LUIS GARCIA BALLESTER, *"La medicina Valenciana del siglo XIV"*, Actas del 1er Congreso Espanol de Historia de la Medicina (Madrid, 1963), pp. 383–84, and idem, Historia social, p. 25 n. 31.
16. A.C.B., *"Manual de Bernat de Vilarrubia"*, April 1302–July 1302, fol. 110r-v.
17. ARCHIVO GENERAL DE PROTOCOLOS DE BARCELONA, *"Manual de Pere Folquer* , 1338, pp. 134–41; SEE RICARD CARRERAS VALLS, *"Introduccio a la historia de la cirurgia a Catalunya: Bernat Serra i altres..."*, Tres treballs permiats en el concurs d'homentage a Gimbernat (Perpignan, 1936), pp. 1–63.
18. In December 1332 Alfonso made a grant to *"Olmocat Sarracenam domesticam nostram in presenti infirmitate nostra ex officio suo ciururgie ... pro labore in infirmitate ipsa"*, (A.C.A. Canc. Reg. 500, fol. 146); in February 1332/3 there is a reference to *Cahat Sarracena Valencia cirurgica nostra"*, (A.C.A. Canc. Reg. 486, fol 12).

19. Interpret the word "caractes" as cognate with caracter" (Cat.) and referring to graven symbols which, as the text shows, were to be worn ("portare") by Maria: hence, I suggest, "seals". The text is quoted by JOSEPH PARARNAU I ESPELT, *"Activitats i formules superstitcioses deguarcio a Catalunya en la primera meitat del segle XIV"*. Arxiu de Textos Catalans Antics i (1982), 54 n. 26, but with no attempt to explain "caractas".
20. A.C.A. *"Canc. Reg."*, 239, fol. 181v; *"Reg. 240"*; fol. 124; *"Reg. 210"*, fol. 34v.
21. AVICENNA, Liber canonis (Venice, 1507; reprint Hildesheim, 1984), Lib. III fen 1 tr. 2; fols. 173–80. It should, however, be acknowledged that for some Jewish Christian physicians (including Arnald of Villanova) the use of seals and talismans was thought to be of medicinal value, though this was a matter of some controversy in the fourteenth century: see BRUNO DELMAS, *"Medailles astrologiques et talismaniques dans le midi de la France (XIIIe–XVIe siecle)"*, 96e Congres national des Societes savantes (Toulouse, 1971), archeologie, t. II, pp. 437–54.
22. This table includes only those practitioners who can be identified as active in a particular region of the kindom of Aragon, about 80% of the total.
23. These figures, which are inevitably largely conjectural, are based on J.N. HILLGARTH. The Spanish Kingdoms 1250–1516 (Oxford, 1976), I, pp. 29–32, and references there.
24. GARCIA BALLESTER, *"Historia social"*, pp. 21–22, n. 22, suggests that this master may have been the Montpellier physician Bernard Gordon, but this Bernard is not known to have practiced outside of Provence (ssee Luke Demaitre, Doctor Bernard de Gordon (Toronto, 1980). On the physicians I have so far identified as active in the appropriate time period, the most likely possibility is master Bernat Frayre or de la Grassa (active at least 1321–1333). On the other hand, it would seem more likely that al-Shafra learned his art from a surgeon than from a physician: in that case, his master might have been Bernat Borrac or Bernat de Molla, both practicing surgery in Valencia by at least 1321. I have found no trace of a surgeon named Bernat in Valencia at an earlier date.
25. GARCIA BALLESTER,*"Historia social"*,pp. 21–22; H.P.J. Renaud, *' Un chirrurgien musulman du royaume de Grenade: Muhammad al-Safra"*, Hesperis 20 (1935), 1–20.
26. For a discussion of the situation of the Muslim communities in the crown of Aragon in the mid-fourteenth century, see John Boswell, The Royal Treasure (New Haven and London, 1977).
27. A.C.A. *"Canc. Reg."*, 569, fol. 38v; *"Reg. 441"*, fol. 17r–v.

BURNING MIRRORS AND THE PERSPECTIVE*

Prof. Rushdi Rashed

FRANCE

ABSTRACT

The profound change in the theory of vision reached by Ibn al-Haytham, may be characterized as a systematic introduction of new norms — mathematical and experimental — to treat traditional problems in which light and vision are united. Until then light had been considered to be the instrumentality of the eye and to see an object was to illuminate it. In order to construct a theory of light, it was necessary to begin with a theory of vision; but to establish a theory of vision required taking position on the propagation of light. Each task immediately involved the other and each theory borrowed the language of the other.

The optics of Aristotle, like that of Euclid, and even that of Ptolemy, comprised both factors. In order to introduce the new norms systematically, a better differentiation forced itself on Ibn al-Haytham. But how did it happen? To understand this capital theoretical transformation, we propose to go back to the theory of burning mirrors, as it was constituted particularly by al-Kindi and other scientists. This point, very neglected in the history of optics and the theory of vision, seems to us quite important to grasp the preparation of Ibn al-Haytham's revolution.

* As the full text could not be made available, we are publishing here the abstract only.

Editors

THE CONTRIBUTIONS OF ISLAMIC PHARMACY TO EUROPE AND COMPARATIVE STUDY OF MEDICAL ASPECTS RELATING TO CHRISTIAN AND MUSLIM CIVILIZATION IN MIDDLE AGES*

Doc. Dr. Ali Haydar Bayat

TURKEY

ABSTRACT

After the decline of the Roman Empire, Christianity took place and root in Europe, a scholastic millenium characterized by apathy and avoidance against science and new developments had been experienced. The basic underlying cause was that Christian mentality opposed to science and had been in conflict with it. With the success of the Church, there was only one belief left: Bible coupled with its interpretation by the Church.

The Church had not precluded the continuation of medicine owing to the miracle that Christ resurrected the dead, among others. However, medical sciences had shown a stagnation and decline for ages until the dawn of new ideas of Renaissance which terminated the old-fashioned ongoing traditions.

Humanity had witnessed incredible great advances in scientific fields together with improvements in human reason and moral values, due to the advent of *Islam* and its civilization in this dark period or Christian era. Since Arabic language was used as a cultural and scientific tool, exchanging of knowledge easily and rapidly became possible among Muslim nations and, in due course, medicine had progressed in great deal and pioneered the European medicine in attaining today's status by having influenced the West indisputably for 600 years, due to such factors as the importance that *Islam* attached to this field, transfer of emipric medicine among Muslim nations in Islamic civilization, translation of secular medical text books improved by Greeks into Arabic and taking Cundishapur hospital and school of medicine as an example.

There was a vast, incomparable differance between Islamic medicine and European Christian medicine in middle ages in favor of Islamic one:

The belief that diseases were brought as a result of sin accompanied by another that was the cause of many diseases in the Old Testament were attributed to God's damnation or Satan's evil deeds in Christian world.

In contrast to the West, diseases were attributed to the invisible agents and that infectious diseases transmitted via contaminated dress, ear-ring, dishes... etc. were very well known in Muslim world.

Particular places were to be made available for saints who were believed to remedy every disease by means of religious and magical symbols instead of drugs in Europe.

Yet in monastries, based upon the extent of permission the Church gave, prescriptions of Hippocrates and Galen were being used. Conversely, in Islamic world; a vide variety of drugs either single or in combination stemmed from countless vegetal origins were in common usage. And there were books delineating synthesis of drugs, their usage, and dosages. Pharmacy had been separated from medicine as an independant field.

Medical education in Europe was to be instructed in monastries whereas secular medical education and its applications in hospitals of today's understanding were to be performed in Muslim world.

* As the full text could not be made available, we are publishing here the abstract only.

Editors

While Christians didn't pay any attention to hygienic rules and didn't even advise them, in that era, *Islam* took it seriously and attached importance to cleanliness by regarding it as a half of the religion and prohibited or encouraged many salient points in temps of preventive medicine.

So the advanced status of Muslim medicine and pharmacy spread into through Sicily and Andulus in middle ages in Europe, and in a short time, the Islamic classics were translated into Latin and the understanding of medicine and pharmacy of Islamic civilization spread into Europe.

QUALITY CONTROL: PAST AND PRESENT*

Prof. Dr. M. Zuhair Al-Baba

SYRIA

ABSTRACT

Since the beginning, man has tried to take advantage of all living materials and minerals. The plant Kingdom was always to him representative of a great source for obtaining such materials for this very reason he found it as necessary to draw lines of distinction because food, "remedy" and poisons, depending in this respect mainly on his own senses and memory. The "Remedies" used by the ancient people were simple and made out of one material. However with the progress of civilisation drugs became more complicated consequently sophisticated methods have become necessary.

The prominant Roman scientist "Pliny" described a method to differentiate between the (Verdet) and the (Vitriol) so was Dioscrides who described a method of examining some drugs specially Opium.

Later on, after the appearence of *Islam,* Religion Of Arab Empire became vast and heterogenous and this in itself necessiated the setting up of a sort of quality control over almost everything including many drugs. Furthermore, a group of people was formed and was entrusted with the task supervising this activity. They were called "The Advisors". Subsequently several methods were newly verified for discovering adulteration and substitution of drugs. These methods were mentioned in details in several medical books of the time.

In Europe, the need to examine compounded preparations was less significant than identification of drugs, since the majority of physicians prepare their remedies and present them to their patients by themselves. At any rate, a large number of those physicians were personally concerned with collecting some of the local plants or managed to buy them from round market sellers.

Once drugs became available, from Orient, in large quantities during medival times and these drugs were subject to adulteration and deterioration. Thus the necessity to Arabic medical books became inevitable to the physicians of that time, for such books contain detailed description of many drugs and some of them contain a formula for compounded preparations besides some simple methods of examination of same. One of the well known books was "Liber Regius" or "Pentagni" which was translated by Constantinus Africanus (died 1087), "Cod d'Avicenne" which was translated by Gerardo Of Cremona in 1279.

The first Medical School in Europe was "S. Salerinatus" in Italy one of the most famous books of which is called "Antidoteirum Nicolai" which contains a lot of information about drugs based on the abovementioned Arabic Books.

In 1359, King Of France Jean Le Bon enacted a decree comprising that Pharmacists must obtain this book and prepare remedies in compliance with said book.

During Sixteenth century, Europe witnessed the appearance of new kind of medicine which depended upon the use of chemical compounds in treatment known as "Iatrochimy". This kind of Medicine is related to a German Chemist called "Paracelsus"(died 1670). It is also worth noting that a lot of his thoughts were derived from The Arabic Books. Paracelsus used distillation extensively in order to obtain a material he called "Fifth Element" (Quintessence) to which the effect of drug is attributed. Before French Revolution Broke out, two members of The Academy Of Science Of France started to examine a number of drugs while using distillation process as well. However, this examination came to be unfruitful, thus human senses remained the only way adopted in examination.

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* As the full text could not be made available, we are publishing here the abstract only.

Editors.

The appearance of "special preparation" in Europe (which was called"The secret remedies"),is of great significance in the development of drug examinationn particularly in the examination of the preparations that contain: Antimony, Arsenic and Mercury, besides examination of some drugs imported from The New World such as Ipecacuanha.

These preparations enjoyed a wide spread popularity in Europe while they had been purchased against high prices, thus The French Government, in 1728, started the manufacturing control of such preparation for two reasons:

1. To ensure that manufacturers are duly licenced and duly have necessary documentation.
2. Seeking to know the drug components of which remedy consists hence ensuring that it is free from any toxic materials.

However, research people started to resort to new methods both physical and chemical in order to have control over drugs both as to quantity and quality.

ANAESTHESIA IN ISLAMIC MEDICINE AND ITS INFLUENCE ON WESTERN CIVILIZATION

Prof. Dr. M. Taha Jasser

SYRIA

INTRODUCTION

Science and medicine belong to no ethnic or national group. Of the innumerable scientific discoveries made by man, only few are really the work of a single person, nation, generation and locality. Often a medical discovery is the summation of the many partial contributions made by predecessors throughout the ages.

It is unfortunate that leading historians have ignored the achievements of the orient as a whole and the Muslims in particular in the various fields of science and medicine. There is evidence that Islamic civilization has made enormous contribution to the progress of science and medicine. Suffice it here to mention the names of few great Muslims scientists whose gigantic contribution to the progress of civilization is presently enjoyed by all mankind. Of these were Alaa El Deen Ibnul Nafiess whose description of the pulmonary circulation antedated the confirmed discoveries of the renaissance period, by 300 years[1], Ibn El-Haitham the founder of optics and El-Khawarizmi the founder of Algebra, are other great scientific contribution from Islam. The purpose of this study is to highlight the discoveries of Muslims scientists in the field of anaesthesia which influenced the western civilization and still being used in practice at the present time.

ANAESTHESIA IN ISLAMIC MEDICINE:

The delay in the introduction of pain allaying drugs is attributed to the old belief in the west, that pain and suffering was the price paid by humans for sins[2].

Humanity is indebted greatly to the introduction of modern anaesthesia by Morton, Wells, Simpson and others[3]. Text books at hand, however, indicate that inhalational anaesthesia as such was not known before, and that there may have been some attempts, tried by the Greeks and Romans who are reported to have used magic and superstition, hypothermia and eral use of analgaesic mixtures[4].

The physicians of Islamic civilization were familiar with surgery and have practiced different kinds of surgical procedures such as amputation, tonsillectomies, excision of tumors, and in some instances describing technical details[5]. This extent of surgery could not have been performed without some kind of pain allayment. In addition, one of the reasons why the Muslims could make their way into the field of anaesthesia was the fact that the concept of pain as a punishment from God had no place in their belief and tradition.

There is evidence that the Muslims used to administer sedatives and analgaesic mixtures before a surgical operation. A question from Avicenna reads "A patient who wants to have an amputation of one of his organs must have a drink prepared from a mixture of Mandagora and other sleeping drugs"[6]. Other plants used for the same purpose were Indian cannabis *(Hashish)*, Opium poppies *(El-Khishkash)*, *Shweikran* (Hemlock), *Bhang* and hyoscyamus.

The Muslims scientists are also credited for the introduction of inhalational anaesthesia by using the then called "Anaesthetic sponge" or "Sleeping sponge". A quotation from Sigrid Hunke's book reads: "... the science of medicine has gained a great and extremely important discovery and that is the use of general anaesthetics for surgical operations, and how unique, efficient, and merciful for those who tried it, the Muslim anaesthetic was. It was quite different from the drinks

the Indians, Romans and Greeks were forcing their patients to have for relief of pain. There had been some allegations to credit this discovery to an Italian or to an Alexandrian, but the truth is and history proves that, the art of using the anaesthetic sponge is a pure Muslim technique which was not known before. The sponge used to be dipped and left in a mixture prepared from cannabis, opium, hyoscyamus and a plant called Zoan"[7].

In the field of chemistry, the ether bond (–O–) which is the basic radical in a group of anaesthetics is common use to day (Diethyl, ether, methoxyflurane, enflurane, fluroxene, forane) deserves special consideration. There seems to be some disagreement as to who synthetised ether first. Some sources credit Valerius Cordus who is said to have described the technique of its manufacturing in his book "Annotation on Discorides" (printed 1561) and called it sweat vitriol. Other sources claim that Paracelsus described the synthesis of ether in his "Opera Medico-Chemica Sive Paradoxa" (printed 1605) and reported its use in chicken. In this controversy Armstrong davison made the following statement: "... it is not certain that Cordus who died in 1544, deserves the credit of this discovery; Paracelsus "Von Honheim" who died in 1541 also described the synthesis of ether in his Opera Medico-Chemica Sive Paradoxa"(8).

There is evidence to indicate that physicians of Islamic medicine were the discoverer of alcohol and probably unknowingly of ether radical (–O–). It is well documented that alcohol was distilled by El-Kindi and although the name is a pure Arabic, coming from the original word *'Al-goul"* which means something which knocks down the brain, and it is mentioned in the Holy *Quran,* describing the wine of paradise as "Free from Al-goul" and those who try it will not suffer from hangovers[9,10]. Despite of that, there has been some attempts to credit the name to a western author. Eric, J. Holmyard (1937) came up with the following statement: "It was Paracelsus who first gave the name alcohol to spirit of Wine. Originally signifying the black eye-paint used by eastern women, al-Kuhl or al-Kohol had gradually acquired the meaning of any very finely divided powder; thence by a natural transference it came to mean the best or finest part of a substance. Possibly Paracelsus regarded Spirit of Wine the best part of wine and therefore named it alcohol of wine or simply alcohol"[11].

In another study made by M.Y. Hashimi (1968) the view of Holyard is adopted and Hashimi went further to say: "Alcohol is plural of Al-kuhl"[12]. Both views are in fact far from the truth. There is no word in Arabic such as alcohol, according to all Arabic dictionaries, Encyclopedias and literature. Al-Kuhl is a remedy put in the eye for treatment and there is no plural of this ward. The Arab as a proverb used to say (Fine as el-Kuhl) for solid substances and certainly not for the liquids and there is evidence that the name alcohol is a deformed conversion of Al-goul, a derivative of El-Igtial which means knocking down swiftly, the characteristics of wine as mentioned by poetry of some Arab poets before *Islam*[13].

On the other hand there is evidence that Sulfuric Acid was discovered by Al-Razi[14]. They used to distil alcohol by treating it with sulfuric acid. Considering that diethyl ether can be produced by the extraction of water out of alcohol ($2C_2H_5OH + H_2SO_4 \longrightarrow H_2O + C_2H_5–O–C_2H_5 + H_2SO_4$); it becomes likely that the old Muslims were first to lay down the basis for the synthesis of this essential anaesthetic substance.

In the field of restruction, the use of bellows (a prototype of Ambu) is restricted to the Society of Resuscitation of Drowned Persons of Amsterdam in 1767 and to the Royal Humane Society in 1771, some even credit the use of bellows to ventilate the lungs of Paracelsus (1493–1541)[15]. However there is evidence that Muslims of the 13th century A.D. were familiar with resuscitation of respiration using the bellows. The following abridged anecdote is taken from Ibn Abi Usibia "Calsses of Physicians"[16] (Ar. Tabakat El-Attibaa)[17] written in the 13th century. The author was a learned physician and oculist who lived chiefly in Cairo and died in 1270 A.D.[18].

Ibn Abi Usibi'a narrates[17]:

"El-Rashid (Emir El Mou'mineen, or Prince of Believers) would not eat unless his physician Gabriel Ibn Boukhtaishou was present. One day Gabriel arrived late to dinner and begged forgiveness of El-Rashid saying that he was busy trying to medicare the cousin of the Emir (Ibrahim Bin Saleh), who was very ill and that he did not think that the cousin would survive longer than the pray of darkness. On hearing this, the grand Vezir Jafar Ibn Yahya interfered and said: "Great Emir El-Mou'mineen, I know one by the name Saleh Bin Bahla who is familiar with the Indian way of medicine and I would suggest seeking his services". Saleh Bin Bahla was summoned and ordered to examine the Emir's cousin, Ibrahim and report back to the Emir. On completing his examination, Saleh Bin Bahla reported saying: "Be humble enough your Majesty, Prince of Believers to be my witness that if your cousin expires tonight, every pet I own will be sacrificed for God, and whatever fortunes I have will be gifted to the poor". When the time of the evening prayer came, the death of cousin Ibrahim was announced. On hearing the news, El-Rashid started to blame Saleh. Saleh kept silent for a while and then shouted: *Allah, Allah* (God, God) your Majesty Prince of Believers, I urge you not to bury your cousin alive. Your cousin is not dead. Please allow me to see him again". Permission was granted, Saleh brought a bellow and a snuff called *(El-Kundus)* and started to inflow through the nose of Ibrahim for round twenty minutes. Soon the body of Ibrahim began to shake, then he sneezed and sat in front of El-Rashid, Ibrahim survived, married El-Rashid's sister, Princess El-Abbassia and was appointed governor of Egypt and Palestine".

CONCLUSION

Science has no native home of its own and every person has the right to ask for it. When the talents and circumstances exist, new horizons can be discovered. The Muslims are first in the list of the nations who had the honour of holding the torch of civilization for quite a while and made a great contribution to basic sciences, upon which the modern technology and progress is raised. In the field of anaesthesia and resuscitation, the contribution of Islamic civilization is enormous and its influence on the western civilization is profound and discoveries made have laid down the foundation of modern practice.

Today the Islamic nations are invited to contribute more and more and they are quite capable to do right that again.

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DISCUSSION

Dr. Farukh Hussain

Thank you Your Excellency, I am a Psychiatrist, living and practising in London but originally from Pakistan.

The point I would like to make is that the message we have received through out this session is that the past was glorious. Perhaps another meaning would be that the future will be brighter. But what is about the present? The present is like a chain, always linking the past with the future.

I would like to add one thing here that the discoveries of the Muslim Scientists were not chance discoveries; as if somebody jumping into a tub of water and shouting "Eureka", or somebody having an apple fallen on his head or having a mould of fungus grown in a plate, but these discoveries were very systematic. They were not only clear observations but they were very clear thinking and behind it was the belief. The belief was not only in one God and one Prophet (ﷺ) but also in one Glorious Holy Book i.e. the *Quran*, which is the basis of all what we have said today. And I feel that as long as this message is there, "that we have got to not only unite, which we already are on the basis of religion but also in communicating to one another", what ever we think is appropriate for the moment.

Part Two: *The Influence of Islamic Civilization During the Renaissance Period in The Field of Medicine or its Allied Subjects.*

CHAPTER TWO

(Some Selected Papers - Not Presented)

1. TIBB IN TURKEY
   Hakim Mohammed Said
2. THE INFLUENCE OF ISLAMIC CIVILIZATION ON EUROPEAN CIVILIZATION DURING THE RENAISSANCE PERIOD, IN THE FIELD OF MEDICINE OR ITS ALLIED SUBJECTS
   Prof. Abdul Mottaleb
3. ROGER BACON'S 'SCIENCE OF EXPERIENCE'
   Prof. Eric Forbes
4. ABSTRACTS OF CONTRIBUTIONS OF ISLAMIC MEDICINE TO UROLOGY
   Dr. A.M. Dajani
5. ISLAMIC MATERIA MEDICA AND THEIR INFLUENCE UPON THE WEST: A STUDY OF SOME ASPECTS
   Hakim Mohammed Said, etal

TIBB IN TURKEY

Hakim Mohammed Said

PAKISTAN

INTRODUCTION

Scholars and seekers of knowledge turn to history for a true understanding of the causes of the rise and decline of nations and for a proper assessment of the components of different civilzations and cultures, their distinctive features, their unique achievements and their socio-economic structures. Composite, non-partisan history is the only means available to man of co-relating the past and the present. It enables him to build a dynamic and viable future on the basis of conclusions it leads him to draw from the failures and successes of people and nations in ages gone by.

The invaluable contribution of Muslims to the art of history-writing has been universally recognised throughout the ages because Muslim historians conformed to the highest principles of truth and honesty, impartiality and objectivity in recording facts and event and in the analysis of historical forces. They always showed a masterly grasp of the cross-currents and under-currents that unobtrusively shaped events and movements of world importance. They totally rejected as undependable all data which was not verifiable to the minutest detail or where the integrity of the source was in any way found doubtful.

An honest writer of history sifts all material at his disposal, separates facts from fiction, discards what to him appears to be interpolation by vested interests and uses only that part of his material which has stood all scrutiny and has been proved totally authentic.

To write the history of a people is to discuss, in depth, its aspirations and ideals, its beliefs and folkways and its primary socio-economic institutions. The historian is required to evaluate its culture and its achievements in the domain of art and literature, its legal system, its moral and social values. To be able to do justice to his subject, he must have its total picture before him - and this picture cannot be complete without an adequate knowledge of the general standards of the health of the community, the diseases prevailing in it and the medical facilities available to it. A standard work of history must therefore contain a knowledgeable account of the health culture of the people whose story forms the subject of that work. A work of history that falls short in this vital matter – the general state of the health of the people has a most important bearing on all other aspects of its passage through time – cannot be accepted as a comprehensive and complete document. Health is a major factor in the rise and decline of nations. Consequently a well documented account of the collective efforts made by a people to improve general health standards and the preventive arrangement instituted by it against the spread of diseases will go a long way in enabling readers to judiciously evaluate its motivation in the pursuit of progress and to make a fair assessment of its attitudes and ideals.

Turkish history is certainly very intersting in this respect. Every phase of it fully sustains the reader's interest, whether it is the Seljûq period of the Ottoman period or the time of Mustafa Kemal. I am certainly not in a position to state with any authority whether Turkish historians did make any mention of the people's health, prevalent diseases and their available treatment in their works out I do feel that if, while talking on the subject, I make a few points about the history of Turkish medicine and health-culture, it will certainly help not only in a better critical appraisal of available Turkish works of history but may also in some small way assist future Turkish historians.

I would like to mention, here, an example, to elucidate my point.

When we undertake a review of hospitals in ancient Turkey, from a historical and philosophical standpoint, we come across a common feature, which leaves a clear and lasting imprint on our minds. Every ancient Turkish hospital had a very large and well-organised department of Psy-

chopathology. And furthermore, the depàrtment of the hospital dealing with mental disorders had among its panel of physician singers and instrumentalists whose number was larger than that of traditional doctors who prescribed drugs and medicines to treat the patients. This one historical fact regarding health arrangements in ancient Turkey brings many other important facts to light which need a close and careful study by specialists. Some of these are:

a) Was mental illness a national problem of such magnitude that it made it absolutely necessary to take large scale measures to meet it and to set up massive organisations, comprising large number of specialists, at every hospital to handle patients' suffering from mental disorders?

b) Where did the concept of music therapy for mental ailments originate and wherefrom did it come to Turkey? Or was it Turkey's own contribution to the art of healing?

c) How effective was this music therapy? What was the comparative percentage of cure in treatment by medicine and treatment by music; and what was the overall average of cure in mental diseases? Which particular melodies were found to be curative and which medicines produced positive results?

d) Which class of society was more prone to mental disorders? Was the percentage of mental illness larger amongst the nobility - the affluent people - or did it make greater inroads amongst the impoverished people? This investigation is of vital importance because the date thus obtained will provide definite clues to the financial and economic conditions prevailing in those times and the impact they had on the various sectors of the community.

e) The preponderance of mental diseases is not only an indication of widespread economic adversity but also an open symptom of social unrest. Political chaos creates emotional irritants in society and these in their turn lead to psychoneurosis and other mental disorders.

f) If psychosis and loss of mental equilibrium become common amongst the affluent people and the politically dominant nobility this will have an adverse effect on their decisions and their wrong decisions and imbalanced administration and state policies will in turn create a state of violent disequilibrium in the country and the people.

If writers of Turkish history have, in their research and investigative study, generally ignored this important fact and have not given it due importance while producing their works, we can say, with full conviction, that such works are not based on a total grasp of facts and consequently will impede the work of drawing dependable conclusions - imperfect major and minor premises will produce nothing but erroneous deductions.

The study of Turkish history brings into light an institution of primary importance and that it is public charities. We come across a great number of such charities and when we have a close look at the charity covenants - we are struck by the fact that each document consists of two hundred and fifty pages or more. The volume and size of the legal documents pertaining to these charities itself deserves to form the subject of exclusive research.

The Turks have undoubtedly always been true and fine Muslims. Their love for *Islam* is a glorious tradition that has shone through the ages and shines today as resplendent as ever. One can confidently assert thàt they have always fondly cherished the important Islamic institution of public charities and held it in absolute respect. Public charities in Turkey have by and large comprised:

a) Hospitals
b) Mosques
c) Serâis (inns)

The profound attachment of the Turkish nation to these three institutions evokes the following thoughts in one's mind:

1) Does the fact that a very large number of hospitals was set up by the government and/or philanthrophists mean that diseases were rampant in Turkey and ill-health was a mass phenomenon? Was this general state of ill-health due to the absence of an efficient health service or was it brought about by impure water and contaminated foodstuffs? Was the supply of defective food caused by adulteration or by the negligence of the administrative hierarchy?

2) The construction of mosques in such a large number as we find in Turkey is an undeniable proof of the great love the Turks had for *Islam* and shows that they were zealously regular in offering congregational prayer and in paying the *Zakat*.

3) The existence of a very large number of inns makes one wonder whether the Turkish people were compulsive tourists who loved to travel around or they were forced by prevailing conditions to lead a peripatetic life or whether still economic adversity made them move from place to place in search of livelihood.

DETAILS OF MEDICAL TREATMENT

One problem that confronts all students of Turkish history is lack of any clues about methods and principles of medical treatment in Turkey. The total dedication of its people to *Islam* leads one to assume that their principles of medical treatment were based on and in conformity with the teachings of the *Qur'an* and the *Ahadith* of the Holy Prophet(ﷺ).

In all likelihood they followed the dictates of nature and the use of medicinal herbs was in vogue. But this at best is an intelligent guess. The matter, indeed, requires in-depth investigation. The close Turco-Arab association in socio-political matters, which is spread over many centuries, does suggest that the two peoples might have actively collaborated with each other in medical research and kept up a fruitful exchange of medical information.

THE OTTOMAN TURKS AND THE SCIENCE OF MEDICINE

The most outstanding achievements of the Turks in Muslim history were in the political and military fields. Political leadership of the Muslim World passed on to the Turks during the eleventh century and their predominance as a world power lasted for almost seven centuries. During this long and distinguished period they not only won glory for themselves on the fields of battle but received universal acclaim for their magnificent services in the evolution of a world civilization.

They did not lag behind other peoples in the field of intellectual and scientific pursuits and used the pen as skilfully as the sword. Their contribution to the fund of human knowledge and civilization is second only to that of the Arabs and the Persians. But because of the fact that during the early centuries of the Islamic era, Arabic was the academic language of the entire Muslim world and racial and nationalistic parochialism had been rooted out almost completely by the universal teachings of *Islam*, the many remarkable contributions made by the Turks in the scientific field remained unattributed to them and were included in the genre of Muslim or Arab heritage. In the early period of Islamic ascendance, the Turks had so submerged their identity in the Islamic fraternity that they did not care for any distinct position either for themselves as a separate people or for their language. This distinguishes them from the Iranians who were always deeply conscious of their separate nationhood. It was because of their total identification with *Islam* that for many centuries the Turks used the Arabic and the Persian languages as the only media for their scientific and creative writing.

The Turks made valuable contribution to the medical science as they did to religious thought, philosophy, mathematics and astronomy. Turkish physicians wrote original treatises on medicine and Turkish sovereigns were generous patrons of medical research. The name of General Fâteh Ibn Khâkân will also shine in the Turkish Roll of Honour for establishing the fifth biggest hospital in the Muslim World at Baghdad in the time of Abbasid Caliph Al-Mutawakkil (232–247 A.H.); also will the name of Ahmed bin Tolon, Turkish Governor of Egypt who founded the sixth biggest

hospital of the Muslim World in Fastût. This incidentally was the first hospital in the Mulsim World which was given a vast land endowment to meet the expense of running it. This heralded the start of the noble tradition of founding hospitals for the welfare of the suffering humanity which was amply enriched by successive regimes, all of which were Turkish, with the exception of Bani Buiyah and the Ayyubites - the latter being Kurds who were, racially, near kinsmen of the Turks. This tradition of patronage to medical research was inherited by the Ottoman Turks, through the Seljûqs of Anâtôlya and Memlûks of Egypt who succeeded the former in Anâtôlya and the latter in Egypt.

How right is Suheyl Unver, Director of the Institute of the History of Medicine in the Istanbul University and himself a distinguished research scholar who has done most noteworthy work on Turkish medical classics, when he says "Ottoman medicine is a continuation of the medicine of the Seljûq period both in its basic concepts as well as in practice".

Mohammad Tâhir Bursali in the third volume of his book *Osmanli Muellifleri* has written a detailed account of the work of eighty-six Turkish authors – the list does not include those men of medicine who, although they had written books and treatises on medical subjects, are generally known for their contributions to other disciplines and branches of knowledge. In the appendix, Tâhir Bursali has mentioned the names of 53 medical books written by such writers in the Turkish language from the period of Mehmed the Conqueror to the establishment of the Academy of Medicine in 1827 A.D.

During the reign of Mehmed the Conqueror, was created the high post of Raeesul Atibba (the Chief Physician). The medical affairs of the state and matters of Public Health and Hygiene were the responsibility of the Chief Physician, which means that the said post was equivalent to the present day ministrial portfolio of Public Health. Tâhir Bursali has in his scholarly works given the names of sixty-three eminent physicians who held this post under different rulers from the period of Mehmed the Conqueror to the time of Mahmud II (1808–1839).

It is gratifying to note that serious and sustained efforts have been made in modern Turkey to preserve this invaluable medical heritage, and the innumerable books on medicine in the Arabic, Persian and Turkish languages which lay scattered in different libraries are being collected at one place and a large number of such works has been carefully catalogued and preserved in the Institute of the History of Medicine at the Istanbul University. With the availability of this priceless storehouse of ancient knowledge, work of present-day Turkish medical scientists has been considerably facilitated. Given below is a brief evaluation of the Turkish works on medicine in the light of the excellent work done by Dr. Abdul Haq Ednân Edivar, Dr. Suheyl Unver, and other eminent scholars.

The Arabic and the Persian languages held sway amongst the Turks till the 15th century and like the Muslim students and scholars of the South Asian subcontinent they received their education in these languages and later wrote their works in the same and as Urdu gradually replaced the two languages in the subcontinent so did the Turkish language in Turkey – the only difference being that in our land this process began during the 19th century whereas it started in Turkey during the 15th century.

Turkey was a conglomerate of small fiefdoms, which had come into existence at the disintegration of Seljûq Kingdom in Kônya, till the Ottoman state was founded at Sôgut towards the end of the 13th century. It was in these small fiefdoms that the Turkish language received official patronage for the first time. A beginning was made in compiling books on medicine in the Turkish language in two small princedoms called Aydin Ogullari and Menteshi Ogullari which were located in south western Turkey. These two princedoms along with the small states situated in Anâtôlya became protectorâtes of the Ottoman state at the end of the 14th century and were incorporated in it in the beginning of the 15th century. It is quite justified therefore to view the local medical work of this period as the starting points of the pursuit of medical research in the Ottoman Empire.

The first major book on medicine of this era is the translation in Turkish of the classic *Kitab-ul-Jami fil Edviyet-ul-Mufrede* by the renowned Spanish physician and botanist Ibn-i-Baytâr which was compiled under the title *Mufredât-i-Ibn Baytar* at the behest of Umur Bey (741–749/1340–1348), the ruler of Aydin.

Practical work in the field of medicine was undertaken for the first time in the Ottoman State during the reigns of Murad I (1359–1389) and Bayazid Yaldrum (1389–1402). During this period a scholar called Murâd-bin-Ishâq or Ishâq Bin Murâd, about whom little is known, wrote a book entitled *Havas-ul-Edviye* in 792 Hijra/1387 A.D. which is the first work on medicine in the Turkish language in the Ottoman period.

This book contains brief description of the properties of single remedies, Dr. Abdul Haq Ednân is of the view that this treatise depends for its material on the well-known classic *Zakhira-e-Khwarzam Shahi* by Ismâel Jarjâni and Ibn Sina's *Kanun.* Contemporaneously with *Havas-ul-Edviye* or a little earlier an anatomist of Bergama translated in Turkish *Kamil-us-Sinaa* a masterly work by the renowned physician of Buveyhi period Alî Ibn Abbâs. This book was universally accepted as the most important and authentic medical work in the Muslim world till the compilation of *Kanun* by Ibn Sina. It was the second most important piece of translation in Turkish after *Mufridât-e-Ibn-i-Baytâr.*

After this rather brief account of early works on medicine we come to the great Turkish man of medicine Hâji Pâsha of Kônya (died 820 Hijra/1417 A.D.). Although a citizen of Ayden, he was a contemporary of Sultan Murâd and Sultan Bâyazîd Yaldrum during whose reign this small state was incorporated in the Ottoman Empire. Consequently Hâji Pâsha spent his last years in the Ottoman State. Hâji Pâsha had received his education in Cairo along with the distinguished Turkish religious scholars Mulla Finâri and Sheikh Badrud Din bin Qâzi Samâvana and the Turkish poet and philosopher Ahmedi, Later on, he started working in the same city as the Chief Physician in world famous hospital set up by Mansur Kalavun. Having served in this capacity for some time he returned to Turkey at the invitation of Fakhruddin Isa, the ruler of Ayden.

Hâji Pâsha wrote numerous books on medicine and other subjects in Turkish and Arabic. His most important work is entitled *Shifa-ul-Eskam Fid Dava-ul-Alam* which he dedicated to Fakhruddin Isa in 783 Hijra/1381 A.D. The original manuscript of this work in Hâji Pâsha's own handwriting is preserved in the library of the Top Kapi Museum, Istanbul. Besides, handwritten manuscripts of this book are available in many libraries in India, Egypt and Istanbul, which is an evidence of the universal acclaim received by this work all over the world. The most significant feature of this book is that the author has scrupulously avoided unnecessary details and has confined himself to dealing with the heart of the matter. The book comprises four treatises as detailed below:

1. Theoretical and practical information.
2. Drinks and eatables. This chapter according to Dr. Abdul Haq Ednân Edevar is based almost completely of Ibn-i-Baytâr's *Al-Jami.*
3. Diseases of all limbs from head to foot.
4. Diseases of the entire body (organic diseases).

Although this book in its basic approach is based on the *Principia Medica* and theories of Ibn Sina and the ancient Greek system of medicine yet he has also set down his own views and observations. Later on Hâji Pâsha produced a Turkish version of this book under the title *Teshil us-Shifa* so that the largest number of his countrymen could benefit from it. The most probable date of its completion is 1408 A.D. Names of other books written by Hâji Pâsha are *Kitab-us-Sa'ada, Kitab-ut Talim, Muntakhabush-Shifa* and *Ikhtilaj Nama. Muntakhabush-Shifa* is in Turkish. In addition to these books he wrote a treatise on "Piles". Due to the large number of his writings on medicine and the profundity of his observations he enjoys the same high position in Turkey that Ibn Sina holds in

the world of *Islam*. We have good reason to call him the Ibn Sina of Turkey.

During the period i.e., Hâji Pâsha's lifetime, some of the other medical books produced in Turkey or translated in Turkish are given below:

1. Sh. Jamâlud Dîn 'Aqserai produced an abridged version in Turkish of Ibn Sina's *Kanun* under the title *Mujezul Kanun* which became very popular in Turkey.
2. A fellow student, in Cairo, of Hâji Pâsha and Turkey's major poet Ahmedi wrote a book in verse entitled *Tervihul Erah* in which according to Dr. Abdul Haq Ednân Edivar after a brief but comprehensive expose on (the science of anatomy) he has discussed diseases and the methods of treating them. This book was dedicated by him to the Ottoman Prince Emîr Sulemân (1403–1410).
3. The *Muntehab* of Abdul Wahâb, which is dedicated to Sultan Mohammed Chalepi (1403–1421).

Although founding of hospitals does not come under the purview of this article yet it seems to be necessary at this stage to give a brief account of the setting up of the first hospital under the Ottomans. This hospital was founded by Bayazîd Yaldrum in 802 Hijra/1400 A.D. at Brosad and it comprised 4 large and 22 small cubicles (wards'). It had on its payroll three doctors and 2 compounders. All patients received medicare irrespective of race, colour or creed. Although there is no mention of a medical school in the testament of the hospital but many Turkish research scholars are of the view that a medical school was attached to the hospital and was called "Dârut Tibb" (Faculty of Medicine). This hospital-cum-medical school was established at a time when no European country had a similar institution of such excellence. Subsequent to the founding of the medical school at Brosad, the Ottoman Turks founded the second medical school in 1470 A.D. during the reign of Mehmed the Conqueror and the third one in 1555 during the reign of Sulemân the Great. Only a few ruins are extant of the first hospital but the buildings of the third hospital are being used for different purposes even to this day. The setting up of medical schools is a proof of the fact that the Ottoman Turks did not confine their patronage to hospitals and compilation of medical books but took all necessary steps to promote teaching of the medical science in properly equipped institutions.

As we move on in the fifteenth century we come across many medical treatises which were written during the reign of Sultan Murâd II (1421–1451) and some of which are dedicated to the royal patron. Perhaps the most important work of this period is *Zahirei Muradiye* written by Mumin Bin Mukbil in 1437 A.D./841 Hijra. Hakim Mumin is now more widely known in Turkey by the name of Mumin Zâde Mukbil. He has discussed diseases of the brain, the head, the eye, the ears and the stomach in 5 chapters. One of the finer points of this book, according to Dr. Abdul Haq Ednân is, that in it Arabic technical terms are followed by their Turkish equivalents. The book is well arranged so far as its topics are concerned. The most detailed discourse is on the eye and pictures of instruments used in eye-surgery are also given in the book. But it does not have many personal observations and is on the whole, a compilation, deriving most of its contents from Arabic and Persian books. His main source is the *Zakhira-e-Khwarzam Shahi.*

Hakim Mumin Bin Mukbil compiled another book which is entitled *Miftahunnur* in which a brief discourse on general health and anatomy is followed by discussion in depth on diseases of the eye. The compiler also enumerates the qualities that a good physician, in his view, ought to possess.

Dr. Suheyl Unver makes a mention of two more noteworthy medical books produced in the time of Sultan Murâd II. One of these is *Tuhfi Muradi* written by Hakim Mahmûd Shervâni and the other, a work in three volumes, entitled *Kamal Name,* written by some anonymous physician. *Tuhfi Muradi* is devoted entirely to precious stones and their medicinal properties.

Now we move on the time of Sultan Mehmed the Conqueror and his son Sultan Bâyazîd II (1481–1512 A.D.). These two empire builders (1451–1481) were also generous patrons of art and learning. Besides other branches of scientific enquiry which flourished during their reign, a number of important books were also written on the science of medicine. The most distinguished surgeon and physician in Sultan Mehmed's time was Sherfeddin Sabuncuuoglu who was a resident of Amâsiya and worked as Director of the local hospital for 14 years. Later, he translated in Turkish the renowned classic *Attasrif* written by the great Andalusian Physician Abul Kasim Zehravi. He presented, this compilation, to which he gave the title *Carrah Nama-e-Elhani,* to Sultan Mehmed the Conqueror. The great physician wrote this book three times – the first translation was probably done in 1465 A.D./870 A.H. and the third version in 1468 A.D./873 A.H. The manuscript of the first version is preserved in the library of the Institute of Medical History, University of Istanbul, the second is available in the National Library of Paris and the manuscript of the third version lies in the library of Eli Emiri. The second and the third manuscripts are in the hand writting of the translator himself, and are well illustrated with sketches. The book contains 398 pages and is the first significant work on surgery in the Turkish language.

Although, basically it is a work of translation from Arabic, yet the compiler has given his own observations as well and has added pictures of surgical instruments, some of which he had designed and manufactured himself. These instruments are by and large, modified versions of instruments already in use.

The second book of Sherfeddin Sabuncuuoglu is entitled *Mucerreb Name* in which he has recounted medical experiments conducted by him personally. He produced anti-snake bite serums and before making their experimental use on human beings he tried them on birds.

During the same period renowned physician Eshref bin Mehmed wrote a book *Hazainus Sa'adat* and presented it to Mehmed the Conqueror.

Another important work on medicine, of the period is *Yadgar Ibn-Sherif.* Although it has not been found possible to correctly determine the exact date and year of its compilation, yet Dr. Abdul Haq Ednân is of the view that it was written sometime after the conquest of Istanbul in 1453 A.D. Quite a large number of manuscripts of this book are still extant, which is a proof of its wide popularity. The book contains discussions in depth on air, water, place of residence, drinks, eatables and garments. In the discourse on wine the author has enumerated its medicinal uses.

Another important medical personality of Sultan Mehmed's time is Ahi Chelebi (d. 1523 A.D./ 930 A.H.). Although he came into prominence during the reign of Bayazid II, who had much faith in his skill as a physician, Ahi Chelebi lived very long, and died at 90 during the reign of Sulemân (Kanûni). He was the Director of the hospital at Ederne. He is remembered for a treatise that he wrote on stones in the kidney and the bladder. And Although the remedies he has prescribed are by and large derived from Ibn Sina's *Kanun,* he has added to them some valuable personal observations. In addition to this treatise, the Turkish translation of *Mu'cez-Fit-Tibb* a work by the renowned Egyptian Physician Ibn-Nafîs is also ascribed to Ahi Chelebi. But Dr. Ednân holds the view that the translation was done by Chelebi's father Ehmed Kemâl who himself was a distinguished physician.

Under Ahi Chelebi's instructions a Jewish physician named Mûsa Calinûs Israeli wrote a medical, treatise, the distinctive feature of which is that a mention is made in it for the first time, of European men of medicine and good use of their researches is made in it.

During the reign of Bayazid II a Greek work was also translated in Turkish. This ancient book was found during the expedition against Morea and a Turkish surgeon named Ibrâhim Bin Abdullah Cerrâh translated it in Turkish under the title *Cerrah Name.*

A mention was made in this book for the first time of a disease which was called "European Disease" and appeared in the region during Charles VIII the French King's expedition against Naples in 1405.

Approximately during the same period Ehmed Bin Bâli Fekîh translated in Turkish Necmed Dîn Mehmûd Shîrâzi's (d. 1330) book *Havi-i-Saghir* under the title *Mecma-ul-Mucerrebât,* and made valuable additions to it.

Amongst the medical works written during the time of Sulemân Kânûni (1520–1566) is a book entitled *Munafeunnas* which was written by the leading medical authority of his time Mehmed Kaysunizâde. The second noteworthy book is *Kamus-ul- Hikme Wa-Tibb.* This book is based on the work of Ibn Baytar and subjects are arranged in alphabetical order. Another special feature of this book is that every name and term is given in Arabic along with its equivalent in Turkish. During the time of Sulemân Kânûni *Mucez* by Ibn Nafis was translated once again in Turkish. This translation was undertaken by post Surûri at the behest of the personal physician to Prince Mustafa. If is a literal translation which contains occasional explanatory footnotes. Dr. Abdul Haq Ednân has observed that this work of translation is a big help to those who want to learn the Arabic language.

Among other doctors of medicine who flourished in the Ottoman Empire outside Turkey proper, the most important was Dâûd Bin Omer Antâki who lived in the 16th century. He belonged to Syra-Egypt and was a philosopher and mathematician of note besides being one of the leading figures of the medical discipline. He wrote a number of books on philosophic subjects and mathematics but his most significant work is his medical book *Tezret-ul-Elbab* which is also famous under the title *Tezret-ul-Antaki.* This book received wide acclaim in Turkey and other Muslim States. Seven editions of this book were printed in Egypt between 1254 A.H. to 1324 A.H. It was probably written by the author in 972 A.H.

Dâûd Antâki was well versed in the Greek language also. In his *Tezret-ul-Elbab,* after giving some general information about medical subjects he has written notes on leading Greek and Arab men of medicine. His account of single remedies is based on *Aljami* of Ibn-e-Baytâr. but it is enriched by description of the results he obtained by personally carrying out experiments on them. Dr. Abdul Haq Ednân states that whereas Ibn Sina mentioned eight hundred single remedies and medicines in *Kanun,* Antâki in his work describes one thousand seven hundred and twelve single remedies and medicinal ingredients which can be used medically.

This is followed by a brief discourse on anatomy and he has, in this connection, recommended the study of his other book *Nuzhet-Fit-Teshrih.* In the second part of the book he has mentioned diseases in alphabetic order. Antaki's second most important work is *Ennuzhet-uf-Mobhice Fi Teshhiz-ul-Ezhan.* Its subject is pathology. Its style and approach is philosophical and the author claims that no other scientistist has ever written on this subject. Dâûd Antâki wrote an annotation and commentary on Ibn Sina's *Kanun* and named it *Nazm-Kanuncek.*

The most important contribution to the science of medicine in the 17th century is the book *Enmuzec-ut-Tibb* which was written by Emîr Chelebi, the Chief Physician in the royal court of Murâd IV. Emîr Chelebi too had, like Ahmedi and Hâji Pâsha, received his education and training in Egypt and had worked in Kalavun Mansûrya Hospital at Cairo. He died in 1638 A.D./1048 A.H. Dr. Ednân observes that he emerges as a master physician in this book. This book like many others on medical science begins with a discourse on animals, different regions of earth and different climes and then follows the description one by one of known diseases and their treatment. He maintains that it is not prudent to blindly accept all that the medical experts of earlier ages have left behind and a man of medicine should, as a matter of principle, make experiments personally and observe the progress of the disease and the working of remedies. He has quoted examples in the matter. He concludes the book by laying great emphasis on the study of anatomy and the need for further development

in this science. He suggests that to further improve man's knowledge of the human organism,, experiments can be conducted on the corpses of war casualities. And if this is not found possible experiments should be carried out by using the dead bodies of monkeys and pigs.

Dr. Suheyl Unver has mentioned another book on anatomy written during this period which was written by Shamsuddin Erâki and has observed that it is a very useful work. It is quite likely that this book is the same to which Dr. Abdul Haq Ednân has referred in his book *Osmanli Turklerinde Ilim* as *Teshrihul Abdan* by Shamsed Din Shervani and which he has discussed in some detail. This book was written between 1629–1631 during the time of Sultân Murâd IV. One part of the book comprises the translation of Ibn Sina's *Kanun* and of *Sharh-i-Teshrihul Kanun* by Ibn Nafis. It contains some beautiful drawings. The compiler has in his introduction to the book, described in detail different parts and limbs of the human body and discussed anatomy after writing a discourse on the four elements, different temperaments and compound medicines. He discusses the the anatomy of the womb and has shown its place, in a drawing of the female body, to illustrate his point about surgery of the womb. It also includes a chapter on Embryology. Dr, Abdul Haq Ednân has expressed the view that the most important source on which the author has drawn is *Tesnrih-ul- Beden* by Mehmed Mansûr Hâji Ehmed which was written in Persian in the 9th century A.H. He bases his view on the similarity that the arrangement of this book and its drawings have with the Persian work. This book by Mohammad Mansur and received universal acclaim and was printed in Lucknow. India, in 1265 A.H. under the title *Teshrih-e-Mansuri.*

The books written in Turkey during the seventeenth century included some whose Turkish authors drew, for the first time, on Latin, Italian, French and German sources, although in a very small way. Turkish writers were introduced to European medicine by foreign doctors who were attached to European diplomatic missions in Istanbul. After the discovery of America, certain goods having medical properties reached Europe from the New World and from there they came to Turkey. These included Quinine and Ipecac. One of the first examples of European influence perhaps is *Gayet-ul-Beyan Fit-Tadbir Beden ul Insan* - a book written by Sâleh bin Nesrullah Helebi (d. 1670) which the compiler, presented to Sultan Mehmed IV and received a reward for it. This book includes discussion of some new diseases which were spreading in Turkey. He avails himself of the expertise of European medical specialists and talks of new drugs and methods of treatmst. Sâleh bin Nesrullah also compiled other books which included *Gayet-ul-Itkan* and *Gayet-Fit-Tibb.* The latter deals with external and internal diseases, skin diseases and cosmetics. The writer discusses the properties of some mineral and organic poisons. *'Geyat-ul-Itkan'* was later on translated in Turkish, during the time of Sultan Ahmed, by Mustafâ Faizullah.

Sâleh Nesrullah also translated in Turkish a book entitled *"Basilica Chymica"* written by a European medical scientist named Oswald Croll (d. 1609) which is preserved in the Berlin Museum. Besides, translations in Turkish of the medical writings of a German doctor named Paracelsus (1493-1541), who was the first writer to strongly criticise the medical theories, of Galinus and Ibn Sina – are also ascribed to Sâleh Nesrullah.

Although Sâleh Nesrullah and Hayâti Zâde were well-acquainted with European medical experts and their writings – which proves the fact that Turkish men of medicine had established contacts with Western medicine yet Dr. Ednân wonders at the obvious ignorance, despite these contacts, of Turkish doctors of the new medical findings and discoveries of European researchers.

During this period Mehmed Bin Ahmed translated in Turkish Ibn Baytâr's medical classic *Kitab-Mugni fil-Edviyet-il-Mufride* and also wrote a commentary on it which he named *Mualejat-i-Sheykh Ibn-uz-Baytar.* This work he had undertaken in compliance of the orders of Hussain Mustafa Pasha - the ruler of Hungary.

Dr. Ednân Edivar has written about Greek Physician Alexander Mavrocordato who received his education at the Italian University in Padua and wrote a 150-page dissertation in Latin in 1664 A.D. on blood circulation and the function of the lungs. In this book after discussing the theorities of blood circulation put foward by Hippokerates, Galen and Vesalius he gives an exposition of the theory advanced by Harvey in his famous work *De Motu Cordis* in regard to blood circulation and compares it with earlier theories. This author had very close links with the royal court at Istanbul and he was the personal physician of the French Ambassador to Fâzal Ahmet Koprulu Pasha, President of the Council of Ministers. Dr. Ednân wonders why despite his position of importance he remained so little known in Turkey as a physician. He did not create any impact even on the local practitioners of the art of healing. It was because of this fact that the Turks remained unaware of the new research on blood circulation and it finds no place in new medical books published in Turkey.

Two important medical lexicons were produced in Turkey in the 17th century. The first was compiled by Hussain Hazârfan and is entitled *Lisan-ul-Etibba.* The first part of this book contains Arabic words along with their Turkish translations, the second half is devoted to Turkish words with their Arabic translations. The author has also given the Greek names of drugs and medicines, has discussed in some detail diseases and temperaments and in the concluding chapters has given an account of authentic treatments of important cases by leading Arab, Iranian and Greek physicians.

The second medical dictionary was compiled by Hakîm Ehmed Bin Ibrâhîm, who was closely connected with the Indo-Pak subcontinent, After completing his education at the Ederna and Istanbul University he came to India and became special physician to Emperor Shahjehan. On return from India he compiled in 1670 A.D. or 1080 A.H. a voluminous medical lexicon entitled *Kamus-ul-Etibba.* In his foreword to this work he states that he has also translated the works of Râzi and Ibn Baytâr. .

Another distinguished physician of this century, with close links with the court of Sultan Ebrâhîm (1640–1648) was Eli Effendi (d. 1649) who wrote the following three books.

1. *Deva-ul-Emraz*
2. *Nizam-ul-Edviye*
3. *Mufredat*

Many books were written on the science of medicine in Turkey during the 18th century. Shabân Shifai wrote two books on child birth, mother and child care, post-natal diseases of the mother and the baby and upbringing of the child. In one of these *Tadbir ul Mevlud* written in 1112 A.H. the views and observations of Zakariyya Râzi, Ibn Sina and Hâji Pâsha are presented in lucid Turkish.

Another book *Feraid-ul-Mufredat* appeared in 1166 A.H. The name of its author remains unknown. Although a lexicon, it mainly discusses plants and animals rather than medicines. Names of plants and living organisms are given in Arabic, Persian and Greek and their medical properties are put forward. Dr. Ednân has observed that this book is very useful for those who want to read medical and botanical literature written in the ancient style.

Ibn Sina's *Kanun* has always been an invaluable reference book for Turkish physicians and a number of abridged versions of this classic were available in Turkish but its complete translation was done by Hâji Mustafa towards the end of the 18th century at the command of Sultan Mustafa III. In his interpretation of difficult portions, the translator made use of *Sharh-e-Kanun'* by Qutbud Din Shirâzi, but he retained the original Arabic names and terms. During the same period Hakim Sulemân, the son-in-law of Heyâti Zâde, produced a Turkish translation of *Akrabadin.*

Western influence on Turkish medicine became noticeable in the eighteenth century and there was palpable increase in the use of Western source material. Dr. Suheyl Unver has stated that the

most prominent Turkish physician of the 18th century Gevrek Zade Hasan Effendi was a forceful advocate and supporter of the European method of medical treatment. He wrote books on use of music in medical treatment, diseases of the eye, gout and pediatry.

Abdul Azîz Effendi, son of the illustrious historian Subhi translated the renowned Dutch physician Herman Boerhaave's famous book *Aphorizma* from German into Turkish in 1771 A.D./1185 A.H.

This book was studied throughout Europe. With the translation of this book medical scientists in Turkey became fully aware of Harvey's theory of blood circulation for the first time. This was the first complete translation of modern European Medicine.

The most illustrious amongst Turkish doctors of the 18th century was Wesîm Abbâs who died between 1759–1761. His great work *Dasturul Vesim Fi Tibb-ul-Jedid Vel Kadim* is in two volumes and is spread over more than two thousand pages. The book contains discussion in depth of all diseases of limbs and organts - from head to foot, gynaecology, pediatric, boils, sores and ulcers along with their prescribed treatment. It is said that European doctors were frequent visitors to his residence. This explains his use of Western source material in his work. He has also mentioned the names of all his foreign colleagues. Dr. Ednân Edivar has collected necessary bio-data on thirteen persons out of this list. Dr. Ednân observes that although Hakim Wesim Abbas was temperamentally inclined to critical evaluation and research, he could not free himself of the hold on his mind of ancient masters. He remained unaware of new discoveries in the field of medicine in spite of the fact that he benefited from his acquaintance with European doctors - so much so that he had not knowledge of Harvey's findings about blood circulation - Harvey's book was translated into Turkish a decade after his death.

During the time of Sultan Selîm III (1789–1807) an engineering school was set up for the Turkish Armed Forces. Later other modern technical institutions became the starting point of the advent of modern disciplines. A medical school was set up in 1826 and in 1867 an association was founded under the name Tibbyia Usmâniya which undertook large scale translation of medical books, from French into Turkish, thus laying a firm foundation for modern medicine. Among a host of people who translated medical works from European languages two names stand out prominently i.e. Hakîm Shâfi Zâde Atâullah (d, 1826) and Hakîm Behjat Mustafa (d. 1833).

What has been said above is a brief sketch of medical activity during the Ottoman period. Dr. Abdul Haq Ednân in his excellent book *Osmanli Turklerinde Ilim* (Science and the Ottoman Turks) in his evaluation of medical activity has observed that Ottoman doctors adhered to the theories and concepts of Galen and Ibn Sina unto the very last despite Turkey's close proximity to Europe could not avail of the modern medical discoveries that achieved a breakthrough in this science after European Renaissance in the 15th century. They were not even vaguely aware of European advances in medical research right upto the 18th century. Dr. Ednân is quite correct in this summation. In real fact the main reason for this was the historical fact that the Ottoman Turks appeared on the scene when after the destruction of Baghdad by Mongols and the exodus of Muslims from Andalusia the Muslim world had entered the period of intellectual and creative decline, as a result of which Muslim scholars had lost all initiative and were content to follow the trodden path. Not only did the science of medicine became static, our thinkers and intellecuals confined their creative work to writing footnotes on and annotate the works of ancient masters and it was generally believed that what the old masters had written covered every field of knowledge, and was the last word and it was impossible now to break any fresh ground. Here we should not forget the fact that this mental inertia was not confined only to the Muslim world – the entire Orient including India, China and Japan, was in the grip of an all-pervasive decadence. Ottoman Turks were a part of the Orient and of the Muslim Ummah, hence they could not be otherwise. The age of enlightenment in the West

was the product of circumstances that did not exist in the East. Hence the West went ahead and and the East was left far behind.

However, despite this shortcoming, the Ottoman Turks did render important service to the medical science. They were fully cognizant of all work that had been done in the world till the 15th century and which was available in Arabic and Persian. Afterwards they translated in Turkish almost every important medical book that was written in foreign languages and thus promoted this vital branch of human knowledge. Towards the end of their dominant position – when their decline had started, they turned to Western medicine but owing to their political decline and instability they could not achieve much in this sphere. The Turkish men of science manifested considerable brilliance and initiative on different occasions and made noticeable contributions through personal observations and experimentation to the fund of medical data. They also designed new surgical instruments specially those required for eye-surgery. A Hungarian convert to *Islam* and a researcher of note Abdul Kerîm Germanus has written that Turkish doctors made a valuable contribution to the diagnosis and treatment of psychological and hereditary diseases and they were famous throughout Central Europe for their masterly skill in surgery. Likewise, Dr. Suheyl Unver maintains that hospitals for lepers were established in Turkey for the first time in human history. These hospitals were located at Kaiseri, Ederne and Istanbul. Special residential wards were built outside city limits for the lepers in Cyprus and Kastmûm. Moreover anti-smallpox vaccine was introduced in Turkey towards the end of the 17th century (1679 A.D.).

This fact was wonderingly revealed in a letter in 1717 by the wife of Montago. the British Ambassador. The Turkish had made such remarkable advances in the treatment of mental diseases that they made use of music for some types of psychic ailments; this was against the contemporary practice in most European countries to burn alive mental patients in the mistaken belief that they were haunted by evil spirits. In view of the remarkable services rendered by Turkish medical scientists were haunted by evil spirits. In view of the remarkable services rendered by Turkish medical scientists to this noble discipline, which have been briefly recounted here, I can with full confidence state that the volume and the quality of the contribution made to the science of medicine by Ottoman Turks upto the 18th century is unmatched, with the exception of Muslim India in the entire Muslim world and the Orient.

EARLY HOSPITALS IN TURKEY

The hospitals of medieval Islam are, in the true sense of the word, the forerunners of the modern hospital. The Greek Aesculapian was a temple of cure with mystifying atmosphere calculated to produce psychological effects on patients and ordinary physicians practising Greek scientific medicine hardly played any part in them. Early Islamic hospitals, on the contrary, were well organized and specialized institutions of charity and they constituted strongholds of scientific medicine.

Professor Aydin Sayili has rightly claimed in his essay that in the development of hospitals as specialized philanthropic and scientific institutions the Turks seem to have played a distinct role. The fifth Islamic hospital was built by Fâteh Ibn Khâkân, the Turkish general and minister of the Abbasid caliph Mutawakkil, and the sixth one by Ahmed bin Tolon. This later institution was the first Islamic hospital supported by a **waqf** endowment. Out of the five earliest hospitals that had *waqf*, four or at least three of them were built by the Turks.

Hospital-building activity gained momentum beginning with the Seljûqs. Although the great Seljûqs paid more attention to the establishment of educational institutions; their successors in Anâtôlya, Syria and Egypt supplemented the efforts by establishing hospitals. The celebrated hospitals and lunatic asylums of Damascus and Cairo were built by Nureddin Zangi, Salahuddin and Mansûr Kalavun; and we all know that two of them were Turks and the third one, that is Salahuddin, was semi-Turk and was brought up and patronized by Nureddin Zangi. The historian Maqrizi has

furnished detailed information about five of the greatest hospitals of Cairo. Among these the first one was built by Ahmed bin Tolon in 873 and the last one and the greatest of all, was built by Mansûr Kalavun in 1284 A.D.

Now let us come to Anâtôlya, which was ruled by a branch of the Seljûq dynasty known as Seljûqs of Rum and was contemporary of the Zangids, Ayyubids and the Memlûk rules of Syria and Egypt. Under their patronage large number of social welfare institutions were established in their kingdom, including hospitals, which are known in Turkish history as *Bimaristan, Daru-us-Shifa, Dar-as-Sehha, Darul Afiye* and by the Turkish equivalent as *Hastane* or *Hastahane.* "These hospitals", as explained by Dr. Suheyl Unver in his book on Seljûq medicine and in his other articles, "had plans which were in perfect accord with the functions of a medical institutions, and they also served as medical schools. In Turkey there are still found remains of these hospitals, some of which are in good condition, and can help us understand their plans and designs. These highly advanced social welfare institutions, which were usually founded by the Sultans, their wives, daughters or their ministers, had large *Awkaf,* that is, properties bequeathed to run these hospitals. Some of the deeds and documents regarding these *Awkaf* are still preserved. They show in detail how these hospitals should be managed. Here I will try to give some details about the building and the management of these hospitals in the light of the writing of Turkish research scholars of modern age.

Hospital buildings of the Seljûq period in Anâtôlya were generally designed on the model of a Seljûq school. They consist of *eyvans,* that is, three walled vaulted antechambers open in front, and rooms arranged around an arcaded courtyard. Only the rooms were not planned as separate units as they were in a *medresa* or school, but were joined together to form large wards where patients were looked after. Now let us have a glance at the buildings of these hospitals of the Seljûqi period in Turkey.

At Kayseri

The hospital at Kayseri is one of the earliest and most important hospitals built during this period. It consists of two buildings standing side by side and known as Shifaiye and Ghiyaseyeh. They are also called in Turkish, Chifte meaning *medresa* or twin *medrese.* The building of the Shifaiye hospital was built in about 1205 A.D. Sultana Nesibe Khatun, dàughter of the Seljûq Sultan Kilich Arslan the Second. The neighbouring building, the Ghiyaseyeh, which served as medical school was built by Sultan Ghiyaseddin Keykhusrev (1204–0210), brother of Nasibe Khatun, and is attached to the hospital building, by an inner passage. Both buildings have the classical plan of the Seljûq *medresas,* that is, an arcaded courtyard with the *eyvans.* The hospital is larger, having a width of 32 metres and length of 40 metres. Both as a whole measure 60 metres long and 40 metres wide.

The *medrese* contained a tomb tower. As such tomb towers usually belonged to the builders it is assumed that Gevher Nesibe Khatun is buried here. A .local yellowish stone is used in both the buildings. The division of the rooms of the hospital is more detailed. The two gates open into a street. Only one of these is the main gate and is more monumental and richly decorated. A small-sized dome with large *muqqarnasses* (stalactite) is placed over the portal. A pointed arch which surrounds the *muqqarnas* is adorned with a frieze formed by three intertwining motifs with rounded profiles. The same frieze continues into the portal niche. A geometrical band consisting of intercepting polygons and circles encloses the portal. The general appearance is still of the preparatory stage to the monumental Seljûq gates. Each piece of stone, which is in the filling of the arch, is decorated symmetrically with a voluminous rosette. On the corner fillings of the portal three rosettes apiece are placed. The marble inscription over the rosettes is written in *naskh.* The cut stones are in the upper of the inscription, and the side stones are decorated with geometrically star-shaped rosettes; on the central stone there is a lobbed rosette and a relief. This relief is in a damaged condition and is supposed to be the figure of a snake which, in those days, was considered to sym-

bolize hospitals. The entrance portal formed by a wide archway is much damaged today. One of the two side niches is completely demolished. The other side niche is organized from *muqqarnasses* (stalactite) and the upper stone contains the figure of a lion. In the opinion of Dr. Sherare Yetkin this figure is perhaps connected with Kilij Arslan, father of both Gevher Khatun and Sultan Ghiyaseddin. In Turkisk, *arslan* means a lion. The demolished left niche is assumed to have contained a similar lion figure or perhaps that of a bull.

The Sivas Hospital

The hospital was built by Izzeddin Keykavus (1210–1219 A.D.) in 1217 A.D. The Sultan who died of tuberculosis, was a scholar and a poet. As he himself was a sick person, he gave special attention to the science of medicine.

Like Ghiyaseyeh and Shifaiye, the original plan was constructed as a paired building. After the excavations that architect Sedat Chetintash made in 1938 A.D., it was brought to light that the foundations of a similar building existed and this building, as noted down in the *Waqf* documents, was that of a medical school. This type of buildings, consisting of a hospital and a medical school standing side by side, is a particularity of the Seljûq period. It denotes the special attention which the Seljûq rulers to medical teaching. The medical school was used for lectures and the hospital was used for actual diagnosis and treatment. The existing hospital at Sivas is the largest of all, measuring 48X68 metres. It has the classical type of *medrese* plan, an arcaded courtyard with *eyvan*. The buildings also contain long, narrow corridors and rooms with fireplaces. Facing the entrance there is broad *eyvan* topped with a pointed arch. On either side of the *eyvan's* arches a round head is placed. One of them, as confirmed by the inscription found in it, represents the sun. From the diadem on the head, rays like sunlight are diffused. It is a male head. The one on the right, however, is a female head with long braids. It is enclosed within a crescent and represents the moon. The sun is the symbol of light and power, whereas the moon stands for natural powers. In one of the rooms to the right of the courtyard is the tomb tower of Izzeddin Keykavus. His tomb tower is one of the best examples of the Seljûq art with its rich glazed brick, sand tile mosaic decoration. The geometrical interlocked design and stars and richly interwined inscriptory decoration from the most refined part of the building with varied colours of blue, white, navy blue and turquoise. The inscriptions in relief, which run over the door and windows, contain the date of building. On the arch of the door there is another inscription which contains the ruler's ideas about life and death. which are in a lyrical and tragic style. The complex of a hospital and medical school is one of the most monumental works of art of the Seljûq period. An enormous *wakf* was created and the management was left to Jamaleddin Ferrukh bin Abdullah, who had also built a hospital himself. The *wakf's* name of this hospital is still preserved which shows that more than a hundred shops and lot of land were bequeathed for the expenditure of these two institutions and that a number of expert physicians, surgeons, and oculists were employed.

The Keykubad Hospital Konya

Several hospitals were constructed in Kônya, the capital of the Seljûq rulers of Anâtôlya, and its surroundings during the 13th century. The greatest of all was built by Sultan Alaeddin Keykubad who ruled from 1219 to 1236 A.D. This hospital is not in existence now and even its location is unknown. The same Sultan had also built a hot-spring bath-house in Kônya.

Another hospital at Kônya was ordered by Kemaleddin Karatay, brother of Jalaluddin Karatay, who was a minister to Seljûqs. It was situated in front of a still existing Karatay *medrese*. According to its *wakf*, Jalaluddin Karatay commissioned this hospital for his brother, who was a physician. Only one glazed-brick decorated *eyvan* survives and it is known today as the Karatay *Medrese*.

There were hospitals also at Aksaray (Kônya) and not Akshehir (Kônya) which no longer exist. It is assumed that they were all undertaken by Alaeddin Keykubad, the greatest of the Rum Seljûqs.

The Divrigi Hospital

Divirigi is a small town in the province of Sivas, but during the Seljûq period it was a large city. It was the capital of the Menguch dynasty which ruled here from 1071 to 1252 A.D. as a vassal of the Seljûqs. Turan Malik (the wife of Ahmed Shah and daughter of Fakhreddin Behram Shah) Complex built in 1228 A.D. consisted of a mosque, a hospital and a tomb. The Complex deserves a significant place among the monuments of Turkish art because of its planning and embellishments. The hospital is situated next to a mosque. Although its plan follows the traditional *medrese* type with an arcaded courtyard with *eyvans,* the usual open court is closed with a three-sided barrel vault which stands on four huge pillars. The middle part of the vault is topped with a lantern which is placed directly underneath an octagonal pool.

The *eyvans* are covered with vaults which have various star-forms, and are decorated very elegantly. Rooms at the sides, which were used as wards, are covered in a rather simple manner, with plain barrel vaults. A staircase leads to the second floor; it lacked a hand rail, and it is placed to the right of the door that opens into the courtyard from the entrance. On the second floor a gallery runs on the southern and western sides of the building. A domed room to the left of the large *eyvan* is the tomb and has several sarcophagi which are covered with tiles. Another door leads into the mosque. It is thought that the Menguch *amir* Ahmed Shah and his wife Turan Malik Sultan are buried in the tomb, as it was traditional that the founders of such buildings were buried there.

The hospital at Divrigi measure 32X24 metres. Its portal shows a decoration very foreign to the usual Seljûq portal ornamentation. It reminds one of the Gothic portals. Small columnettes recess inwards towards the door on several levels. These meet at the top and from the pointed arch of the portal. The perpendicular direction is accentuated with horizontal bands formed by exceedingly large round panels and geometrical interlocks. The panels have geometrical decorations, and palmettes in plastic. The decoration on either side of the portal, which are arranged on different levels, are less elaborate towards the wide space in middle.

On the upper facing of the portal there are five-cornered stars – almost the image of the starry heavens. Down below, there is a window that is divided by a small pillar of which the small prismatical shaft is completely covered with palmettes and Rumis. The space underneath the window has the appearance of wooden casettes, ornamented with geometrical stars, intertwining and plastic palmettes and Rumis. The decorations over the clustered colonnettes that originate from the bottom of the large *muqqarnas* (stalactite) consols on which the pointed portal arch rests, and which moves downward after forming a knot. Over these colonnettes there are shield-like panels which consist of palmettes that look almost as if pasted there. At the top of these there are two symmetrical human heads to the right and left of the portal.

The Chankiri Hospital

Chankiri is a small town on the Ankara-Zonguldak railway. Here a hospital was built in 1235 A.D. by Atabey Jemaleddin Ferrukh, an *amir* at the time of the Seljûq Sultan Alaeddin Keykubad. The inscription, which is much damaged now, is in Arabic. It houses today the Chankiri Museum. Two knotted snake-figures are set in relief in stone. The snake-figure, an antique symbol of the medical world, survived into the Seljûq period on hospital buildings. *Mar* means snake in Persian, and as a matter of fact, the names of *Maristan* and *Bimaristan* are derived from this symbol. The snake-figure was considered as symbol of darkness and evil and it was believed that it possessed a protective talismanic character when knotty.

The Kastamonu Hospital

The famous Seljûq Vezir Muinuddin-Suleman Pervane, a devotee of Maulana Rûm, is reputed to have made many public buildings such as *Jami, medrese, kervansarai,* and *hamams* at different

places. He had also built a hospital at Tokat in 1275 A.D., two years before his death. But here, I should like to mention another hospital which his son Ali bin Muinuddin Suleman Pervane had built at Kastamonus in 1272 A.D. Later on it was converted into a Kadiri monastry and is now generally known as Yilani Darush Shifa, that is, the hospital of the snake. There is a folk-story current to this day as to how this hospital was constructed and took the name of the snake. There is a figure of a knotted snake on the stone decoration of the hospital. The inscription in Arabic on the building, however, shows that the building was built to serve as a *Maristan* or hospital. Its architect was Sad from Kayseri. The building was damaged considerably after a fire. The *eyvans* and rooms are placed around the courtyard. What have survived are only a small mosque, a tomb, two rooms and the library sections. The portal contains graceful patterns of the Seljûq stone decoration. Frieze rows formed by geometrical star intertwinings and palmettes surround the portal in a harmonial manner. Six graves were discovered in the garden of the *shifa-hane*. The entrance into the tomb tower, which has 18 more graves, is from the mosque. It is generally believed that the saint Shaykh Abdulfettah and his disciples are buried here. The date when this hospital was converted into a convent is not known. However, it is suggested that Vali Abdulfettah might have been a physician and so were his so-called disciples. Their piety increased with centuries and took the form of a legend. It is recorded that until the time of the abolishment of the convents in Turkey in 1925 A.D., many mental diseases and neuralgia were cured here through hypnotic suggestion.

The Amasiya Hospital

After the Seljûq, a large part of Anâtôlya was occupied by the Mongol dynasty known as Ilkhanids. In this period a great hospital was built at Amasiya in 1308 during the reign of Ilkhanid Sultan Oljaytu Khudabende. It is said in the inscription that the building was undertaken by Amber bin Abdullah, a slave of Yildiz or Ildus Khatun, the wife of Sultan Olcaytu. The plan is like a *medrese* with an arcaded courtyard. Its measurement is 24X34 metres. In addition to a main entrance, a main *eyvan* and rooms like long corridors are placed around the courtyard. The *waqf*, drawn up in 1312 A.D., was run by Alaeddin Ali Pervane, brother of Yildiz Khatun. The Amasiya Hospital was not only a hospital but it was a medical school as well. Many physicians received their education here and its activity survived into the 19th century. In the hospital surgical operations were also performed and it is also recorded that all kinds of diseases, including mental diseases, were treated in the hospital. Sherfeddin Sabuncuuoglu bin Eli, who practised in this institution as a physician for fourteen years, has left to us a work with original illustrations written 1465 A.D., namely *Kitab al-Jarrahiyei Ilkhaniye* (The Ilkhanid Surgery Book) which proves the advanced state of medicine at his time. Several hand-written copies of this work still exist. One copy is in the library of Eli Emiri Effendi, number 79 at Fatih, another copy with 134 miniatures is in the Bibliotheque Nationale in Paris.

The portal decoration of the Ilkhanid Hospital is in the tradition of the Seljûq style. The palmette and Rumis patterns seen on the portals of the *medresas* at Erzurum and Sivas are repeated here. An interesting speciality of this portal is the repeated here. An interesting speciality of this portal is the embellishment on the key-stone of the door. A filling which consists of palmette leaves is marked at the corners. In the very middle, on the key-stone, however, a human figure sitting cross-legged is to be seen. It is assumed that it might have been the portrait of the founder or of a physician at the hospital.

In addition to the above hospitals there is recorded evidence that medical institutions were also established at Tokad, Erzurum, and at other places, before the Ottomans.

The Seljûqi tradition of establishing hospitals continued through the Ottoman period, when they became an integral part of the huge complexes built by the Ottoman Sultans. The first hospital of the Ottoman period recorded in history was built in 1400 A.D. at Bursa, by Bayazid Yaldrum

(1389–1402 A.D.). This hospital was known as *Darut-tibb.* Although Dr. Osman Shevki in his book on "Turkish Medicine" has mentioned this building as a school of medicine, Dr. Ednân Edivar differs from him because there is nothing to support this view in the *wakf* documents. Moreover, he says that it was a tradition in those days that a hospital was always attached to a medical school. The above description of the Seljûq hospitals is a clear proof to support this claim. The earlier hospitals established at Jundishapur and Baghdad, which had served as a model for the Seljûq institutions also functioned as medical academies-cum-hospitals. Therefore there should be no doubt that the *Darut-tibb* of Bursa also performed dual functions and it was the first hospital of the Ottoman period.

The Fatih Hospital, Istanbul

It was a part of a great complex built around Jami Fatih. A series of buildings consisting of eight educational institutions, known as Medrese Semanye, were built around Jami Fatih in 1470 A.D. Eight more schools, smaller than the former, were also built behind them as annexe. On the western side of the mosque there was a library for the teachers and students of the schools. At one corner was a *Musafir Khana* or travellers' guest-house and at the other corner was a great hospital. We know from the *wakf-nama* that two expert physicians, and *jerrah* or surgeon, one pharmacist, one oculist, one servant and one door-keeper were employed in the hospital. It was emphasised in the document that physicians could be taken from any religion. The physicians were asked to visit their patients at least twice a day and employees were instructed to treat patients politely. The pay was also fixed for the employees in the *wkf-nama.* Hospital patients were provided food and other facilities. It is not known, however, whether this hospital served as a medical school or not. If Evliya Celebi is to be believed, there were seventy rooms in the hospital and the number of employees was two hundred. Evliya has also mentioned that mental cases were treated here with musical instruments. According to him the hospital had separate wards for women and for non-Muslims. The hospital continued to function until the time of Mahmud II (1808–1839 A.D.) in a dilapidated condition.

The Bayazid Hospital Ederne

This hospital was built by Bayazid II, son of Mohammed Fatih, in 1488 A.D. at Ederne. Its architect was Khayreddin. Like the Fatih Hospital it was a part of a large complex built around the Jami Bayazid II. The hospital had two exclusive sections, one for eye diseases and the other for mental diseases. Because of this last mentioned section its fame had spread throughout Europe because here mad patients were cured by means of music and hypnotic suggestion, whereas in Europe mad people were burnt in those days under the belief that they were possessed by evil spirits. According to Evliya Celebi ten singers and ten musicians were employed in the hospital for the treatment of lunatics. Beautiful and good smelling flowers such as roses, hyacinths, tulips, jasmines and others were also used in the treatment of the mental cases, A medical school or in the words of Evliya Celebi "Medrese-i-Etibba" was also attached to the hospital where expert physicians discussed Socrates, Aristotle, Galen and Pythagoras with their pupils, who received practical training in the hospital. It is said that 167 men were employed in the whole hospital which was situated in a beautiful garden adjacent to the outer courtyard of the Jami Bayazid. Evliya has given an interesting account of the beautiful bath-house, marble pillars, fountains, cistern, *sebil* and other buildings of the hospital and at the end he prayed for the soul of Bayazid II who had established such an institution.

The Manisa Hospital

Hafsa Sultan, the wife of Sultan Selim I, and mother of Sulemân Kanûni, had a large complex at the city of Manisa in Western Turkey that consisted of the mosque, a *medrese, hammam* or bath, a poor-house and a hospital. The complex was completed in 1535. Merkez Effendi, a noted physician

and a *sufi,* who died in 1551, was appointed the first incharge of the hospital. Merkez Effendi had prepared a *majun,* or brain tonic known a *Mesir* which was considered very effective in treating mental cases. The hospital at Manisa is still in existence and a festival is organised there every year from April 15 to 23, during which the *majun Mesir* is prepared and distributed.

The Haseki Hospital

Khurram Sultan (1502–1561 A.D.) the Russian slave girl and the wife of Sultan Sulemân Kanûni had built a number of social welfare institutions in her name or in the name of her daughter Mihrimah Sultan in the locality of Haseki in Istanbul. A hospital was also included in it. The hospital was a part of a complex consisting of the Haseki mosque, a *medrese,* a *sebil* and a kitchen for the public. It was built in 1539 A.D. Evliya Celebi said about it that it was a health house beyond admiration.

The Sulemaniya Hospital, Istanbul

Sulemân Kanûni (1520–1566 A.D.), the greatest Ottoman Sultan, had built a vast complex around his magnificent mosque, known as Jami Sulemaniye, including schools, colleges and a medical college. A hospital known as Sulemaniye Dar-ush-shifasi was also built beside the medical college in 1557 A.D. The hospital was situated at a place where it now stands at Askeri Matbas or Military press, according to Ednân Edivar. Dr. Suheyl Unver has published pictures and the plan of the hospital in Vakiflar Dergesi. He has also furnished information as to how the hospital was managed in the light of the *wakf-nama.* The staff of the hospital consisted of one head physician, three physicians, two surgeons, two oculists, one steward, one secretary, four makers of sweet drinks, one butler, four caretakers, two washermen, one hair-dresser and one massagist. Evliya Celebi, admiring this hospital, says: "This hospital is such a cure-house where by the grace of God a patient is cured in three days. The surgeons are very expert. This place is a heaven of refuge beyond description".

The Sultan Ahmed Hospital

Sultan Ahmed complex at Istanbul is the last great complex of the Ottoman period. Its architect was Muhammed Aga, who built it on the order of Sultan Ahmed I between 1600 and 1617 A.D. This complex was composed of a mosque, travellers' guest-house, kitchen, for poor, school, hospital and the tomb. According to Evliya Celebi "the poor and the patients suffering from mental illness are brought in the Sultan Ahmed Hospital for treatment. The climate here is pleasant and the staff takes care of the patients with love. An officer of the place know as Kizil Agasi regularly visists and talks to patients". Now most of the buildings of the Sultan Ahmed's complex are extinct with the exception of the great *Jami* which is known as Blue Mosque and is standing with full splendour.

With the decline of the Ottoman Empire the tradition of building large complexes came to an end. Some hospitals were built during this period but they are of no importance.

In addition to the above mentioned hospitals, there were other hospitals also, built during the Ottoman period, but we have no information about them except their names. Two hospitals, however, are worth mentioning as they were built exclusively for lepers. One was built at Ederne during the reign of Sultan Murad II (1421–1451 A.D.) and the other at Security now Uskudar in 1514 A.D. by Sultan Selim I, and was known as Karaja Ahmed Jazzam Hastanesi.

I have not mentioned here the celebrated Turkish *hammams* and the spas built during the Seljûq and Ottoman periods in large numbers. They too were a sort of health houses. But they were used by patients without medical consultations. The famous traveller Ibn Batutah says that there were three hundred spas in Anâtôlya which were used by victims of various diseases. This brief narrative of early hospitals in Turkey points out to the fact that hospital planning and administration had reached a high standard in those times when the concept of public health was not well-defined

in many other lands. The Turkish contribution to the idea of hospitals, however, leaves room for further researches and it is hoped that sometime in the near future more information will become available to throw more light on this contribution to medical history made by Turkey.

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THE INFLUENCE OF ISLAMIC CIVILIZATION ON EUROPEAN CIVILIZATION DURING THE RENAISSANCE PERIOD IN THE FIELD OF MEDICINE OR ITS ALLIED SUBJECT

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BANGLADESH

The coming of Islam in the sixth century created faith, and confidence in its followers and gave them a message of brotherhood and a measure of Democracy. They led great conquest and within the hundred years of the death of Prophet organized a Wonderful Kingdom from the East Coast of Arabian sea to the East Coast of Atlantic & developed a culture and civilization which stood as a marvel of the middle ages when the whole World and Europe was plunged into barbaric ignorance and rift alone held the torch of learning and civilization brightly shining which lighted the World upto 1650. Islam considered the religion of Science to be the Twin sisters and on the fundamental faith the glory of Islamic Science & Medicine flourished.

Among the ancients we do not find much science in Egypt, China and India, and just a bit of it in Greece and it was absent in Rome. The Arabs had the scientific spirit of enquiry and they may be considered to be the father of the Modern Science.

The main achievement of medieval Arabic Medicine and its influence on the Eueopean Medicine was in the field of:-

Systamization.
Development of Pharmacology.
Establishment of Surgery.
Establishment of Ophthalmology.
and
Building of Hospitals.

This can be said that the rise of Islam, one of the wonders of the world brought fundamental changes in faith, Philosophy, Politics, Economics, Arts and above all science and everything that is needed for civilized living for which there is no second example on the Earth. The wisdom of the other people were taken and the man educated in previous traditions when become Muslim fused their formal learning with the Quranic Philosophy. Their contributions went into the general stream of Islamic thoughts and thus an autonomous Islamic culture and science took shape.

On the basis of this knowledge gained from others they made their own researches and made several important discoveries. These scientific activities took place all over the Islamic Empire but above all toward Baghdad the capital of Islam the eye of Iraq, the seat of empire, the centre of beauty culture and arts. The Arabs were great travellers, Historians and Writers (Al-Beruni, Ibne Batuta, etc.) which contributed in the flow of knowledge in the Islamic World. Supreme confidence and faith in himself the Prophet had which he left as heritage for his followers is evidenced by his invitations to the mighty emperors of Persia, Rome, Constantinapole and China to embress Islam.

Arabic Medicine began with translation from Greek and Syriac created by ORIBASIOS AND PAULOS of Aegina. The Arabs took over the Galanic system, corrected it, improved it added new things to it until the European impact on it in the 19th century. When the chief works of Galen & Hippocratics were available in Arabic, the Christian lost their monopoly in Medicine & several Muslims reached such a stature in Medical science they stood for above their oredecessor and became greater than the Greatest - the Greeks.

The attitude of Europe to the Arabs & Islam was a contrast of fear and admiration coupled with acknowledgement of superiority. This was altered with the capture of Toledo in 1085, the conquest of Sicily in 1091 and fall of Jerusalem in Christian Cruseders in 1099. These events along

with tread brough the Western Europe in contact with Islamic Civilization in Muslim Spain & in Palestine. There for the first time they realised that the Islamic culture & Science is far more superior that they ever seen before. So started the translation of Arabic science into Latin & on the foundation of which the Europe has developed the Modern science. Not Merely did Islam share with Western Europe many material product and technological discoveries; not merely did it stimulate Europe internationally in the fields of but it provoked Europe in the forming a new image of itself. According to Baron-Carra-de-Bany the writer of legacy of Islam concludes by saying that the Arabs have really achieved great things in science they taught the use of Arabic numerals and thus became famous of arithmatic in everyday life. They made Algebra & exact science and laid the foundation of analytical Geometry plans and spherical Trigonometry which did not exit among the Greek. In Astronomy they made valuable contribution because they had to know the direction of *Makkah* It was in fact in the sphere of Mathemetics and Astronomy that the fast advances were made by the Arabs in *Islam* They also made a considerable contribution and sea fearing and discovered the telescope and mariners compass. They talked well the art of gracious living in which the small things the shocks and kamizs were introduced by the Muslim thinkers which passed from Islamic World through Constantinapole to Europe. Of the Other Sciences contributed by the Arabs the most important was Al-Camy in the sense of Chemistry.

Jabir-Ibne-Haiyan was the most prominent among the chemists, several names for substances and chemical vessels have come into European languages from Jabir Corpus. The Arabs made a substantial contribution in the field of Botany, Zoology & Mineralogy and the best works were in Botany, Logic and Metaphysis also took a greater strive during the Islamic period. Imam Gazzali(R) and Ibne-Seena, Ibne-bajja, Musa-Ibne-Maymun were the top in logic, Metaphysis and Theology.

The Romans for the first time established Military Hospital for the treatment of soldiers but it took a complete shape during Islamic civilization. Hospitals were for the first time established in Europe in 13th century. The European hospitals were established in the imitation of Hospitals in Baghdad, Cordova and Damascus. There were about 60 hospitals in 1116 A.D. which started during the regime of Caliph Harun-or-Rashid. The Govt. bore all the expenses of treatment and feeding of the poor patients in the hospital. A fabulous hospital was established in Morocco in 13th century which towered all of them during that time.

The administration of hospitals during Islamic civilization has little difference from the administration of hospital in Modern time. Every hospital had indoors and outdoors and indoor had separate arrangement for male and female patients. There were separate wards for different categories such as fevers, ophthalmia, dysentery and surgical cases.

The teaching in the hospital was similar as it is to-day; Medical examinations were conducted to the fitness of Medical students to become Physicians was established by Khalifa Moktadir in the year 931. The dresses of physicians were identified during the Abbaside regime and Ibnul Amig recommended a dress of the physician as such that it does not make the poor jealous and the rich does not dislike it. He recommended the use of white cloth by the physician which is even used today.

Ali Ibne Rabban discussed about Physiology in 9th century. He described that brain, heart and liver are the main organs of human body and he described each in detail. He also thought that stomach, gall bladder, spleen and lungs are also necessary for maintenance of the normal physiology of the body in addition to brain, heart and liver.

Ali Ibne Abbas in 10th century had written his views on the function of the heart and lungs. He described the systole and diastole inspiration and expiration and capillary system.

Ibne-Seena for the first time in Medical history described the theory of bacteria and virus as the cause of the disease. He described the presence of bilirubin, albumin and serum in the blood. He gave a vivid description about ptyalin, Hcl, enzymes in intestines and their role in the process of digestion of food. Nobody for 200 years after him could add anything in addition to his descriptions.

Ibnul Khatib in 14th century again postulated that bacteria and virus present in atmosphere are responsible for the cause of certain disease and he cited Plague as an example of this.

The progress of Anatomy during the Islamic period was slowed down due to religious restriction on dissection of dead body and they followed the science of Galen in this aspect. Yu-Hanna during the regime of Calipha Al-Mansur dissected an ape and wrote a book on Anatomy which was highly praised by the scientists of his time and scientists after him. Ibne-Seena also wrote a book on Anatomy in Bokhara in 11th century.

In 12th century Abdul Latif wrote a book on Anatomy at an age of 28 and he challeneged some information of Galen on Anatomy to be not correct. He described the lower jaw bone is composed of only one single bone instead of two as described by Galen. Subsequently the Arab anatomist described that the skull is composed of 8 pieces of bones which was described as 7 by Galen. Monsur Fobbe wrote another book on Anatomy on 14th century.

The Muslim scientist of Spain made a break through in the development of surgery. Abul Kasim of Cordova wrote a book on Surgery for the first time in the 10th century. Al-Razi also wrote a book in surgery in which he described Neuro-surgery, Hernia, Tumour and E.N.T. He He recommended the use of goats intestine for stitching at the side of operation. Ali Ibne Abbas also wrote a book on surgery. He gave a vivid description on laryngotomy. Ibne Seena also wrote in detail about surgery. Abul Kasim for the first time established surgical treatment on scientific basis. His book was the first illustrated book in surgery.

Muslim physicians for the first time used devices of anaesthesia for operation on the patients. Ibne Seena recommended opium, latuce seed and belladonna for anaesthesia. He described application of cold water for the relief of pain. Alcohol was mixed with Dernel & water to produce annaesthesia.

Egyptian opium, liquorice extract and colchicum, suckrash in equal quantity mixed with water was used to produce sleep. Venesection as surgical treatment was used for the treatment of hypertension, cellulitis & intracranial haemorrhage.

During the 10th century Al-Razi used cautery as a surgical treatment which is still being maintained. He advised operation and cautery for cancer, physiotherapy for paralysis and cautery to stop bleeding and for gangrene. Both Ibne-Seena and Abul Kasim mentioned especially the use of cautery in their books.

Arab physicians used to treat fractures by using an ointment with immobilization and this was used by Abul Mansur in 10th century which he developed into plaster of Paris in 19th century in Europe.

Ibne Seena has given an illustrated description in the treatment of fracture. Al-Razi and Abul Kasim described the treatment of difficult diseases like fracture of pelvis, paraplegia & vertebral dislocation in their book.

Ibne Seena described the difference between tumour and cancer which has remained unchanged even today. Al-Razi recommended operation followed by cautery for the treatment of cancer. Abul Kasim is known to have operated the cancer in the chest. The operation by the Arabian

physician in the peritoneum has remained unchanged even today. Peptic ulcer and intestinal ulcers were described by Ibne Seena, Al-Razi. Arab scientist in *SIRAJ* performed colostomy for the first time. Arabian physicians also treated hernia, hydrocele, urinary calculus by operations.

In 2nd century Rufus wrote a book on ophthalmology. In 10th century Ibnul Haisum for the first time proved that we can see the object because light from the object comes to the retina. Ali Abbas abd Ibne Seena wrote books on ophthalmology. They used the term retina and catarract and also described conjunctivitis, corneal ulcer, glaucoma, leucoma and night blindness.

Arab physicians also wrote books on Obstetrics and Gynaecology. First description of Caesarean Section is found in Shahanam written by Firdousi about the birth of Persian Hero Rustam. Al Ahnab Bin Kaies was also born by Caesarean Section. During the Islamic period the female doctors used to treat the Gynaecological diseases under the supervision of male surgeons. Cervical polyps and cervical atresia were treated by Arab Gynaecologist which was described by Bahaud-Dowla.

There is no description of Obstetric in Greek Medicine. During the Islamic period Moschion Aetius and Paul described about obstetrics. Abul Kasim, Ibne Seena and Al-Jurgani wrote on obstetrics as an special subject.

Women were mostly engaged in obstetrical work. The daughter and grand daughter of Avenzoar during 1091 to 1162 were engaged in this profession. Abul Kasim Al-Zahrawi described about cranioplasty operation, in his book *Kitabut Tasrif*. He also described the use of forceps. He also described Walcher's position during delivery. Ibne Seena wrote in detail about pregnancy in his *Qanoon* in which he described about Dystocia. He described different procedure for delivery and advised the use of obstetrical forceps perhaps for the dead foetus. They also described about the induction of labour by use of instruments and medicines.

That the use of fillets and obstetrics forceps was first introduced by Arabs and not by the Europeans has been proved by William Smellie (1697–1763).

Arab physicians especially Ibne-Seena described about teeth. He described that every tooth has at least one root, and two roots in the tooth of the lower jaw, and wisdom tooth has three roots. Upper teeth have got three roots ro counteract the action of gravitation. Abul Kasim described about the surgery of teeth. Arabian physician in Cordova suggested to apply false teeth from the bull after extraction of sick teeth. Mesu the junior, treated caries teeth by gold cap. He described the sympathetic pain in the disease of the teeth. They used Alcohol to wash wound and cold with ice to stop bleeding and Thermocautery and hot fomentation.

Ibne Seena used cannula for the examination of the Eye. He described lacrimal fistula and recommended daily dressing which helped to heal the wound quickly. This lacrimal cannula ultimately lead the discovery of Syringe.

CONCLUSION

Because Europe was reacting against Islam and belittled the influence of Islam and exaggerated its dependence on its Greek and Roman Heritage. Today the mankind is moving into the era of the one World, therefore time has come for Europe to correct false emphasis and to acknowledge fully their debt to the Arab and Islamic world..

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ROGER BACON'S 'SCIENCE OF EXPERIENCE'

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Roger Bacon was a medieval English scholar whom many would regard as having been born 'out of his time' because his method of philosophising was so atypical of the thirteenth century A.D. (or 7th Hegira) in which he lived. Although there are only a few brief references to him in contemporary chronicles, it would appear that he received his early education in Oxford before teaching subjects like logic and grammar, natural philosophy, and metaphysics in the Faculty of Arts at Paris University. In later life, he became a Franciscan Friar. The main sources of biographical information about him and his ideas are contained in his three major works, the *Opus major, Opus minor,* and *Opus tertium* all composed during the later years of his life[1].

The Aristotelian Corpus was, as might be expected, a dominant formative influence upon Bacon's philosophy in general, and upon his natural philosophy in particular; but his world view is distinguishable from most contemporary and later Christian thinkers in the extent of its dependency upon indirect translations into Latin from Syriac and Arabic sources as opposed to direct translations from the Greek. The internal evidence of his writings reveals, for example, that his familiarity with Greek medical texts such as those constituting the Hippocratic Corpus was slight; whereas he quoted frequently and accurately from John of Damascus's *Aphorisms* and Haly ben Rodwân's astrological commentary on Ptolemy of Alexandria's *Tetrabiblos* and famous exposition of Galen's *Ars Medica.* Half of his references to the Jewish physician Isaac ben Solomon Israeli stem from the works of the latter's Arab pupil Aḥmed ben Al-Gezzar (alias Ametus). His chief guide in medicine was the *Canon* of Ibn Sina (Avicenna), whom he cites as frequently as all those other writers combined[2]. In philosophy too, Ibn Sina's influence upon him was more immediate than either that of Aristotle or Ibn Rashd (Averroes).

The book which was destined to have the greatest impact upon Bacon's mode of thinking and to mould it into a form unique among his western contemporaries, was the pseudo-Aristotelian *Secretum Secretorum,* or 'The Secret of Secrets', a Latin translation from Arabic by the French-speaking Philip, Bishop of Tripoli[3]. This popular work purports to contain the secret doctrines of Aristotle, written expressly for his famous pupil Alexander the Great, son of King Philip II of Macedon. Despite the fact that Greek ideas had been incorporated into it, the texture is oriental rather than western, and probably originates from the early 9th century A.D. (2nd Hegira) when there was a considerable interaction between Persia and Syria. No Syriac translation has, however, been discovered, and the particular edition which Bacon read in Paris is based upon the so-called "eastern Arabic form" embodying a number of accretions or additions up to approximately 1220A.D. (or 580 Hegira[4].

The author, whoever he may have been, is supposed to be giving Alexander advice on regimen and medicines; the choice of government, court officials, and ambassadors; and the conduct of wars. Astrology is strongly recommended as a profitable method of anticipating future events; as is the bearing of a talisman or good-luck charm and a herb with healing properties. In the introduction to his own annotated edition of the text[5], prepared around the mid-13th century A.D., Bacon defends astrology on the ground that since the body is modified hour by hour through the action of the various constellations, it is disposed to act in a prescribed way. However, he is careful to point out that the anticipated course of events can be altered either by the exercise of human free-will or by divine intervention. Elsewhere, he lists the neglect of astrology and alchemy together with that of natural philosophy, metaphysics, and sense-experience among the major weaknesses in the contemporary

education of medical students; the others being the prevailing ignorance of the Arabic, Greek, Syriac, and Hebrew languages, and the nature and action of prescribed drugs. He also expressed concern at the lack of knowledge concerning the diagnosis, classification and causes of diseases, and the consequent inability to explain the mechanism of illness[6].

In an attempt to compensate for his own ignorance of such matters, Bacon devoted two decades of his life to the study of what he terms *scientia experimentalis*. It is tempting but confusing to translate these Latin words as 'experimental science', as this term has since acquired a rather specific connotation as a result of the so-called "Scientific Revolution" in Western Europe that began more than two centuries after Bacon's death[7]. It is, indeed, because of the positivistic interpretations of the rise of science by the previous generation of historians of science that Bacon has been unfairly criticised for having failed to plan his own series of experiments or subject his theories to systematic experimental verification.

A more accurate translation is 'the science of experience', since Bacon was actually regarding the sum total of his own sense-experiences, his Christian life-experience, the experiences of other investigators of natural phenomena, and those of known mystics whose knowledge was received by spiritual revelation, as constitutiing the neglected sources of inductive and revealed knowledge which would provide a new axiomatic framework capable of transcending the sterile premisses of the traditional syllogistic arguments of contemporary scholastic philosophers. The separate sciences, however, had first to be subjected to the test of verification, then classified in accordance with their theoretical principles in order to establish their interrelationship to one another, before being applied practically to achieve useful ends[8].

Bacon therefore did what he could to learn Arabic medical terminology, Greek grammar, and Hebrew (to interpret biblical texts), and to improve his knowledge of medicine, astronomy and astrology, mathematics, optics, physics, in parallel with alchemy and what we would now call physiological psychology[9]. This selection of subject-matter, and indeed the prime motivation behind his prolonged search for a superior wisdom or universal science, can best be attributed to the particular nature of the above mentioned Arabic texts and Latin translations which were beginning to be available to western scholars at that time. The writings of the Oxford friar Robert Grosseteste, Bishop of Lincoln, were also a strong encouragement to Bacon in his studies of optical phenomena and mathematics[10]; while a recent analysis of Bacon's contributions to medicine and science[11] indicate that his general line of thought is much more representative of his age than used to be supposed.

In addition to the positive impact being made on Christian thinking by the transmission, both direct and indirect, of Arabic writings, another factor which for some (including Bacon) proved to be a source of dissatisfaction, was the Catholic church's deliberate neglect of the natural sciences as being of no importance to the Christian Faith. Quite apart from the value of such knowledge for detecting common elements in different systems of belief, and seeking a basis for religious tolerance and understanding through philosophy rather than by crusading, the main purpose in possessing it was to utilise it as a foundation for a more profound human understanding of God's Creation and His will[12]. Bacon hoped that one might in time establish valid precepts of moral philosophy for the guidance of future generations of mankind. Significantly, the same ultimate goal was again to be proclaimed by Bacon's namesake Francis Bacon in 1620 when he introduced a rather similar utilitarian philosophy[13], and later in the century by John Locke[14] then by Isaac Newton[15]. However, in contrast to Roger Bakcon's scheme, revealed knowledge now ceased to be regarded as an essential component of the new hypothetico-deductive method of reasoning. To what extent the writings of Roger Bacon or the more widespread assimilation of Arabic knowledge into the mainstream of the western intellectual tradition may have stimulated the inductive or analytic stream of philosophical

thought, is a matter which can be resolved only by a thorough historical investigation lying well beyond the scope of this paper.

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ABSTRACTS OF CONTRIBUTION OF ISLAMIC MEDICINE TO UROLOGY

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The aim of this paper is twofold; to review the most important contribution to urology by Arabian and Muslim Physicians and to refute the frequent denials by many scholars of their role in this field.

Picturing Muslim Physicians simply as transcriptors of Greek, Roman and Indian medicine has been refuted by many scholars[1-6]. To the contrary, they had enriched medicine by their experience and deligence and became the discoverers and exporters of knowledge which lit the way to modern European civilisation.

Al Razi, Ibn Sina and Al Zahrawi top the list of these physicians, and of equal importance, though less renowned, we find that Ibn al Quff, Thabet Ibn Qurrah, Al Magousy, Al Tabary and others had also made great contributions witnessed in their works.

ANATOMY:

Al Magousy[7], Ibn Sina[8] and Ibn Hubal[9] gave a detailed account of the anatomy of the bladder and of the intramural part of the ureter which is no different of what we know now. They also drew the attention to the importance of such an arrangement in the prevention of vesico-ureteric reflux. It is interesting to note that nearly a thousand years later this same observation was made by another renowned scholar of Arab descendence viz. E. Tanagho[10]. Both Ibn Hubal and Ibn Sina stressed the importance of the muscle 'at the mouth of the bladder' which on voluntary relaxation allows urine to flow out during micturition[8].

Ibn al Quff described the value of the cremasteric muscles in keeping up the two testicles and preventing their dangling[11].

Al Magousy is said to be the first to describe such anomalies like hypospadias, epispadias and hermaphroditism[7]. He also described the arteries to the penis and their role in erection.

The description by Ibn Sina that 'the bladder contracts in every direction and squeezes out urine while the muscle at its mouth relaxes'[12] does not differ from what we know now about the principles of the act of micturition.

RENAL STONES:

Muslim Physicians had devoted a lot of their attention to this subject. They tried to explain the way of their formation and described their signs and symptoms. They also described, for the first time, operations to remove such stones or to break them; and advised certain medications to treat stone patients and to prevent formation of such stones.

STONE FORMATION:

In trying to explain that Ibn Qurrah attributed it to the narrow opening of the kidney or of the bladder, and that the nidus on top of which further deposition might occur was viscid material found in urine as a result of ingestion of heavy food[13]. Ibn Sina mentioned that inflammation of the kidney might end in stone formation[14]. Al Razi on the other hand believed that calcification of pus resulting from ulceration of the kidney might initiate the process; and that stones might be formed either in the kidney substance, in the pelvis of the kidney, or in both[15]. According to Ibn Qurrah, stones start as small bodies and enlarge by time[13].

This is what we actually know nowadays of the presence of a nidus albeit pus, blood etc., on which salts are deposited. We are also aware of the importance of obstruction and infection in the aetiology of stone formation.

Both Ibn Sina[8] and Al Zahrawi[16] had agreed that bladder stones are common in children and that kidney stones occured in the elderly. This is similar to what we know nowadays of the prevalence of stones in children of many of the Third World Countries.

The two physicians also agreed that bladder stones were less in women as their bladder passages are less tortuous, shorter and wider[17].

SIGNS AND SYMPTOMS OF STONES:

According to both Ibn Sina and Al Razi, pain is worse when stones are formed or during their passage down to the bladder, otherwise patients "feel heaviness in the flanks"[18]. This is very similar to how we describe pain due to the stones.

Ibn Sina[19] made a very clear differentiation between kidney and bladder stones which did not differ either with that of Al Razi[20], or of Al Zahrawi[16] (Table I).

Muslim physicians had mastered differentiation between many diseases and Ibn Sina as well as Al Razi before him, though in more detail, gave us a perfect description of differential diagnosis between colonic and renal pain (Table 2) which we believe is no different from what we teach now.

TREATMENT OF STONES;

Al Razi advised giving sedatives during the attack of colic and later drugs which help to move the stones once the pain had subsided[21].

Ibn al Quff[22] believed that treatment of large stones was easier for the following three reasons:

1) The large ones stop at the beginning of the urethra and in fact remain in the bladder.
2) It is easier to palpate the large one.
3) Surgery is more tolerated in patients with the large one as they had got used to the pain.

Al Razi[23] quoting Al Tabbary, Abu Khaled Al Faresy and Bukhtaishoua mentioned the following substances as useful for breaking stones; juice of radish leaves: caper: Prunus mahaleb: water of soaked chick peas: bitter almonds etc.,Ibn Qurrah[24] and al Antaki[25] added the Jewish Stone and Rubus Sanctus, etc., to the list. In addition in the margin of Tathkaret Daoud (p.92) the following were said to be useful — Alkekenge, Rubus friticosus, diuretics and honey[26].

SURGERY:

According to Springle, Al Zahrawi was the first to remove a bladder stone transvaginally, and the Lithotomy operation was devised by him[27]. S. Hamarneh remarked about the latter that it was a great step in surgery[28]. (Fig. 1).

Both Al Razi and Al Zahrawi[16] gave a detailed description of the operation for the removal of bladder stones and stressed that the internal wound should be smaller than the external one to prevent leakage of urine and that no force should be used[29].

Al Razi even advised extracting the stone by means of "a forceps" or breaking it to pieces before removal[29].

Both Al Razi and Al Zahrawi had pointed out the difficulty of operating on women and Ibn Al Quff[22] gave five reasons for that:

1) She may be a virgin and one cannot introduce the finger in the vagina in search of the stone.

2) A woman would rarely accept surgery and her tolerance of pain is less.
3) Women are usually shy.
4) The incision is more difficult and dangerous as the site of the stone is farther.
5) She may be pregnant and surgery will harm the foetus.

Commenting on the advice by Maysosen to use forceps for extracting the stone after incision, Al Razi believed that method was better as it would cause less laceration[30].

Ibn Sina on the other hand did not advise surgery because "it is very dangerous"[31]. This is in agreement with Ibn al Quff's opinion who added that wounds after kidney operations would not heal because of the continued passage of urine[32].

URETHRAL STONES:

Al Razi's advice to pull the skin of the penis forwards before direct incision on the stone to prevent fistula formation is similar to that of Al Zahrawi's. Both advised tying a thread behind the stone thus preventing it from slipping back into the bladder. To avoid laceration to the external meatus if the stone is near the tip Al Razi advised meatotomy[33], the procedure that is followed today.

In case of retention of urine due to a stone stuck in the urethra Al Zahrawi devised the following instrument (Fig. 2) and method by which he had avoided surgery on many occasions.

> "Take a steel probe with a sharp and pointed triangular end and with a long handle. Tie a thread behind the stone... introduce the probe gently till you reach the stone and try to penetrate it bit by bit... until you make a hole through it. Urine comes out immediately. Press on the stone from outside to crush it... The patient is thus cured... If you do not succeed then operate".

Commenting on that Spink and Lewis said — "This device of Albucasis does seem to have been in a manner a true lithotripsy many centuries earlier than our modern era and completely lost sight of and not even mentioned by the great middle-age surgeons Franco and Parei, nor by Frere Come the doyen of genitourinary surgery"[34].

PREVENTION OF STONE FORMATION:

Ibn Qurrah[13] advised avoiding heavy food and drinks, taking things which would clear the passage and cause diuresis e.g. seeds of melon, squirting cucumber, raddish seeds, cumin, bitter almonds; and many others.

This advice was also given by Al Razi[35].

This is what we nowadays advise for stone patients regarding diet, hydration and diuresis.

CIRCUMCISION:

We believe that the four methods of circumcision described by Ibn al Quff[36] are the basis of what we practice at the present time. His description of (a round object of the size of the prepuce to be put below it in order to stretch it and push the glans to inside) can be considered the original genuine prototype of the present day Gumko. Also (... to tie the prepuce with a fine thread so that the glans can be pushed to inside...) can be considered the principle of the plastic capstan used for circumcision. Al Zahrawi prefers using the scissors for cutting (... because cutting will be proportionate and at the same level...)[16] (Fig. 3).

HYPOSPADIAS AND IMPERFORATE EXTERNAL MEATUS:

Both Al Zahrawi and ibn al Quff had stressed the importance of these conditions — (... Some children are born with no opening to the glans... if there is one there may be a downward curvature 'chordee'... each is harmful. The first causes retention of urine while the latter affects fertility as sperms are emitted at an angle...)[37].

Al Zahrawi described the anomaly as a very bad disfigurement and added (... the child cannot urinate forward until he lifts up the penis)[16]. This is a very clear picture of the anomaly and of its ill effects as we know today. The benefit of repeated dilatation of the narrow external meatus was also stressed by Al Zahrawi[16]. (Fig. 4) Regarding the surgical treatment of the anomaly, we do not believe that either physician was successful in introducing an acceptable procedure.

SURGERY AND SURGICAL INSTRUMENTS:

The famous surgeon E. Forge, praised Al Zahrawi for compiling all contemporary surgical knowledge in his great work Al Tasreef[38]. Al Zahrawi described some operations for which he can be considered a leader in surgery. He also invented many instruments of his own. In addition to the previously described operations he must have the merit of being the first to recommend what we now know as the Trendelenburg's position which was adopted from him and named after by the German Surgeon[39].

He is mentioned as having described urinary diversion to the rectum in males and to the vagina in females[40]

Al Razi described operations on the bladder, urethra and the treatment of complications of such operations.

Before those two surgeons, Al Magousy, in addition to describing urethral anomalies and their treatment, is said to be the first who described perineal cystolithotomy.

However no advancement was made in the treatment of varicocele and hydrocele.

Regarding surgical instruments, Kirkup[41] said that the first application of the modification of the handle of an instrument was the dental forceps made by Al Zahrawi. Commenting on the use of Al Zahrawi of the scissors for circumcision, Spink and Lewis said — (... it may, therefore, be attributed to the Arabs; that is the application if not the actual invention...)[42]. The Methkab deviced by Al Zahrawi can also be considered an instrument for lithotripsy[43].

CATHETERS:

Tucker[44] denied that any improvement on catheters had been made before the beginning of the eighteenth century, and that the anatomy of the urethra was not taken into consideration. This is clearly refuted by the Muslim Physician's description of the catheter regarding its size, shape and maleability, together with the material of which it was made [45-48]. (Fig. 5)

Again while J. Herman[49] had denied that any improvement was made in the field of catheters we find that Ibn Sina had advised that more than one hole should be made for irrigation and drainage and that it should be of a round head. In addition our Muslim Physicians had described very beaufifully what could be considered irrigation syringes with negative pressure effect[16, 46]. (Fig. 6). We also find that Ibn Sina had advised caution and gentleness during catheterisation to avoid urethral injuries, not as Tucker had described that the patient was at the mercy of the size of the catheter[44].

Commenting on the irrigation of the bladder, Spink and Lewis wrote — (This chapter on irrigation of the bladder is both more comprehensive than any classical description and of the utmost original value. Celsus and Paulus merely give a few lines or a paragraph, but Albucasis devotes a whole chapter with splendid illustrations[50]. (Fig. 7)

DILATORS:

The importance of urethral dilatation and the indication that the Arabs were the first to use the dilators and to stress their importance are well documented[16, 51].

URINE:

As modern techniques for chemical, microscopical and bacteriological examination of urine were not available to them, Muslim Physicians had to rely upon the physical characteristics of urine and were able to draw very important conclusions[52]. Thus Al Razi condidered that urine reflected the circulation in the urinary system[53]. Muslim Physicians laid down strict rules for the collection of urine which do not differ from what we advise today[54].

Al Razi advised examining urine for colour, consistency, deposit, taste, clarity, touch etc., and he divided each into different subdivisions and then specified the cause and the meaning of each[55]. Haematuria with epithelial debris and foul smelling urine denoted cystitis which might be associated with pain in the suprapubic region[55, 57]. In case of urethritis there might be discharge with burning along the shaft during micturition[58].

Both Al Razi and Ibn Sina described different types of frequency and polyuria including diabetes, the later stressed the importance of a pelvic mass pressing on the bladder causing such a disturbance[60, 61].

Both physicians attributed nocternal enuresis to the laxity of the bladder neck muscles and the sphincter together with deep sleep. They advised for treatment limitation of fluid intake and light food at bed time[62, 63] as many advise nowadays. Ibn al Quff added that involuntary urination can be due to spinal injury (neuropathic bladder)[64].

Urinary retention could be due to obstruction at the bladder neck due to blood clot, a stone or a new growth[16, 46]. Both Al Tabary and Al Razi differentiated very clearly between the different types of anuria whether of kidney origin due to ureteric obstruction or bladder neck obstruction; they also stressed the importance of the presence or absence of a round globular mass (bladder) in the suprapubic region[65, 66]. In addition Al Razi described azotaemia, gangrene of the scrotum and haemoglobinuria[67].

TREATMENT BY HERBS:

Muslim Physicians had copied many prescriptions from ancient medicine and added very many of their own[68]) as seen in (Table 3).

SUMMARY

This review demonstrates how Muslim Physicians had contributed to and improved on the progress of medicine in the field of urology.

ACKNOWLEDGEMENTS

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Prof. B. Abu Rumaileh of the Faculty of Agriculture was very helpful in producing the scientific names of the herbs and plants.

Table I
Differentiation between kidney stone and Bladder stones

	Kidney stone	Bladder stone
Description	Softer, smaller, reddish	Harder, larger, grey-greyish white, coarse. May be as small particles and more than one
Patient	Obese, elderly	Usually thin (boys) Infancy — adolescence
Pain	Worse during formation or movement to bladder. Radiation to groin means movement, stops when stone in bladder.	Less except if causing retention. Itching and pain along penis and its base. Pain in hypogastrium. The patient plays with his penis.
Urine	Turbid then clears, or remains turbid with deposit	Lighter in colour but with deposit, may contain gravel. Mixed with blood if stone is big or coarse. Dysuria with small one (at neck), Frequency.
Associated complaint	Parasthesias over ipsilateral thigh.	May have prolapse of rectum.

Table 2
Differentiation between colonic pain and renal pain

	Colonic	Renal
Severity	Severe	Little, like thorns.
Site	Begins below on the right, extends up to the left; more in front and in hypogastrium.	Begins high in the back, with dysuria, extends slightly downwards, more in the back. Pain in ipsilateral testicle.
Time	Sudden, eases on defecation, worse on eating.	Gradual, severe at end, may be worse on defecation.
Radiation	To any part of abdomen.	Steady in place.
Chills	Not present	Frequent.
Agreeable & Unagreeable	Wind and stools ease the pain.	Do not ease pain.
Medications to break the stone	No effect	Ease it
Stools	Hard scybala, or like dunge of cows.	May be no constipation
Accompanying symptoms: Pain in lower limbs & back Anorexia, biliary vomit, severity of pain, Drowsiness Relief by vomitting	 Less More More	 More Less Less
Causes & indications: Overeating, Bad food, colic, Borborygmi, Constipation Turbid urine, Burning	Precede	 Precede

Table 3
Herbs and plants used by Muslim Physicians

Diuretics	Disintegration of stones	Dribbling of urine	Dysuria	To increase sperms
Artemesia absenthium	Solidago virgaurea	Juglans regia	Matricaria chamomilla	Phoenix dactylifera
Ammoniacum resina	Cucumis melo			
Cucumis melo var. flexuosus (seeds)	Anethum graveolens			
Cucumis sativus (seeds)	Raddish (leaves)			
Ficus carica	Water of chick peas			
Opopanax	Prunus amygdalus			
Eruca sativa Mill	Prunus mahaleb			
Ceratonia siliqua	Capparis			
Punica granatum	Alkekenge			
Crocus sp.	Rubus sanctus			
Andropogon nardus				
Sagapenum				
Fumaria officinalis				
Alkekenge				
Struthium				
Malva sylvestris				
Apium graveolens				
Cuminum cyminum				

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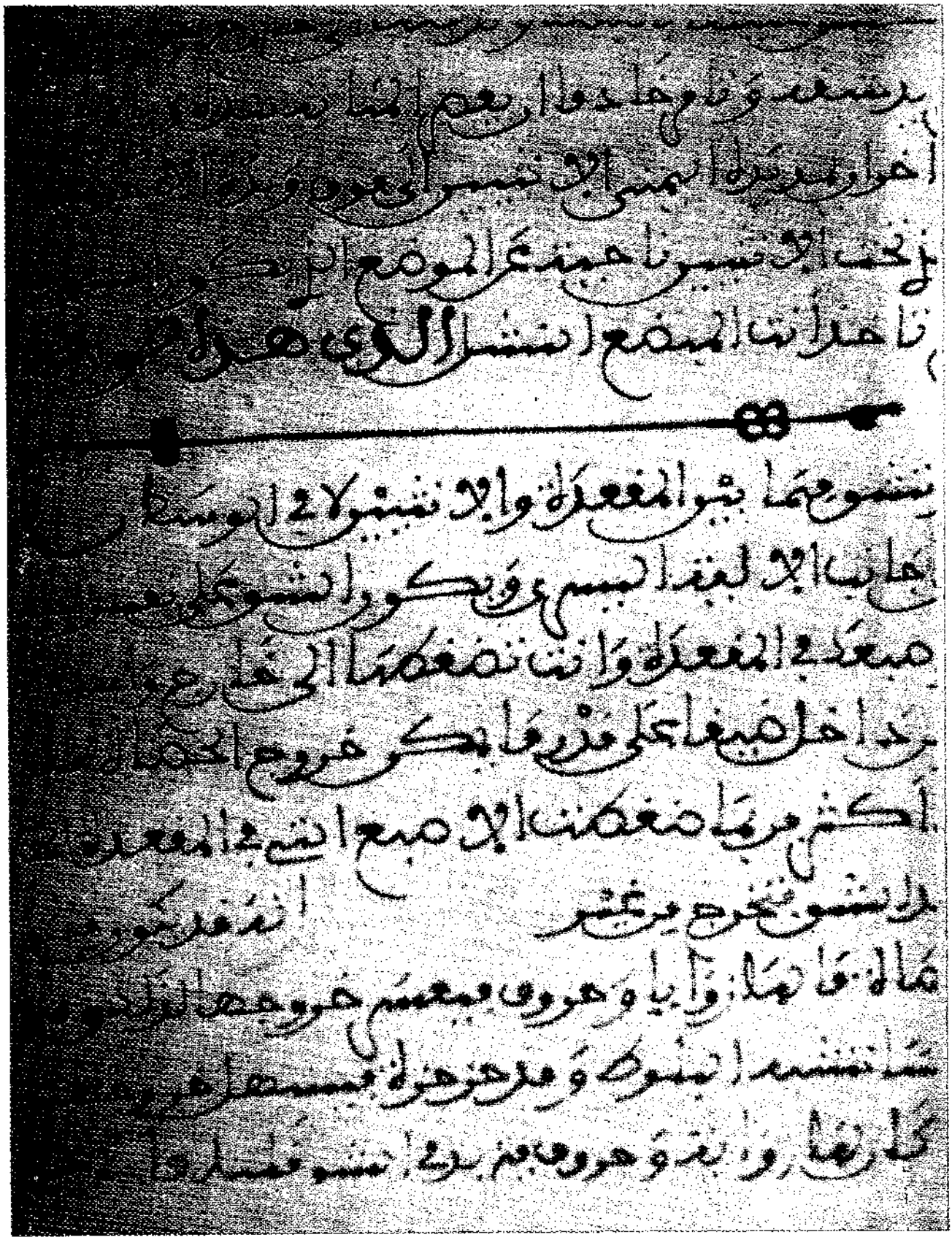

Figure 1: A scalple for incising on stone.

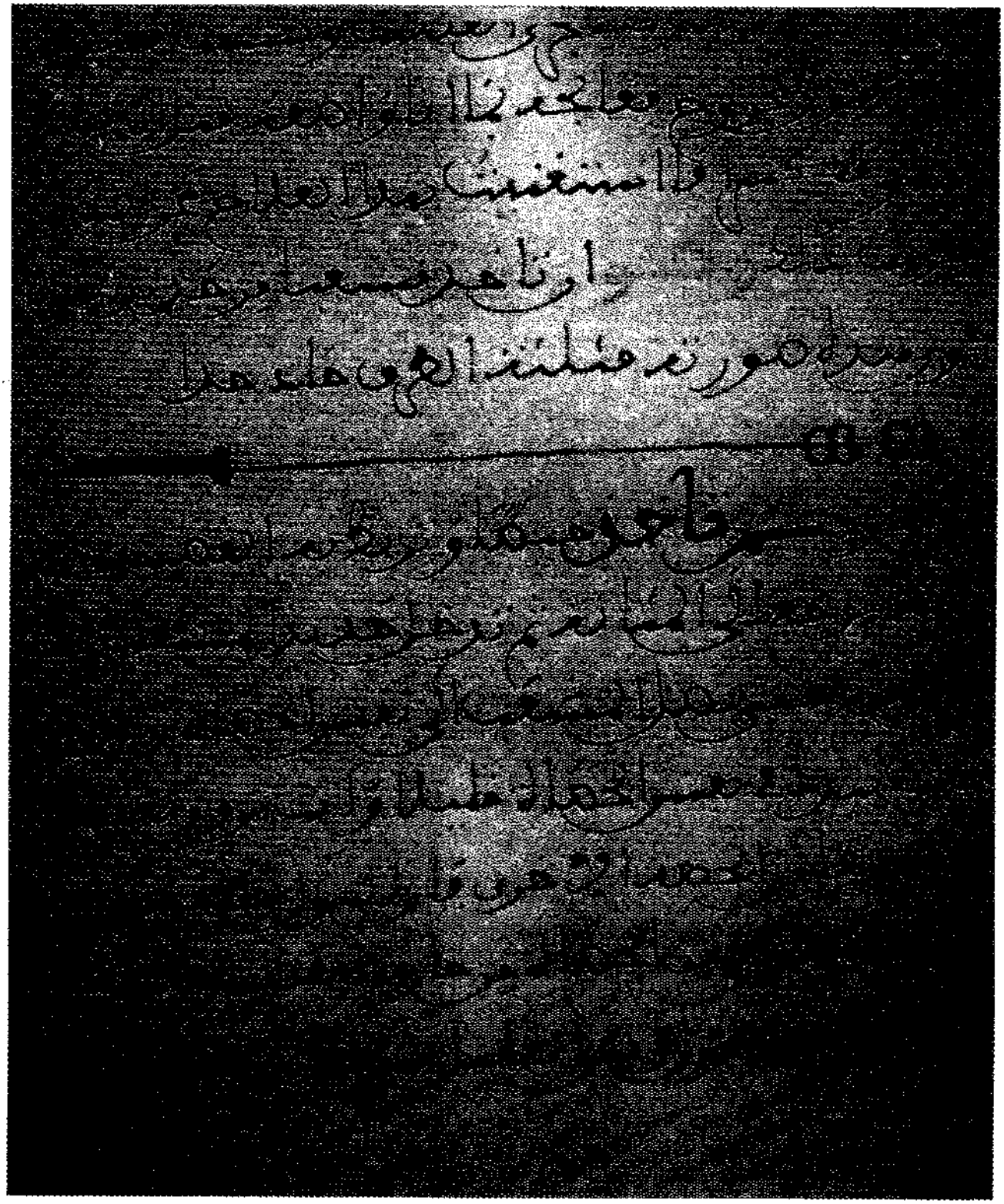

Figure 2: "The Methkab", for breaking an obstructing urethral stone.

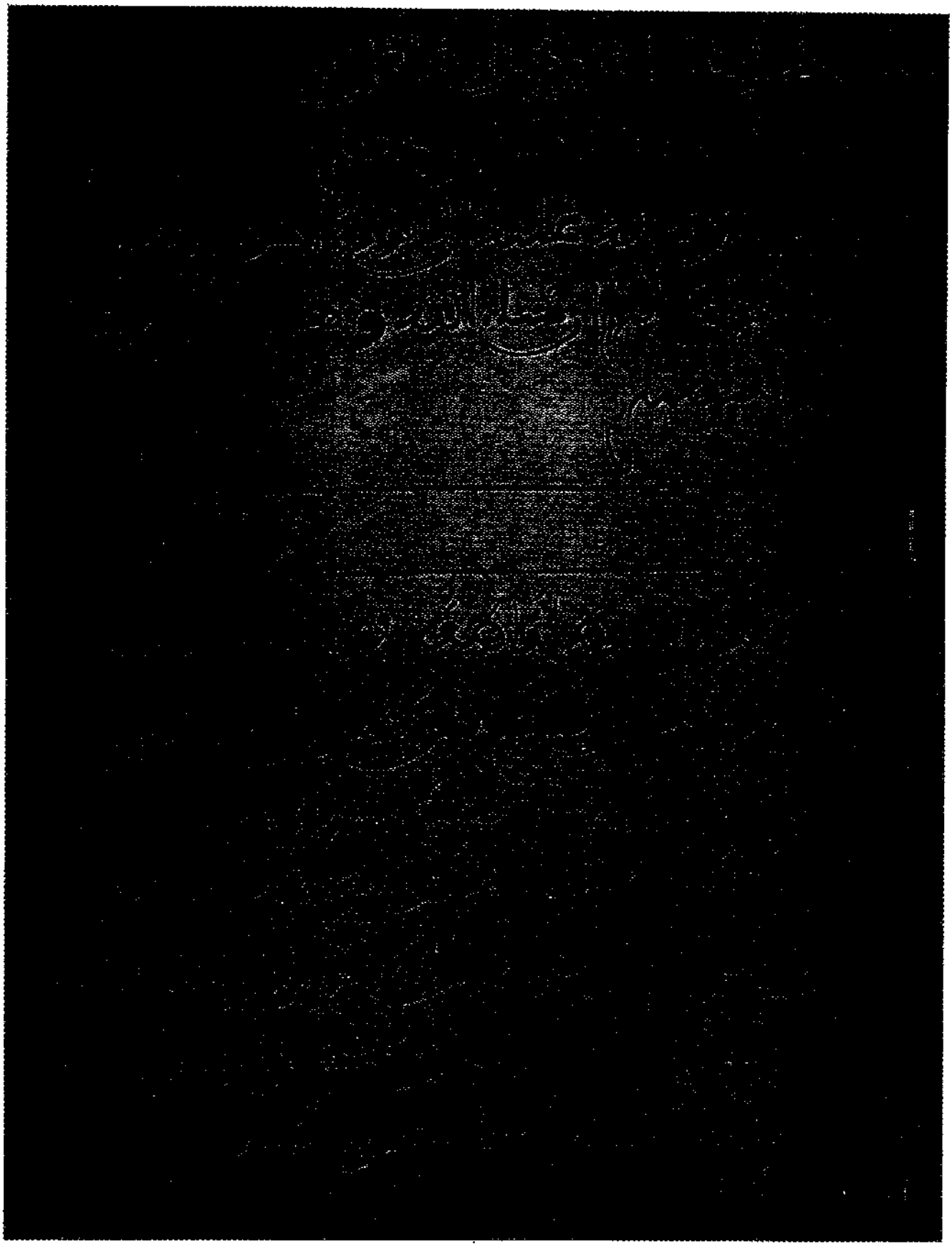

Figure 3: Scissors for circumcision.

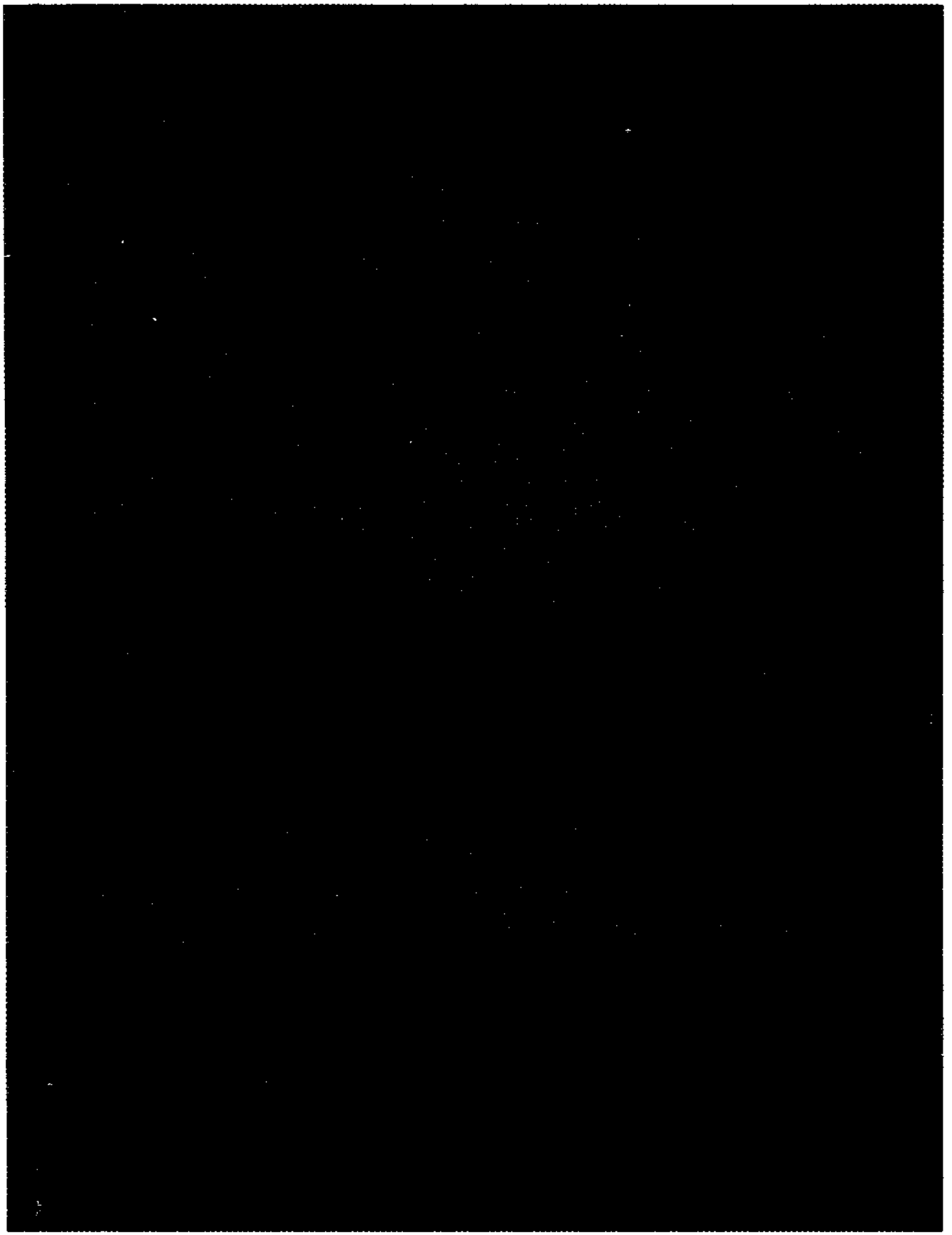

Figure 4: A sharp and pointed probe for making a hole in the glans in cases of hypospadias.

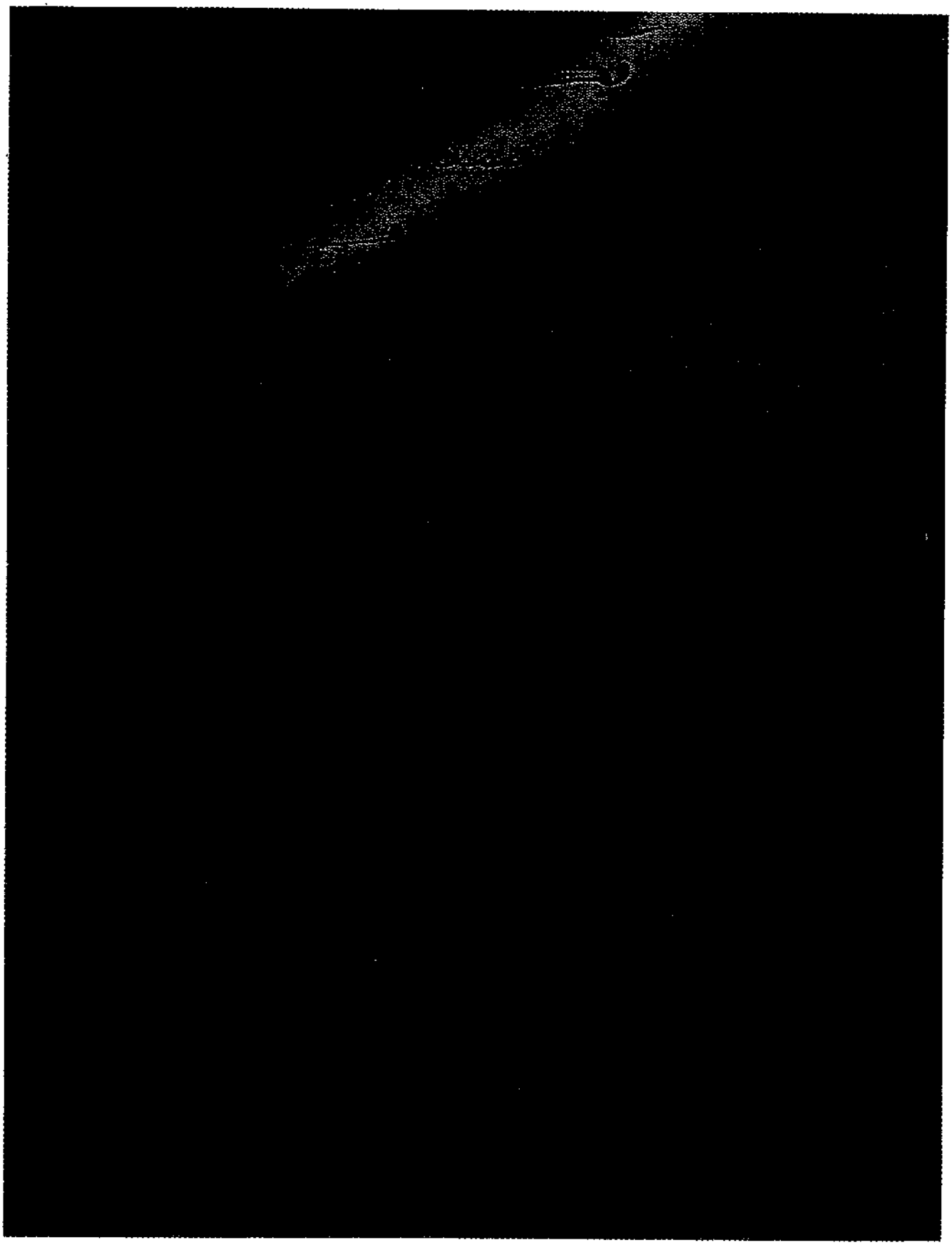

Figure 5: A catheter.

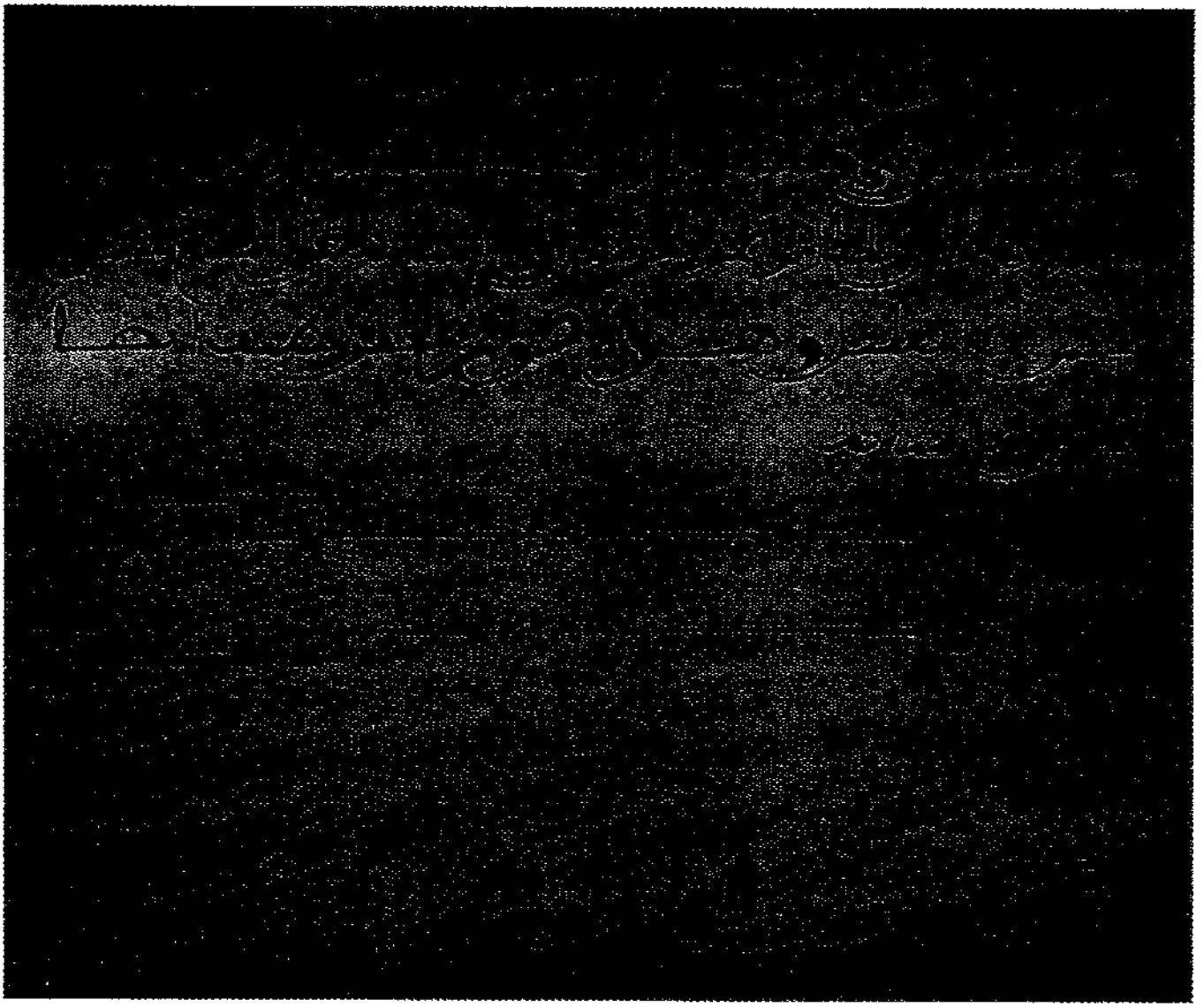

Figure 6: A bladder syringe.

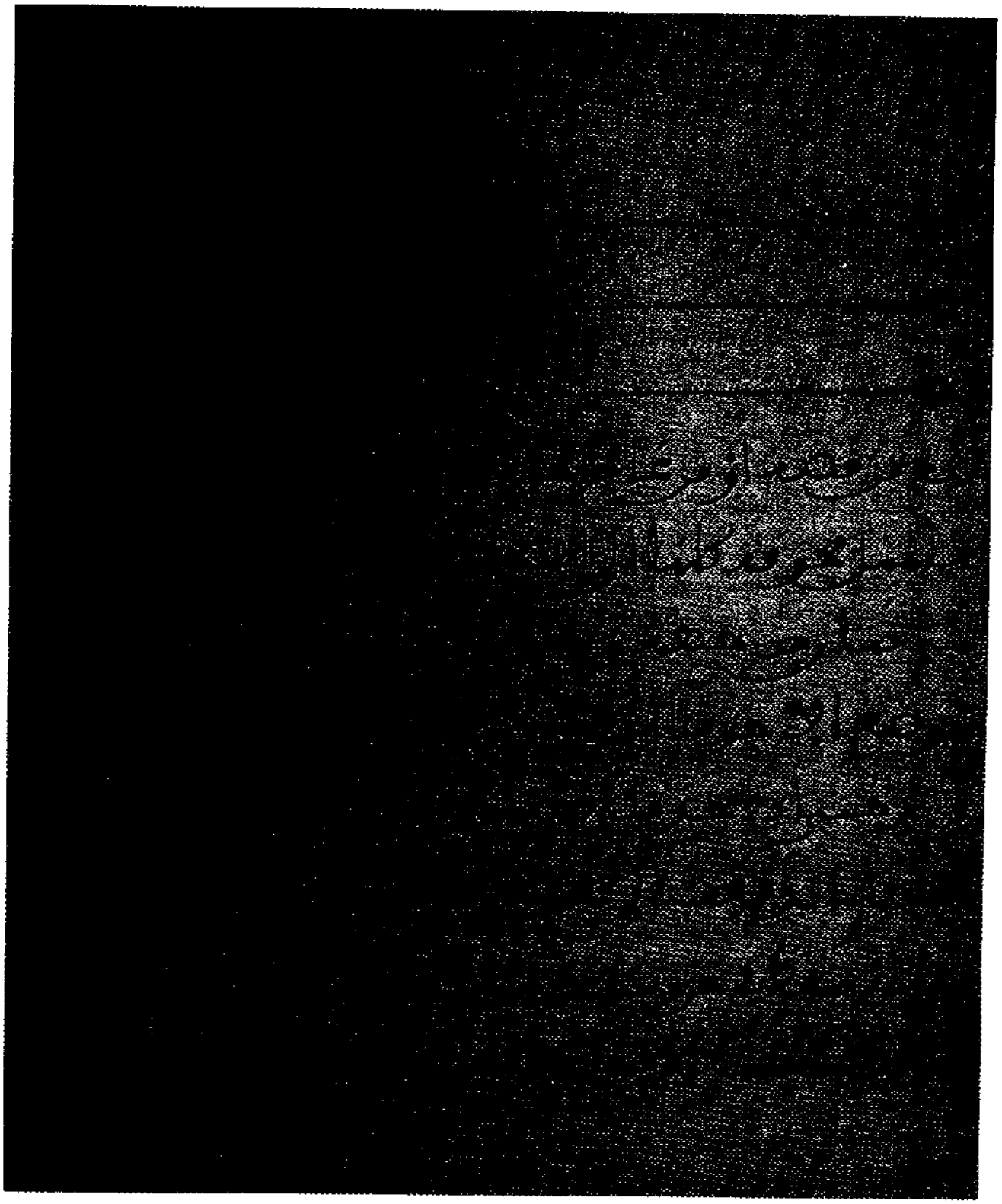

Figure 7: Irrigation syringe.

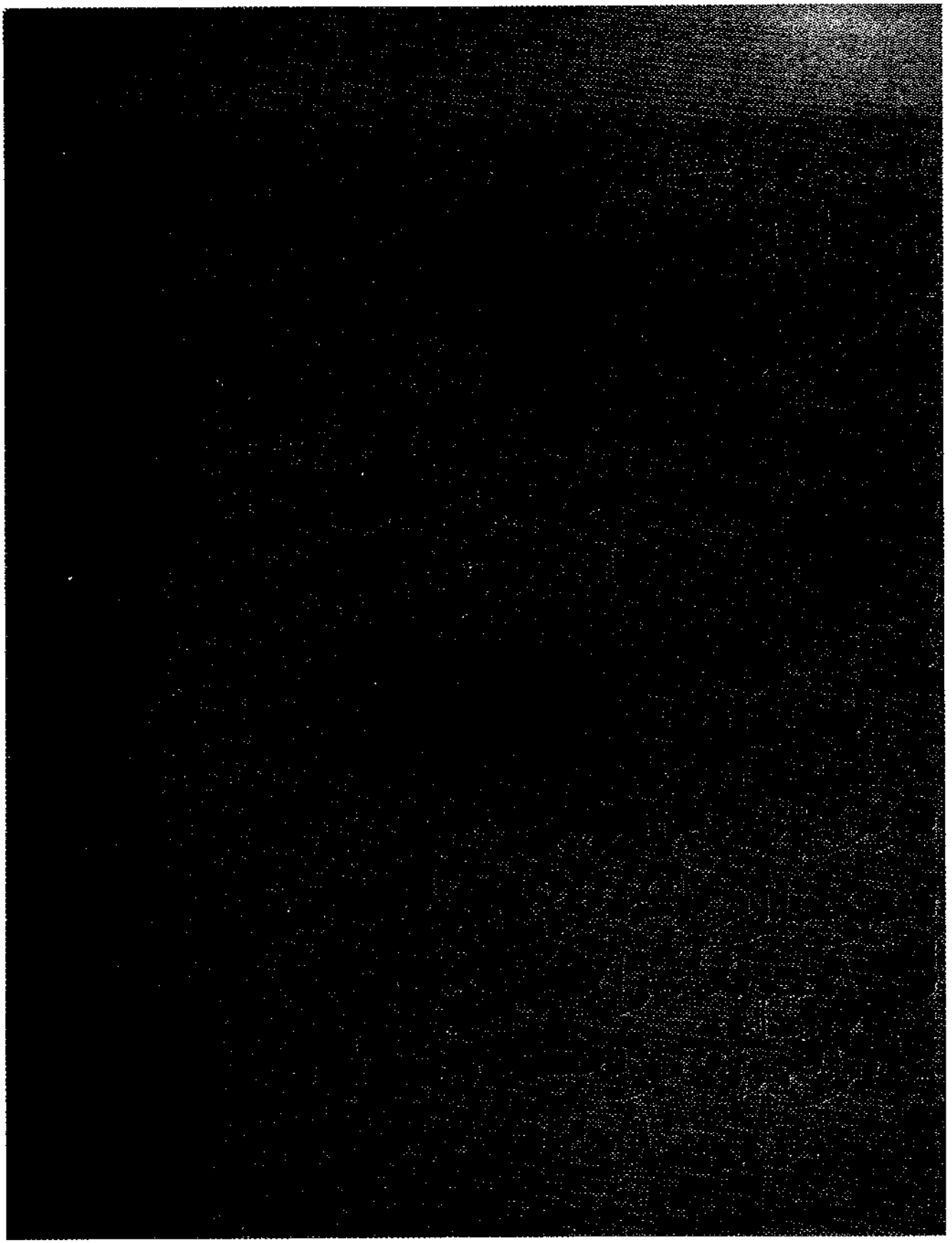

Figure 8: A cautary for fulgurating warts and newgrowths of the prepuce, glans and urethra.

ISLAMIC MATERIAE MEDICAE AND THEIR INFLUENCE UPON THE WEST: A STUDY OF SOME ASPECTS

Hakim Mohammed Said and Dr. Kamal Mohammad Habib

PAKISTAN

While reflecting upon the history of medicine, itself a compost of several factors round which the patina of ages long past has collected, and no matter how much we might try to rasp the surface, the history of the origins of some of the elements that have shaped medicine stand irretrievably lost. One of the principal factors in this compost relate to drugs. Nevertheless, even in the face of the evidence available to us, it is possible for us to reconstruct some of the contributions made to medicine and its history both by Muslim physicians and historians. For example, we may justifiably claim that the dictionary of the biographies of famous physicans compiled by Ibn-abī-Usaybīʿah, the mediaeval Syrian Arab historian and biographer, *ʿUyūn al-Anbāʾ fī Tabaqāt al-Atibbāʾ*, may well have anticipated the present-day dictionaries of national biographies and *Who's Who* in different disciplines. If Ibn-abī Usaybīʿah's comprehensive work were not the first to have addressed itself to the kind of discipline we have in mind, founded as it was upon the Arab quest for genealogy, the claim might have appeared unwarranted; but, since the Western interest in biography as and art is definitely in the proper sense a mediaeval phenomenon, biography in its classified form derives in a large measure from Islamic contributions to the subject.

We have referred to this aspect by way of a preamble only. Perhaps a more cogent instance would be that of Islamic materiae medicae.

(i) Pre- and Post-Islamic Materiae Medicae

It was through the pioneering efforts of Arabs that *The Greek Herbal* of Pedanios Dioscorides was transmitted to mediaeval Europe. It was translated directly into Arabic without resort to a Syriac intermediate in 9th century A.D. by a Nestorian, Istafān bin-Basīl, also known as Stephanos. Another Nestorian of Syrian origin, and one of the greatest translators of all times, Hunayn ibn-Ishāq al-ʿIbādī, improved upon this work, and wrote its redaction. But for these translations during the ʿAbbāsid era — which blazed an altogether new tradition — Dioscorides' work would have been consigned to irredemable oblivion. Even during the Medieval Age Dioscorides was remembered largely through aphorisms and the magical properties of drugs[2]. Improved versions of this monumental work were made available from time to time, especially in the Western Caliphate[3].

While it is true that Dioscorides' attempt is the first integrated one in human history, how many of the drugs mentioned by him would be identifiable today? The genus of the plant, possibly yes; but what of the species? It has therefore been contended with some justification that at best only one-sixth of the drugs described by Dioscorides could be properly identified today[4].

The Muslim contribution to materiae medicae is of a twofold nature. One lies in the direction of the preparation of *aqrābādhīns* or medical formularies and the other in the direction of discovering new drugs with therapeutic properties or investing known drugs with additional curative properties, as will be discussed later. The word, *aqrābādhīn,* is itself a loanword from the Greek *graphidon*[5]. The Greek word means a list or registry. In Arabic it became synonymous with a list or registry of drugs and prescriptions. This alone represents a very high water-mark of achievement insofar as the pre-Islamic Arab knew of only a few drugs, and these too simples. Considerable and unremitting clinical and pharmacological study must have gone to determine the overall effect of a polypharmaceutical and the synergistic properties of simples. And so we get two kinds of writings: those

devoted to the materiae medicae and those describing polypharmaceuticals. Some Muslim physicians made *aqrābādhīns* part of their medical works, e.g. Ibn-Juljul (possibly in the *Tafsīr asmā' al-adwiyal al-mufradah* or An Exegesis of the Names of Drug Simples, now in Madrid, 233)[6] and the *Dhakhīrah-i Khwārazmshāhī* (in Persian) by Sayyid Ismāʿīl Jurjānī, the tenth book of the letter work comprising a medical formulary. Martin Levey has hypothesized that the *aqrbādhīn* might have derived its origin form Galen's Die compositione medicamentorum... and further "that it persisted as a pharmacological form into the nineteenth century"[7]. The same writer who translated and edited the *Aqrābādhīn* of Al-Kindī says in his introduction to the work:

> ... The manuscript lists many prescriptions without any definite organization as to their medical purposes, kind of medicament, or any other category. But internal evidence suggests that the manuscript was arranged by the type of medicament, such as decoctions, pills, ointments, and syrups. This type of arrangement for an *aqrābādhīn* was a favourite one in early Muslim medicine[8].

Prior to thirteenth century A.D. several medical formularies, e.g. those by Sabūr bin-Sahl (d. 869 A.D.), al-Rāzī (d. 925 A.D.), Ishāq bin-Hunayn (fl. 870-92 A.D.), Saʿīd ibn-Hibbat Allāh (d. 1101 A.D.), Al-Tilmidh bin-Salāmah (d. 1165 A.D.), Al-Qalānisī (d. 1194 A.D.), and Najīb al-Dīn Samarqandī (killed by the Mongols during the sack of Herat in 1222 A.D.).

Just as in case of encyclopaedic biographies, so in the case of medical formularies, Europe began to adopt this form of medical writing three centuries after Al-Kindī. Pietro d'Abano (ca. 1250-1316 A.D.) added a supplement in Latin to the medical formulary of Māsawayh Al-Mārdīnī (d. 1015 A.D.), the original Arabic test of the work being no longer extant[9]. This Latin version remained current almost for centuries, and Māsawayh, in fact, came to be designated as *pharmacopoerum evangelicta* in Europe.

The first extant materia medica in Arabic — and also possibly one of the most original of all times — is by Abū-Hanīfah Ahmad bin-Dā'ūd al-Dīnawarī (d. 895 A.D.). It is rather unfortunate that it is extant from the *radīf alif* to *zā'*[10]. The work is characterized by linguistic finesse and excellence of observation. Al-Bīrūnī's *Kitab al-Saydanah fī al-Tibb* follows the approach of Al-Dīnawarī. One characteristic feature of this approach is that the writer of a materia medica does not confine himself merely to descriptions of medicinal plants but seeks to establish the identification of the plant or drug from quotations from established writers and poets. Whereas Dioscorides made actual observations in his capacity as a physician in the army of the emperor Nero, Muslim writers of materiae medicae not only described the physical and therapeutic attributes of a drug, but fortified their conclusion regarding its properties from authorities. A random quotation from al-Bīrūnī's *Kitāb al-Saydanah* might perhaps explain this aspect graphically:

> *Al-ʿarār.* — The author of *al-Mashāhīr* says it is *bahār al-barr.* Abū-Hanīfah writes that it is fragrant like *tayyib al-rīh [buphthalmus* or *buphthalmum* (ox-eye)]. Asma ʿī says it is *bahār al-barr* and has quoted a verse in support thereof (*wāfar* metre):
>
> Satiate thyself with the ox-eye of Najd. Thou shalt not have the fortune to see it in Syria.

Another poet (in the *Kāmil* metre) says:

White in the morning and pale in the evening like the ox-eye. Abū-Hanīfah (further) writes: "It is wild *bahār,* very yellow, with broad buds. Iguanas and chamaeleons are excessively fond of it". Ibn-Mandawayh says "One variety of this plant is lethal. It acts as a sternutatory when sniffed. Some varieties induce intoxication, whilst others are very pungent; they should be avoided"[11].

From all this it follows that the drug is the ox-eye.

An approach like this might be circumlocutory and long-winded, but is nonetheless very sound in that the identification of the drug is backed by etymological evidence, folklore, and verification by poets. But it has its disadvantages as well. A scholar like Al-Bīrūnī, considering the age in which he lived one of the greatest of all times, is apt to wander far a field from the theme he has in hand, but, on the whole, this approach represents the Arab ethos and its quest for thoroughness.

(ii) Islamic Contribution to Drug Taxonomy

Taxonomy as a scientific discipline is a modern phenomenon, although in its rudimentary form it has manifested itself since Theophrastus (370-285 B.C.) down to Carl von Linnaeus (1707-78 A.D.). Historians of botany are universally apt to ignore the Muslim contribution to this discipline.

In the binomial notation due to Linnaeus, while the first part of the name of a plant or animal gives its genus, the second part gives its species; and this name etches out some characteristic feature, either physical or adjectival, of a plant or animal. Thus a name like *Cyclamen europeum* (saw-bread) signifies that it is a plant indigenous to Europe. The Arabs had come very close to this kind of binomial notation. An example of this nomenclature can follow from a name like *iklīlaal-malik* (the king's crown; melilot). Likewise, the polypody *(Polypodium vulgare* Linn.) is known in Arabic as *kathir al-rijl* (many-footed) and *azrās al-kalb* (dog's tooth) in allusion to the toothed shape of the plant's foliage. The botanical name of the plant is *Polygonum aviculare* Linn. and in English it is known as the knot-grass. Scribonius Largus says that its name derives from the fact that it is ubiquitous[12]. The most common Arabic name for the knot-grass is *'asā' al-rā'ī* (the shepherd's staff). All the synonyms for the plant are, except for the mononomial *batbāt*, binomial; and all of them express the peculiar features of the plant. The Linnaean system is based upon the inflorescence of plants. While describing umbelliferous plants, Al-Bīrūnī invariably refers to their having fennel-like flowers, and he can identify certain families by alluding to their leaves, flowers or fruits. Thus he can recognise a legume by stating that it bears bean-like pods or by suggesting that such and such plant belonged to the milkweed family (Euphorbiaceae). Surprising enough, he could even in some cases identify boraginaceous plants as well. It is thus to be seen whether such a system exercised direct or indirect influence upon the Linnaean system. Further, as we have in the case of the knotgrass, the Arabs like the Europeans of today possibly had common and scientific names for plants. There are, of course, exceptions; but the coincidence is so remarkable that it canot be dismissed as being merely fortuitous.

(iii) Muslim Contribution to the Identification of Drugs

If the aim of the Arab writers of materiae medicae was merely to reproduce what the Classical writers like Dioscorides, Galen, Oribasios, Paulos of Aegineta had said one wonders whether there was any point in their undertaking one work on materiae medicae after another. What the authorities on drugs like Ibn Al-Baytār and Al-Bīrūnī have done is to have ensured the identification of a drug through observation and linguistic support. In this respect Al-Bīrūnī excels all others. He gives the Greek (which he calls the Rūmī), Persian (vulgate as well as the proper), Sogdian, Sigzian, Syriac, Zabulistanian, and Indian names of drugs. Ibn al-Baytār's unquestioned superiority over Al-Bīrūnī lies in the fact that he was a proper practitioner of medicine, was less dicursive, and, unlike Al-Bīrūnī, instead of contenting himself with the mention of an authority, he refers to the work he quotes from and in many cases to the part of the work. In the case of Dioscorides, he invariably mentions the part he quotes from. And yet, surprisingly enough, the transcription of the Greek names of drugs in the case of Al-Bīrūnī is sometimes more accurate than in that of Al-Baytār. Thus, about the fern, *sha'r al-ghūl* (the ghoul's fern), Al-Baytār says that Dioscorides in Book IV describes this plant after the

barsiyāwushān (parsiyāwushān in Persian; *Adianatum* spp.) and that the name given to it by the Greek physian was *taranjūmālas*[13]. Al-Bīrūnī here scores the better of him by stating that in Greek the plant is known as *tarīkhūmānas*[14]. This can be interpreted as *Trichomanes* spp. syn. *Onychium japonicum* according to modern nomenclature. This seems to be further confirmed by the fact that the Greek synonyms for the fern-plant, *Adianatum venestum* Don., were *politrichon, calitrichon, trichomanes,* and *ebinotrichon.* The *parsiywushan* is a member of the pteridophyte family, Pteridaceae, and therefore the description of *Trichomanes* spp. corresponds to the sporophylls of ferns characterized by circinnate vernation and pinnules (as in the maidenhair fern). The transcription of the Greek name for the plant establishes beyond doubt the identity of the plant.

(iv) Expension in Materiae Medicae and Therapeutic Usage of Drugs

Without going into specific details, one could well compare the number of drugs described by Dioscorides in *The Greek Herbal* with those described by Muslim writers. Dioscorides' versatility is absolutely amazing; he has knowledge of drugs from far-flung regions like Central Asia and the Far East. In all, he describes some 600 drugs, and if a vast majority of them is unidentifiable today, the fault is not his, as the present-day tools of identification were not then available. Al-Bīrūnī a thousand years later lists about 1,085 drugs, and, even assuming that 20 per cent of them are repetitions and have been described as synonyms, the addition to materiae medicae the Arabs must have been enormuos Ibn Al-Baytār, in the *Kitāb al-Mughnī,* which remains as yet unprinted, has almost double this number. *If the case is therefore objectively examined, it should be self-evident that the Muslim physicians within four centuries after the advent of Islam discovered twice as many drugs as mankind was able to find out within four to five millenia prior to Islam.* This alone should be sufficient to highlight the Muslim contribution to materiae medicae.

Another aspect of the Muslim contribution to materiae medicae is the discovery of ever new usages of drugs. We can here at best give a few instances. The *kyparissos* of Dioscorides, which in all probability is *Cupressus sempervirens* Linn. is prescribed by him as a refrigerant. In addition, it has also been prescribed by the Greek physician as a cure for the polyps of the nostrils, conglutination of wounds, erysipelas, carbuncles, inflammations of the eye, and the stomach[15]. Al-Kindī, on the other hand, employs it for relieving facial heat, haemorrhoids, rectal pulsation, and extermination of worms. Cypress tips are also used by him in the inflammation of the liver[16,17]. Najīb al-Dīn Samarqandī prescribes Cypress in conjunction with savin *(abhal)* or *Juniperus savina* Linn. and rue *(sadhāb; Ruta graveolens* Linn.) in rheumatic swellings[18]. *Not only were the matriae medicae being expanded; the old, well-known drugs were being invested with new therapeutic usages.*

Another interesting example is that of *āqir qarhā* (Roman pellitory root; *Anacyclus* pyrethrum D.C.). Dioscorides has it for paralysis, excessive phlegm, and tooth-ache[16]. Al-Kindī has discovered other uses for it and prescribes it for blemishes, neck pustules, sore throat, and as a tranquillizer[19].

It would be a monumental task to enumerate the number of drugs added to materiae medicae by the Muslims. But some of the drugs added to materia medicae after Al-Kindī are: *gawzabān (Caccinia glauca* Savi), *azād dirakht (Melia azedarach* Linn.), *bdāward (Volutarella divaricata* Benth et. Hook f. syn. *Amberboa divaricata* Kuntze), *bādrunjbūyih (Melia officinalis* Linn.), *sumbul jaballī* or *asārūn (Valeriana wallachi* D.C.), and so on. It is from the Indo-Pakistan subcontinent that a very large segment of additions derive. In the *Muhīt-Aʿzam* compiled in the nineteenth century in the subcontinent the number of drugs had swollen to about 10,000. Al-Bīrūnī's description of tea, for example, is the first in any literature outside of China[20]. Peppermint was also incorporated into materiae medicae for the first time by Ibn-Sīnā[21]. It was employed by him in neuralgic affections. It is also most probable that spogol seeds, described in Arabic ās *bazr qatūnā,* owed their discovery to Arabs who took it from the pre-Islamic Iranian materie medicae. Ephedra, from which the alkaloid

ephedrine is obtained, and which is an extremely important ingredient of Western pharmacopoeiae, owes its discovery and development to the Arabs. It is used in modern medicine as a sympathomimetic drug in asthma. The same is true of myrobalans, which are among the richest sources of ascorbic acid; they were borrowed by the Muslims from the Hindu materiae medicae.

This field of investigation is almost limitless, and a study of the synonyms of drugs is of overriding importance so that it might be finally assessed whether the drug being prescribed by the *tabībs* is the correct one. Taxonomy and the active principles of drugs are closely related. Flora of some of the Islamic countries has been catalogued,[22, 23, 24] and it is hoped that the heritage left by our forefathers will serve as beacon light for us.

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10. Edited by M. LEWIN (Uppsala, 1953).
11. HAKIM MOHAMMED SAID (tansl.) *"Kitab al-Sayadanah fi al-Tibb* (Al-Biruni's Book on Pharmacy and Materiae Medica)" (Karachi, 1973), p. 224 of the translation.
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23. Cf., for instance, HOLGER ERDTMAN, *"Organic Chemistry and Conifer Taxonomy in* "Perspectives in Organic Chemistry", ed. Sir Alexander Told (New York, 1956), pp. 453-94; R. DARNLEY GIBBS, *"Chemotaxonomy of Flowering Plants"* (Montreal and London, 1974), vol. 1: Constituents.
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PART THREE

INVITED LECTURE

CHAPTER ONE

(Invited Lecture)

REPORT ON THE SESSION

This session was conducted from 8.30 to 9.15 by Dr. Reda Saeed Al-Obaid and Prof. Abdul Hafiz Helmi as chairman and moderator. This was an invited lecture given in this session by an eminent scholar i.e. Prof. Abdul Aziz Kamel. His topic was "MEDICINE IN ISLAM THROUGH JURISDICTION, PRACTICE AND PLANNING".

Editors

MEDICINE IN ISLAM THROUGH JURISDICTION, PRACTICE AND PLANNING

Prof. Dr. Abdulaziz Kamel

KUWAIT

INTRODUCTION

Mr. Chairman
Dear Colleagues

It gives me pleasure to concur with the preceding speakers who have consecutively expressed their gratitdue to Turkey represented by its president, government and people for sponsoring this grand Islamic Medicine Conference.

Gathering on its land, we owe the city of Istanbul the right to associate its longstanding glory with our prospective collaboration to build up a present and a future.

Visiting this city pre-occupies my mind with three aspects of its heritage: faith, science and planning. Muslim attempts continued for eight centuries until Sultan Mohammad Al Fateh managed to enter Constantinople in 857H/1453. The genius of this young man culminated in coining the depth of creed and the advanced scientific level which facilitated overcoming the fortifications and walls of the city. Under his commandship the two powers: faith and science coalesced. In previous attempts, however, faith was not lacking, but they were short of a scientific level capable of challenge and victory. The third factor, planning, seems to be glittering in the sky of Istanbul marking the architecture genius, Khogah Sinan, who has been outstandingly distinguished at all levels: among his country men (Turks), fellow Muslims, and sophisticated specialists in architecture.

In the Tenth Hijri Century/Sixteenth Christian Century, Sinan managed to lay the foundations of the Turkish style of architecture as well as the religious and civil constrcutions in more than one country in the Ottoman Empire. The three mosques selected by Sinan to represent the stages of his own promotion: Shah Zadah, Sulaimaniah. (in Istanbul) and Seleemiah (in Adernah) are, in actual fact, nothing but a mixture of faith, science and planning.

In the horizon of Istanbul, Adernah and even in more than one Turkish city, one senses the genius of Sinan, who died in (996h/1588 A.D.), inviting us to a kind of hospitality impregnated in the three terms: faith, science and planning.

SECOND REVIVAL

Mr. Chairman
Colleagues

Surviving the outset of the Fifteenth Hijri Century designated as the Second Islamic Revival, which currently prevails all over the Islamic World and scientific circles regardless of some earlier Islamic efforts. We, certainly witness a revival; however, it is not the second one. The Islamic World may have faltered in the wake of the first revival during the eras of Post-Prophet Caliphate, Umayyads and Abbasids. The fall of Baghdad in (636 H/1258 A.D.) will remain as an indicator of a mighty earthquake in the history of Islamic civilization. This incident, with its syptoms and after-effects, deserves a comment in connection with the register and history of Islamic civilization part of which medicine is.

Let me, temporarily, put aside the issue of Baghdad to talk about Constantinople.

The West regards the year 1453 (A.D.) as that of the "Fall of Constantinople". Islamic historians referred to "Mohammad the Conqueror" and "Victory over Constantinople" and how the old name gave way to that of Istanbul. We also, read in the literature of civilization how the fall of Constantinople affected the age of Renaissance in Europe, how the "brain drain" helped

trigger European thought as well as progress and also how the fall of the Byzantine Empire carried the seeds for the new regime.

This link-up quickly renovates aspirations in the European individual while reading about his history victory after defeat, light after darkness and prospective hopes for a promising future instead of sorrows. Moreover, our readings include the recordings of Islamic civilization historians as to the obituaries in memory of the fall of Baghdad as well as others referring to withdrawal from Al-Andalus after the fall of Granada in (897 H/1492 A.D.). We do not, however, claim to associate this with the subsequent revival reflected by the scientific endeavours which would not give in to defeat.

In the field of medicine, since Baghdad flourished in the first Abbasid Age, it uniquely sponsored outstanding brains both in practice and in scientific contributions:

- Ali Ben Ruban Al Tabari, author of *"Firdaws Al Hikmah"*, (Wisdom Paradise), which was the first systematic Islamic book on medicine.
- Mohammad Ben Zakaria Al-Razi, died in (313 H/925 A.D.), writer of *"Al Hawi"* Encyclopedia, which was based on his own remarks about patients medical check-up and treatment in addition to his publication *"Al Mansouri"*, which secures a special reputation in the West.
- Ali Ben Al-Abbas Al Magoosi, died in (384 H/994 A.D.), author of *"Kamel Al-Sinaah"*, which was also designated the *"Royal Book"*.
- Ibn Sina, died in (428 H/1037 A.D.), spent all his life in Persia, deserves to be called the "Philosopher of all scientists" and the "scientist of all philosophers", his publication *"Al Qanoon Fil Al Tib"* (Law of Medicine) may be considered a landmark in the history of medicine.

Islamic science was, simultaneously, reviving in the Far East. In Al-Andalus lived the greatest surgeon in the history of Islamic Medicine, Abul Qassem Al-Zahrawi, author of *"Kitab At-tasreef"*.

This is no place for inference[1], but I mention it to set a pattern by which the Caliphate House (Government) was one of the largest scientific centres, most capable of attracting scientists particularly medical people and imitated by other cities which had their own scientists. Muslim countries including independent ones (from Caliphate) never lacked other celebrities who have left some heritage in the history of medical science.

After the decline of the Abbasid Caliphate, other Islamic cosmopolitan cities began to feel more responsible and endeavoured to make up for what the Islamic civilization had lost as a result of the destruction of its libraries, dispersing its scientists and ruining its institutions. Scientists, were, therefore, strongly motivated to defy defeat moving steadily towards the age of encyclopedias. They collected as much as they could from heritage and emigrated together with traders and craftsmen to Al Sham (Syria), Misr (Egypt), the world of the Indian Ocean and its isles in Malay, Indonesia and even beyond that - to the Philippines and left after them, in the desolate land, only a few. In these new Islamic countries which were established after the Mogul tide calmed down and the tempest was replaced by running waters for irrigation and plantation[2].

Here are the titles some grand encyclopedias which followed the fall of Baghdad and distinguished the nature of this stage in the literature.

- *"Masalek Al Absar Fi Mamalek Al Amsar"*, by Ibn Fadl Allah Al Amri (749 H/1348 A.D.).
- *"Nihayat Al Arb Min Funoon Al Adab"* by Al Nuweiri (733 H/1332 A.D.).
- *"Sobh Al Aasha Fi Sinaat Al Insha"* by Al Qalqashandi (821 H/1418 A.D.).

LANGUAGE DICTIONARIES

- *"Lisan Al Arab"* by Ibn Manzoor Al Afriqi (711 H/1311 A.D.).

In the medical field, Brain Drain resulted in the flourishment of medical activities in Al Sham and Misr. This imigration increased after the fall of Baghdad but had started since the Second Abbasid era and the disappearance of the Great Caliphs then.

- Ibn Abi Usaibah, wrote *"Oyoon Al-Anba'a Fi Tabaqat Al Atibba"* (668/1259).
- Qutb El-Deen Al-Shirazi, (710 H/1311 A.D.) interpreted *"Al-Qanoon"* of Ibn Sina in his own book *"Al-Tohfa Al-Saadiyah"*, which is considered the most accurate and profound interpretation ever written about *"Al Qanoon"*.
- Aladin Ibnul Nafees, (687 H/1288 A.D.), reputable as "Second Ibn Sina" practised his job between Al-Sham (Syria) and Misr (Egypt), was the pioneer of discovering the minor blood circulation and was scientifically recognized as the genuine predecessor of William Horvey. Ibnul Nafees is, also, the writer of a medical encyclopedia known as *"Al Shamel in medical industry"*.

Medical centres flourished in Morocco, Persia and India, too.

In the Turkish territories of the Ottoman Empire, distinguished names in the field of medicine achieved remarkable success:

- Haji Pasha Al Ayeedeeni, (9th century (H) 15th century A.D.).
- Mohammad Al Kozooni, physician of Suleiman the First and Saleem the Second 10th century (H)/16th century (A.D.).
- Dawud Al Antaki, one of the most remarkably talented people in the history of Islamic sciences, his book *"Al Tathkirah"* is one of the most wide-spread medical references in the late period[3].

However influential Western medicine may be in most Islamic countries, some of these still preserve their Islamic heritage particularly in India, Pakistan and Bangladesh and, simultaneously, make use of Western medicine.

Preserving Islamic medical heritage has started to gain ground even in the West itself reviewing this heritage in particular and the traditional heritage in general has formulated an integral part of the current Islamic national and international interests.

It, therefore, seems that, between the First and Second Revivals, there have been several revivals which effected new states some of which were set up on lands owned, gained or retained by Muslims. Some old and new cities and capitals, consequently, acquired a certain position owing to the unending contributions of Muslim scientists.

In other words, we can say that despite the loss which occurred to Islamic civilization in the wake of the Mogul expansion from the East together with the losses and exhausted efforts which resulted from the Western Expansion represented by the Crusaders' Wars, a new movement of revival was triggered in the form of contribution stages which had varied axes and bases, but were distinguished with survival and struggle for existence. Here, we need a new history of Islamic civilization aimed at recording the resistance of scientific defeat and enthusiasm for writing to preserve heritage and create new generations of researchers.

We, meanwhile, do not wish to overlook the internal Islamic attrition existing in the wars between Islamic countries diminishing the choicest of the youth and all that we keep for future. We, also, have to explicate its negative influence on the Islamic course.

We should maximize our co-operation and, meanwhile, minimize our disputes as much as possible. We should, also, encourage scientific efforts away from internal disputes and call for immunity of scientists, scientific organizations and generations to help them shoulder their res-

ponsibilities one of which is to record the history of their civilization including medicine. I hope this will be among our recommendations together with an invitation for co-ordination of overlapping or redundant efforts undertaken by more than one scientific structure in the Islamic World.

MEDICINE BETWEEN JURISPRUDENCE & PRACTICE

The relationship between jurisprudence and practice is associated with *Islam's* view of man as expressed in the Quranic verse *(WE HAVE HONOURED ADAM'S DESCENDENTS)* and that man is *Allah's* agent on the earth as in *(GOD INFORMED THE ANGLES THAT HE WOULD CREATE AN AGENT ON THE EARTH)*[5].

For man *Allah* created the universe and endowed him with senses and thought.

HE WHO CREATED (FOR YOU) ALL THAT IS ON THE EARTH[6].

SAY HE WHO CREATED YOU AND GRANTED YOU HEARING, SIGHT AND HEART AND YOU ARE LESS GRATEFUL[7].

Our jurists viewed the essential objectives of jurisdiction as five: preserving religion, self, thought, property and posterity. Al Emam Al Shatbi argues that these five aspects are crucial for the benefit of religion and life and once they are misachieved life affairs will be based on misgivings and, subsequently, lead to insecurity and misery in the hereafter (Day of Reckoning). These objectives can be achieved by either the support for their pillars, i.e. to maintain their existence or what saves them from current or expected defection, which signifies complete rudimental attention[8].

Achieving these objectives is supported by a certain level termed *Hajiyat* (needs) by Al Shatbi below which is a third level termed *Tahseenat* (improvements), i.e. using the advantages of habits.

If essentials are fundamental, needs would be supportive or subsidiary; whereas improvements develop performance. With their five horizontal (or three vertical) divisions, they all revolve around one axis, i.e. man's dignity from which stems human care in health or sickness - health with its comprehensive concept (physically, psychologically and spiritually) as well as sickness in its over-all sense, too, comprising all these aspects whether caused by man's own deeds or by an external power.

ATTITUDE TOWARDS THE PATIENT

Closely linked to this is the attitude of *Islam* as a religion towards the patient. Attention and care extended to him by his relatives as mentioned in *Quran.*

BE KIND AND MERCIFUL TO YOUR PARENTS.

NEVER FORGET ALLAH WHOM YOU PETITION OR YOUR RELATIVES AS HE KEEPS AN EYE ON YOU.

Kindness and care are due on the patient's relatives in addition to his initial right as a human being.

As to the relationship between care and the society the former is an obligation once fulfilled by one sector of the society, it does not formulate the same obligation to others. In *Islam,* the individual's need for food or water is identical with his need for care. Now, as the state together with the local executive bodies and donated institutions undertake the responsibility, medical care planning has become the job of an organisation in which individual and group initiatives coalesce forming service channels complementing what is done by the governmental bodies concerned...

ATTITUDE TOWARDS SICKNESS

In *Islam,* sickness means a deviation from health. The Prophet (ﷺ) advises us *"Slaves of Allah! Take medicine as Allah has created a cure for every disease except senility"*[11].

One never comes across a negative attitude towards sickness; so, one has to preserve one's health and seek all possible ways for recovery in case of sickness and the society should give as many facilities as possible in this regard. Besides, one never gets a hostile attitude towards a patient as used to happen to feeble-minded individual in Europe in the Middle Ages when this or madness was associated with evil spirits.

The (Arabic) linguistic root of this word is (g n n) does not indicate a loss but refers to a kind of concealment. From it we derive *(magan)* which protects the warrior and also *(gannah)* i.e. garden because its tress conceal whoever is in it. This protection or concealment necessitates existence as it were a concealed mind of a mad man, if uncovered it will become normal again[12].

Sickness is nothing but a test by *Allah*. The Prophet (ﷺ) says, *"Whatever misfortunes a true believer may have - fatigue, grief, melancholy or worry - are used to redeem his sins"*[13].

This indicates that endurance of pain is a kind of worship as it comforts the soul, which helps the patient get over pain and, meanwhile, aids his physician in treatment. Our old and new heritage teems with the attitudes of holy people towards sickness - showing patience and endurance or seeking cure if possible or even expressing satisfaction in case it was beyond the capacity of medicine and cure[14].

This co-operation between the patient and the physician used to occur in a friendly and caring atmosphere (physical, psychological and preparatory for public life) witnessed at the hospitals establishment during the different stages of Islamic flourishment at many capitals.

DISCUSSION OF SOME PROBLEMS OF PROPHETIC TRADITIONS IN MEDICINE

This lengthy course of requesting medicine and cure discussions were held about some Prophetic traditions an outstanding one of which is : *"Beware of infection"*[15] together with others which recommend avoiding disease and others that encourage care to the sick.

This reflects the practical pictures which comprise an approach towards sickness to cure the patient, warning against infection and separation of the healthy from the sick for protection.

Each of these attitudes goes in line with one or more or the Prophetic traditions.

A– A number of our scientists said that the Prophetic traditions about medicines are not legislative but the juice of the age[16].

Had it been so, the Prophet (ﷺ) himself would have prescribed medicine for whatever arose. He (ﷺ) sometimes could prescribe medicine but He (ﷺ) nevertheless, used to recommend the consultation of some specialists. When Saad Ibn Al Waqas (Rad. A.) fell ill, the Apostle(ﷺ) paid him a visit and said: *"Call Al Hareth Ben Kaldah to medicate him"*[17].

B– Some mentioned that the tradition (Beware of Infection) was addressed to Abu Hurairah (The Prophet's companion) but He discontinued it.

C– Some considered each of these traditions for a specific target, situation and level of faith. We shall not give more details about this matter which can be sought in relevant references such as *"Tahtheeb Al Athar"* by Al Tabari and *"Zad Al Mo'ad"* by Ibn El Qayem"[18].

That was due to the fact that the Islamic practice was experienced in seeking cure for every disease, protection from infection, and care for patients considering all this as a religious and social responsibility together. This is explained in the Islamic term *Ibadah* (worship) which is the goal of *Allah* whenever a good deed is contributed in the society whether it is done for ourself, one's relatives or for the society.

We have a recent example from Turkey:

When smallpox was almost devastating European peoples in the Eighteenth Century, the

Ottoman state applied vaccination. Lady Mary Montague, wife of the British Ambassador to the Ottoman State recorded her remarks on visit to Adernah in 1717, in which she mentioned how less the degree of seriousness of smallpox was in the orient. She knew that vaccination was after this. She got convinced of its usefulness and tried it out with her children. She, also, prescribed it for her own people, but she was accused sorcery and resistance to the will of *Allah*. She, nevertheless, perserved with her ideas until the Royal family were convinced to use vaccination among its members after preliminary experiments outside the family.

Her countrymen, eventually, accepted and formally used vaccination until this honourable Lady died in 1762. Sixty years later, they made a memoire in her name on her grave, glorifying her generous help to her countrymen by transferring imperical science from Turkey[19].

Practical application of the Prophetic tradition:

"Slaves of Allah ..... seek medication" was extensively practised. Islamic thought has permanently been based on assimilation, participation and creativity.

PRESENT AND FUTURE RESPONSIBILITIES

These responsibilities are two fold:

First : Utilization of past responsibilities considering that the present is a mobile point of time – today is the future of yesterday as well as the past of tomorrow - Such a consideration should not be confined to a certain period or stage of flourishment in our attempt to rewrite Islamic civilization a part of which medicine is. Here, we do not envisage a golden age after which Islamic existence failed, even partly, to yield anything new.

This stock comprises the Islamic World in its comprehensive sense where territorial and national circles move and, thus, it is the pivot or nucleus as seen in the world context.

Investigating these relationships, we can consider a number of schools such as the "regional" and "thematic" ones in connection with the organizations in charge of the history of civilization in the Islamic World at an international level utilizing previous contributions in addition to the outcome of published scientific documents and graphics, which coincides with the current revival in the Islamic World.

Second : Planning future tasks starting from here through all circles mentioned above and undertaking the most immediate measures as to:

1– Preventive Medicine
2– Curative Medicine
3– Scientific Research

PREVENTION AND CURE

In many countries of the Third or Developing World, one can consider preventive medicine as "neglected medicine" Dr. Nabeel Al-Taweel, in his book *"Al-Hirman Wat-Takhalluf Fi Diyar Al Muslimeen"* (deprivation and retardation in the Islamic World) 1404 H/1984 A.D. says:

Our preliminaries in Islamic and Developing (or underdeveloped) World are reversed - Here, public health services are usually exhausted and concentrated in urban centres and lack serious attention. Curative medicine consumes most of both ordinary and developing budgets simply because such an achievement has a glittering and concrete structure represented by buildings and equipment which can be propagated by mass media circles and, therefore, support the structure of the executive authority system.

Preventive medicine, on the other hand, has a different psychological effect[20].

The services are distributed among more people and a greater demand for it is felt in lower classes where people have no access to decision-makers and distributors of budgets and services. Anything else is found in curative medicine which is supplementary to preventive medicine whatever is said about it. Curative medicine cures an existing danger, whereas preventive medicine protects from an expected danger. The former is confined to patients and mostly practised at state or private institutions. If a major part of preventive medicine provides service to the individual, in the curative medicine, the individual seeks the services centre and if both kinds of medicine complement each other, prevention would be basic as an extenstion of normal condition, whereas care would be subsidiary as it takes the patient back to normal (or nearly normal) condition.

SCIENTIFIC RESEARCH

Contemporary scientific research is a group activity which no longer suits a desolate researcher, scientist or even scientific group. Scientific cooperation has, thus, become essential at the national, Islamic and international levels - a cooperation that can not be achieved through reading and correspondence, but through meetings and direct discourse[21].

In the medical field we, in the Islamic world, need research projects that tackle five main scopes at least:-

First : More attention to medical heritage in the Islamic world from the practical point of view so as to raise the percentage of our reliance on it as much as we can on a formidable scientific basis.

Second : Considering traditional medicine in ancient civilizations such as those of China and India.

Third : Constant contact with scientific research centres in the advanced world.

Fourth : Encouraging discourse between medical people and Islamic *Shari'a* (Jurisprudence) and ethics people - a discourse which has already started at both international and Islamic levels.

A– At the international level, I would like to refer to Varna's Seminar about "Science of life and Ethics", held in June 1975[22]. In it, life was considered in a comprehensive sense including all relevant human sciences. It was followed by other seminars and specialized conferences about the relationship between medical and ethical aspects and a certain phenomenon such as alcoholics.

B– At the Islamic level, the Islamic Organization for Medical Sciences published "Islamic Constitution for Medical Profession" (1401 H/1981 A.D.). Besides, Kuwait witnessed a specialized seminar on "Birth" in (Shaaban 1403/May 1983) of which the Islamic Organization for Medical Sciences published proceedings. This seminar hosted men of both medicine and religion in a unique fertile discussion distinguished with an objective scientific atmosphere. The seminar aimed to discover a new route for the direct discourse in which all efforts collaborate to solve present and future problems of Islamic conduct within an age where scientific discoveries have explored new horizons both at the human or scopic levels.

Fifth : Undertaking direct field studies which investigate the dimensions of problems juxtaposed with their materialistic and human aspects with a view to finding solutions that harmonize with their context.

SPOTLIGHT ON INTERNATIONAL COOPERATION SCOPE

First : There is an international tendency, towards "Urgency of developing a new ethics", which considers scientific achievement and steers it for the good of man and human

communities in each of the advanced, and developing countries and for realizing the wish of scientists to continue discourse with ethics men supporting each other with a view to establishing human rights on two bases; science and ethics. This discourse will help determine the concepts and common language between them. Thus, researches complementation replaces their parallelism or consecutiveness.

The recommendation of the seminar of Varna was to convey these concepts from the research level to the pedagogic one at specialized universities and schools, then to general education and the cultural level in the society at large. It was, also, recommended that this be accomplished by collaboration of all specialized organizations in the United Nations; particularly UNESCO and W.H.O. (World Health Organization). The world need for this scientific charter became dire after the Second World War, before which and even two centuries earlier science was the best achievement of humanity. Scientists are the leaders of thought and pioneers of progress through whose discoveries and inventions - nations plan their steps to future. The year 1945 was, nonetheless, decisive in altering the outlook on science. After the release of the first American atomic bomb over Heroshema, and the second over Nagazaki, science seemed a mixed blessing - angel and devil, fire and light. The giant was released from the cell, which caused fatal injuries to the religion and its ideals as the great historian Arnold Toynbee says[24]. So, science was incorporated in politics and war, the costs of its research consequently became higher, its scope widened, and the state acquired supreme authority over many of its large executive bodies. New weapons began to threaten all human existence and life has become at the mercy of reprisal, horror or nuclear terror. In addition, exploring new areas of medicine has yielded the wars of germs, radiation and destruction of human nerve cells[25].

Nowadays, humanity witnesses an age where power overlaps with fright, scientific cooperation with contest and racing, secrets of nature with those of states and guarding military constructions with those of scientific ones. In many meetings of world organizations which speak for peoples, we hear a call for minimizing armament and re-routing some of its funds towards promotion, prevention, cure and education and, meanwhile, taking into account what is spent on destruction, preparation for it or even terror resulting from it. We, on the other hand, hear some voices of politicians persuading us to delimit our expectations and reliance on them in financing peace and promotion projects among which are those geared to a better human hygiene. Richard Nixon, the former president of U.S.A. presented this view in his book, *"The Real Peace"* (1983), in which he refers to "war" as a past alternative, and "peace" as the only alternative for future. However futile war may be, there were 15 wars as well as tens of minor fights in the Third World in summer 1983. Since the Second World War, one hundred and forty wars have broken out causing losses of at least 10 millions. Peace is not the terminal of contest, but it is a technique for surviving it provided that it be given constant attention as soon as it is accomplished; otherwise it will die out[26].

Let us consider his following statement:

It is risky to misinterpret genuine peace as perfect peace. Perfectionists usually dream of a non-conflict world - a world which has never existed[27].

In actual fact, perfect peace is not achieved except in the grave and before the invention of printing machines. It is, indeed, the substance of poetry and press articles which disguise bright notions with beautiful word. Genuine peace, on the other hand, is actually authentic peace adopted by practical leaders who view the welfare of their people in a daring manner. He eventually concluded that both big powers should be capable of self-defence and repression of other parties. He, also, recommended that labour all over the world should be a combination of soqoor (eagles) and *Hama'em* (pigeons) and that a balance should be stricken between power utilization and economic support[28].

I have given this summary for a basic reason: one portion of economic support may be offered by these big countries which are engaged in the marathon of international dispute, another portion may be obtained from international organizations which have faced pressures advocating peace, as happened to UNESCO in December, 1983. This paves the way for a basic matter, i.e. the importance of building up the self-sufficiency in the Islamic World supported by faith in *Allah*, fraternity and scientific planning.

FLASHES ON ISLAMIC COOPERATION SCOPE

Whether we wished or not to be a constituent of this international structure which positively and negatively controls our future, we have to take the best move possible towards our target within the context of this conference.

A primary task would be the co-ordination of our efforts and sources together with the achievements of Islamic-natured organizations and minor ones which follow the same courses in Islamic World sectors.

To cite an example, the way was paved for this co-operation in one of the most important organizations - Islamic Conference Organization - when Casablanca in Morocco (1401/1984) witnessed the Fourth Islamic Summit Conference.

Among the committees formed by the Third Islamic Summit Conference in *Makkah Al-Mukarramah* (January, 1981) was the joint-work with Coast Countries Committee - those countries beyond South Grand Sahara constituting the inhabited coast overlooking this huge sand dune. We are familiar with what these countries suffer from - the encroachment of the desert (Southwards) on urbanism and plantation through constant and quite sand movement.

The Islamic Summit Conference authorized this committee to trace and apply all measures needed for aiding coast countries in resisting draught and taking appropriate initiatives in this regard. It also established a general framework for emergency food supplies, essential rural development projects. For this purpose the Kingdom of Saudi Arabia, State of Kuwait, Iraqi Republic and U.A.E. have offered financial contributions.

What I would like to say here is that this preventive job - a geographical aspect about a long area extending in the Islamic World between the Pacific and Atlantic Oceans, and a practical one about development problem culminating in its comprehensiveness including the resistance of hurdles and the support of positive contributions.

We, therefore, badly need an atlas of services for the Islamic World. This conference has to undertake the component of medical services considering its three aspects. The Islamic Conference Organization studied the overlapping specializations problem of its ensuing sub-organizations at Casablanca in January, 1984 in an attempt to develop its administrative structure. It is, nevertheless, felt that there should be more co-ordination if we consider scientific joint-work at all levels among all existing bodies in the Islamic international context. This co-ordination for an atlas of Islamic medical services is but a constituent of a comprehensive Islamic services atlas, which is, in turn, a part of the Islamic future as a whole.

CONCLUSION

Mr. Chairman,

Colleagues,

At the outset of this Fifteenth Hijri Century, Muslims recommended investing this historical occasion which co-existed with an Islamic revival with a view to steering this revival which has been distinguished with a desire for co-operation, accessible and convenient communication, a surplus of money, an increased number of educated people and a better awareness of the Islamic

World needs. They, also, recommended development of joint projects and an Islamic court of justice to take care of cases between Muslim countries establishing peace, reconciliation and justice.

This glared in the recommendations of the third and fourth Islamic Conferences. Despite the growing need for every human and financial effort, wars violently break out in the Islamic World at the level of the one country, the next door neighbours or brethren. Is it possible to hope that war between Iran and Iraq come to an end, peace be resurrected on Lebanon lands, land owners return to Palestine, their country and that every refugee or dispersed person go back to his own country?

At the Islamic level, our God calls for this and we, in turn, preach it for individuals, peoples and the public Islamic welfare.

As scientists and thinkers, we are equipped well enough to recommend the appropriate style and advice for our countrymen, fellow-believers and every supporter of righteousness, peace and justice. In addition, we have persistently and patiently, been calling for righteousness and truth and we feel that the great scientific as well as practical responsibilities to be shouldered by the Islamic World need a lot of efforts. We, likewise, feel we should construct bridges between science and religion and invite those who work in scientific fields to meet with those working in legislative fields to investigate many issues such as inheritance and birth.

Thank you all for listening.

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PART FOUR

THE INFLUENCE OF ISLAM AND ITS TEACHINGS ON HEALTH OF HUMAN BEING AND THE SOCIETY

Part Four: *The Influence of Islam and its Teachings on Health of Human Being and the Society.*

CHAPTER ONE

(Papers Presented)

REPORT ON THE SESSION

There were actually two sessions in PART I and PART II held on one main topic i.e. "ISLAMIC BEHAVIOUR AND HEALTH". From these two sessions, the part I was held from 9.30 to 11.30 under the chairmanship of Prof. Dr. Ibrhaim Badran and co-chairmanship of counsellor Abdullah Al-Isa. Dr. Ayseqil Demirhan Erdemir was moderator. At this session, seven papers were presented on "THE INFLUENCE OF ISLAM AND ITS TEACHING ON HEALTH OF HUMAN BEING AND THE SOCIETY" and discussed.

Editors

ISLAMIC MEDICINE - RETROGRESSION OR PROGRESS?

Prof. Dr. Omar A. Schroedter

WEST GERMANY

After centuries of stagnation, the Islam is now at a point of new awakening, indeed, this awakening has already begun and is well underway. In almost all Islamic countries, from Eastern Asia to the Atlantic coast, from the Russian steppes, from Turkey to the South of Africa, one cannot ignore any longer a movement which stands up against the separation of the *Islam* and the state, and which restores the *Qur'an* as a basis of legislation, making it the centre of human living and coexistence. This awakening, this renaissance is comparable with the revolutionary energy of the time when 1,400 years ago the Prophet Muhammad (ﷺ) and his successors, the khalifs, rose and proclaimed the new teaching of the one God *ALLAH* and carried it in an unprecedented campaign deep into the Occident. For a number of centuries, the borderline of the Islamic region could be drawn in its Northern part on the outskirts of Vienna, across the Swiss Alpine passes down to the Southern provinces of France. Who is aware of the fact today that at that time the green banner of the Prophet (ﷺ) waved over large parts of Switzerland?.

But what was it that made this new and revolutionary movement so attractive that people were flocking to it by the thousands? Indeed, the *Qur'an* prohibits the compulsory conversion of people of a different faith. During the rule of the Moors over Spain, the Christian monasteries and the Christian communities there were benevolently fostered so that they reached a heyday unsurpassed until today. Also, this peaceful coexistence between the two seemingly so different religions is unique in the history of the world which to this day has always been characterized by fratricide, oppression and compulsory missionary activities. The examples range from the early cultures of Mesopotamia to the Inquisition in medieval Christianity to the Communism of our century, only to mention Afghanistan.

The reason for this triumphant advance of the *Islam* was, that a movement had been initiated by one single man, by a simple merchant and illiterate, by Muhammad (ﷺ) - a movement which is not only a religion but also a comprehensive system including all spheres of life - spiritual as well as secular, idealistic as well as material ones. It became the basis of the creative coexistence of people of all nations, all races, and it made no difference between black and white, between peasant and sovereign, between rich and poor. They all were and still are brothers under one single God who is called *ALLAH*.

The best example for the high cultural standard of this movement is its public health service, its medicine; they were a thousand years ahead of their time.

Whatever influences remain from the long-gone times of Islam's heyday - the most brilliant heritage stemmed from a few thousand men who brought not only the Islamic people but also the whole of humanity progress where it was most urgently required: in medicine.

In the Occident, the medieval art of healing was characterized by invocation, magic and rite. It is still rooted in the Christian faith, indeed, Jesus himself acted as a healer and instructed his disciples: "Heal the sick, awaken the dead and cast out the devils". Independent science, as promoted by *Islam*, is replaced by monastic superstition and the monopoly of exorcism. In the Christian thought, every kind of disease was the work of *Satan*. Instead of fostering the people's hygiene, Christian kings healed by laying on hands. Thus said King Edward the Confessor in the 11th century: "I touch you, the Lord heals you". In this way, up to 1,500 patients "went through his hands" in one session.

So it is only too understandable that in Europe, people only discovered very late that pestilence was not caused by Sin, but by the fact that washing and bathing were frowned upon, and above

all by the pollution of the environment in the 14th century which is today hardly imaginable. The streets were littered with refuse and carcasses. In contract to this, street cleaning, baths and food control were quite normal for the Arabs.

The Prophet Muhammad Himself (ﷺ) brought about a great advance in the people's hygiene by introducing the five daily washings. He introduced circumcision and thus created the best preventive measure against cancer of the penis and the uterus, as modern cancer researchers agree.

Al-Razi (865–925), who was not only a physician but also a mathematician, astronomer, musical theorist and philosopher, is considered to be the father of pollution research. When he had to decide on the site for a new hospital, he hung up pieces of meat in numerous parts of Baghdad. Where they showed the lowest degree of decay after 24 hours, the new clinic was erected.

One hundred years earlier, Harun Al-Raschid had built the first hospital in Baghdad. Its organisation was quite different from the "Hôtel de Dieu" in Paris, for instance, where, according to contemporary records, the sick were lying half-starved in straw amongst the vermin, and the attendants only dared enter the rooms with vinigar-filled sponges in front of their mouths to face the pestilential stench of the wards where the dead were often left lying for more than 24 hours. However, "Hôtel de Dieu" was at that time considered as a great step forward. Before the 12th century, there were no hospitals whatsoever in Europe. The crusaders were the first to bring back this idea from the Orient where they had become acquainted with the Arab Clinics which were in every respect exemplary.

As early as 850, Baghdad had 34 hospitals, Cordoba 50. They were equipped with dozens of bath-halls. Many of them had an annual budget of more than 1 million *Dirhams,* and they were financed by governmental subsidies, donations and inheritances as well as by the yields of external estates.

In his Adula Hospital, Al-Razi and his 24 chief specialists ranging from eye doctors to neorologists treated the patients who were grouped according to their diseases. Every day, he carried out visits with his students. In the Adula-Hospital, there was a common room for the convalescent with board games and musical instruments. Al-Razi was also the author of writings on the healing effect of music. He wrote a book with the title: "Book for those who have got no physician in their vicinity", the first health adviser for home use. He was probably the greatest cancer specialist of his time, and he described suitable cancer therapies and operation methods.

After his death, thousands of case histories of his patients were found in his trunks, complete with family anamneses and curricula vitae as well as the corrections of the theses of the ancient Greek physicians. His disciples evaluated the material. It comprised 30 volumes and became the most important medical encyclopedia of both medieval words.

In Baghdad, in Cairo and in Cordoba, there were hospitals with male and female nursing staff, in which patients of both sexes were treated with equal rights. That was at a time when London, Paris and Berlin were hardly touched by civilization.

In less than a century after the death of the Prophet Muhammad (ﷺ), the Muslims gave evidence of their ability and originality as scientific innovators. In the big hospital of Baghdad, the rooms of the fever patients were always situated near fountain springs which cooled the air. The mentally ill were treated with kindness and humanity which is still an exception in the psychiatric clinics today. Gentle music and story-tellers alleviated the pains of the sick and made the restlessness of insomnias more tolerable. The rich and the poor received the same attention and care. After being released from hospital, the patient was given 5 gold coins so that he was able to obtain treatment during his convalescence.

These medical centres had specialists of internal medicine, surgeons, ophtalmologists as well as pediatricians and gynaecologists. They had large libraries and pharmacies at their disposal.

The immobile and those who lived in remote areas were looked after by mobile clinics. Such mobile clinics are praised today. however, as an achievement of modern medicine.

In the gynaecological field, too, the Islamic doctors broke new ground. They discovered the muscular action of the uterus during birth and also a large number of female diseases as well as cancer of the uterus. They invented the vaginal speculum as well as a device for the artificial dilatation of the vagina during birth.

A gynaecologist named Ali Ibn-Abbas wrote 1,000 years before Darwin on the genesis of the species and their functional adaptation to the environment.

The control of pharmaceuticals which is carried out in the Federal Republic of Germany by the Federal Health Authority and by the FDA in the United States is by no means a modern achievement, since the Islamic medical profession already performed a quality control of pharmaceutical preparations.

Pharmacists were a licensed profession, and they were advised to prepare medicines according to the doctor's prescriptions. Physicians were forbidded by law to own pharmacies or to keep a stock of pharmaceuticals, Conflicts of interests were thus avoided.

The physician Al-Razi discovered that gold and silver were effective heart medicines; and he found in distilled herbal extracts, in the sirup (Arabic: *"scharab"*) a way of making less agreeable medicines more palatable for his patients. When he finally succeeded in candying fruit (from the Arabic: *"cand"*, sugar cane), he soon had invented the dragée, the sugar-coated pill.

What we call Occidental medicine today has its roots in this Islamic medicine whose effects can still be seen today. It stimulated the knowledge of anaesthesia, bacteriology, hospital care, surgery, pharmacy, ophthalmology, psychosomatics, and medical training. Who is aware of the fact that the shape of surgical instruments in use today was created by the Arab surgeon Khalaf ben-Abbas Abul-Kasim who lived at the turn of the 10th to the 11th century? Vein spreader, bone-saw, spoon, needle for sewing-up wounds, surgical hook, scraper and scalpel are still being used in almost the same shape..

Abul-Kasim, the inventor of the afore-mentioned vaginal speculum, already practised the ligature of large blood vessels with which a French surgeon entered the records of medical history 600 years later. Even the discovery of the blood circulation, which is attributed to the English-man William Harvey (1616), was mentioned almost 400 years earlier by the head physician of a Cairo hospital, by Ibn Al-Nafis, as can be read in Ibn Al-Nafis "Commentary on the Anatomy of the Canon of Ibn Sina". Harvey was, by the way, as Galilei was before him, a student of the university of Padua which was greatly influenced by Arab thought. Would this be a coincidence?

There were three characteristics which led the Arabs to such high achievements in the field of medicine: Intelligence, activity and ingenuity. They possessed a sharp, creative intelligence which developed on the grounds of religious zeal, and they had a natural love of all things beautiful which, combined with imagination and the capability of expression, led to their appreciation of intellect and genius.

The purpose of the medical training was to improve and to preserve the health of the individual and the community.

The medical training took 5 to 6 years. It began with chemistry, physics and biology courses which were followed in the 2nd year by anatomy and physiology, and finally by pathology and

pharmacology. The practical beside training took place from the 4th year to the end of the training period.

Ibn-Sina, better known as Avicenna (980–1037) was the head physician of a Baghdad hospital. He introduced the ability test for physicians. From the permits of practice which were issued by him, we can conclude the number of approved physicians in the city which then had two million inhabitants: There were 860 doctors, which means one doctor for every 2,325 inhabitants. We also owe him the insight that cancer is a disease of the system and not a locally defined phenomenon.

Since then, not much has changed.

However, there is one essential difference between then and now: In Islam, the individual person was embedded in the Islamic spirit, and whatever he did was done for Islam. The *Quran* was the basis of the Arab physicians, action and treatment. Even the Prophet Muhammad(ﷺ) had already established the thesis which seems strangely familiar to us who base our treatment on natural medicine: *"For every disease, there is a treatment".*

Which were the new ways that were introduced by Islamic medicine into public health care? For many centuries, medicinal plants belonged to the treatment repertoire. However, the concept of antibiotics was only introduced with the Islamic era. The Arab physicians did not only describe infectious diseases, but also listed in their pharmacopoeiae medicinal plants which are effective remedies against organisms which cause rabies or other infectious diseases.

Even during the Prophet's lifetime (ﷺ), the healers were using a strange ointment made from fungi which formed on the harnesses of mules. They had a miraculous effect on infected wounds. Almost 1500 years later, in 1920, this fungus was rediscovered by the English chemist Fleming. He was awarded the Nobel Prize for the preparation which he developed from it. The fungus is called pencillin.

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The Islamic art of healing was mainly based on medicinal herbs. One knew of the antibiotic effect of many herbs which is partly superior to that of modern antibiotics, such as chloramphenicol and streptomycin. They were successfully used for the treatment of smallpox, tuberculosis, typhoid fever, diphtheria, as can be seen from the ancient literature.

After being collected, the medicinal plants were cleaned dried and pulverised and extracted with alcohol (an invention of Arab chemists). Apart from plants, also animal and mineral substances were put to medical use. For this reason, a considerable treasure of medical prescriptions was gathered so that conservative therapy often triumphed over operative methods. This enhanced the reputation of the Islamic physicians who only resorted to bloody operations when these were inevitable.

According to Islamic thought, internal diseases and their symptoms are closely and inseparably related to psychic disorders. Among the complaints which originate in disorders of the psyche are headaches, tuberculosis of the lungs, stomach diseases, hot fever - as opposed to the cold - delirium, jaundice, suppuration of the intestines, gout and polyarthritis. Fainting was not seldom described as an expression of circulatory insufficiency which was also regarded as being psychogenous. The physician would always feel the patient's pulse and register his complexion. Stomach and gallbladder complaints were most frequently mentioned. Their causes were already mentioned

in the *Hadith* by the Prophet (ﷺ):

"Adam's son fills no vessel worse than his own stomach".

The frequently described diseases of the gallbladder - even as far as to its rupture - were then and still are regarded as having psychosomatic origins.

Leprosy was a general term not only for the disease itself but also for all sorts of exanthemae.

The exact anamnesis, inspection and palpation were the basis for diagnosis. In the Tawaddud, we learn of the possibilities of recognising diseases by the examination of the condition of the body, by feeling the patient's hands to find out whether they are taut, hot, dry, cold or moist, but also the sclerae of the eyes as well as the posture of the back were taken into account in the diagnosis.

The eye doctors of that time had such a high level of knowledge that the writings which they handed down on us are still valid in modern ophthalmology. From the 9th century, we possess textbooks for this discipline by Hunain ibn Ishâk (809–873), Al-Râzi (850–923) and by the most renowned physician of the Islam, by Ibn Sinâ, who is better known by his latinised name Avicenna (980–1037). Hunain was the author of the works *'kitab al-'ashr makalat fi'l-'ain"* - "The complete works on the eye in 10 volumes". It is the oldest textbook of its kind and comprises the following chapters: 1) Nature of the eye; 2) nature of the brain (it was known even then that the eye forms part of the brain); 3) optic nerve and vision; 4) hygiene; 5) causes of eye injuries; 6) symptoms of eye diseases; 7) effects of medicines; 8) ophthalmic medicines; 9) treatment of eye diseases; 10) prescriptions, and 11) eye operations.

There was treatment for blindness, cataract and strabismus (squinting); Ibn Sinâ, by the way, describes a cataract operation in every detail.

The physician Ibn Al-Heitham who is better known in the Occident by the name of Al-Hazen, was one of the numerous universal geniusses brought forth by the Islam. He investigated the refraction through air and water and calculated the thickness of the atmosphere, astonishingly enough, as being almost exactly 15 kilometers. To this end, he worked with glasses ground in various ways. Thus, as a side-product of these findings, the reading spectacles were invented around the year 1000.

Mental disorders are equally represented in the medical textbooks of the Islam. They are diagnosed exactly. As the *Qur'an* prohibit explicitly all kinds of debauchery, thse are also classified as mental disorders, such as sadism, masochism, homosexuality, paederasty as well as lesbianism and sodomy.

The Islamic teaching on medicines comprises drugs of herbal, animal and mineral origins, which we, in part, do not even find in the works of Galenus or other ancient physicians. They include camphor, galingale, zedoary root, rind of the pomegranate root, cashew, myrobalan, sanelwood, coconut, liquid storax, cloves, mastic, cubeb and zarnab. Many of these are medicinal plants which probably the most famous seafarers of the world, the Omanis, brought back from their travels that led them as far as China. The capital of the Sultanate of Oman, for whose Sovereign I have the honour of being doctor and consultant, is still called *Muscat* which means nutmeg. The *Muscat* or nutmeg is a commonly used spice in cooking, and still applied under the name of nux moschata for gastritis, gastroduodenitis, gastroenteritis, for the gastrocardiac syndrome and neurasthenia.

Aloe is also mentioned as a herbal drug and used as a laxative. In the tales of "A Thousand and One Nights", a story is told of the merchant and the thieves in the cycle of "The Tale of King Dschali'âd and his Son Sird Chân" (900th to 930th night). The chieftain of the thieves disguises himself as a physician in order to rob a wealthy merchant. There, it is stated: "Now the latter gave him a powder in which there was aloe in abundance, and told him: "Take this tonight!" The mer-

chant took a specimen and found relief. The following night, he received a powder which contained even more aloe, and he took it and was thoroughly purged. The next day, the thief, who had won the merchant's confidence, administered him a lethal medicine".

Apart from that, "A Thousand and One Nights" also mentions hulled sesame, cornelian cherries and grapes as medicines. In the lovely tale of *'Ala edidin Abu esch-Schamat"*. (249th to 269th night), we find a complicated prescription of a medicine to achieve a man's fertility. It contains the following ingredients: Two ounces of Greek opium, some Chinese cubeb, cloves, cardamom, ginger, white pepper and common lizzard. All these ingredients should be pounded and cooked in fine olive oil. Added to this are three ounces of incense, and one cup of nutmeg flower. The whole is then soaked and processed with honey to make a electuary.

In Islamic medicine, the "Bendsch" enjoyed a special position. It is repeatedly mentioned in numerous parts of the literature. Now, what was so special about his; In the "Book of Poisons" by Djâbir ibn Haiyân, extracts from black and white henbane (Hyoscamus niger and albus) are mentioned as Bendsch. Henbane belongs to the genus of atropa, datura mandragora and scopolia and thus to the Solanaceae. The effective ingredients of these drugs or their extracts are the alkaloids atropine, hyoscyamine and scopolamine, Their effect is similar, but in their specific tendency, there are certain differences. They act peripherally and lytically on the nerve endings of the parasympathetic nervous system, i.e. at first centrally stimulating, and later paralysing. In the case of atropine and hyoscyamus, the stimulating effect prevails, whereas in scopolamine, the paralysing effect is more apparent. Combined with *hashish* or opium, this effect can further be modified. Extracts from these plants and their combinations were mixed with wine, burnt or administered in the form of so-called sleeping sponges, as they were well suited as an anaesthetic due to their sleep-inducing and pain-killing properties. Due to the form of application and the dosage, it was possible to emphasize either the sleeping or the stimulating properties. The history of these drugs would fill volumes, not only in the Orient.

To combat the abuse or the inadvertent overdose of these psychomimetics, we find the following prescription in the "Book of Poisons" by Djâbir ibn Haiyân: As a vomitive, a mixture of honey, borax and hot water is recommended in which dill has been cooked. The leading antidote and universal remedy seems to have been the "Great theriaca" which was composed of 64 different substances. It is still repeatedly quoted by the medieval physicians of the Occident, for instance by Paracelsus.

Honey was an important and multi-purpose medicine in the Islam which was used for chronic bilharziasis and, above all, for bilharziatic ulcers of the bladder. Even in the *Qur'an*, the healing power of honey is mentioned. In the 16th *Sura Al-Nahl*, i.e. the Honey-Bees, once can read in the 70th verse:

> *FROM THEIR BODIES, THERE COMES A DRINK, MANIFOLD IN COLOUR, CONTAINED THEREIN IS HEALING FOR MANKIND. THIS IS INDEED A SIGN FOR PEOPLE WHO REFLECT .*

From the Prophet Muhammad (ﷺ), the following sayings on his subject have been handed down:

> *"Take these two remedies: Honey and the Qur'an".*
>
> *"Whoever takes honey three times a day, will never suffer from serious disease".*
>
> *"There is cure in three things: In a honey drink, in venesection, and in the cauterising iron. But I do not recommend the latter".*

Ibn Sina, also called Avicenna, recommended honey as a wound dressing, and reported rapid healings, since honey is a bactericide. It has hygroscopic properties. The dressing thus remains moist for a longer period and does not stick to the wound and to the newly formed tissue. It is furthermore neither toxic nor irritating. Honey contains glucose, fructose, vitamins and minerals which are imperative for a rapid regeneration of the tissue.

The use of honey in urology was described by Ibn al-Nafis and Avicenna. The latter used a mixture of honey and medicinal herbs for treating tumours of the bladder. Nafis mixed honey with barley for the same purpose. Razi, Antaky and others combined it with further substances in order to control kidney and bladder stones.

Moreover, honey was used for the treatment of diseases of the gastro-intestinal tract, the eyes, the skin, the heart, the blood, the respiratory tract and also for psychoneurosis and poisonings.

In Islamic medicine, honey belonged to the natural remedies which was popular and often used because of its wide range of effects.

A very important aspect should not be forgotten, however, which differentiates Islamic medicine in a positive way from the medical profession of other peoples and modern medicine. It was never restricted to treatment and medication alone. It always included Islam as a religion and a way of life. No hospital would be conceivable without a mosque and without a *Qur'an* school. The *suras* of the *Quran* and the words of the Prophet (ﷺ), the *Hadith*, were guidelines and an an integral part of the therapy. This was only possible because there has never been a contradiction between the teaching of the religion and science as had been the case with other relious communities. No Arab Galilei never had to revoke what he had recognised to be true, and so-called dissidents from dogma were never burnt at the stake in the Orient since dogma is unknown to the Islam anyway.

Speaking of Galilei How did he obtain his knowledge that the earth revolves around the sun? Now, he was a professor at the university of Padua. Padua, however, belonged to Venice. And what Venice was for Arab spices, Padua was for the Arabic science: the main place of exchange. The writings of Galilei Keppler and Kopernikus also contain the results of Arabic research, Half a millenium before Galilei, Arab astronomers proved that the earth revolves around the sun. Al-Fargani found out that the orbit of the sun is on a restrograde course. For this reason, what Galilei postulated is not the scientific sensation attributed to him; just as little as the discovery that the earth revolves around its own axis. This was discovered by Al-Biruni long before the Occident became aware of it. Al-Chwarismi discovered that the earth is round. In the Occident, people were burnt at stakes by the Holy Inquisition for many years thereafter, because they dared to maintain these facts.

The Prophet Muhammad (ﷺ), as can be read in the relevant works of dental medicine, is also considered as the initiator of modern dental hygiene and prophylaxis. He ordered the Muslims to clean their mouths and teeth five times a day, and he created the first toothbrush from the root of an Arabian shrub. It is still used in the same shape today.

Because of his merits in the field of medicine, the French scientist Perron called the Prophet Muhammad (ﷺ) a "universal doctor".

I said in the beginning, that we are presently experiencing in many parts of the world a rebirth of the Islam. The Muslim people have realised that right, justice and freedom cannot be expected from the doctrines of salavation of the Western world. Painful experiences in colonial times, under governments which endeavoured to strictly separate state from religion, the negative influence of the so-called occidental civilisation and the great power blocs - Communism on the one hand, the Western democracies on the other - resulted in the recalling of their own traditions. This has

also been the case in the field of medicine, and very strongly so. True, it is acknowledged that modern medicine cannot be condemned wholesale. But a combination of tradition and modern achievements will give Western medicine, which is now at the limits of its possibilities, a humane face and new impulses for possible further development under humane aspects. All these things are quite well-known. We experience such birth-pains in Europe where certain groups of interest see their influence dwindle and try with legal and often extralegal methods to eliminate the natural remedies.

But let us remain in the Islamic region which has not yet experienced such hard controversies. On the contrary: In January 1981, the First International Conference for Islamic Medicine took place in Kuwait. This conference was followed by a second congress. The purpose of these meetings in which physicians, pharmacologists and medical historians participated, was to lay the foundations for the renaissance of the Islamic medicine and to introduce it into the clinics and practices of the entire Muslimic region, as a valid second direction beside the modern methods. It was decided to erect in Kuwait a model clinic sponsored by means from private trust in which these goals will be realised. Here, also, a mosque and a *Qur'an* school will be in the centre of medical care and therapy. According to Muslimic understanding, medicine in Islam has never transgressed its ethical limits. The human body was always considered as unity of body and mind. As long as the health system was active within these limits and did not go beyond its ethical boundaries, the spiritual content also remained intact. No therapy was possible without these premises. I very much hope that this revival of traditional values in medicine will not be limited to the Islamic region alone and that this will be an important step towards better understanding of the principles of Islam in the Non-Islamic world.

Islamic medicine - this is past and future. Islamic medicine - this means progress and humanization. The medicine was on a summit in the islamic countries already more than one thousand years ago. It was fertilizing the science all over the globe, not only in the field of medicine. What we call Western medicine has its very roots in this Islamic medicine. But this was possible only because the traditional Islamic medicine was strictly based on the teachings of the Holy *Qur'an* and the *Hadith* of the Prophet Muhammad (ﷺ). To return to this old and new way will of course be sometimes hard and strenuous. But in the 2. Sura *Al-Baqara,* verse 153 we find our guideline:

OH YOU, WHO ARE BELIEVING - SEEK HELP IN PATIENCE AND PRAYER:
ALLAH IS WITH THOSE WHO ARE STEADFAST!

COMMUNITY HEALTH IN ISLAMIC PERSPECTIVES

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INTRODUCTION

At the "Second International Meeting on Islamic Medicine", we had presented a paper entitled "Islamic perspectives on philosophy and policy of health". We should like to recall briefly some points.

1. the integral meaning of the health, covering:
   — body health,
   — mental health,
   — moral health,
   — spiritual health
2. Health is influenced by three kinds of factors:
   — constitutional factors (biological and inherited make up)
   — environmental factors including:
      * physical environment (soil, water, air, climates)
      * biological environment (plants, animals, micro-organisms; organic materials)
      * social environment (human, economical, cultural and moral) spiritual and political environment
   — behaviour factors
3. As Islamic physicians defined it, "the medicine is a science that studies the human body in state of health or disease, in order to protect health or restore it when altered" (Ibn Sina). This definition indicates the two purposes of medicine:
   — treatment of diseases (by medical means)
   — protecting and promoting health and welfare (by preventive medicine and by improving the factors that influence health)
4. Health care in its global meaning intervenes at the level of the mentioned factors:
   — constitutional factors (activity of health services)
   — environmental factors (public services in various sectors concerned by physical, biological and social environment)
   — behaviour factors (depending of personal education and consciousness in the fields of health care, culture, morale,...)

Fig. 1

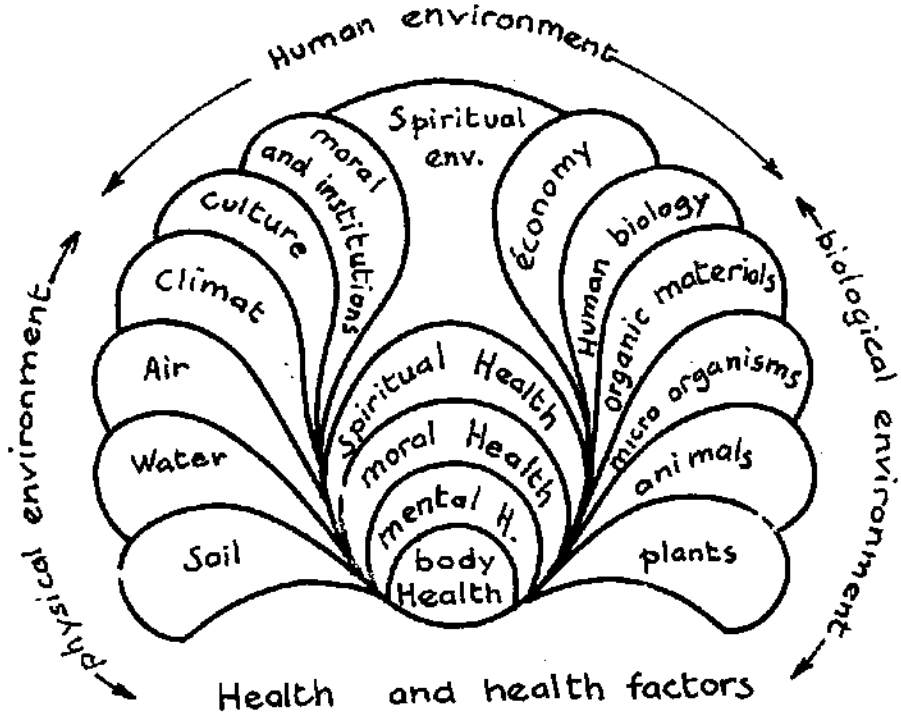

Fig. 2

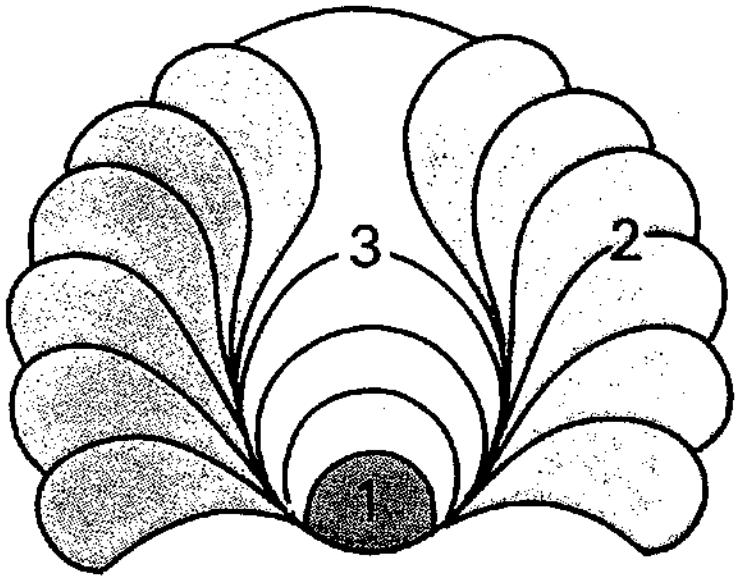

Fig. 3

II. COMMUNITY HEALTH IN ISLAMIC CIVILISATION

The aims of health policy are to protect and promote human health through its physical, mental and spiritual components, and the individual health and welfare are closely related to the health and welfare of the whole community, as a holy *hadith* said:

> *"the believers are in their mutual friendship and mercy, like a unique body. When a part of it is suffering, all the organs are enduring insomnia and fever".*

So, *Islam* is worth more than any others, in taking care of community health by preserving it or restoring it when altered.

Islamic civilisation as religion, culture, morale and social institutions, has early contributed to promote health and wellbeing to all members of the community and even beyond it.

Islamic civilisation created many general and specialized hospitals, medical services and assisting institutions. It set up libraries, community homes, and developed science teaching, including natural and medical sciences, in addition to the other public institutions which aims to achieve and promote economical, moral and spiritual conditions of society. Here are the main qualities that distinguish the community health in Islamic civilisation:

— wellbeing is an existential purpose covering both the land of living and the Next World.
— health in its complete meaning include corporal, mental, moral and spiritual dimensions of man.
— the practical aims of the medicine are: the treatment of diseases, and the protection and promotion of health
— health care is a social function based on the communitarian solidarity that involves both public and individual responsibility.
— personal health is closely linked to social and environmental conditions of health.
— health services are not lucrative enterprises but social service that must be covered by governmental or communitarian resources.
— fundamental teaching include religious education and general culture meanwhile teaching of medicine is delivered both in theoretical way such as medical schools and in practical way such as hospitals.

However, we have to notice some weak points:

— the ignorance of the primary causes of diseases, mainly the infectious ones
— consequently, absence of a medicine really acting against infectious diseases.
— the absence of a central planned and well established policy of health services.

III. ISLAMIC WORLD DECLINE AND THE BIGINNING OF THE OCCIDENTAL RENAISSANCE

After centuries of a shining civilisation, Islamic world came into dark period of decline, because it drew away from its moral sources. It dropped the rope that protected it from error. Thus it not only fell apart into tribes nations and parties fighting against each other, but faced problems of internal conflicts, epidemics, famines, which were causes of more weakness. Then Islamic civilisation degenerated and vanished away with its sciences, arts, industries, social and central institutions. Medicine put away its scientific book and turned into primary and superstitious popular medicine.

Meanwhile, Occidental peoples started competing with Islamic world. They drew sciences and knowledges from Islamic sources while the same sources had vanished in Islamic world. Nevertheless, the Occidental civilisation in its Middle Age period, had to face three fundamental crises:

— an ideological crisis that opposed dogmatic theology to the new discoveries in natural sciences.
— a sociological conflict opposing the different social classes
— a moral crisis that opposed the materialistic aims of life to the moral and spiritual values.

During this first period, and for many centuries, the Occidental Civilisation did not show any interest to the community health, except for the marginal charity houses run by religious institutions.

IV. COMMUNITY HEALTH IN THE CONTEMPORARY OCCIDENTAL WORLD

Community health in its modern meaning appeared only in the XXth century with the radical social changes. The interest given to community health is due to an ambiguous motivation where the personal aspiration to health joined the business interest in preserving the active and productive man power.

For this reason, the policy of community health reflects the ideological and moral contradictions existing both in the liberal and the socialistic systems. This will be illustrated by a comparative study between a liberal system represented by USA and a socialist system represented by USSR.

Scope	liberal system (USA)	socialist system (USSR)
general aims of health	- health is a personal aspiration more than a collective need - health means mainly physical and psychological welfare	- health is a community need more than a personal aspiration - health means mainly physical and social sounding
policy of health	- health is a personal affair more than a governmental concern - health care is mainly individual initiative - private social insurance is dominant	- health is governmental concern more than a personal affair - health care is a governmental project - health services are all governmental
health services	- offices and institutions are mainly private - physicians are independant or wage earning in private enterprises	- all health services and medical institutions are governmental - physicians are governmental employees
financial coverage	- health services have a mercantile character - expenses are covered by private insurance or by personal contribution - marginally, existence of public assistance or charity institutions	- health services are free of charges for all citizens - charges are covered by governmental budget
pharmaceutical's policy	- making and marketing pharmaceutical products are commercial enterprises - making, marketing and researches belong to private firms	- drugs are generally free of charges - producing and distribution of pharmaceuticals are a governmental monopoly.
policy of medical teaching	- the choice of studies and specialisations is free - teaching programmes are elaborated by university teams - charges are supported by students or contractual employers	- specialisations and programmes are planned according to the governmental project - teaching charges are covered by governmental budget - all graduates must be civil servants

REMARKS

Remark 1.

Here is a brief comparison of the different advantages and disadvantages in both systems.

system	advantages	disadvantages
liberal system of health	- the personal ambition is encouraged, thus led to competition and improvement - efforts and personal qualities are better rewarded - personal responsibility is more engaged - supplies are abundant as regards to the demand	- disparity of citizens in front of diseases and health services - mercantile character of the medical and pharmaceutical institutions - overproduction of pharmaceutical in varieties and quantities - study charges supported by students - neglect of moral and spiritual dimensions of health
socialist system of health	- health services are planned according to public objectives of social and economical development - equality of citizens in using health services - health services free of charges - importance given to social health - importance given to the health prevention	- restriction in personal choice - monopoly of governmental health institutions - frequently low level of qualities in health services - heavy financial charges supported by public budget - neglect of moral and spiritual dimensions of health

Remark 2

The comparison between the health system in USA and in USSR, represent two extreme politics. In fact, many states in the world, pick up from the two systems, according to their ideological option and their social and economical conditions. So, the private and the public sectors are coexisting in various proportions in the most European and third world countries.

ISLAMIC PERSPECTIVES IN COMMUNITY HEALTH

Can we imagine an islamic point of view in community health policy in comparison with liberal and socialist systems?

In its islamic meaning, community health is based on three methodological criteria:
— fidelity to the islamic doctrinal, moral and cultural sources
— broadmindedness with regards to the external civilisations
— the *ijtihad* or effort to historical adaptation and advancement of sciences and technology.

1. As for the fidelity to the islamic sources, it is based on the following principles:

— the integral meaning of the health including physical, mental, moral and spiritual dimensions of the man.
— policy of health involves:
  • curative medicine using medical means,
  • preventive medicine that protect health by medical and hygiene means,
  • general prevention acting at the level of health factors in environment
— health care is at the same time, a personal and a public responsibility involving the governmental and the community institutions.
— community health is not a commercial enterprise, but a social service.
— each member of the community has equal right to health, wellbeing and happiness

2. As far as scientific and cultural broadmindedness is concerned, it means oversight on the scientific, technological, economical and social achievements performed by other peoples, in order to acquire knowledge with regards to what fit in with moral Islamic principles and with the common good of people.

3. As for the *Ijtihad*, it means the development of scientific researches, creative technology, and planned strategy to promote the human being in all the fields of health, education, and social development.

These criteria led us to some axes of thoughts on the perspectives of an authentic Islamic community health policy:

axes	perspectives
general purposes of health	— preventive and curative medicine is a common responsibility of all the community members — health and welfare are rights for all human beings — health care covers corporal, mental, moral and spiritual dimensions of man. — individual health is linked the social and environmental health
policy of health	— policy and planning of health projects, are under governmental responsibility — community health aims to provide all the citizens with health services — community health includes: * curative medicine * medical prevention * promoting of the factors dealing with the health (natural, biological, social, cultural and moral environment) — responsibility in community health involves both public and communitarian institutions — community health is based on the collective and conscious participation of the citizens
health services	— the institutions may be: * governmental sector provided with all technical, material and human means * health institutions run by professional associations * benevolent institutions funded and ruled by the community * private sector submitted to public rules

axes	perspectives
financial coverage	— public establishments are covered by governmental budget — in the professional institutions, participation of the partners — *zakat, wakf* and other donations — eventually personal contribution
policy of pharmaceuticals	— production, importation, distribution, are planned according to the general objectives of the community health — researches will be developed in order to promote new means of therapy and prevention, with respect to economical and harmless criteria — natural medicine will be promoted
medical teaching	— educational policy is under governmental responsibility — education programs are planned according to community health objectives — scientific and techological talents and vocations must be encouraged — moral, cultural and spiritual education must be promoted both in basic and medical teaching — studies must be free of charge throughout all the steps

Remarks

We only mentioned general ideas in Islamic community health perspectives. Various ways to approach medical and samitarian problems in the modern Islamic society are possible, with regards to historical, economical and sociological conditions of each country. For example, the proportion between public and private health services, may be different. Educational programmes and methodology of teaching are evolutive. The permanent objectives are to promote the general level of community health by improving health services environmental health and the citizen's consciousness.

CONCLUSION

Community health policy in its Islamic perspectives, is characterized by:

— the global meaning of the health which include physical, mental, moral and spiritual dimensions of the man.
— the practical objectives of health which are to promote both preventive and curative health services and improve the external factors that influence the health
— health and educational institutions are not lucrative enterprises, but community services
— moral and spiritual virtues can't be set aside of the medical profession.

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HEALTH AND MEDICINE IN THE WEST FROM AN ISLAMIC PERSPECTIVE

Dr. G.M. Karim

SOUTH AFRICA

INTRODUCTION

Medicine as practised in the West has several failings. These stem from either ethical or moral issues, or more largely because it is based on a homocentric foundation, and because it is materialistic and often atheistic. One example of the progress made by the West is in South Africa, where the economy and the society is at a very advanced level. However, the indigenous people, the Blacks lead a very primitive existence both economically and socially and there exists in South Africa, therefore, a unique situation regarding disease patterns. The white or more affluent class suffers from different diseases to that suffered by the poverty stricken blacks.

Whatever diseases there are amongst both the affluent and the poor can be alleviated by following islamic principles in both their prevention and treatment.

South Africa is the most industrialised country in the continent of Africa, producing 25% of the total gross national product of the whole of Africa, 50% of its electricity, 20% of its agricultural products, and 60% of its industrial output. South Africa produces more energy than Italy, as much crude steel as France, more corn than Canada, more wool than the United States and more fish than Britain. South Africa produces more gold, vanadium, aluminium, silicate and platinum than the world, and it has the largest reserves in the world of gold, manganese ore, chrome vanadium & flouspar. It occupies a strategic position in the world because of these minerals which are vital to the space technologies of both Russia and the West, and also because every 15 minutes a supertanker leaves the Gulf to cross the Cape sea route with oil for Europe.

Its medical service is the best in the continent and certain of its divisions like Vaccine production and Cardiac surgery are foremost in the world.

TABLE 1

RATIO BETWEEN POPULATION AND MEDICAL PRACTITIONERS AND DENTISTS IN SEVERAL AFRICAN COUNTRIES.[1]

Country	Year	Number of		Population per	
		Med. pract.	Dent.	Med. pract.	Dent.
Angola	1973	383	—	15 400	—
Botswana	1974	63	5	10,480	132,050
Ghana	1974	856	44	11,230	218,480
Lesotho	1974	50	—	20,400	—
Libyan Arab Republic	1974	2,063	136	1,140	17,290
Nigeria	1973	2,343	103	25,460	579,150
Republic of South Africa	1981	16,736	2,750	1,878	12,002
Senegal	1974	281	29	15,370	148,930
Rhodesia	1973	1,035	162	5,700	36,420
Sudan	1974	1,400	83	12,370	208,650
Swaziland	1974	54	6	8,890	80,010
Upper Volta	1974	99	9	56,600	655,600

The number of Pharmacists is 5,920; and Nurses classified according to race group are as follows: This also indicates a high degree of development as the ratio of nurses to population is 1:408.

TABLE 2

NURSES IN SOUTH AFRICA

Year	White	Black	Asian	Coloured	Total
1981	29,694	22,149	1,002	4,479	**57,324**

TABLE 3

DISTRIBUTION OF HOSPITAL BEDS BY TYPE OF SERVICE PROVIDED, 1974.

Type of service	Number of hospitals	Number of beds	Beds per 1000 population
Psychiatric	20	19,367	0,8
Tuberculosis	30	7,704	0,3
Leprosy	2	1,729	0,1
General	642	100,890	4,1
Other	71	12,780	0,5
Total	**765**	**142,470**	**5,8**

Baragwanath Hospital is the largest in Africa, with 2,344 beds, 1,000 nurses in training, a staff of over 400 doctors and 110 specialists, and one of the largest hospitals in the world. It is situated near Johannesburg and caters for Blacks exclusively. Its running costs annually amount to R61 million and admits 119,501 patients — compared to the most modern hospital for Whites, the Johannesburg Hospital, the cost of which is R56 million annually, but has only 33,784 patients. This disparity is

evident when population figures are analysed. The ratio of black to white is 4:1 but there are 8,000 beds for Whites and 13,000 for Blacks. Black hospitals are allocated far less money than White hospitals which have fewer patients.

The White Boksburg-Benoni hospital received R7.9 million for 9,339 admissions whilst its equivalent, the Tembisa hospital received a million more for almost 25,000 more patients. In Pretoria at the White H.F. Verwoed Hospital it cost R45.5 million to treat 28,042 patients whilst its Black counterpart the Kalafong received R18.6 million to treat 47,223 patients. Baragwanath hospital alone treats 1,727,270 patients whilst the 38 White hospitals treated 1,840,745 patients. At Baragwanath hospital 26,952 babies were born whilst at the White hospitals in the whole province there were 29,910 deliveries!

The bed occupancy rate in the black hospitals ranges from 92.5% to 125% whilst the occupancy rate for Whites is 16% to 65%.

There is thus a curious anomaly which could only be present in a society ridden with colour prejudice and inequality where, whilst white hospitals are standing virtually empty and deserted, black hospitals are overcrowded and patients have to sleep under the beds on the floor!

The total Annual Budget for health is 1,165,722,000 rands.[2]

TABLE 4

EXPENDITURE ON THE VARIOUS PROGRAMMES EXPRESSED AS PERCENTAGES OF THE TOTAL

PROGRAMMES		EXPENDITURE 1980/81 %	EXPENDITURE 1981/82 %	VOTE 1982/83 %
Programme 1 -	Administration	2.77	1.14	1.13
Programme 2 -	Infectious, com municable, & preventable diseases	20.45	5.36	5.32
Programme 3 -	Mental Health	28.54	8.28	8.12
Programme 4 -	Medical Care	22.72	5.09	4.62
Programme 5 -	Health Protection	3.44	0.92	0.97
Programme 6 -	Assoc. & Support Services	22.08	5.99	6.61
Thefts & Losses		—	0.00	—
Programme 7 -	Welfare promotions	—	36.60	36.20
Programme 8 -	Civil pensions & contributions to funds	—	33.98	34.08
Programme 9 -	Military pensions & other benefits	—	2.25	2.51
Programme 10 -	Supporting services	—	0.39	0.44
		100.00	**100.00**	**100.00**

One method of judging the affluence of South Africa is to note the number of swimming pools, where there are 270,000, the highest in the world. On the otherhand, this affluence leads to destructive life styles, and South Africa leads the world in having the highest motor cycle mortality rate in the

world, as well as the highest incidence of Ischaemic Heart Disease (IHD) and 60% of all deaths amongst Whites are due to what is termed 'destructive lifestyles' and which are totally preventable. The destructive lifestyles resulting from an affluent society result in the following mortality rates:-[3]

TABLE 5

MORTALITY RATES

IHD (Ischaemic Heart Disease)	32.8%
Cerebrovascular Accidents (CVA)	5.3%
Chronic Lung Disease	3.2%
Lung Cancer	4.6%
Motor Vehicles Accidents (MVA)	8.1%
Suicides	5.2%
Chronic Liver Disease (COL)	1.5%
Total	**60.8% of all deaths**

Compared to other countries, the deaths from I.H.D. disease in South Africa, is rising whereas it is dropping in the United States. Deaths from motor vehicle accidents rank second in the U.S.A., South Africa and Australia whereas in England, Wales and Scotland, cancer of the Lung ranks second. In the U.S.A, the Calung ranks second and exceeds the number killed in Motor Vehicle Accidents. The death rates from CVA are dropping in England, Wales and Scotland by 10% and 29% in the U.S.A.

Chronic Respiratory Diseases accounted for a smaller proportion of all deaths in South Africa and the U.S.A. compared to the U.K. The number of suicides is greater in S.A. than in Scotland and Wales but in the U.S.A. the incidence is almost double. Death from cirrhosis of the liver was much higher in the U.S.A. than England or South Africa. In South Africa, amongst the Black population this ranks as the highest killer due to a variety of factors. Amongst the Whites cirrhosis is due to alcoholism, whilst amongst the Blacks it is mainly due to malnutrition.

In the European-Active range of 16-64 years over the period of 1968 to 1977 some 60% of all deaths amongst males, and 40-50% of all deaths amongst females were from such causes as IHD, CVA, lung cancer, chronic respiratory diseases, motor vehicle accidents, suicide and cirrhosis of the liver. Of these IHD can be considered as the most common cause of death, according to Prof. Wyndham, and accidents were next (cerebro-vascular accidents) with motor vehicle accidents being third in frequency.

Whilst the general health of the populations of the U.S.A., Australia and the U.K. improved, during the period, there was no change in the figures, for S.A. implying that the mortality rate of leading destructive lifestyles continued. Prof. Wydham makes the following observations according to an editorial in 'The S.A. Medical Journal':[4]

Ischemic heart disease:

Remains the most serious affliction of the White population! This is far more serious amongst the Whites in S.A. than other populations with a MR of 220/100,000. The other most frequent cause of death, CVA which is linked to Hypertension also did not decline in South Africa, as did the incidence of IHD and CVA in the rest of the world due to preventative measures being instituted. These two together account for 30% of deaths in South Africa amongst the Whites.

Motor vehicle accidents:

White South African males have the worlds highest rate for deaths from MVA and suicides. Annually S.A. loses some 1000 whites in the prime of the lives and some 200 females due to road

accidents. This deprives the country, like IHD, of its most active and qualified people — the former death age being 35 and under whilst IHD is over 35. The high suicide rate amongst White males requires urgent attention according to Prof. Wyndham.

Lung cancer and respiratory disease:

South Africa had a lesser incidence of CRD than the developed countries, and whilst the MR are dropping there, South Africa has increasing MRs due to increasing in smoking. Prof. Wyndham concludes his paper by stating that the MRS for the most prevalent of causes can be reduced significantly by vigorous involvement of the communities concerned, and a change in direction of medical effort away from hospital based curative medicine into the fields of promotion and disease prevention.

Some peculiarities of medicine in South Africa: Poverty is the prerogative of the Blacks according to Prof. Ali Moosa[5], Professor of Pediatrics. This statement is based on his findings a preponderance of 'poverty diseases' in his department of Pediatrics like Malnutrition, Kwashiokor, gastroenteritis, Bronchitis. Disease patterns differ in the different race groups according to their degree affluence: e.g. Indians have 10 times the incidence of diabetes and heart disease compared to their compatriots in India. Whilst Whites suffer from IHD, the rate of valvular disease due to Rheumatic Disease is abnormally high in the Blacks.[6]

Rheumatic heart disease:

This is amongst the first ten of all causes of death in the age group 15-24 years for all races in South Africa. The incidence ranges from 6.9/1000 in later years. It is a disease of poor socio-economic conditions associated with rapid urbanization and industrialization. One observer remarked that because of the high incidence of rheumatic fever and its ravages, South African surgeons (cardiac) were the most experienced in the world in prosthetic, heterograft and tissue cardiac valve replacement.

Cirrhosis of the liver:

A recent study found that alcohol is the most common cause of cirrhosis in the liver of Johannesburg Blacks and that a third show signs of primary Cancer.[7]

Alcoholism:

This is costing the country millions and many lives at the peak of their careers are being destroyed by the stresses gendered by an affluent society, with all its incongruities of poverty, and injustice side by side with 'hovel and shanties' and malnutrition on the one side and luxurious mansions, overeating and indulgence on the other.

At a recent conference on Alcohol and Drug Dependence, the Director-General of Health for South Africa made the following observation[8]: "That 75% of all Whites between the ages of 20 and 59 years used alcohol, and that increasing numbers of Blacks were also becoming consumers, as increased urbanisation and industrialization amongst Blacks made them consume more alcohol. There are also other socio-economic factors which is the cause of this. In 1969 the per capita consumption of alcohol was 3.67 litres whilst the figure for 1980 was 6.92 litres! The consumption was increased by 69 million litres between the period 1969 and 1980. The excise duty which was paid on alcohol was R600 million which amounted to almost two thirds of the Health Budget of South Africa. South Africans spent nearly 5 million rand per day on alcohol and on the negative side it costs the State R237 million a year due to alcohol abuse amongst Whites and Coloureds alone.

In the U.S.A. this cost to the State runs to $15 billion and in the UK this amounts.to £1000 million annually.

It cost the State from R300 to R748 a day to treat each of the 700 institutionalised alcoholics. Almost 10,000 accidents a day take place in South Africa in which alcohol plays a part, and majority of accidents of all types are caused by alcohol abuse: Car 56%, cycle 62% and pedestrian 65%. In 1980, 7,500 died, 24,077 were seriously injured and 57,142 were less injured.

According to Prof. Retief, alcohol is the fourth largest cause of death in South Africa with Cancer, Heart illness, Venereal Disease STD being the three other foremost causes.

SOCIAL FACTORS

Divorce:

Divorce amongst the Whites: South Africa has the worlds highest divorce rate, with alcohol playing a major role in this; (33% in Johannesburg). With the 16,000 registered divorces almost 4,000 were directly due to alcohol, and the resulting damage to children was that 5,000 children were placed in foster homes. 62% of the inmates of these foster homes were there because of family breakdowns due to alcohol. One woman described her life with an alcoholic as a 'living widow' as she had to bear the major burden of looking after the children, providing for them and also for maintaining the home and taxes. It is not only the children, but the unborn child who was also affected: Foetal defects such as brain dysfunction, abnormalities, cardiovascular and musculo-skeletal abnormalities were directly caused by alcohol in 30% of the cases.

Alcoholism, concludes Prof. Retief is expensive in terms of integrity, morals and values whose cost cannot be counted in economic terms, but only in socio-economic disintegration.

Smoking:

The causes of the high mortality rate amongst Whites due to circulatory disorders IHD, CVA, Hypertensive disease — 42% of all Whites smoke older than 16, whilst 16% of all Blacks. The Government earned 250 million rands in revenue from excise duty on Tobacco.[9] Cigarette smoking costs South Africa R3 million a day according to the Department of Health or R1 billion per year. Last year South Africa imported 250,000 tonnes of wheat whereas land used at present for tobacco cultivation could be used for cultivating other crops as well as relieving the high level of malnutrition, e.g. 27% of children under 2 years in the Ciskei have Kwashiokor, whilst in another study 30% of the children in the Transkei die of malnutrition.

Mental health:

South Africa is spending a major part of its health budget on the care and treatment of the mentally ill. There is also increasing incidence of mental illness due to urbanization with its consequent socio-economic problems. In South Africa alone there was a rise of 21% in the prescription of psychotropic drugs last year, and this tendency will repeat itself in all the developing countries. Life styles in the Muslim countries are becoming westernised with consequent rise in mental illness.

Malnutrition and disease:

Prof Schoub states that 100,000 black children under 5 die every year from acute infantile gastroenteritis, respiratory infections and measles. The major cause of death in the third world is G.E. which is largely a disease of social deprivation associated with overcrowding, inadequate sanitation, lack of fresh water and early weaning.[9A]

Tuberculosis:

This is South Africa's most expensive disease costing the country R23,000,000 annually whilst only 5% of patients are receiving therapy. Comparisons of the risk of TB are as follows:

South Africa (Blacks)	2.2% risk of infection
Kenya, Lesotho, Zaire	2.3%
Egypt, Ghana, Maputo	3-4%
Algeria, Morocco, Transkei	4-5%
Botswana, Swaziland	5-7%

It is important to note that separation of the Bantu homelands shows a decreased incidence of TB in South Africa than is actually the case. Of the estimated 110,000 cases annually only 45,000 are diagnosed. Serious socio-economic problems coupled with nutritional problems are a cause for this high incidence amongst Blacks. Failures of TB treatment is due to a patient-orientated approach, and not a national or global approach. There is a wrong emphasis on control measures, little or no research, control is haphazard with insufficient beds and nurses.[10]

Hypertension:

Also a major problem in South Africa which if adequately treated would need 6,000 doctors in South Africa alone, according to Prof. Clarence, Principal of the Natal University during the 3rd Congress of the Hypertension Society of South Africa. Prof. Clarence then went on to say that this was an impossible task, and it was clear that a change in lifestyles would have to be advocated.[11]

Several authorities in different fields have suggested a new approach to the treatment and prevention of illness in order to reach an ideal solution. One starting point, by an Emeritus Professor of Medicine at the University of Witwatersrand said that the Medical School should rather be called a health school.[12]

Is there a solution to the blind meanderings of western authorities regarding what is health and what is treatment?

The solution is Islamic Medicine.

Islamic medicine is one of the best known of the heritages of the Muslim world to the West, since by the ninth century of the Hijra, the Arab world could boast of sophisticated medical schools, specialised hospitals and wards for the treatment of the different diseases, and for the origin of pharmacology and the introduction of the experimental method in medicine by the use of animals.[13]

The profound truths contained in the *Qur'an* and the *Hadith* were the impetus to the development of medicine in *Islam* due to the fact that medicine was regarded as being sacred since it originated from the Prophet (ﷺ) himself.[14]

Since the cultural and intellectual development of a society depends on its political stability, its economic progress and its commitment to an ideological cause, i.e. religious fervour, medicine in Islamic countries suffered the same fate as did the society, i.e. with the decline of political hegmony, there was a period of withdrawal, recession, followed by stagnation which has persisted for the last seven centuries.

With progress and industrilisation of the 3rd world countries it is inevitable, that with the modernisation and many of its technological benefits, many of the failures of the western systems will also become manifest. This is particularly evident in the prevalence of disease patterns which are being inherited by the underdeveloped countries from their more advanced counterparts.

Under foreign and colonial rule most of the Muslim countries had to resort to western systems of education and had to rely on foreign systems of training of medical and other personnel.

In the field of medical treatment too, it is but natural that therapies will be borrowed by the new countries, many of which would be contrary to the principles of treatment prescribed by the *Qur'an* and the *Sunnah* — the *Tibb-al-Nabawie*. Since most of the medical practioners and health workers are being trained in the modern or western countries, the entire world-view (weltanschauuing) of Western medicine is homocentric, whilst that of Islamic medicine is theocentric, in accordance with the directives contained in the *Qur'an* and the Prophetic Traditions *(Hadith)*.

A. Medicine

It is well recognised that many of the diseases which lead to the major causes of death in the West are iatrogenic, i.e. produced by man himself. These causes could be classified as follows:

1. Cardiovascular:

Heart attacks, Strokes, Hypertension, the majority of them due to "destructive lifestyles".

2. Respiratory:

Emphysema and Chronic Bronchitis and cancer of the lung due to environmental pollution occasioned by man himself, mainly smoking and industrial pollution.

3. Metabolic:

Diabetes, Gout, Kidney and Gall Stones, Hyperlipedemia are related to diet.

4. Neoplastic:

Cancer has been shown to be caused by external stimuli such as:

Cancer of the colon due to lack of fibre in the diet. Stomach cancers predominate in the Japanese probably due to dietary factors as is cancer of the oesophagus in the Transkeins in South Africa.
Cancer of the liver has been traced to an aflatoxin in contaminated wheat and maize products;
Cancer of the tongue is due to betel chewing in Indians and Pakistanis.
Lung Cancer is due to cigarette smoking and air pollution; Cancer of the pancreas has lately been shown as being due to coffee drinking in excess.[15]
Cancer of the ovaries have been shown by a South African researcher to have dietary links.[16]
Food additives and colouring have also been implicated in cancer causation.
Cancer of the bladder is due to opium[17] and coffee drinking in excess.[18]
Fasting has been shown to affect the Nitrosomic Reactions in the bowel and thus fasting prevents Cancer.[19]

5. Infective

Infections have been attributed in many countries where there are dietary deficiencies and imbalances to cause a high incidence of respiratory illnesses and deaths due to gastroenteritis as also cirrhosis of the liver. It will be seen that the major causes have a dietary link, which led Imam Zahabi[20] to the state that the entire medicine is contained in half an *ayat* (verse) of the *Qur'an* which states:

'EAT AND DRINK BUT NOT TO EXCESS'.

(S7 :V31)

The fact that disease is due to faults in nutrition has been mentioned in the six essentials or Prophetic Medicine which was recognised since the earliest of times in Islamic medicine.[21]

As late as this decade, the Western definition of a 'balanced diet' is given as follows:

A balanced diet is that which consists of foods containing all the essentials for growth and maintenance of sustained good health.[22]

This definition was considered unsatisfactory, because it did not refer to either proportions of the various nutrients, which led the author to redefine a balanced diet as follows:

'A balanced diet is one in which all the necessary (and no unwholesome) items of nutrition are present, in proportions and amounts best suited for growth and the maintenance of sustained good health'.

This definition, however does not accord with the *Sunnah*, where the *Qur'an* lays stress on undereating, and which is confirmed by the *Hadith* which states that the stomach is divided into thirds, each containing solids, liquids and air, in equal portions.

The *Hadith* also elaborates on this aspect of eating in moderation, by stating that the stomach is a tank of disease, that overating leads to slothfulness and dulls the intelligence, and that meat should not be eaten daily.

There remains much work to be done in publicising the dietary rules according to the *Sunnah* in the prevention of disease, including the posture of eating, i.e. that one should not lean against the wall whilst eating, or in a recumbent position, that one should drink water in sips, etc. that shoes should be removed, and that the saying of *Bismillah* before eating, whilst acknowledging the bounteousness of *Allah*, was also to seek protection from the deletrious effects of food! Refinement in eating was brought about by the noble Prophet, (ﷺ) since before *Islam*, the custom was to gulp food and overeat!

Fasting was enjoined in the *Qur'an* in the earliest *Surahs*, and certain foods were forbidden to humans, e.g. pork, which only lately has been elucidated to contain 'hard fats' which are deletrious to health. (S2:V174 & S5:V4, 6, 119, 120, 146, 16, 116). Pork also results in the foremost cause of Epilepsy in South African Blacks due to Cysticercous of the brain.[23]

B. Paediatrics :

Dietary factors in paediatrics have lately been recognised to play a leading role in even the prevention of heart attacks and other related diseases, and breast feeding has acquired a new found status in the West after its advantages had been proven to show a lesser incidence of illness, its immunological role is due to the presence of macrophages, by the presence of IgA which protects the surface of the GI tract from bacterial invasion. Its immunological role is due to the presence of maternal macrophages and antibodies. Cow's milk is high in IgG and low in IgA. Consequently cow's milk does not offer the same protection as mothers' milk does.

Because human babies grow slowly compared to the young of other species, human milk is lower in protein than cow's milk. Urbanisation leads to artificial feeding which is detrimental to the health of the baby. Breast fed infants also did better than artificially fed infants both physically and intellectually.

The importance of this is stressed in the Qur'an in Surah Baqarah 2:234 where a child should only be weaned after 2 years and foster mothers were recommended for cases where breast milk was unavailable from baby's own mother.

The glut of artificial foods and the advertising that is taking place in the third world should be curbed.

C. Dentistry:

The use of *miswak* is sufficient indication of the role played by hygienic habits. The *Hadith* from Ibn Abbas RDA, on the benefits of the *miswak* which can be summarised as follows: that it perfumes the mouth, strengthens the gums and teeth, dissolves plaque and phlegm, and opens the stomach, i.e. increases appetite. It is an act of *ibadah* which pleases the angels as well as *Allah*, could not be improved upon by modern day dentists.[24]

It does not have to be bold to say that the flouridation of drinking water as practised in the

developed countries, with its possible harmful effects, would be entirely unnecessary if proper dental hygiene as enjoined by the *Sunnah* is practised. Here we have an ideal example of the West treating symptoms resulting in harmful effects from treatment, and not regarding causes.

D. Drugs intoxicants, Alcoholism and Smoking:

The scourge of alcohol and habit forming drugs is all too evident in the West where these have wrought more social havoc and destroyed more lives than any of the wars which plagued mankind, yet the West fails to heed the Qur'anic injuctions that all intoxicants are harmful and should be prohibited.

The miracle of the *Qur'an* as a medium of effecting social change is evident when we consider the circumstances of the *ayat* prohibiting alcohol. At a single command, the streets of Medina were flowing with spilled wine. This was achieved on the basis of faith alone, whilst the West spends millions in trying to rehabilitate alcoholics, and drug addicts, it does nothing to alter the spiritual condition of the addicts, it does nothing to alter the spiritual condition of the addicts, or the social un-Islamic environment. This latter factor accounts for the large number of relapses amongst alcoholics since no treatment is given for the underlying sociological factors.

Muslims can justifiably be proud of this achievement which should serve as a beacon to the entire world on the handling of this problem which is destroying countless lives at the peak of their existence, yet it is tragic that Muslim doctors are still advocating western methods of treatment for the addicted.

Calls for bans on smoking in the West are gaining momentum, since it was realised that smoke and pollutants are the cause of severe disabling pulmonary diseases, including cancer of the lung. In a *fatwa* by the Saudi Sheikh Muhammad bin Ibrahim cigarette smoking is contrary to the Sunnah,[25] and Muslims are falling prey to western media which advertise smoking. Muslim governments should immediately halt the importation and manufacture of cigarettes.

E. Geriatrics:

Many illnesses amongst the elderly are due to faults in nutrition. Indeed the process of ageing can be considerably influenced by a proper diet.

Many of their illnesses can also be caused by their being dumped in old age homes and the lack of a family unit, isolation and loneliness are situations which should not occur in Muslim society if due attention is paid to the injuctions of the *Qur'an* on the attitude and care of parents and the elderly, that not even a word of anger is to be directed at them, that paradise lies under a mother's feet, etc. S6:V152, S17:V24, 25, S29:V9 & S31:V15.

F. Gynaecology:

Cancer of the cervix has been shown in many centres to be less amongst Muslims due to circumcision of males. The *Qur'an* has also prohibited sexual relations during menstruation. Professor Badri states that the *Qur'an* is the most advanced manual on Sexology extant and has freed Muslims from many inhibitions which are harmful to the development of a healthy society, as well as curbing licentious and all immoral behaviour.[26]

Prof. Ansari states that in the protection of society, *Islam* regards immorality, and more particularly sexual immorality as being greater in magnitude than murder or theft.[27]

G. Venerealogy:

New diseases like AIDS and the scourge of venereal diseases can be entirely prevented by Islamic norms of behaviour. This is greatest boon given to mankind by *Allah* in the numerous verses dealing with sexual behaviour in the *Qur'an*.[29]

H. Thanatology:

This is a subject which has received scant attention[28] in medical schools in the West whereas the Prophetic medicine and Muslims have centuries ago prescribed proper care, and preparation of the dying and the terminally ill.

I. Dermatology:

Personal hygiene and cleansing of the skin is considered to be of such importance that it is mentioned in the Book of *Allah* from the earliest of Revelations,[30] since it is the largest organ in the body. Ibn Qayyam states that the act of *wudu* is for the removal of external impurities, and the face or skin is the mirror of man, whilst the *salaat* is for the removal of internal disorder.[31]

J. Exercise and rest:

In the *Sittah Durruriah*, (the six principles) exercise and rest have been mentioned in the causation or disease and its prevention:

1. Air, including effects of climate, water, soil
2. Food: its quality and quantity and times of eating
3. Bodily rest and exercise
4. Sleep
5. Emotions
6. Excretions including sex

Centuries ago, the *ulama* (doctors) knew of the physical benefits of the *salaat* and the various postures of the salaat were analysed and commented upon:

> *The ruku and sajda have an effect upon the venous return to the heart and thus stimulate the heart, whilst the spinal and abdominal muscles which were used during the qiyam, gave tone to the blood vessels. The sajda served to cure headaches (by assisting drainage) and this principle is still used in the treatment of congestive sinusitis.*

However, the main benefits of the *salaat* are psychological and will be shown in this paper to contribute to a very large extent to the mental well-being of Muslims.

Imam Zahabi states that prayer was to 'remove bad thoughts, put out the fire of anger, frustration and conflict and calls upon one to submit in humbleness to one's Creator'. Prayer submerges ones ego with all its subhuman or evil tendencies, i.e. it assists in erasing the 'programmed memories of stress stimulus-response' situations which if repeated often enough, and given no opportunity of erasure cause a permanent chemical reaction to be set up in the body, which has been shown to cause raised blood pressure, excess insulin is secreted and abnormal demands on the body are effected.

Prayer thus will not only prevent physical illness, but by achieving 'homeostasis' or stability leads to the creation of developing positive attitudes: i.e. one has to depend upon *Allah* to solve ones problems, to ask Him for assistance. These positivistic attitudes remove most of the negative attitude of helplessness, of isolation, uncertainty and mental confusion, which are the major factors in the causation of neuroses and later depression — the most common of the milder mental illnesses afflicting mankind.[32]

That the emotions have a profound effect upon health was well known to the Prophet Muhammad (ﷺ), which is evident from the *Hadith*, that when a man came to the Messenger for advice, he was told never to be angry. This is also confirmed in the *Qur'an* where those 'who restrain their anger' are promised the reward of Paradise. (S3:V134). A *Hadith* also states that anger is Satanic, and since the Devil is created from fire, the antidote is water. Thus the performance of a *'wudu'* is

prescribed for the treatment of anger, a most effective and cheap remedy, available to all for resolving nervous tension without resorting to drugs, which in themselves cause immense harm.

It was a prophetic principle that the remedy of any illness was firstly by diet, by following the *Sunnah,* then by drugs and lastly but not exclusively by prayer. The act of the *wudu* and the *salaah,* plus the mental preparation and participation, leads to the development of one's personality since it entails forbearance, forgiveness and nobility.

Resorting to tranquillisers, so prevalent in the West, for the resolution of minor problems, only creates further problems, and does not solve the situation at all. Indeed drug addicts are being produced and doctors are guilty of having an inadequate and uninformed response to the whole problem of the minor mental illnesses.

The Prophet (ﷺ) also prescribed unique remedies for the treatment of sorrow, apprehension and fear, two of the major causes of neuroses. He prescribed that the reading of the two *Surahs,* the Mu'awwaidhatan which teaches man how to seek refuge in *Allah* and to ask for His protection. These are anchors in the present day treatment of neuroses, whose base is insecurity and helplessness. The *Qur'an* states that the rememberance of *Allah* lends tranquillity to the heart:

> *FOR WITHOUT DOUBT IN THE REMEMBRANCE OF GOD DO HEARTS FIND SATISFACTION*
>
> *(S13: V28)*

However, the greatest role of the *Qur'an* would be in the prevention and treatment of psychoses, the major form of mental illness. To enable us to appreciate better this statement regarding the scope of Western psychology, the domain of abnormal psycholoses, one would have to obtain the structure of the Consciousness, according to Islamic derivations.[33]

K. Psychology and Psychiatry:

The Prophet (ﷺ) was the first to observe mental illness objectively in a Jewish youth[34] and Muslims have the credit for establishing the first mental hospital in the world[35] where music was played for those confined to these wards.[36] Muslims were also the first to discard the demonological theories of concerning mental illness and therefore lifted the study of these two disciplines to a scientific level.[37]

It would suffice to review briefly the theories of Western psychology to better understand the Islamic viewpoint which is in complete contrast.

Originating from the Greek word 'psyche' which was equated to the soul, to the modern definition of psychology which is the study of human behaviour, one can perceive that modern psychologists have deviated from earlier views which were more in accord with the Islamic conceptions, to the latter views which are materialistic.

Freud derived most of his views from the Talmud, and 'consciously or unconsciously secularised Jewish mysticism' since it is beyond dispute that it played a decisive role in his thought.[38]

Research in this field is of utmost importance, since the treatment of the mentally ill according to Western concepts has not resulted in much success.

Treatment of the mentally ill is confined to the masking of symptoms by the prescribing of sedative drugs, and other drastic measures, such as ECT (Shock) have been largely abandoned due to the unequivocal results obtained.

Western psychotherapy has also been criticised in a book published in the U.S.A. Based on fifteen years of research by a US clinical psychologist Dr. B. Zilbergeld,[39] reveals many misconceptions about

psychotherapy and counselling. He concludes that professional therapy in the United States is 'overpromoted, over used and overvalued' and challenges eight myths about therapy.

According to the *Sunnah,* Muslims have a far superior mode of therapy of the mentally ill, which results in not only relieving the patient of his symptoms, but also of redirecting the centres of energy contained in the *nafs* to its higher levels in the *Ruh.*[40]

The *qalb-ruh* circuit requires that the individual ennoble himself with the actualisation of the *Hadith:*

"Imbibe yourself with the qualities of the Divinity."

i.e. that he should direct all activity according to the dictums of the Noblest Exemplar according to the Quranic injunction:

YOU HAVE IN THE NOBLE MESSENGER OF ALLAH, THE BEST EXAMPLAR

(S33:V21)

and in so doing to act in harmony with the rest of creation, to radiate peace and goodwill, and to serve others rather than crave attention to himself and his symptoms.

A *mumin* operating on the proper *Ruh-Qalb* circuit will not overeat, thus his health will be safeguarded, to enable him to save his fellow men in the removal of injustices, want, poverty and hunger.

The verse in *Surah* Bani Israel, in which *Allah* states that:

WE REVEAL THE QUR'AN OF WHICH THERE ARE PARTS WHICH ARE A HEALING AND MERCY TO THE MUMINS,

(S17:V82)

(i.e. a higher status than Muslims) proves that the *Qur'an* is the Book of Healing.

According to the injunctions contained in *Surah almaidah,* V.35, it is incumbent on Muslims to save life, and whoever gives life to one, it is as if he has given life to all mankind'.

Muslim medical men and women have thus also the *Hadith* to inspire them to greater efforts: *'For every disease there is a cure'.*

Dr. Muti-al-amin Kilaji states that it is this statement which led to the search for new medicines after which the foundations were laid down by Muslims for pharmacology, and it should still serve to stimulate the present and future generations to greater efforts.[41]

Similarly more effort is needed in propagating the wisdom contained in the six prophetic principles of medicine, which will lead to better and more complete therapies of illnesses, as well as their prevention.

Finally, mental illness is bound to increase as the underdeveloped countries advance technologically and adopt western norms, and it is a unique challenge for all Muslims to alleviate the sufferings of all humanity for which the *Qur'an* and the *Sunnah* are destined to play a leading role, inshallah.

The *Qur'an* repeatedly enjoins the feeding of the hungry, and it evoked the greatest social revolution in the history of mankind when it urged man to unite in calling others to the Truth, for the suppression of evil, and for lowering the wing of forebearance and mercy to those who cannot see the light.

The *Sunnah* and the *Qur'an* should serve to initiate a revolution in medical care as an example for all the world!

This is the task which the Islamic Medical Associations should strive for, *inshallah.*

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PAIRING IN LIVING THINGS

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Allah says in the Glorious *Qoran*:

> *IN TIME WE SHALL MAKE THEM FULLY UNDERSTAND OUR MESSAGE (THROUGH WHAT THEY PERCEIVE) IN THE UTMOST HORIZONS (OF THE UNIVERSE) AND WITHIN THEMSELVES, SO THAT IT WILL BECOME CLEAR UNTO THEM THAT THIS (REVELATION) IS INDEED THE TRUTH. (STILL) IS IT NOT ENOUGH (FOR THEM TO KNOW) THAT THY SUSTAINER WITNESS UNTO EVERYTHING?"*
>
> *(S41:V53).*

We begin with this verse to explain that *Allah* Almighty promised in His Book, the *Qoran,* that He will be uncovering some of the hidden secrets of this world and that He will be showing man some of the miracles existing in his body.

This introduction is necessary. It shows that the aim behind writing this paper lies in looking deep into *Allah's* creation of this world, in accordance with the many *Qoranic* verses asking us to examine *Allah's* creatures, the heavens and the earth, camels, fruits etc. All of these prove without any doubt the existence and the greatness of *Allah.*

In doing this, we look carefully at what is on this earth, studying, observing, as well as proving that it is an act of *Allah.*

This was the introduction. In the *Qoran* there are verses stating that there is pairing in this world: in every creature, in fruits, in plants of the earth, in human souls, in cattle and sheep, in creating male and female sexes. The most accurate meaning is given by verse: 49 of *Surah* 51 *"Azzariat"*, which says:

> *"AND OF EVERY THING WE HAVE CREATED PAIRS THAT HE MAY RECEIVE INSTRUCTION".*

This verse is a challenge to us to think deeply about all creatures in order to find out this fact: pairing. In fact, it says: Prove that this is not the case.

The Arabic equivalent to the word THING is given to mean any thing that can be known, physically and spiritually. It implies that a thing is willed and wanted and hence it is revealed after being non-existing. While the world PAIR in Arabic, means one member of a couple; anything that has a partner. It never means an absolute one or unity. Hence the Arabic word for pair is really a member of a pair, like something that has an opposite; like wet as opposed to dry, male vs female, day vs night, sweet vs bitter etc. At-Tabari explained this verse to mean creating two different species like happiness and sadness, belief and disbelief, sky and earth, sun and moon, male and female. He also mentioned that a THING is created by *Allah* with an opposite. This way *Allah* will be a unique entity different in being singled out: He is the One God, the Primary Cause, the Eternal and Independent Being, while a THING is never given to mean *Allah* in Arabic. A THING thus implies that it is deficient and imperfect because it performs one function or indicates one quality only: Fire, for instance only heats and cannot be used to cool, likewise, ice cools but cannot heat, and therefore both complement and supplement each other, while neither can be described as perfect. Therefore a THING is created and is imperfect. On the other hand, pairing is the rule in the created world. Said Kuttub in his: " "In the Shadows of the *Qoran*" says: Recent scientific research is going to reach the fact that the structure and make up of this

world can be traced to the atom. The atom is composed of an electric pair: positive and negative. It is now known that the atom-mass is concentrated in the center in a nucleus which is positive around which a number of negatively charged particles rotate. These are known as electrons. The sum total of charges is equivalent to that of the nucleus and is in equilibrium with it. The electrons move with a very high speed around the nucleus to prevent them from falling on it because of gravity. The nuclear mass is several thousand times more than that of the electrons with tremendous space between the two. This is the picture of the atom described in the Physics Text-books.

Structure of the atom resembles that of the solar system according to the Physicists. We know that there is an hierarchy in this universe: atoms, elements, compounds, cells, tissues, organs, systems, organisms. Hence every living organism is composed of atoms that are made up of positive and negative components. A THING is a description of an entity that is created. THINGS can be divided basically into plants and animals as well as human-beings and genies, with pairing clearly exemplified. It is also present in the sky and the earth, the sun and the moon, the star and the planet; the earth also clearly shows pairing. Land and water, mountain and plain, sweet-water and salt water etc. If we look at living things like plants for instance we find that each plant is made up of cells. A cell is a very small tiny thing surrounded by a wall inside which there is a membrane bordering a viscus substance known as the cytoplasm which in turn surrounds the nucleus. On examining the wall we find that it is made up of a primary wall and a secondary wall. The plasma membrane is also made up of two lipid layers in which two types of proteins are embedded. Cytoplasmic Organelles are covered by double layered membrane as is found in the nucleus, mitochondria, endoplasmic reticulum (which can either be smooth or rough) ribosomes, vacuoles etc. Animal cells on the other hand are not very much different from plants except for the distinguishing characteristics between them (like the presence of a cell wall and plastids in plants). Cells could either be eucaryotic or procaryotic, showing pairing. Plants respire as well as photosynthesize taking in oxygen in the former and expelling out carbon CO_2. They do the opposite in photosynthesis, (taking in CO_2 and producing Oxygen), with the help of the light absorbing chlorophyll which is Chl A and Chl B. Photosynthesis is made up of 2 systems: — Photosynthesis I and Photosynthesis II. In the first one a 5 carbon compound is manufactured out of Carbon dioxide, the level of energy is increased and an electron is accepted and carried along the electron transfer series to the 2nd system. In the second system a six carbon compound is manufactured and Oxygen is produced. Pairing is clear in Photosynthesis.

Classification of plants reveals that they are either vascular or non vascular. Vascular plants are either seed producing or seed-less. Seed plants are either gymnosperms or angiosperms. Angiosperms are either monocots or dicots and flowers are either single or culsters known as inflorescences.

Inflorescences are on a stalk (peduncle) made up of nodes or internodes ending with a receptacle. Most flowers contain two sets of sterile appendages, the sepals and petals, which are attached to the receptacle below the fertile parts of the flower, the stamens and carpels. The sepals occur below the petals, and the stamens below the carpels. Collectively, the sepals form the calyx and the petals the corolla. Together, the calyx and corolla constitute the perianth ('around the flower'). The sepals and petals are essentially leaflike in structure. Commonly the sepals are green and the petals brightly colored, although in many flowers both parts are similar in color.

The stamen which is the male reproductive organ is made up of a fine filament carrying a two-lobed anther having pollen grains. Flowers also have carpels, the female reproductive organs housing the ovaries, out of which comes the stigma.

Reproduction in plants can be either sexual or asexual. So what about a flower that has both male and female organs, doesn't self-fertilization take place in it? The answer is that in such cases it is almost impossible for self-fertilization to take place. The flowers have adapted against that in many ways

which prevented them from doing that. For example, the stigma will be covered with wax; pollen produced by the anther of the same flower cannot dissolve it while pollen of a completely different flower from the same species can do that. Other ways include having the stigma higher than the anther or having the anther in a group away from the stigma which is in the middle.

Some plants produce seeds out of which a root and a stem grow. Plant tissues are either primary or secondary; with the secondary being either vascular cambium or cortical; the former is either xylem or phloem while cortical tissues are either primary or secondary with the later being either cork or phelloderm. All of this is exemplifying pairing.

Roots could either be primary or secondary; ground or aerial, fixing plants or for storing food. Stems also contain the cortex and the pith and they carry leaves. the leaf is made up of a blade (lamina) and a petiole. Dicot leaves are either simple or compound. Compound leaves are 2 types; pinnates with the blades carried on both sides of the petiole or they can be palmate with all of them hanging at the tip of the petiole. Each blade has two surfaces in which stomata are found. Each stoma is surrounded by 2 guard cells.

Green plants manufacture from simple compounds complex ones, examples of which are Carbohydrates, fats, proteins, and hormones. Auxins are plant hormones that elongate the stem. They also help fruits mature, cambium to grow and cells to be specialized. Here they are stimulatory. However, auxins do have inhibitory roles; they prevent lateral buds from growing. Plant hormones, therefore exemplify pairing.

Animals on the other hand are either symmetrical or asymmetrical. Symmetry is either bilateral or non-bilateral like radial or spherical. Animals could be unicellular which reproduce either sexually or asexually. Sexual reproduction involves a male and a female. Reproduction then is either sexual or asexual in animals as well as in plants. Asexual reproduction could be in the form of fission whereby the body divides into two organisms. This form of reproduction implies numerical replication of DNA. DNA constitutes the major portion of the chromosome. DNA itself is composed of the two complimentary strands. Pairing is clear here. DNA is the origin of life because it is capable of making identical copies of itself and also because it contains definite information on the characteristics of the living organism. Here lies the origin of life and pairing is very clear in it. DNA itself is of two strands, each coming from one parent. DNA is negatively charged but covered with a positively charged protein. The two stands are attached together by chemical bonds between four nitrogen bases that exist in pairs: C and G, and A and T.

Asexual reproduction could also be in the form of budding, spore formations, fission etc., all of which are due to simple retention division known as mitosis. Sexual reproduction on the other hand starts with formation of gametes by meiosis. Gametes are either males (sperms) or females (ova), each containing a haploid number of chromosomes. So if the diploid chromosome number in a human somatic cell is 46, the sperm has 23 and so does the ovum. The sperm comes from the father and the ovum from the mother. Union of the two forms a diploid zygote. Pairing is evident. Chromosomes contain genes which are always in pairs with each carrying a genetic trait: dominant or recessive. Genes carry the characteristics of the species as well as the individual in code. Enzymes are manufactured using this code. Genes are responsible for height, skin colour, eye colour, intelligence, obesity etc. They are tramsmitted in the ovum and the sperm.

Plants also reproduce sexually. Pairing is every where.

After that when you look around you will see pairing in every thing. You see in the final body form. Taking the human-being as an example, he has two hands, two legs, two lips, two ears, two eyes, five fingers in every hand and 5 toes in every leg. He has a head opposite to the feet, a back and an abdomen. Man is body and soul. When closely examining the organs and the systems and their

functions we see pairing in almost every single one of them: the heart is really two hearts, left and right; there are two ovaries, 2 testicles, 2 lungs, two kidneys. Out of nervous system nerves go in pairs, left and right. In respiration the body takes Oxygen and expells CO_2. Blood is a liquid which contains formed elements. Formed elements may be white blood corpuscles or red. Blood vessels are either arteries or veins, with almost a vein to every artery. The nervous system may be divided into sympathetic or para-sympathetic. The sympathetic, for instance, dilates the pupil, inhibits the flow of salvia, increases heart beats dilates capillaries in the lung, inhibits digestive secretion and peristalsis, stimulates the conversion of glycogen to glucose and inhibits contraction of the urinary bladder. The para-sympathetic does exactly the opposite with pairing clearly indicated.

The body contains enzymes. A living cell is capable of producing some where around 50,000 of them. Enzymes are catalysts in biochemical reactions. They are all functional proteins. In addition to them there are structural proteins used in making tissues and organs. Enzymes take part in anabolism as well as catabolism. In the former they help synthesize compounds like proteins, fats, etc., while in the latter they are used to break down these compounds as well as help in the oxidation of glucose to produce energy. Enzymes are active under optimal conditions of temperature, pH, and substrate concentration. They could be inhibited by poisons or unfavourable conditions. In all of that pairing is clear. Proteins could be levorotary or dextrotary. This is true of many other compounds.

The Endrocrine system is one of two; the other being the exocrine which includes salivary, sweat, sebaceous, gastric, uterine, vaginal and mucus glands, which secrete the compounds through ducts to the outside of the body. Endocrine glands secrete their hormones directly into the blood. A very clear example of pairing.

The Endocrine glands are many. They secrete hormones which could be stimulatory or inhibitory. Glucose for instance is controlled by two hormones, insulin and glucagon with the former decreasing its level in the blood while the latter increasing it. Calcium metabolism is controlled by parathormone and calcitonin. The former is secreted by parathyroids and increases the level of calcium in the blood while calcitonin is secreted by the thyroid. It does exactly the opposite. In actual effect there is a clear characteristic in the nature of the Physiology of the endocrine glands. They lead to equilibrium by way of stimulation and inhibition. This is a clear example of pairing. Even if we look at the functions of the one gland we find that pairing leads to equilibrium. Take the thyroid gland for instance the normal function is accomplished by equilibrium between hypersecretion and hyposecretion.

Endocrinology is a big field which cannot be covered in total here. Therefore, I shall choose some examples to indicate pairing. During pregnancy progesterone is secreted by the corpus luteum of the ovary during the early phase and by the placenta later on in order to maintain pregnancy by keeping the uterine wall thick, rich in blood and spongy. If the level of progesterone decreases because of one reason or the other, or during labour, the uterus starts contracting to expel the foetus, at this time estrogen levels increase. Pairing is clear here also.

There are many hormones that act antagonistically like the Thyroid Stimulating Hormones and Thyroxin, ACTH & the adrenal cortex hormones, gonadotrophins to the gonads, hypothalamic releasing factors to pituitary hormones etc. Pairing is indicated.

The kidney shows pairing. It is made up of a cortex and a medulla. The cortex contains glomeruli inside Bowman's capsules with an afferent and an efferent artery. The nephron has a proximal and a distal convoluted tubule. The loop of Henle has a descending and an ascending arm.

Muscles are either striated or none striated. Striated muscles contain actin and myosin. Neurons have axons and dendrites.

The body muscles are either smooth or skeletal. Smooth muscles could be either circular or

longitudinal. Skeletal muscles are responsible to move bones with one moving the bone in one direction while another in the opposite direction.

There is inspiration opposite to expiration, drinking to urination and sweating, feeding opposed to defecation.

There is an object and its image, tallness and shortness, obesity and slimness, lightness and heavyness, laughter and crying, sleep and wakefulness, convexity and concavity, war and peace. Pairing every where: pairing is also seen in metabolism: anabolism and catabolism, irritability and response, receptor and effector.

Water out of which life arose is a liquid that evaporates at high temperatures and solidifies at low temperatures below zero.

Cells move by cilia or flagella. Transport into and out of cells could be passive by diffusion from a high concentration to a lower one, or active from low to higher concentrations.

Feeding of living organisms is either autotrophic or heterotrophic. Digestion is intracellular as in Amoeba, bacteria and WBC, or extracellular like in multicellular animals.

Energy needed for the bodily activities can be obtained in one of two ways: aerobically or anaerobically. Pairing every where.

The water cycle exemplifies pairing: Sea water evapourates to form the clouds which condense to form rain.

The circulatory system is either open as in insects or closed as in man. Blood is either liquid or coagulated.

Pairing is also evident in Teeth and in Dentistry, The masticatory apparatus is composed of two dental arches: the maxilla and the mandible. The maxilla is homologous to two bones: the maxilla proper and the premaxilla. The mandible makes its appearance as a bilateral structure: right and left mandibles joined in the midline.

Teeth develop in two generations: deciduous as well as permanent dentitions. The primary deciduous teeth are composed of ten pairs while the permanent are made of sixteen pairs.

The tooth develops as bud which then becomes covered with a cap. The dental cap is made from an inner dental epithelium (tall cells) and another cuboidal epithelial layer; the enamel grows in between these two.

Later, a dental papilla and a dental sac form. The papilla produces the dentin. Dentin forms in two stages: uncalcified predentin and then calcified dentin.

Pairing is also evident in human development. The male sperm (with its 23 chromosomes) unites with the female ovum (with its 23 chromosomes) to form a zygote that has 46 chromosomes. The beginning then shows paring. The zygote then divides mitotically into 2 cells. The cleavage continues: 2 give 4, 8, 16, 32 cells, etc. The zygote travels until it reaches the uterus where it becomes a 'blastula'. This leech-like stage is composed of an outer trophoblast and an inner cell mass. The embryo develops further and the inner cell mass produces the ectoderm and endoderm. Mesoderm later forms in between and gives rise to somites. At this stage the embryo becomes known in Arabic as a "Chewed" thing.

When the human organs are examined, they reveal paring. They are all given rise to by the 3 germ layers.

Ectoderm for instance gives rise to the nervous system which is divided into two: central and peripheral. Central nervous system contains the brain and spinal cord. The brain structure reveals the

cerebrum, cerebellum and brain stem. The cerebrum is in the form of a right and a left hemisphere, or it is in four lobes: frontal, parietal, temporal and occipital. The cerebellum is made of a right and a left portion connected by the vermis. The brain stem is composed of the medulla, the pons, the midbrain and the diencephalon. There are also twelve pairs of cranial nerves. The spinal cord is organized into a right and a left side.

Mesoderm gives rise to connective tissue, muscles, urogenital system, blood, bone marrow and membranes. They all show parity. Bones are of two kinds: those that make up the peripheral bones and the others are in the cranium. Peripheral bones are in two: left and right. The vertebral column is composed of vertebra each of which made of two skeletal pieces.

Mesoderm also makes the spleen and the appendix. These are considered by anatomists as single structures that do not exist in pairs. Some anatomists, however, have found what they called an "accessory spleen" in addition to the spleen proper. Pairing may not be clear in the appendix but that does not mean it is not there. More investigations are needed in this respect. The spleen on the other hand show pairing in its function. It makes two kinds of WBC's: Monocytes and Lymphocytes, each of which has a different role in immunology.

Endoderm gives rise to the mucous membranes in the digestive system, to the liver, pancreas, thyroid and parathyroids, the thymus, etc.

The stomach has two openings (cardiac and pyloric), two curvatures (lesser and greater), two gastric arteries (right and left) and two vagal branches (right and left).

The liver starts from endoderm as two buds; The liver we know is made up of four lobes: right and left, caudate and quadrate. The pancreas starts off as a ventral and a dorsal bud which unite to produce the pancreas. It perfroms two functions: digestive and hormonal. The intestines are small and large.

Pairing as mentioned earlier may not be clear in some other parts of the body. But that does not mean it is not there. It indicates that more investigations are required.

Otherwise pairing as has so far been stated is striking:

WITHIN YOUR OWN SELVES, CAN YOU NOT THEN SEE?

(S51:V21)

Pairing is so evident that it says: Observe that every thing is in pairs. This is everywhere, even in human behaviour.

Here man loves and hates, is fair and unjust, is generous and stingy, honest or dishonest, truthful or lier, believer or non believer, hungry or full, happy or sad, patient or impatient. Pairing every where: life and death, birth and mortality, rationality and stupidity, young and old, fast and slow, light and darkness, paradise and hell, etc.

Even the Angles have wings that are in pairs.

In conclusion, pairing is in very thing except *Allah* Almighty.

Yet some one might ask: But is pairing really in every thing?

Our response will be that pairing is in every thing. If we cannot see pairing in an empirical observable thing that does not negate it. We need to look harder and dig deeper in order to find it.

Didn't *Allah* Almighty say:

"AND OF EVERY THING WE HAVE CREATED PAIRS.....".

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DOCUMENTATION OF THE PHYSIOLOGIC EFFECTS OF THE QURAN (A Controlled Study)

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There is a growing interest in the healing powers which have been attributed to the *Quran* according to the Prophet's (ﷺ) teachings and according to the *Quran* itself. Until recently, it has not been known how the *Quran* achieves the healing, and whether its effects are physical, spiritual, or a combination of the two.

At the Akbar Clinic in Panama City, Florida, we have been conducting an ongoing research during the past year in an attempt to answer this question. The preliminary phase of this research was to find out whether the *Quran* has any effects on the physiology of the human body, and to record these effects if present. Computerized electronic monitoring equipment was used to record physiologic changes in healthy volunteers while exposed to Quranic recitation. The effect of the *Quran* was evaluated in Arabic speaking and non-Arabic speaking Muslims, as well as in non-Muslims. The non-Arabic speaking volunteers, Muslims and non-Muslims, were exposed to the original Quranic text in Arabic as well as to the English translation of the *Quran*. In all these categories, the preliminary studies showed that the *Quran* has a definite stress reducing effect which was documented in 97% of the conducted trials. This stress reducing effect was manifested in the form of objective physiologic reactions reflecting an altered state of the autonomic nervous system. The details of these preliminary results were presented to the 17th Annual Convention of the Islamic Medical Association of North America in St. Louis, Missouri in August 1984[1].

It appeared from the preliminary studies that the stress reducing effect of the Quran was attributable to two factors: one factor was the sound of the Quranic words of the original Arabic text regardless of whether or not the listener understood the recited text, and regardless of the belief of the listener. The second factor was the meaning of the recited text of the *Quran* even if it were just the English Translation without hearing any of the original Arabic words.

The second phase of our Quranic research at the Akbar Clinic was to conduct controlled studies in order to determine whether the apparent stress reducing effect and the recorded accompanying physiologic reactions were truly attributable to the Quran and not to other non-Quranic factors, such as the sound or tone of Arabic Quranic recitation: or the listener's awareness that the recited material is a part of a holy scripture. In other words, the purpose of these controlled studies is the verification of the claim that the Quranic words per se possess the power to produce physiologic reactions regardless of whether or not they are understood by the listener. The details and results of this phase of our Quranic research are the subject of this paper.

EQUIPMENT

A MEDAC System 2002 (Medical Data Acquisition System) is a computerized stress management system which was developed by Boston University Medical Center and Davicon Company of Boston. It measures stress responses through direct entry physiological testing and non-invasive physiologic monitoring. The system is a fully integrated turn-key system consisting of the following components:

- Software for psychological testing, physiological monitoring, and report generation.
- Apple IIe personal computer with two floppy disc drives, video display, and a printer.
- Instrumentation that measures two channels of muscle activity, i.e. Electromyography (EMG), one channel of skin conductance, i.e. Electrodermal response (EDR), one channel of blood flow and heart rate, i.e. Photoelectric plethysmography (PPG), and one channel of skin temperature.

The Electromyography (EMG) monitor measures the neuro-muscular activity. Increased stress causes increased muscle tension and electrical potential. The frontalis muscle was used for recording of neuro-muscular activities utilizing a non-invasive surface electrode.

The Electrodermal Response (EDR) monitor measures the skin conductance level (or electrical conductivity of the skin) in micro Seimens. EDR changes as small as 0.007 micro Seimens can be detected. The skin conductance is affected by its moisture due to sweat gland activities. Stress increases sweat gland activity and electrical conductance. Relaxation or stress reduction decreases sweat gland activity and skin conductance. Finger tip electrodes are used for EDR monitoring.

The Photoelectric Plethysmography (PPG) monitor detects and displays the instantaneous blood volume and skin temperature. It uses a highly sensitive lightbeam emission circuit for the real-time monitoring of the peripheral vascular activity. Any increase or decrease of blood flow volume is displayed with each heart beat in a pulsatile real-time fashion. Increased stress results in vasoconstriction with decrease of blood flow volume and skin temperature and increase of heart rate. Relaxation or stress reduction leads to vasodilatation, increased blood flow volume, increased skin temperature, and decrease of heart rate. A non-invasive finger-tip transducer is used for photo-electric plethysmographic recording.

METHODS AND MATERIALS

210 trials were conducted in five healthy volunteers, three males and two females, ranging in age from 17 to 40 with an average age of 22 years. All subjects were non-Muslims and non-Arabic speaking. The subjects were monitored during 42 treatment sessions, each session covering five trials, with a total of 210 trials. The subjects were exposed to Quranic recitation using the original Arabic Quranic text during 85 trials, and were exposed to non-Quranic Arabic readings recited in sound and tone identical to the Quranic recitation during 85 other trials. The subjects were exposed to No reading at all in 40 trials during which they were only sitting comfortably with their eyes closed. This was the same position assumed by the subjects during the other 170 trials in which they listened to Quranic or non-Quranic Arabic readings.

The non-Quranic Arabic readings were used as a Placebo for the *Quran* since the listeners could not distinguish these non-Quranic readings from the Quranic ones. The sessions without any readings were designed to determine whether the stress reducing effect was in any way due just to the relaxed position of the subjects with their eyes closed while listening. It became obvious from the early trials that the sessions without any readings did not produce any significant stress reduction, and the trials were later limited to the Quranic recitations and the Placebo. The sequence of trials conducted in one sitting was continuously altered to assure reliability and relevance of the data recorded. In other words, the same subject would listen to Quranic recitation first, followed by non-Quranic recitation on one occasion then listen to non-Quranic recitation first, followed by Quranic recitation on another occasion. The cycle was then repeated. At no time was the subject able to recognize the identity of the recited material.

The monitoring during these controlled trials was limited to the measurement of Electromyographic activities through one of the EMG channels of the above described MEDAC System utilizing a non-invasive surface electrode over the forehead muscle. The mean electrical potential of the monitored muscle was recorded in addition to the standard deviation, excitation threshold, and a percentage comparison to the base line.

This method of monitoring was selected because it provided actual figures for accurate quantification and comparison of the results.

In any controlled trial or a group of trials, the one treatment modality which produced the lowest muscle potential was considered positive since this indicated a greater stress reduction as opposed to the compared modality.

RESULTS

Positive results, i.e. lower electrical muscle potential indicating greater stress reduction ability, were obtained in 65% of the Quranic trials and in only 35% of the Placebo trials. In several subjects, the positive results of the Quranic trials could be reproduced even when the sequence of Quranic and Placebo trials was reversed. This added to the reliability of the positive results in these subjects.

DISCUSSION AND CONCLUSION

The early results of our Quranic research suggest that the *Quran* has a definite stress reducing effect which can be qualitatively and quantitatively measured. This effect could be recorded as changes of electrical potentials of muscles, electrical conductivity of the skin, or vasomotor responses affecting heart rate, blood flow, and skin temperature. All these changes reflect an altered state of the autonomic nervous system which in turn could and would also affect other body organs and their functions. There are therefore endless possibilities to the potential physiologic effects of the *Quran.* It is also known that stress leads to impaired immunity possibly by means of the production of Cortisol or other neuro-endocrine mechanisms. It is, therefore reasonable to expect the stress reducing effect of the *Quran* to have a stimulating effect on the immune responses of the body, which in turn may enhance the healing or prevention of a variety of illnesses including infectious diseases, cancers, and others.

The results of our controlled trials also suggest that the Quranic words per se, regardless of the meaning, possess the power to produce a physiologic stress reducing effect in man.

It should be made clear, however, that these results are only the early findings of a limited number of trials conducted on limited number of subjects.

Our Quranic research is continuing in order to achieve numerous objectives including:

1– Conducting a larger number of trials on a larger number of subjects to confirm our current information.
2– Comparing the effect of the Quranic words to the effect of the Quranic meaning, in original and translated texts.
3– Comparing the effect of various passage of the *Quran,* such as the ones promising reward and the ones promising punishment.
4– Comparing the effect of the *Quran* to the effect of other stress reducing modalities currently in use.
5– Examining the humoral and cellular immune responses in persons exposed to long term Quranic treatments.
6– Applying the Quranic treatment to specific conditions, particularly the ones of physical nature, and assess its value in a meticulous scientific manner.

It is obvious that such a research project is a long and complex one which will require several separate studies and will extend over several years. It is, however, a very exciting subject and its potential practical implications may prove to be very rewarding.

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A GENERAL VIEW OF MEDICAL ETHICS IN THE ISLAMIC WORLD AND ANATOLIAN TURKS

Prof. Dr. Aysegul Demirhan Erdemir
TURKEY

INTRODUCTION

The science of medical ethics is a very important branch, today. The term of deontology forms two words. Deontos means duty and Logos means science in Greek. So, the deontology is the science of professional behaviour and the medical ethics. In addition to this, it is a science about the duties of physicians. Every scientific branch has a characteristic deontology, so, the deontology of medicine is also an important science. We know that the name of this important science is deontology or medical ethics. Today, the medical ethics or deontology develops continously and it becomes an important science. Because the science of deontology is present in the source of every medical theme and this scientific branch helps that the problems of these medical themes are explained from the point of legal and moral conditions.

The science of medicine has been present since the beginning of life and the man has thought the medical themes since the primitive ages. In the primitive, ages, the duty of the physician-ship was given to the chiefs of the tribe, the priests and the magicians. These persons were the president of characteristic groups and so, the medicine obtained some moral, ethical and scientific values from these men.[2,15,22,24,29,34]

For example, these themes are explained in some sacred books and some medical manuscripts in the ancient India, ancient Israel, ancient China and ancient Greek and Rome. Afterwards, we see the development of medical ethics in the Islamic World and Anatolian Turks. In this article, the historical development of deontology is realized in these countries. In addition to these, a general view of medical ethics in Turkey of today, is also explained and some samples and some scientific documents are given.

A GENERAL VIEW OF MEDICAL ETHICS IN THE ISLAMIC WORLD AND ANATOLIAN TURKS

Islamic world that was a continuation of the ancient Greek, gave a great importance to this theme because of the medical authorities like Abu Bakr Al-Razi, Al-Biruni, Ibn Sina and their deontological books. Abu Bakr Al-Razi (854-932 A.D.) prepared 200 books on various themes and 5 of them are related to the medical ethics.

Ibn Sina (Avicenna) wrote various books during his life. The number of his various books is a few hundreds. Although he wrote a great deal of books, his worth could be understood following his death and he was remembered for long centuries. The manuscripts, according to Brockelmann, included 68 books on theology and metaphysics, II on astronomy and natural philosophy, 16 on medicine and 4 in poetry. Several of them are available only in the original Arabic; others have been translated into Latin; a few into English. A discussion of cardiac drugs has not been translated.[11,12]

The most important one of his books is Canon of five volumes. This monumental treatise required many years to assemble; it required tremendous initiative and study, a profound knowledge of science and medicine and a capacity for composition.[10,19]

On the one hand, Ibn Sina described personal observations of Western and Eastern scholars like Hippocrates, Rhazes and Calinos, on the other hand, he added his own personal observations to this classic knowledge in this book. The Canon of Avicenna, a standard reference text from the 12th to the

17th century, was used in the universities at Montpellier, Bologna and Paris. Editions for study were published as early as 1658.[26]

The Canon is a huge encyclopedia of medicine of almost 1,000,000 words. It was written as five volumes according to Islamic traditions.

Canon was translated into a great deal of languages in the West and East; for example, it was printed as in Latin in Venice in 1542, in Arabic in Rome in 1593. It was also translated by physician Mustafa Efendi of Tokat into Turkish with the name of Tabhiz-al-Mathun (The translation of Canon) in Turkey in 1761-1766. Mustafa Efendi was the palace-physician of Sultan Mustafa III (1757-1774) and he translated this book, when modern medicine introduced to our country; so this translation provided a great success for that period. Thus our physicians made use of summaries of this main source of Islamic medicine up to that time.[12,15,17,23]

One issue of the translation of Canon that was written by the translator in the form of manuscript, was given to the library of Ragip Pasha as 23 note-books and it is recorded with the number of 1335, today. Moreover, other issues of this translation are present with the number of 342 in the section of Baghdad in the library of Topkapi Palace and with the number of 1015 in the section of Hamidiye in the Library of Suleymaniye.

This book of Ibn Sina is an original manuscript for that period. Thus it has a great deal of medical truths that can be accepted in that ages. So, some medical ideas in this book are found in the medicine of today. Moreover, a wide variety of positive findings are also present in this manuscript. [24, 26, 28] Thus, positive findings about medical ethics are also found in this book. Ibn Sina wrote the characteristics of an ideal doctor.

According to Ibn Sina: "A doctor must have a nice face and a tall body. Because, people generally believe that a man who doesn't look like healthy, in the other words, who looks ill, cannot treat ill people. Moreover, a doctor must be a clean man and he must smell nice. A doctor who doesn't smell nice, disturbs the patients. A doctor must keep the secret of his patients. This type of doctor wins a true respect (a respectful condition) in the society and he is an ideal man. In addition, a doctor must be serious and conscientious. A doctor must respect the law and the truth." The thoughts of Ibn Sina about deontology have become the most important themes of physician-ship since the middle ages. Because, they contain both the problems about medical ethics in the middle ages and the deontology of today.[30]

As far as the Turkish-Islamic States, Kutadgu Bilik, which was the most important book about Turkish language and was written by Yusuf Has Hacip in 1070, contains some deontological parts. This book mentions also that a doctor must be a respectful person and a doctor must belong to the upper classes of the society.[24,32]

In Seljukian Turks, the subjects of medical ethics were also present in some medical books. Ebul Bereket of Baghdad and Nizami-i Aruzi of Semerkand showed various characteristics of a doctor. Cehar Paper (Article) of Nizami-i Aruzi contains some parts about this theme.

Ottoman physicians investigated medical ethics in their books. But, these studies were very simple. Because, modern medicine didn't develop at that time, all deontological subjects showed a simple condition. These were only related to the duties and characteristics of a doctor, because the technical branches such as organ transplantation, hibernation etc., didn't develop at that time. For example, in the XVth century, Ibn Serif wrote in his book, called Yadigar: "A doctor must know the diagnosis and the prognosis of a disease. Furthermore, a doctor must be conscientious for his patient."[17]

If Sifa-al-Eskam, a Turkish famous doctor of the XIVth century, Haci Pasha summarized some

themes that the doctors must be careful about the treatment. According to Haci Pasha: "A doctor must be a conscientious and a realist man. He must keep the secrets of the medical condition of the patient. He mustn't want much money from poor patients. He must also treat slaves and poor patients. He must pay attention to the responsibility of physician and so, he mustn't cause the death of a patient."

Emir Celebi who was the famous head-physician of the XVIIth century, wrote medical deontology in his book, called Enmuzec-al-Tib: "A doctor must know the effect and dose of every drug by heart."

Furthermore, Hayrullah Efendi, one of the famous head-physicians of the XIXth century, showed 24 rules of Hippocrates belonging to the medical ethics, in his book, called Makalat-i-Tibbiye[14,15,28]

The education of deontology began in Turkey in the XIXth century as in many countries of the world. Thus, for the first time, the first courses on deontology and medical history were given by Dr. J. Nurican in the military medical faculty after 1875. These courses were taught by Dr. Huseyin Remzi Bey (1839-1896) and other professors in the form of voluntary courses. Thus, a book, called Tarih-i-Tip (Medical History) was written at that time. After 1909, Dr. A. Zoeros Pasha (1842-1917) began to teach deontology and medical history as a volunteer professor.[15,34]

After the foundation of the Republic, in Haydarpasa Medical Faculty, the department of medical history and medical ethics was opened. We know that the faculty of medicine of Haydar-pasa was founded in 1903 with the name of Military medical faculty and this faculty was united with the civil Medical Faculty in 1909 and these two faculties were called, Haydarpasa Medical Faculty. At that time, this faculty became the international medical faculty and new investigations were made here. Afterwards, Dr. Galip Ata Bey (1897-1947) gave these courses in this faculty, again. In 1933, the chair of medical ethics was given to Prof. Unver in the building which was at Beyazit. Thus, Prof. Dr. Unver also gave these courses in Haydarpasa Medical Faculty in 1929-1933. All the departments of the basic sciences of this faculty were moved to Beyazit in 1933. Thus, the first professional founder of this department is Prof. Unver. Afterwards, in this branch, a few men became professor. Prof. Sehsuvaroglu is one of them. This professor wrote many books about this theme. Today, in Turkey, four associate professors and one professor are present in this scientific branch. These scientific men serve in the medical faculties in Bursa, Istanbul, Ankara and Izmir.

A GENERAL VIEW OF MEDICAL ETHICS IN TURKEY OF TODAY

It is seen that the problems of physician-ship had various periods. These problems have been investigated in a modern way since the development of medicine. These themes are investigated in Turkey of today. We must emphasize medical ethics today more than we did in the ancient ages. Because this science does not only investigate moral values of the physician-ship, but also it studies legal relations of new technical themes of medicine of today. But the responsibility of the doctor is present in all these themes and this branch is studied both by doctor and by lawyers. So, today, we investigate all the legal problems belonging to the deontology.

The most important themes of deontology are the duties of a doctor. These duties are divided to four parts: 1) The duties concerning the doctor. 2) The duties of the doctor to his patient. 3) The duties of the doctor to the personnel working with him. 4) The duties of the doctor to his colleagues.

Another subject of medical ethics is the responsibility of the doctor. In the ancient times, another subject of medical ethics was the responsibility of the doctor. Physicians were punished with compensation and prison because of the medical responsibility. If a doctor showed carelessness in the treatment of his patient and the responsibility of the physician appeared, he was punished with compensation and prison in the ancient ages.

Afterwards, in the Islamic world, in the middle ages, according to the canonical sciences, a doctor

who made carelessness in the treatment, was punished by the law of retaliation (an eye for an eye). Furthermore, in Europe, both Civil Law and Penal Law were applied to the doctors.[28] Administrative law, Civil law, Turkish obligation law and Turkish penal code are applied for the responsibility of the physician in Turkey of today. If a doctor causes the death of a patient because of the technical mistakes, he is punished with prison according to the penal code. Furthermore, a physician is punished with the compensation according to the civil law.[7,8]

The problems of organ transplantation are the most important themes in medical ethics. But, today, these legal problems decrease in our country because of the new codes. In these codes, all these conditions are definitely present. Thus, in the organ transplantation from the donor to the recipient, the written permission of the family of dead, is necessary from the point of moral values. But in the traffic accidents, organ transplantation can be applied from a donor with the biological death to the recipient according to the organ transplantation laws with the number of 2238 and with the date of 1979 and with the date of 1982. In the organ transplantation, from a person with double organs to the recipient, the conditions such as the written permission of the donor, the determination of this permission with a record that contains the signatures of three doctors and the studying of symptoms during the transplantation and the information about these symptoms to the recipient are very important.

Another theme of medical ethics in Turkey is related to the habit forming drugs. Turkish codes about this theme try to prevent this condition.[3,4,8]

Another theme of deontology is abortus and family planning. According to the new code with the date of 1983, the curettage can be made in the official hospitals under the control of doctors without payment for foetus of 1-3 months. The application of family planning in women is a very good and healthy condition. Because the prevention of pregnancy is the most convenient way for the family planning.

Artificial fecundation is applied to married couples who have no child and want to become father and mother. For this reason, it is known that the sperms of another man are injected into the uterus of the woman. This application is made, because of the inability of fecundation of the sperms of the husband and continuous death of their children from the incompatibility of Rh factors in the couples. Today, although moral, social conditions and the problems of heritage are present, this condition is applied in our country as in another countries of the world. Today, in Turkey, a code about this theme is not present. The preparation of such a code is very necessary for Turkey[28]

Euthanasia means painless death. Orthothanasia means passive death. According to Hippocratic Oath, The agreement of Turkish medical deontology, The code of society of Turkish physicians and Turkish penal code, euthanasia and orthothanasia mustn't be applied to the patients.

Another theme of medical ethics is the hibernation. This process is done to patients whose illness cannot be healed. In the future, if new healing methods for this disease will be found, the doctors will apply these methods to the frozen body and so the patient will be returned to his life. But, this process of hibernation can also lead to the charlatanism in deontology[28]

The secret of physician-ship is one of the moral values that a doctor must apply.

In the subject of consultation, medical ethics has some rules. 24th act of the Agreement of Medical Deontology contains some knowledge about this subject.

In the writing of the report, a physician must be careful from the point of legal and medical conditions. Today, an unknown theme of medical ethics is the application of the medical practices on the body. If the experiments are used for the advantage of the humanity during the peace, if a willing man wants to become the test-man and these experiments aren't dangerous for the test-man from the medical and legal relations, they can be applied on him and it is necessary that these experiments

aren't also prohibited from the point of the law. Because, these are useful for the medicine of today.[28,29]

CONCLUSION

Some of the problems of the medical ethics in the Islamic world were investigated by the famous Islamic physicians in the Middle Ages. All of these problems are also examined and some modern codes are present with regard to these themes in Turkey of today.

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DISCUSSION

One Participant

I have to say few words about the studies done and presented by Dr. Ahmed El-Kadi. It was a very neat, new and very original work and based on scientific rules. But I would like to ask, what message do we get? I mean, it seems to me that it is just the opposite what is meant by reading *Quran*. We read the *Quran* without understanding and how can we believe what we read in *Quran* without understanding. How can it have deeper effect spiritually without understanding. I would like few words in answer.

Dr. Ahmed El-Kadi

The message is certainly not to ignore the meaning of the *Quran*. That is still the main purpose of reading or using the *Quran*. However, what was presented today was just a very early results of certain part of the study and the total objective of the study, the main part and the few figures, as I mentioned today that when the meaning as well as the sound was available, the results we had of the effect, was 97% of the trial, and when only the words without understanding available, only 65% has had results and to compare the actual figures the effect was not as much as, but that was just a very early presentation.

The problem was to create a Placebo for the *Quran* and that is the only part which we could use, having no meaning for someone who does not understand or has no idea about the *Quran*. In all our future studies we will not be able to have proper Placebo, once we use the meaning.

Dr. Chaudhry

Thank you Mr. President, I am Dr. Chaudhry from Pakistan. I also have some experience of the Institutions of the mentally ill people over the past 16 years. We are trying the religious therapy there and I go for what has been said about the recitation of the Holy *Quran*. We encourage the patients to offer prayers in "Jamaat" and then there is a casette which was brought from Saudi Arabia. It is played on recorder after the prayers and I cannot comment on the effects, because that is the recitation by the "Qari". As has been said by the speaker just now, that it also impresses the man, because we know it impresses you and it also works on the attention of the persons who are looking after the patients. So certainly, I would say that it is going to effect the person who is going to recite the Holy *Quran* and also the persons in attendance. What ever it is, I think it has been a very interesting observation and study, which has been described this morning and I would be looking forward to the results. Now, it has been only tried on non-Muslims but I think certainly they are going to benefit, for once it is done, because this is being done on scientific bases. So, I congratulate the persons who are doing the study, but this is what we needed today. What we have been telling the world of science that *Quran* has this healing value. They would not accept it untill unless presented on scientific bases. We will prove it. I think that the way they have started, it is an excellent work and certainly they should go on. In Pakistan, I am certain, we will be certainly looking forward to its results. In my own normal way, I have started perscribing prayers to the patients suffering from depression which was not working before, but now those persons waking up in early hours of the morning and I ask them to offer "Tahajjad" and morning prayers and it has worked very well. How it works? I think the time will tell us. But certainly, the way they are going, it is an excellent work and I congratulate them once again. I am very happy that I have been given this occasion to make this observation.

Chairman

You are the last speaker and said very well and I thank you. I just end this session by asking Dr. Ahmed El-Kadi to proceed with his studies, but in utilizing the most Modern technology in using the data base existing in the *Quran* and analysing the screenings to be available for the people who are following Prophet (ﷺ) specially to get the benefits of the treasures inside the meaning. So, I thank you all for attending this session.

PART FIVE

CERTAIN DISEASES, TRANSMITTED DUE TO UN-ISLAMIC BEHAVIOUR

Part Five: *Certain Diseases, Transmitted due to Un-Islamic Behaviour.*

CHAPTER ONE

(Papers Presented)

1. REPORT ON THE SESSION
   The Editors
2. CEREBRAL CYSTICERCOSIS IN CHILDREN
   Dr. Allie Moosa
3. BALANTIDIOSIS, CYSTICERCOSIS AND TRICHINELLOSIS AS SERIOUS POTENTIAL THREATS TO MUSLIM COUNTRIES - AN EPIDEMIOLOGICAL STUDY AND A WARNING MESSAGE
   Prof. Abdul Hafez Helmy
4. THE IMPACT OF ISLAM AND ITS TEACHINGS ON PRESERVATION OF INDIVIDUAL AND PUBLIC HEALTH
   Dr. Ahmed Shawky Al-Fanjary
5. THE ROLE OF MARRIAGE IN PRESERVING THE HEALTH OF THE INDIVIDUAL AND THE SOCIETY
   Dr. Faisal Ibrahim Zahir, et al
6. A BIOCHEMICAL RESEARCH ON ISLAMIC FAST (IF)
   Dr. Mehmet Munip Yegin, et al

REPORT ON THE SESSION

The Part II session was conducted from 11.45 to 13.45 by Prof. Ihsan Dogramaci and Dr. Khaled Al-Mazkoor as chairman and co-chairman respectively. Dr. Mehmet Munip Yegin was the moderator. At the session, eight papers were presented by eminent doctors and scholars on the title, "CERTAIN DISEASES, TRANSMITTED DUE TO UN-ISLAMIC BEHAVIOUR".

Editors

CEREBRAL CYSTICERCOSIS IN CHILDREN

Prof. Dr. Allie Moosa

SOUTH AFRICA

O YE WHO BELIEVE! EAT OF THE GOOD THINGS WHEREWITH WE HAVE PROVIDED YOU, AND RENDER THANKS TO ALLAH IF IT IS HE WHOM YE WORSHIP. HE HATH FORBIDDEN YOU ONLY CARRION AND BLOOD AND SWINE FLESH AND THAT WHICH HATH BEEN IMMOLATED TO (THE NAME OF) ANY OTHER THAN ALLAH. BUT HE WHO IS DRIVEN BY NECESSITY, NEITHER CRAVING NOR TRANSGRESSING, IT IS NO SIN FOR HIM. LO! ALLAH IS FORGIVING, MERCIFUL.

(S 2: V 172, 173)

FORBIDDEN UNTO YOU (FOR FOOD) ARE CARRION AND BLOOD AND SWINE FLESH....

(S5:V4)

HE HATH FORBIDDEN FOR YOU ONLY CARRION, AND BLOOD AND SWINE FLESH AND THAT WHICH HATH BEEN IMMOLATED IN THE NAME OF ANY OTHER THAN ALLAH, BUT HE WHO IS DRIVEN THERETO, NEITHER CRAVING NOR TRANSGRESSING, LO! THEN ALLAH IS FORGIVING, MERCIFUL.

(S16:V115)

INTRODUCTION

Cysticercosis is the most common parasitic disease in the world affecting the central nervous system. It is caused by the larval stage of *Taenia solium,* the pork tape worm. Man is normally the definitive host of Taenia solium and becomes infected by eating inadequately cooked pork containing embryos. These embryos develop into the adult tape worm in the intestine. The gravid proglottids are passed in the stool liberating viable eggs which are usually eaten by pigs as the intermediate host. The ova develop into embryos or oncospheres in the pig's stomach and penetrate the intestinal mucosa to lodge in muscle, brain, eye and other tissues. The cycle is complete when man eats pork containing the embryos.

Cysticercosis is a systemic infestation which occurs when man becomes the intermediate host. This results from ingesting food or soil containing tape worm eggs or from auto-infestation via the fecal-oral route. The egg shell is digested in the stomach and releases the oncospheres which then lodge in various tissues of the body, but especially the brain. The parenchymal cysts in the brain elicit an intense inflammatory reaction that subsides when the organism dies at about 18 months after infection.

Cerebral cysticercosis (CC) is prevalent throughout the world but is especially common in Mexico, central and southern Asia, eastern Europe, the Far East and southern Africa. There are several reports in the literature of cerebral cysticercosis but most of these deal mainly with adults in whom epilepsy, encephalopathy and onbstructive hydrocephalus are the main clinical manifestations[1,2]. This report describes our experience of children with cerebral cysticercosis.

PATIENTS

Between January 1979 and January 1982, 28 children with CC were seen at King Edward VIII

Hospital, Durban, RSA. There were 12 males and 16 females. The ages ranged from 3 - 14 years with a mean of 9 years.

Twenty-seven of the children were African and 1 'Coloured'.

DIAGNOSIS

The diagnosis of CC was made in any child who had unexplained fits and/or unexplained encephalopathy or meningoencephalitis, together with either a positive indirect haemagglutination test against cysticercal antigen (IHA) in blood and/or cerebrospinal fluid (CSF) or a characteristic computed tomographic scan (CT) of the brain, or both.

The CT scan was considered to be positive for cerebral cysticercosis if any of the following occurred singly or in combination[2,3].

1. Multiple small intra-paranchymal calcified lesions with or without a vicinity reaction detected by contrast.
2. Focal low density areas with peripheral enhancement with contrast.
3. Large cystic lesions which enhance in a ring-fashion with the administration of contrast.

CLINICAL FEATURES

The symptoms at presentation are listed in Table 1. Twenty-one (74%) children presented with convulsions, 11 (41%) with headache, 4 (15%) with vomiting and 6 (19%) with focal signs (mainly hemiplegia). One child had paraplegia from spinal cysticercosis.

The patients were classified into 4 separate clinical categories (Table 2). Of the 28 patients, 13 (48%) presented with epilepsy, 7 (26%) with the syndrome of raised intracranial pressure (as judged clinically); 4 (15%) with meningo-encephalitis, 1 (4%) with paraplegia due to spinal cysticercosis (who had CC as well, defined by CT scan); and 3 (7%) were non-classifiable. Patients in the non-classifiable group included one who had severe headache only; 1 loss of consciousness and 1 progressive dementia, spasticity and myoclonic jerks which was shown to be due to subacute sclerosing paraencephalitis (SSPE) (high CSF and blood measles titres). At autopsy he was found to have both SSPE and CC.

INVESTIGATIONS

The investigations included routine CSF examination, CSF and serum IHA, blood eosinophil count, skull radiograph and CT scan.

Blood eosinophilia (absolute count of > 400/cumm) occured in 8 of 11 patients in whom this was documented. The mean eosinophil count was 783/cumm with a range of 420-1245.

Cerebrospinal fluid pleocytosis (Table 3) (range 8-512/cumm) was present in 7 patients who presented with either meaningo-encephalitis or the syndrome of raised intracranial pressure. In 4 patients there was a predominant lymphocytosis (range 8-348/cumm), in 2 a predominant polymorpholeucocytosis (106-156/cumm) and in 1 an initial polymorph predominance was replaced by a lymphocytosis. The CSF protein was elevated in 4 patients (0.53 - 1.28 g/L) and normal in the other 3 (0.32 - 0.40 g/L). The CSF glucose was normal in all cases with a mean of 3.2 mmol/L.

Skull radiographs were available in 27 cases; of these 9 showed calcification and 4 evidence of raised intracranial pressure.

The IHA (Table 4) was done in blood and CSF in 23 children. Of these, the test was positive in both blood and CSF in 12 cases. Both tests were negative in 3 cases. In 3 cases the blood was positive and

the CSF not done, and in one blood was positive and CSF negative, and in another the CSF was positive and blood negative. Thus the blood and/or CSF was positive in 87% of the children.

CT scans (Table 5) were performed in 22 of the cases, and of these 11 showed calcification only 4 focal areas of low density and 7 both. There was a good correlation between the clinical presentation and the CT findings. Of the 11 patients who had calcification only, 6 had epilepsy, one headache only, 1 paraplegia from spinal cysticercosis, one had loss of recent memory and one SSPE and cysticercosis. Only 1 patient had evidence of raised intracranial pressure. On the other hand, 8 of those with evidence of active or dying lesions (as judged by focal areas of decreased density) had meningo-encephalitis or the syndrome of raised intracranial pressure; the other 3 had epilepsy (these had calcified lesions as well). CT scan and the IHA test (Table 6) were both available in 16 patients. Of these 10 children had a positive CT scan and a positive blood and CSF IHA tests. One had a positive blood IHA test and positive CT scan; another a positive CSF IHA test and positive CT scan. In 3 children the CT scan was positive, but both the CSF and blood IHA test were negative. All of these 3 children had calcified lesions only; one of these had concomitant SSPE and died. However, autopsy revealed active cysticercosis as well as calcified lesions. In only 1 child was the CT scan negative when the blood IHA was strongly positive with a titre of 1/2560. This child had meningo-encephalitis with papilloedema and CSF pleocytosis. It is possible that he may have had another reason for his meningo-encephalitis.

TREATMENT AND OUTCOME

None of our patients had any surgical intervention. Patients who presented with epilepsy were well-controlled on anticonvulsant drugs. Five of the 7 patients who presented with the syndrome of raised intracranial pressure were given dexamethasone. The other 2 had no treatment. All 7 patients improved over a period of 2-3 weeks. Four patients with meningo-encephalitis all improved spontaneously. Only 1 child died, he had SSPE as well. The mortality was thus 3%. In contrast the morbidity amongst our patients was 60%, which was due to epilepsy in 48% and motor deficit in 19% of patients (4 children had hemiplegia and 1 had paraplegia). The long-term outcome is unknown in this group of patients because prolonged follow-up was not possible.

COMMENT

This report describes our experience of cerebral cysticercosis in 28 children and demonstrates the value of CT scanning and serology in the diagnosis of cysticercosis. Cerebral cysticercosis is probably much more common in our environment than is appreciated. Between 1971 and 1978 only 7 cases of cysticercosis were recorded amongst children admitted to King Edward VIII Hospital. However, over a period of 3 years between 1979 and 1981 we saw 28 children with CC. This apparent increase in incidence is largley due to the introduction of CT scanning and to increased medical awareness of this condition.

The most common mode of presentation was epilepsy (48%), followed by the syndrome of raised intracranial pressure (26%) and meningo-encephalitis (15%). The high frequency of epilepsy in cysticercosis has been reported by others[1, 5-7]. No case of hydrocephalus due to obstruction to the flow of CSF by cysticerci was seen amongst our patients. Racemose meningitis, which is a grave complication of cysticercosis and associated with a poor outcome was also not encountered in our series.

Before the introduction of CT scanning the diagnosis of cysticercosis was difficult. Our results show the value of CT scanning in the diagnosis of cysticercosis. Serology is also of considerable value although it is less sensitive and less specific than CT scanning. The CT scan was positive in 95% of our patients and the IHA test for cysticercosis in 87% of the cases. The CT scan and IHA test were both

positive in 80% of the patients. Two of the 3 patients with false-negative serology had calcified lesions only on CT scan. Negative or weakly positive titres have been reported in patients with chronic or inactive disease as reflected by the presence of calcified lesions only[8,9]. Other workers have also found serology of value and serum IHA has been reported to be positive in 87.5% of cases[11].

The disadvantage of the IHA test is that a tape worm infestation confined to the intestine can give a false-positive reaction. Cross-reactions also occur with antibodies against *Echinococcus* and other cestodes[10]. False-positive reactions occur in the CSF when the VDRL is positive. In practice, cross-reactions with hydatid disease is not a practical problem amongst our patients since echinococcal infections are rare in our environment. A study by Proctor et al[9] found that 2% of asymptomatic African blood donors had a positive IHA test. This rate rose to 5% when the subjects were selected from a hospital population with no evidence of intestinal or systemic cysticercal infection. The serum IHA was positive in 17% of subjects who had intestinal taeniasis. The aforementioned data is of particular relevance to our study since their subjects were drawn from the same geographical area as our patients.

A complement fixation test (CFT) is also available and is widely used in South America. It has been reported to be positive in 64-89% of cases[8-11]. This test also cross-reacts with cestodes and treponemal antigens. Attempts have been made to compare the sensitivities of the IHA and CFT[8-12], but the results are not conclusive since the number of patients in the studies were too small. Further purification and concentration of the antigenic fractions should provide a more sensitive and specific test that can be used for routine diagnostic purposes.

Peripheral eosinophilia occured in 74% of cases in whom it was measured. We did not find it of much diagnostic value because patients often had other parasitic infestations. The CSF was not examined for the presence of eosinophils in our study but other studies have shown it to be the only helpful finding in the CSF[13-15]. In these studies eosinophilic pleocytosis was reported in 16% to 40% of cases of cysticercosis. The differential diagnosis of CSF eosinophilia is limited and includes other CNS parasites, CNS lymphoma, carcinomatosis, cocciodal meningitis and lymphocytic chorio-meningitis[16]. In areas of the world where cysticercosis is endemic and CT scan not readily available, the presence of CSF eosinophilic pleocytosis would be quite helpful in the diagnosis of cysticercosis.

The skull radiographs were positive in 50% of the cases with 33% showing calcification suggestive of cysticercosis. The other 17% showed non-specific signs of raised intracranial pressure only.

The mortality amongst our patients was only 3%, in contrast to the much higher morbidity of 60%. The morbidity was mainly due to epilepsy (48%) and motor handicaps (19%). The finding is confirmed by other studies[2,13,17,18]. Earlier reports indicated a bad prognosis for patients with cysticercosis with mortality being as high as 40%[14]. This was largely due to the frequent use of surgery to extirpate the cysts in the 3rd and the 4th ventricles[19,20]. Recently the use of surgery has been restricted mainly to the insertion of shunts for obstructive hydrocephalus and the outcome in these cases is quite good[2]. Our data also show that surgery is very rarely needed.

The long term outcome of our patients is unknown, but nonetheless some authors have found that epilepsy improves over a period of years and may stop completely even without treatment[2-19].

Medical treatment has a limited role in the management of cerebral cysticercosis. Dexamethasone may be used for the relief of cerebral oedma in encephalitic cases[20]. The treatment of intestinal worms has no effects on cysticercosis. Recently praziquantel has been found to be cysticercidal in experimental animals[21]. There has been as yet no systematic double-blind study to show the effectiveness of this drug. Ultimately the most important method of combating this disease is prevention. Improved sanitation and careful meat inspection can reduce the incidence of cysticercosis. Human taeniasis must be reduced if cysticercosis is to be prevented.

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TABLE 1

CEREBRAL CYSTICERCOSIS IN CHILDREN

CLINICAL FEATURES IN 28 PATIENTS		
	NO.	%
HEADACHE	11	41
VOMITING	4	15
FITS	21	74
FOCAL SIGNS	6	19

TABLE 2

CEREBRAL CYSTICERCOSIS IN CHILDREN

CLINICAL CLASSIFICATION	NO.	%
SYNDROME OF RAISED INTRACRANIAL PRESSURE	7	26
MENINGOENCEPHALITIS	4	15
EPILEPSY	13	48
SPINAL	1	4
UNCLASSIFIABLE	3	7
(1 severe headache; 1 loss of recent memory; 1 SSPE + cysticercosis)	—	—
	28	100

TABLE 3

CEREBRAL CYSTICERCOSIS IN CHILDREN

	CSF PLEOCYTOSIS IN 7 PATIENTS				
NO.	AGE (Years)	CSF CELL COUNT		CSF PROTEIN	
		Polys.	Lymphs.	(G/L)	TYPE
1	3	0	8	0.64	↑ICP
2	5	312	200	1.28	ME
		48	168	0.88	
3	7	106	348	0.53	ME
4	9	30	74	0.40	ME
5	11	156	10	0.32	↑ICP
6	11	106	100	1.60	ME
7	9	0	10	0.40	↑ICP

TABLE 4

CEREBRAL CYSTICERCOSIS IN CHILDREN

	IMA TEST IN BLOOD AND CSF			
	CSF +ve	CSF −ve	CSF Not done	TOTAL
BLOOD +VE	12	1	3	16
BLOOD −VE	1	3	0	4
BLOOD NOT DONE	1	2	5	8
TOTAL	**14**	**6**	**8**	**28**

TABLE 5

CEREBRAL CYSTICERCOSIS IN CHILDREN

	CAT SCAN				
	↑ICP	ME	E	OTHER	TOTAL
CALCIFICATION	1		6	4	11
↓DENSITY	3	1			4
BOTH	2	2	3		7
TOTAL	**6**	**3**	**9**	**4**	**22**

TABLE 6

CEREBRAL CYSTICERCOSIS IN CHILDREN

	CAT SCAN AND HAI TEST (16 PATIENTS)	
	CAT +VE	CAT −VE
BLOOD AND CSF HAI +VE	10	—
BLOOD AND CSF HAI −VE	3	—
BLOOD OR CSF HAI +VE	2	1

BALANTIDIOSIS, CYSTICERCOSIS AND TRICHINELLOSIS AS SERIOUS POTENTIAL THREATS TO MOSLEM COUNTRIES - AN EPIDEMIOLOGICAL STUDY AND A WARNING MESSAGE*

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ABSTRACT

The paper reviews the most important parasitic diseases transmissible to man from pigs and treats in some detail three very important diseases the pig plays an essential role in their epidemiology. The paper stresses the following points, in particular:

1. Balantidiosis is a direct zoonosis - an anthropozoonosis, and is usually occupational affecting certian sections of the society, but its range may be extended in some cases to involve wider sections. Cysticercosis is a partially reversed direct zoonosis, while trichinellosis is a direct zoonosis. The latter two diseases are particularly very serious.
2. It is a gross mistake, or even a great danger, to underestimate these diseases or to agree with notions claiming that the prohibition of pork is only a matter of religious obedience and discipline and that the pig is not unique in its burden of parasites.
3. Some of the diseases transmissible to man from the pig are not transmitted through ingesting swine meat, but the prohibition of meat effectively devaluates the animal economically.
4. Some of the parasites of the pig may be transmitted to other animals allowed for Moslem consumption.
5. It was taken for granted that trichinellosis is not known in most of our Moslem countries, but its existence has been confirmed in some of them.
6. We should be very alert to the problem and to remain vigilant of the possible public health hezards.
7. The whole matter should find due consideration in medical and science teaching programmes in our universities.

The paper points to the fact that the prohibition of pork, is a "reasoned" one, and that it is inherently *Haram*. We should, therefore, do our best to find out at least some of the underlying reasons for its prohibition. Doing this we appreciate the bless invoked by *Allah* on us —

HE WILL MAKE LAWFUL FOR THEM ALL GOOD THINGS AND PROHIBIT FOR THEM ONLY THE FOUL

(S. 7: V, 157)

Moreover, there are apparent practical advantages as this paper tries to reveal.

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* As the full text could not be made available, we are publishing here the abstract only.

Editors

THE IMPACT OF ISLAM AND ITS TEACHINGS ON PRESERVATION OF INDIVIDUAL AND PUBLIC HEALTH

Dr. Ahmed Shawky Al-Fangary

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RELATIONS BETWEEN RELIGION AND HEALTH

Islam differs from other religions in that it concerns itself with both this life as well as the here after. It is the only religion which has built on earth a state and a society. Hence all the instructions for administrating such a society descended directly from heaven. Some concern the ruling system, others social and economic dealings in addition to the hygienic regime.

The purpose of the hygienic regime in *Islam* is to create a community which is healthy and immune against infectious diseases, and the healthy individual (in body and mind) who is capable of understanding and applying God's message and carrying it away to the whole world.

In this research we summarize *Islam's* instructions in the hygienic field and their efficiency in realising this objective

I. CLEANLINESS, PURIFICATION AND ABLUTION

1. **Body Cleanliness:** *Islam* recommends bathing for[1] twenty three reasons. Seven of them are compulsory and sixteen are preferable.
2. **Hands Cleanliness:** Prophet Mohammed (ﷺ) Says *"Wash thy hands before and after eating"*, Readds *"Wash thy hands after awakening. No one knows where his hands lay during his sleep."*
3. *Islam* recommends **clothing cleanliness** and elegance *"Ameliorate thy clothing and thy mount"*.
4. **Food and drink cleanliness:** Orders for protecting food from dust and insects, the prophet (ﷺ) says *"Cover thy vessels and drinks"*
5. **Residence cleanliness:** *"Clean thy courtyards and thy residence"* as well as street cleanliness *"It is charitable to remove harms from the road."*
6. **Cleanliness of water sources** such as wells, rivers and shores. Therefore, urinating and defecating are forbidden in any of them *"Avoid three evils; defecation in water sources, shades and in the road."*

If these instructions are followed accurately in the twentieth century, we can put an end to all gastrointestinal infections and exterminate harmful insects such as flys, cockroaches and others.

II. ISLAM'S INSTRUCTION IN EPIDEMIC DISEASES CONTROL

Having mentioned the role of cleanliness in preventing infectious diseases, we mention here *Islams* instructions to combat epidemics.

1. **Isolation:** Prophet Mohammed (ﷺ) says in this respect *"Infectious cases would not contact the healthy"*
2. **Quarantine:** on cases such as leppers *"Leave a space of a spear or two between ye and the lepper"*
3. *Islam* also laid basic rules for dealing with an epidemic such as Cholera, plague and smallpox *"Do not enter a land of which you hear there is a pestilence, and if ye are in that land do not try to leave it in escape"*[2]
4. *Islam* encourages every means of protection from infectious diseases such as immunisation. When the prophet (ﷺ) was once asked whether such protective measures prevent God's fate, he (ﷺ)

said *that it is a part of God's will"*

III. NUTRITION IN ISLAM

Islam concerned itself with three aspects of the Muslim's food:-

a. Forbidding the harmful food
b. Aquainting the Muslim with the beneficial food
c. Rectifying his eating habits.

A. Forbidden Items:

God announces:

> *"FORBIDDEN TO YE ARE: DEAD MEAT, BLOOD, THE FLESH OF SWINE, AND THAT ON WHICH HATH BEEN INVOKED THE NAME OF OTHER THAN GOD; THAT WHICH HATH BEEN KILLED BY STRANGLING OR BY A VIOLENT BLOW OR BY A HEADLONG FALL, OR BY BEING GORED TO DEATH; THAT WHICH HATH BEEN PARTLY EATEN BY A WILD ANIMAL; UNLESS YOU ARE ABLE TO SLAUGHTER IT IN DUE FORM"*[3]

Each of these forbidden items has on undisputable scientific argument for being prohibited. It is true there is a controversy round the harm of the swine flesh and the diseases it may cause to human beings because of its dirtiness and its unhygienic nutritional habits. Whereas some people claim that the swine in Europe is being bred in clean pans and under medical supervision there are still some harms in its flesh which science could not overcome such as the excess of cholesterol and its liability to Trichina and Salmonella more than any other animal.

Islam has also forbidden liquor in great as well as small quantities, the harm of which is undisputed. Moreover, its moral and spiritual harm is worse than its physical harm.

B. Unforbidden Food:

Islam keeps pace with natural disposition. Hence, all food is allowed except what is harmful. But, there are certain foods which *Islam* recommends for their nutritional benefit such as meat, fish, honey and milk.

Islam is against vegetarian doctrines which forbid eating meat for religious reasons. The argument is that the human body won't be healthy depending only on vegetables because the human intestines are shorter than those of the herbivorous animals. Thus, it does not suffice its need for proteins from a vegetarian meal.

C. Timing and Quantifying Meals:

— *Islam* prompts people not to be extravagant in eating The Prophet (ﷺ) says *"The stomach is the worst vessel to fill"* The *Quran* says[4] *EAT AND DRINK BUT BEWARE OF EXTRAVAGANCE, GOD DISLIKES THOSE WHO ARE EXTRAVAGANT.*

Islam originated *Ramadan*, a whole month of fasting yearly; the benefits of which cannot be denied whether physically or spiritualy.

— On the other hand, *Islam* is against doctrines which urge people to discard food or to overfast to the extent of weakness. The prophet (ﷺ) announces *"Fast for good is not proper fasting"* He (ﷺ) also declares *"Every morsel a Muslim eats is a deed of charity"*

IV. SPORTS:

Islam attaches much importance to sports in order to create a physically powerful generation

capable of sustaining fighting and resisting diseases. Therefore, *Islam* advises Muslims to teach their children shooting, swimming, and horsemanship. *"Teaching thy children writing swimming and shooting is a duty"* He (ﷺ) also adds *"Teach thy children shooting and train them on horsemanship till they excel"* and since these were the only sports known at the Prophet's time, then, *Islam* encourages all the sports known to us in the time being.

V. SEXUAL HEALTH IN ISLAM.

Sex is one of the most important issues that may affect human behavior and health. Some scientists and scholars consider it the main motive behind most of human actions. Therefore, *Islam* did not exclude one triviality concerning this issue from discussion.

1. **Sexual education:** *Quran* discusses it in a refined style explaining to human beings sexual intercourse and the creation of an embryo *WAS NOT HE A DROP OF SPERM TRANSFORMED INTO A CLOT OF CONGEALED BLOOD THEN HE HATH CREATED AND FURTHER, GIVEN ORDER AND PROPORTION "(Quran)"*[5]

   This text indicates that the sperms are the decessive element in determining the embryo's sex. *Quran* also explains the composition of the sperms. *HE IS CREATED FROM A DROP EMITTED PROCEEDING FROM BETWEEN THE BACKBONE AND THE RIBS .*[6] Then it illustrates the development of the embryo from a drop of sperm to a clot of congealed blood to a foetus lump etc.

2. *Islam* encourages early marriage and teaches the Muslim the particulars of marriage and helps him choose the proper wife. Moreover, it explains matrimonial relations and lays the conditions for seperation and discusses its dealings.

3. *Islam* explains the proper sexual relation between husband and wife and how would each of them suffice the other's needs in order to establish a happy marital life. Prophet Mohammed (ﷺ) interdicted copulation before paying ones wife amorous court. The prophet (ﷺ) also orders *"Be fair to thy wife during copulation and if ye reach your excitement before she does do not hasten her"*

4. *Islam* forbids homosexuality and copulating a woman through her anus for the diseases which may result.

5. It enjoins circumcising males and detests it for females

6. Adultry is forbidden while polygamy is allowed for men.

7. Cleanliness of sexual organs. *Islam* imposes rinsing after urinating or defecation. Moreover, it forbids intercourse during menstruation and requires cleaning after copulation and after menses.

VI. ISLAM AND PSYCHOLOGICAL HEALTH

Anxiety is one of the gravest problems in the twentieth century particularly in Europe. We often hear of millionaires committing suicide, of mothers and fathers becoming mentally deranged and killing their children or their spouses if not their whole family.

The slightest cases are of millions of people who live on sedatives and hypnotics in order to sustain their daily life. The reason for that is not the well-known primitive causes such as poverty, diseases and ignorance, for these countries enjoy easy living and a high standard of education and health. The reason is what we may call "Civilization Stress"

Many studies have been made on its causes. They may be summed up as follows: - Prevalent materialism - spiritual and religious vacuity - Lack of moral impulse and religious restraint - Lack of sympathy and cooperation in modern society - Excess of luxury in absence of human objective - City clamour.

This is the ultimate summary of all reports made by scientific committees which were formed in search for the origination of violence and anxiety in western societies.

It is quite apparant that the real cure for all these points is religion; and *Islam* in particular. Islamic society is the only one in which religious affairs are closely bound to worldly ones, and this life with the hereafter. Thus, if *Islam* is properly applied in our present time with proper understanding and knowledge, all the causes of anxiety would be irradicated.

1. *Islam* achieves love, cooperation, security and sympathy amongst its followers.
2. An Islamic society is vacant of cesspools of evil, liquors; gambling, drugs and adultry.
3. *Islam* rejects despair, despondence, and suicide, and urges people on patience, faith and struggle till victory.

VII. IDEOLOGIC METHOD IN HYGIENIC EDUCATION.

It might be claimed that we are not in need of religion in order to teach people hygiene, and that all the hygienic instructions that were mentioned in this study do not differ from what is in contemporary hygienic books. In answer to that we say that the difference is great. Distributing hygienic leaflets on people or sending them health inspectors is totally different from having these instructions in an ideological religious mould. These instructions in *Islam* are part and parcel of the dogma. They complement worshiping in a way that religious rites cannot be performed without having these instructions applied. This is the glory of *Islam* and its merit over any other regime. It makes health and cleanliness a dogma and a social and religious behaviour for all the classes of people rich or poor, educated or ignorant.

THE FRUITS OF THESE INSTRUCTIONS WHEN APPLIED.

Contemporary Muslims suffer form hygienic degradation because they abandoned their religion's instructions. The defect is not in the religion itself ofr these instructions were applied during the periods of Islamic awakening and have proved their ability to create a perfect society.

In their flourishing days, Islamic capitals were models in cleanliness and elegance. The streets were paved and were daily swept and cleaned and illuminated by lanterns at night, Meanwhile, Europe was a dump full of insects and pigs. The Muslim was considered an ideal being preceeding his time, elegant in his costumes, his mount, his habits and his food.

Dr. Sigrid Konke mentions in her book "Alla's Sun on the West"[8] that the Andalusian explorer Al-Tartousi described the Europeans in the middle ages as "Their beards and hairs are long, they do not wash their clothes nor bathe more than once, or twice a year".

Historic references mention that early Muslims lived longer and healthier than the Muslims of today, that some of the prophet's (ﷺ) companions participated in contention till the age of sixty or seventy. This is actually ascribed to following the hygienic instructions of *Islam* and the avoidance of corruption. Moreover, epidemics and diseases in the Islamic world were much less than they were in Europe at the same period. Even the plagues which exterminated quarter of the inhabitants of the European continent were nullified on the boarders of the Islamic world.[9] In this respect, Bernard Shaw mentions in his book "The Doctor's Dilemma" that no sooner had Britain occupied the Sandwich Islands and managed to convert its inhabitants from *Islam* to Christianity than infectious diseases and epidemics spread among them, and that, says Shaw, is ascribed to abandoning the instructions of *Islam* which enjoin cleanliness even in trivial matters such as cutting the nails and burrying the pairings.

CONCLUSION

In conclusion, we say that if only one Islamic nation in our present time would apply the instructions of *Islam* as a result of proper modern understanding, this country would become the first in the whole world in health standard, and it would be a model for other countries to follow and gracious is God as He says YE WERE THE BEST NATION OF ALL PEOPLE

We were, but when shall we become?!

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THE ROLE OF MARRIAGE IN PRESERVING THE HEALTH OF THE INDIVIDUAL AND THE SOCIETY

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INTRODUCTION

Pairty is one of the laws of *Allah* in the Universe. This is illustrated by the Quranic verses:

AND OF EVERYTHING WE HAVE CREATED PAIRS THAT YE MAY RECEIVE INSTRUCTION

(S51:V49)

AND FRUIT OF EVERY KIND HE MADE PAIRS, TWO AND TWO.

(S13:V3)

and

GLORY TO GOD, WHO CREATED IN PAIRS ALL THINGS THAT THE EARTH PRODUCES AS WELL AS THEIR OWN HUMAN KIND AND OTHER THINGS OF WHICH THEY HAVE NO KNOWLEDGE.

(S36:V36)

Allah has honoured man and conferred on him special favours above a great part of His creation. Therefore, He enforced laws and regulations for the well being of man while He is enhabiting this earth. Of these regulations were those governing the sexual relation between men and women in such a manner that will bring happiness, and preserves for man his honour, dignity and health.

The relation between man and woman in marriage goes back to the early days of Adam and Eve as described in the Holy *Quran:*

WE SAID: O ADAM! DWELL THOU AND THY WIFE IN THE GARDEN

(S2:V35)

and also to the first children of Adam when *Allah* ordered Adam to marry the male of one twins to the female of the other[1].

Then regulation of marriage continued to fluctuate in the history of man until it has been completed in its best form by the teachings of *Islam. Islam* recognized the status of woman as the twin of man pointing out the physical differences which identify her as a woman and so offered her with all the rights she deserves. It directed the woman to use her potential in the activities for which she has been designed. Therefore, it advised her to take care of the domestic activities which suits her nature and to cover up her body from the eyes of foreign men thus honouring her from being insulated because of her body. *Allah* said in the Holy *Quran:*

AND SAY TO THE BELIEVING WOMEN THAT THEY SHOULD LOWER THEIR GAZE AND GUARD THEIR MODESTY; THAT THEY SHOULD NOT DISPLAY THEIR BEAUTY AND ORNAMENTS EXCEPT WHAT MUST ORDINARILY APPEAR THEREOF, THAT THEY SHOULD DRAW THEIR VEILS OVER THEIR BOSOMS

(S24:V31)

Dr. Alqaradawi[2] indicated that the Muslim nation was affected by the West in many aspects, out of these the Muslim woman was drastically affected. She lost her identity very quickly and followed the

western woman in almost everything.

Marriage as an important social aspect in *Islam* and as a guard for the Muslim society from the evils of the western invasion has been given attention by many Muslim writers. It has been discussed from different angles, for example;

1. Kahhala[3] tackled the subject from its historical aspects.
2. El-Attar[4] discussed the matter of polygamy in *Islam* with regard to its religions, social and legal aspects.
3. Abu'n Nur[5] studied marriage in *Islam* and explained in an accurate piece of work the Islamic teachings on marriage.

This study has been carried out to point out the health problems which are quite apparent in the various societies including the Muslim society due to the deviation from the Islamic teachings on marriage. The importance of this study is appreciated at a time when many of the Muslim youth are not able to get married when they intend to do so. The society, specially the urban one, became complex and the requirements for decent living became so expensive. This was reifected in the expenses of starting a new family by marriage. In addition many parents became so greedy and they ask for a lot of money in order to agree that their daughter get married. For these factors and may be others, we observe many youth in almost all the Muslim societies who are not married. If we consider the western life pattern and its influence on the Muslim societies then we will appreciate the magnitude of the problem and the crime which is being committed by the society for not solving the problems which make marriage so difficult.

The objectives of this study are:

1. To show the privileges of marriage in *Islam* as the best and most suitable relation between man and woman and the value of it in:
   a. The preservation of the individual's health, physically and spiritually.
   b. The preservation of the human kind, money, mind and religion.
2. To show the role of some aspects of the Islamic teachings in the success of marriage e.g. in choosing the wife and husband, lowering the gaze and guarding the modesty and the rights of the wife and husband.
3. To show the dangers of the venereal diseases and other social disorders as a result of the deviation from the Islamic marriage.

1. Marriage as an Islamic tradition:

Islam considers marriage as one of its characteristic traditions. This is indicated by the Quranic verse

MARRY THOSE AMONG YOU WHO ARE SINGLE

(S24:V32)

and by the *Hadith* of the Prophet Muhammad (ﷺ), advising the youth to get married if they have got the means to do so and indicating its benefits as a guard from unnecessary looking at foreign women and as a guard for one's modesty. As a temporary solution, if one is not able to get married, the Prophet (ﷺ) advised the youth to fast as a means for weakening the sexual needs. He informed Muslims in another *Hadith* that *Allah* promised to help one to get married if he is sincere in his intention. The Prophet (ﷺ) also warned some companions who intended to keep away from getting married, that although he is the most God fearing, yet he is modest in his prayers and fasting and that marriage is his tradition thus those who abandon his tradition would not be considered from his followers. Therefore, *Islam* considers marriage as superior to be secluded for worshipping. Moreover,

the Prophet (ﷺ) gave an example hy himself, he was a husband and a father and therefore marriage was his tradition and the tradition of the Prophets before him (ﷺ).

Abu n'Nur[5] concluded that by studying the teaching of *Islam* on marriage, the following points will be observed:

1. It is the most ideal relation between man and woman.
2. It can bring happiness to the married.
3. It is the most natural way for the sexual relation.
4. It was a tradition of the Prophets.

2. Marriage in the Islamic Fiqh[6]:

Islam considers marriage obligatory *"Wajib"* for one who is sexually potent and who has an insisting sexual desire thus fearing from committing adultery, which is strictly forbidden. It considers marriage as *"Sunnah Muaqadah"* which is less than obligatory for one who resembles the previous person but who can control his desires. However, if he wants to be considered as a follower of the Prophet (ﷺ) he should consider him as his example and therefore get married.

However, *Islam* considers marriage forbidden *"Haram"* for one who is sexually impotent or does not have the basic requirements towards his wife, unless he explains this to her and she accepts.

Also marriage is not recommended *"Maqrooh"* by *Islam* for a person who does not observe the wife's rights or who is intending to marry a woman he does not like.

3. The Islamic criteria for choosing a wife and for accepting a husband:

The Prophet Muhammad (ﷺ) advised the Muslim nation that if a man who is known for his good character and who is observing the Islamic teachings to an acceptable degree, if he would ask a certain family to get married to their daughter, they should not refuse because if every family would behave in this manner this would lead to seduction and thus to the spread of corruption in the society.

For choosing wife the Prophet (ﷺ) explained that a woman is married because of four things for her; wealth, prestige, beauty and religion, and he (ﷺ) advised the Muslims to marry a woman for her religion and good character. In another *Hadith,* he (ﷺ) warned from marrying a beautiful woman who has been raised in a corrupted family. Yet, in another *Hadith* he (ﷺ) described the character of a successful wife by saying that if her husband would look at her he would be pleased, she would obey her husband and when her husband is not at home she would guard her modesty and would use his money according to his will. The Prophet (ﷺ) stated that a good wife brings happiness to her husband and she is rated as superior to all amusements of this life.

Yusuf Ali[7] said "marriage is a most intimate communion, and the mystery of sex finds its highest fulfilment when intimate spiritual harmony is combined with the physical link. If religion is at all a real influence in life to both parties or to either party, a difference in this vital matter must affect the lives of both more profoundly than differences of birth, race, language, or position in life. It is therefore only right that the parties to be married should have the same spiritual outlook. If two persons love each other, their outlook in the highest things of life must be the same. This is why *Allah* said in the Holy *Quran*

> *DO NOT MARRY UNBELIEVING WOMEN (IDOLATORS) UNTIL THEY BELIEVE: A SLAVE WOMAN WHO BELIEVES IS BETTER THAN AN UNBELIEVING WOMAN, EVEN THOUGH SHE ALLURES YOU. NOR MARRY (YOUR GIRLS) TO UNBELIEVERS UNTIL THEY BELIEVE: A MAN SLAVE WHO BELIEVES IS BETTER THAN AN UNBELIEVER, EVEN THOUGH HE ALLURES YOU. UNBELIEVERS DO 'BUT' BECKON YOU TO THE FIRE. BUT*

GOD BECKONS BY HIS GRACE TO THE GARDEN (OF BLISS) AND FORGIVENESS

(S2:V221)

4. THE benifits of marriage as seen by Islam:

Allah said

AND AMONG HIS SIGNS IS THIS, THAT HE CREATED FOR YOU MATES FROM AMONG YOURSELVES, THAT YE MAY DWELL IN TRANQUILITY WITH THEM AND HE HAS PUT LOVE AND MERCY BETWEEN YOUR (HEARTS): VERILY IN THAT ARE SIGNS FOR THOSE WHO REFLECT.

(S30:V21)

This verse points out very clearly some benifits of marriage, these are:

1. Since women have been created from men, marriage will bring them back to such an intimate relation.
2. Man will find tranquility with his wife, physically and spiritually.
3. Both the husband and wife will find love and mercy in marriage.

Other benefits are:

4. Preservation of mankind.
5. Satisfaction of the sexual desire.
6. Support the economy of the family, when the children grow up and help the parents.
7. Preservation of money, mind and religion.
8. The children if they were raised in a religious home they will develop an intimate relation with parents and according to the *Hadith* of the Prophet (ﷺ) the parents will benefit from their good children even after their death when their children remember them when they pray to *Allah* to forgive them.
9. *Allah said*

SAY TO THE BELIEVING MEN THAT THEY SHOULD LOWER THEIR GAZE AND GUARD THEIR MODESTY; THAT WILL MAKE FOR GREATER PURITY FOR THEM: AND GOD IS WELL ACQUAINTED WITH ALL THAT THEY DO. AND SAY TO THE BELIEVING WOMEN THAT THEY SHOULD LOWER THEIR GAZE AND GUARD THEIR MODESTY...

(S24:V30,31)

The need for modesty applies to men as well as women. A brazen stare by a man at a woman (or even at a man) is a breach of refined manners.

This is well achieved by marriage. To help the achievement of this goal, *Islam* directed the nation to observe many decent attitudes among these is a call for women

THAT THEY SHOULD NOT DISPLAY THEIR BEAUTY AND ORNAMENTS EXCEPT WHAT (MUST ORDINARILY) APPEAR THEREOF...

(S24:V31)

thus advising women not to be a source of corruption to the community.

5. The Effect of Deviation from the Islamic Teachings on Marriage on the Health of the Individual and the Society:

Abandonning marriage will lead to corruption and therefore committing adultry. Adultry being a dangerous social disease has got many physical complications[8] such as:

A. Syphillis:

Syphilis is caused by a spirochete *(Treponema pallidum).* Transmission of infection is either through direct contact with the patient, which is called acquired syphilis, or the bacteria may be transmitted to the fetus from his mother which is called congenital syphilis. The main cause of transmission of infection is sexual intercourse.

The disease passes through different stages and it may remain in the patient's body for a long time or even for the whole life to be carried by the parents to their progeny.

The incubation period for syphilis ranges from three to four weeks, after which it passes into three stages. It simulates some other diseases in many aspects and it needs thorough investigation, long-period of treatment and continuous follow up to cure the body completely from it.

The three stages have different signs and symptoms in addition to the dangerous complications which may follow. The first stage, called chancre stage, is characterised by the appearance of chancre which is a large ulcer that appears on the external genital organs in 95% of cases. In 5% of cases it appears in extra-genital sites such as the lips, tongue, webs of the fingers and the nipple.

During the second stage, the patient develops skin rash, fever, enlarged lymph nodes and spleen, hepatitis, brittle nails, severe bone aches and peripheral neuritis of the cranial nerves especially the vestibulocochlear nerve.

The third stage is called the "gamma stage." Gamma is a painless mass which would be found deep in the skin, liver, larynx, heart, mouth, tongue and sometimes in bones. It may appear also in the rest of the viscera and may open into the surface of the skin to form a syphilitic ulcer accompanied with enlargement of the lymph nodes. Tabes dorsalis may affect the patient during this stage leading to loss of sensation and loss of equilibrium. If the gamma affects the valves of the heart it may lead to stenosis or regurgitation of the affected valve which could be complicated by heart failure.

B. Gonorrhoea:

It is a disease which is caused by gonococci. It is mainly transmitted among persons who commit adultery. However, it could also be transmitted to other persons by contact with contaminated fomites. The organism remains in the sex organs of males and females for several years. The disease may lead to several complications which mainly affect the genitourinary system. The most important is acute and chronic inflammation of these systems and consequently infertility.

C. Herpesvirus Infection:

It is caused by herpes simplex virus type II which was isolated from the cervix of the uterus mainly of prostitutes and also from women committing adultery. The commonest dangerous complication of it is cancer of the cervix of the uterus.

D. Lymphgranuloma Venereum:

is a disease caused by a chlamydia and it is found among the patients attending the clinics of venereal diseases. The organism was isolated from the mouth, throat and anus of the homosexual patients. It has the same signs and symptoms of gonorrhoea.

E. AIDS (Acquired Immune Deficiency Syndrome):

This is a newly discovered fatal disease thought to be caused by a virus which affects mainly homosexuals, prostitutes and their partners. Its incubation period ranges from 6 to 36 months. It destroys the immune system of the body.

The society is protected from these serious diseases by following the virtue of marriage. The callers for morality and virtue all over the world are now advising people to follow the same virtues which have been mentioned by *Islam* as means for controlling these diseases.

Although these venereal diseases attack the body and destroy it, their psychological and social effects are much more destructive on the individual and the society. Among these effects are the following:

1. Loss of dignity which lowers man who has been honoured by his Creater down to the standard of animals.
2. Breaking the family ties which is the basis of the society.
3. Loss of love and kindness which normally prevails among the members of the family.
4. Existence of suspicion and loss of confidence between the husband and his wife.
5. Several mental disorders which may eventually lead to madness and committing suicide.

Many articles have been written about the social problems such as murder, suicide and divorce. These could be principally attributed to not following the traditions of *Islam* in marriage which will protect the individual and the society from these serious disorders.

SUMMARY

This study discussed some aspects on marriage according to the Islamic teachings and the main points which were studied have shown the following:

1. Marriage is one of the major Islamic traditions.
2. Marriage is obligatory for those who have its means and it is preferred to seclusion for worshiping.
3. *Islam* recommends that the wife should be selected on religious basis and likewise when accepting a husband.
4. The purpose of the Islamic marriage is to help man to reach a high standard of morality by applying certain attitudes e.g. lowering the gaze and guarding modesty, to preserve mankind and to offer tranquility, love and mercy for both the husband and wife.
5. Marriage protects the individual and the society from many physical, spiritual and social disorders.

CONCLUSION

Marriage according to the Islamic teachings is the best form for the sexual relation between man and woman. It helps the humanity to preserve their kind under the highest standards of morality. In it one would find tranquility, love and mercy and it protects the individual and the society from many physical, spiritual and social disorders. Therefore, it is the most favorable atmosphere for raising children.

When this divine system is neglected serious problems appear these are:

1. Seclusion and thus escape from the family and social responsibilities and therefore the society will be weakened.
2. Uncontrolled sexual relationships which will result in the spread of corruption, venereal diseases, and crime. The spirituality will decrease in such an atmosphere which will result in many psychological disorders.

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A BIOCHEMICAL RESEARCH ON ISLAMIC FAST (IF)

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INTRODUCTION

Absolute hunger is generally used to mean the state in which nothing is taken except water. Our dictionary defines an Islamic Fast (IF), quite simply, as "Binding", but generally speaking it implies an abstainance from food, water, and other nutritional needs for any period of time in order to execute our obligations to *ALLAH*. Also, known as *SAWM* in Arabic, *ROSA* in persian Language, *JEUNE* in English, and *FASTEN* in Germany; but these expression do not necessarilly define the IF. Here, the Islamic Fast will be considered. We have chosen that subject for two reasons. First, numerous studies which have aided the physicians to support the therapeutic and prophylactic value (as shown in atherosclerosis, hypertension, obesity, infarction, angina pectoris, and high cholesterol cases) or fasting[1,2], and secondly, to make a scientific attempt to answer the questions on this subject forwarded to us by many of our students and people.

Despite the extensive amount of researches done by Cahill et al. on groups of five to six individuals along with many experiments and animals have been performed to test long term effects of fasting, and also some of our scientists suggested to consider the difference of IF from other types of fasting, no data about IF we consider has been compiled neither in Turkey nor in other Muslim Countries. The reason for this is that, even if there are similarities, the Islamic concept of a fast is significantly different from total fast as defined elsewhere. As a result, this subject has not scientifically been investigated and no data about that topic has been given[1,3,4,5,6,7,8,9,10]

Up until now, many authorities on fasting have relied on the guidence of Holy Book *Qoran* commantary and the opinions of certain medical doctors in defining the value of this widely practised ritual, which is essentially a controlled diet mechanism[2,7,11,12]

Definition of IF: Fasting time begins at predawn during which man has early meal and ends at sunset. During that period of time, person should not eat and drink and has to keep away from his carnal appetites. It is a training of spirit. According to this definition, a man who previously has three meals a day will have only two meals a day within the Month of Holy *Ramadan*[13]

MATERIALS AND METHODS

One hundred volunteers having different living standards and from varying age groups, all of whom were religious fasters, donated blood (during post digestive phase) in both the first and the last weeks of the Holy Month of *Ramadan*, in 1976 and 1978. In fasting blood, serum protein and lip protein electrophoresis, total lipid, albumin, globulin, Phospholipid, triglyceride, total cholesterol, sodium, potassium, urea, uric acid, blood glucose, and blood density determinations were performed. In urine, acetone was investigated. The weights of 54 individuals were obtained in a few days before *Ramadan* of 1979. Within *Ramadan*, during fasting state the same persons were subjected to weighing, and this was repeated after one month from *Ramadan*.

Although the time of pre-fast meal varies from one to another, we regarded the time in Erzuum, in 1979. This time will be considered when comparing the normal eating with *Ramadan* meal schedule.

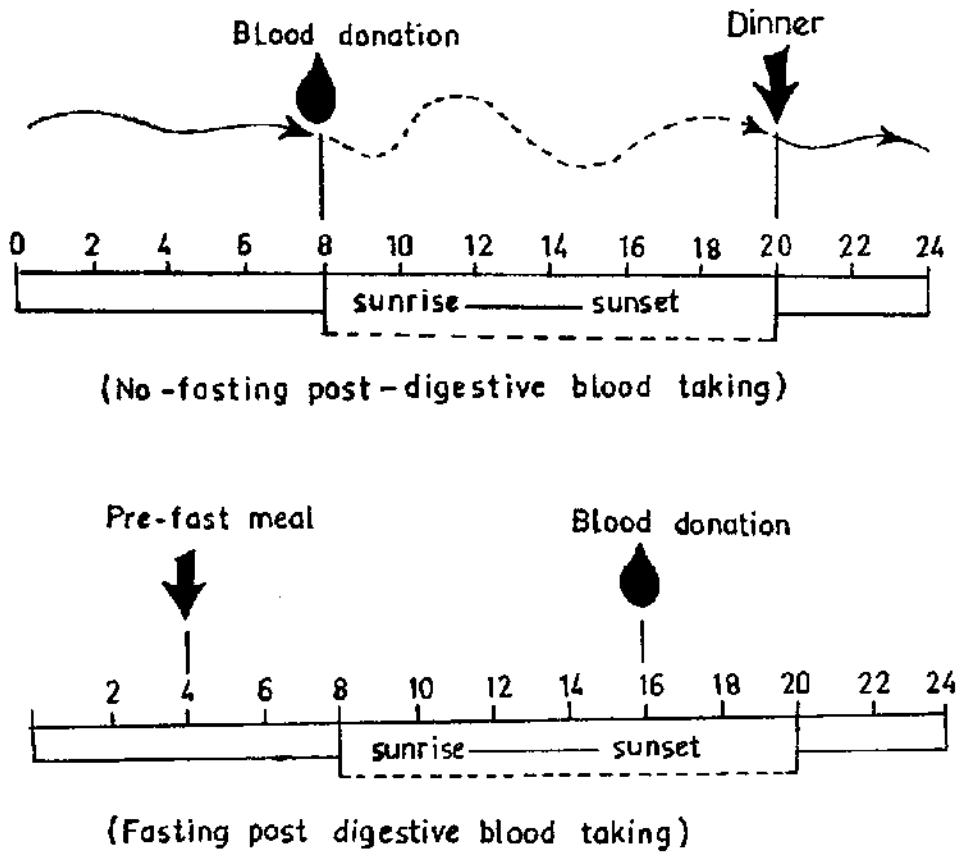

Figure 1. Donation Times of Post-absorbtive State Blood.

During no fasting time, normally, post-digestive blood means that blood would be taken at 8-9 a.m. without having breakfast, whereas it would be taken at 4-5 p.m. in the case of IF. Figure 1 shows that the both no-fasting and fasting post-digestive blood taking have the same interval, 12h.

For no-fasting post-digestive blood taking, an interval at which person has no food and drink is needed. That period of time is 12 h and coincides with the night-time, while in IF, about 1/3 of post-digestive state corresponds to hours of dawn, that is, 4-8 a.m. and about 2/3 into the period between 8 a.m. - 4 p.m. This can be seem in Figure 2. At that point of time during which experiments were performed, daylight-time was noted to begin at 8 a.m. and to end at 8 p.m.

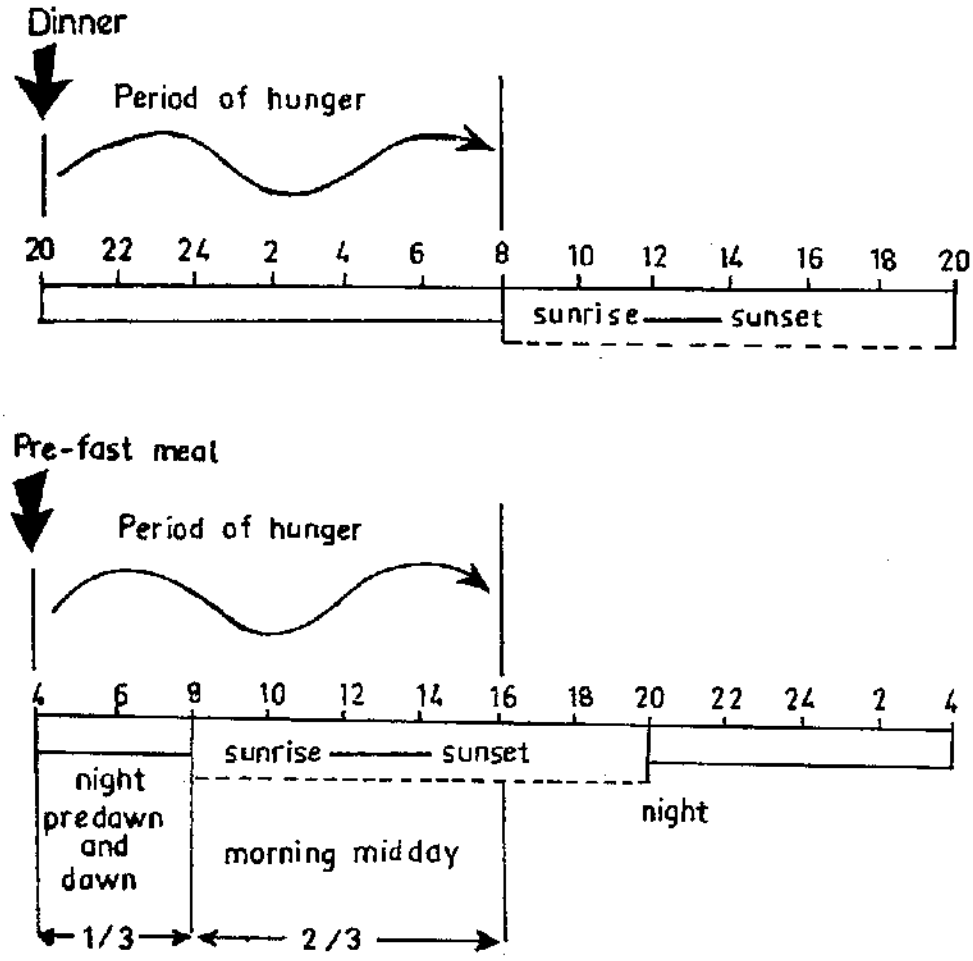

Figure 2. Comparision of Fasting Intervals in IF and in no-fasting.

RESULTS

The results obtained by the analyses of the control and fasting blood of the same volunteers were tabulated on the following tables together with the names of methods used.

The statistical evaluation of findings were done according to Student's t-test and standard deviation formula[15,16].

Table 1
Average total protein, albumin, and globulin levels in the sera of fasting and control groups (the game individuals)

Analysis	total protein		albumin		globulin	
Number of subject	100	98	100	98	100	98
State	Control	Fasting	Control	Fasting	Control	Fasting
Averages (gram %)	6.55	6.55	4.39	4.57	2.18	2.11
Method used	Biuret[14]					

Table 2
Average total lipid, total cholesterol, and phospholipid values in sera of both fasting and control groups

Analysis	total lipid		total cholesterol		phospholipid	
Number of subject	40	40	69	69	48	48
State	control	fasting	control	fasting	control	fasting
Averages (mg %)	515.80	495.75	186.40	183.60	185.14	211.27
Method used	Kunkel[18]		Bloor[17]		Zilverschmid-Davis[19]	

Table 3
Average triglyceride, FFA, and urea amounts in blood in fasting and control

Analysis	Triglyceride		FFA		Urea	
Number of subject	20	20	23	23	40	35
State	control	fasting	control	fasting	control	fasting
Averages (mg %)	116.22	90.90	12.22	8.14	42.50	42.20
Method used	Fletcher[20]		Duncombe[19]		Urease[21]	

Table 4
The body weights and fasting blood sugar (glycemia) levels for fasting and control individuals

Analysis	body weight (kg)			glycemia (mg %)	
Number of subject	54	54	54	37	33
State	before Ramadan	during fast	after one month from Ramadan	control	fasting
Averages	62.031	61.124	62.016	95.86	83.91
Method used	with scales without shoe and coat			modified	Folin-Du[17]

Table 5
The values for blood density, serum sodium, and potassium levels of fasting subjects and controls

Analysis	density		sodium (mEq/l)		potassium (mEq/l)	
Number of subject	40	35	61	61	61	61
State	control	fasting	control	fasting	control	fasting
Averages	1.0417	1.0424	136.80	140.26	4.25	4.77
Method used	Van-Slyke[22,23]		flame photometry[24]		flame photometry[24]	

Table 6
Average uric acid levels in both urine and serum, and acetone levels only in urine for controls and fasting groups

Analysis	Uric acid in serum (mg%)		Uric acid in urine (mg%)		Aceton in urine (qualitatively)	
Number of subject	40	40	35	22	22	22
State	control	fasting	control	fasting	control	fasting
Averages	6.64	6.47	142.43	92.69	absent	absent
Method used	Caraway[25]		Caraway[25]		Lange[25]	

Table 7
Statistical Evaluation of Experimental Results

Analysis	STANDARD DEVIATION				t	Degree of Significance (Significant: S Nonsignificant: NS)
	number of subject	CONTROL	Number of subject	FASTING		
Total protein	100	6.55 ∓ 0.71	98	6.65 ∓ 0.94	0.81	NS
Albumin	100	4.39 ∓ 0.65	98	4.57 ∓ 0.77	1.79	NS
Globulin	100	2.18 ∓ 0.59	98	2.11 ∓ 0.61	0.76	NS
Total lipid	40	515.8 ∓ 85.72	40	495.7 ∓ 64.02	1.18	NS
Phospholipid	48	185.14 ∓ 35.0	48	211.27 ∓ 44.7	3.19	$P < 0.01$ (S)
Total cholesterol	69	186.42 ∓ 50.7	69	183.56 ∓ 47.8	0.34	NS
FFA	23	12.22 ∓ 3.6	23	8.14 ∓ 3.24	4.04	$P < 0.01$ (S)
Fasting blood sugar	37	95.86 ∓ 16.00	33	83.91 ∓ 21.0	2.65	$P < 0.01$ (S)
Sodium	61	136.8 ∓ 3.56	61	140.26 ∓ 8.19	3.03	$P < 0.01$ (S)
Potassium	61	4.25 ∓ 0.497	61	4.77 ∓ 0.77	4.77	$P < 0.01$ (S)
Density of serum	40	1.0417 ∓ 0.03	35	1.0424 ∓ 0.03	0.00	NS
Uric acid	40	6.64 ∓ 1.6	37	6.47 ∓ 1.9	0.43	NS
Urea (in blood)	41	42.50 ∓ 5.6	35	42.20 ∓ 7.6	0.19	NS
Uric acid (in urine)	34	142.43 ∓ 67.8	22	92.69 ∓ 40.9	3.42	$P < 0.01$ (S)
Triglyceride	20	116.22 ∓ 40.7	20	90.9 ∓ 37.9	2.06	$P < 0.05$ (S)

Table 8
Statistical Evaluation of Protein Electrophoresis Values

Analysis	STANDARD DEVIATION				t	Degree of significance
	Number of subject	CONTROL	Number of subject	FASTING		
Albumin	36	51.77 ∓ 6.2	36	50.8 ∓ 6.8	0.63	NS
α - Globulin	36	4.32 ∓ 1.1	36	4.71 ∓ 1.3	1.34	NS
α_2 - Globulin	36	11.09 ∓ 2.1	36	10.31 ∓ 2.0	1.59	NS
β - Globulin	36	12.37 ∓ 2.4	36	14.33 ∓ 2.8	3.21	$P < 0.05$ (S)
γ - Globulin	36	20.30 ∓ 5.0	36	19.57 ∓ 3.9	0.69	NS

Table 9
The Statistical Values of Lipoprotein Electrophoresis

Electrophoretic fraction	STANDARD DEVIATION				t	Degree of Significance
	Number of subject	CONTROL	Number of subject	FASTING		
FFA	66	12.30 ∓ 10.7	66	5.16 ∓ 5.0	4.760	P < 0.001 (S)
∝ - Liproprotein	66	14.53 ∓ 6.25	66	18.94 ∓ 9.88	3.060	P < 0.01 (S)
Pre-ß-lipoprotein	66	15.88 ∓ 2.79	66	16.14 ∓ 8.8	0.190	NS
ß-Lipoprotein	66	45.13 ∓ 14.3	66	45.66 ∓ 11.22	0.239	NS
ᵟ-Lippoprotein	66	10.10 ∓ 6.8	66	12.85 ∓ 9.8	1.883	NS
(ß/∝)^{x} - Lp	66	3.106 ∓ 1.68	66	2.411 ∓ 1.38	2.602	P < 0.001 (S)

("x" That the ration of beta-lipoprotein to alpha-lipoprotein is lower than 2.5 favours cure for atherosclerosis.)

DISCUSSION

In this section, we will discuss about three points.[1] A review on metabolism of starvation,[2] the comparision of the results, and[3] some original aspects of of our results.

1. A Review On Metabolism of Starvation:

So far, researchers classified a fast as a form of hunger; in fact most experts on the subject consider it to be an absolute hunger[4, 26] As a matter of fact, in 1915, a study of phenomenon of fasting was undertaken by Benedict, from a perspective not totally elicudated, who reported a decrease in the carbohydrate deposits of the body in the first few days followed by a gradual diminishing of lipids and finally of proteins[27].

McIlwain, in 1959, then demonstrated that the central nervous system needs glucose. This was followed by works of other scientists who, during the same year, had shown that only 15% of the body's caloric needs were met by utilization of proteins[3, 28]. In view of this, we will first bring to mind the biochemical changes which take place during the process of absolute hunger of starvation.

A human has a glycogen reserve of approximately 200 g. During the short period of hunger the glucose breakdown and the gluconeogenesis exceed that of normal period. This is particularly prevalent in central nervous system, since hexokinase activity, which is responsible for the breakdown of glucose, is 20 times greater in brain than that of in other tissues[3,29]. During long period of starvation the synthesis of glucose from proteins is required to proceed the normal metabolic reactions of central nervous system[4] The reserves of the body can essentially provide the caloric expanditure in an unfed man for a period of 10 h, after which gluconeogenesis will inevitably commence. By the second and third day of a short term absolute hunger, body begins to utilize proteins and lactic acid (Cori cycle) to meet the needs normally supplied by glucose. At the same time, the concentration of insulin in blood falls and migration of extracellular glucose into the intracellular compartment declines, decreasing the glycogen synthesis. During short period of hunger, a rise in concentration of FFA and amino acids can also be noted in blood[4] If this period of absolute hunger exceeds five weeks, nitrogen excretion will decrease and the role played by the kidneys in gluconeogenesis will surpass that of liver. It is thought that, in conjunction with this, there is a decrease in amino acid catabolism. When a point of time at which metabolic demands of brain, erythrocytes, leucocytes, and renal medulla can no longer be met, the organism turns to other pathways in its life-death struggle. For example, brain which previously

needed 140g. of glucose to function begins to operate on 80 g in a state of prolonged absolute hunger, making up for the difference by utilizing 47 g ketones. In such a case, caloric requirements of body are lowered by 15-20%[4],[26].

During the period of rest, the brain consumes two-thirds of body's blood sugar. At the prolonged period of hunger, aside from gluconeogenetic activity resulting from the breakdown of proteins in muscles (called Cori cycle), there is also an "alanine cycle" in the same regions. Alanine which is liberated from breakdown of proteins in muscles is carried to the liver and kidneys by blood. There it is transaminated and ultimately transformed into pyruvate. By the process of gluconeogenesis, pyruvate, in turn, is converted to glucose. When the starving ends at that point, pyruvate will be converted to alanine, thus completing the cycle[30].

In normal circumstance, a minute amount of ketone bodies are produced by the body. During a prolonged absolute hunger, however, there is a marked increase in amounts produced. Of these, the most important ones are aceto-acetic acid and beta-hydroxybutyric acid. Adapdation of organism to these changes cannot be explained, but it's believed that the role of hormonal balance mechanism is important in this situation. During that state of hunger, insulin production is reported to decrease, whereas, an excessive glucagon synthesis can be seen[30].

Because of absence of the enzyme beta-ketoacid-CaA-transferase in liver, ketone bodies can no longer be metabolized there and are released into blood. Whereas, the presence of this enzyme in muscle, brain cells, the testes, and kidneys facilitates the catabolism of ketone bodies. Keeping this in mind, the possibility of brain cells surviving without glucose is unfeasible, since succinyl-CoA is in most probability an essential component of beta-ketoacid-CoA-transferase reaction[30].

Research done by Cahill on a group of individuals in a state of prolonged absolute hunger under controlled medical supervision have shown that the body's total glucose and glycogen reserve is capable of providing metabolic needs for a period of 24 h. Nevertheless, it has been calculated that reserve of triglycerides (neutral fats) can provide basal energy needs for at least 70 days. In obese individuals, this period of sustenance can be as whole year. This period of survival bears a direct relationship with amounts of protein reserves. If 50% of body proteins are available, survival time will increase[26]

During the first and second days of an absolute fast, the oliver's glycogen content falls to 10% of its normal state and this value is maintained throughout the course of prolonged hunger. Thus, during a four-week absolute fast, blood glucose also remains at 81 mg / 100 ml serum (4.5mM)[26] The rate of decrease in glycogen of muscles is less than in the liver. When readily available glycogen has been consumed, abdominal and subcutaneous fatty reserves begin to get utilized, releasing triacylglycerol.

As a result, the synthesis of ketone bodies increases. Besides protein, lipid and carbohydrate utilisation, energy is also obtained from oxidation of ketones[26,31].

Within few days of absolute fast, an increase in urea excretion in urine can be seen, and hence there is an increase in nitrogen excretion. This is an indication of breakdown of body proteins. Despite the body's abundance of neutral fats which can readily be utilized, the excessive demand for glucose by brain can only be met through gluconeogenesis, facilitating by the breakdown of proteins. It is important to keep in mind that the human brain consumes 20% of body energy produced and that it generates this energy from glucose which is the sole source of energy. The brain needs an energy which it provides from 140 g of glucose for a day. When the blood glucose level falls below 80 mg/100 ml, central nervous system will be negatively affected[26]

Begining from the first day of fast, since there is a rapid expenditure of the liver's glycogen reserves, it is important to maintain the blood glucose values within normal limits for the brain to

function properly. Glucose oxidation also occurs in erythrocytes, but they are able to convert it to lactate, as well as muscles. The fact that glucose is produced from glycerol moiety of triacylglycerol and that gluconeogenesis through the gluconeogenic amino acids try to meet this need, as well as glucose can be reproduced from lactate by the way of Cori cycle. However, glucose cannot be synthesized from fatty acids in animals. On the other hand, plants and most of microorganisms can produce glucose from acetyl-CaA[26,31]. During starvation, the carbohydrate reserves are consumed in one day. Since the brain and some other tissues primarily utilize glucose as an energy source, its level in blood should always be over 50mg/100ml. The protein reserves should be preserved because, in starvation, amino acids are the sole source of glucose. As the blood glucose level diminishes to about 70mg/100ml, ketone bodies and the fatty acid levels rise to substitute for the energy source. In the following days of starvation, the brain utilises the ketone bodies which are at very high levels in blood. In fact, during the first three days of hunger, glucose and ketone bodies consumption of brain is 100g and 50g a day, respectively. On the other hand, at the 40th day of hunger, the corresponding levels are 40g/day for glucose, 100g/day for the ketones[31]

The amount of glucose produced from 100g of body's proteins is roughly 57g. Because of amino acids are disaminated to form blood glucose, the amino groups are converted to urea by liver and excreted through kidneys; this explains why the amount of urinary nitrogen is so high during the first days of absolute fast. Proteins responsible for monitoring blood glucose level perform their functions according to orderly guidelines. The ones responsible for very important functions are either used sparingly or expended last of utilization programme in question. The first to get used up are the digestive system enzymes, produced by stomach, pancreas, and small intestine. The reason being that during a prolonged fast, these are no longer needed. Subsequently, in the liver, there is no need to enzymes which are responsible for the convertion of foodstuffs absorbed from intestine to the plasma proteins, lipids, and lipoproteins; so the breakdown of them occurrs. After this phase a strain is placed on muscle proteins. The first strain occurs in both contractil fibers and glycolytic enzymes of sarcoplasmin of muscles. Since there is a decrease in muscle proteins, in the individuals undergoing starvation, suffering from physical inactivity is observed. This is a physical adaptation mechanism of body against to fasting. On account of this compensation mechanism the central nervous system is normally able to function. The breakdown of proteins for providing this proceeding is not clearly known[26]

During the first week of absolute hunger, protein depletion continues at a rate of 100g/day. In this condition, a person can averagely survive for no more than one month. However, between the fourth and sixth week of absolute fast, the breakdown of proteins declines to 12-15g/day. With the presence of a mechanism which limits the protein consumption, other events become manifest; utilization of blood ketone bodies and brain cells' glucose as body fuel becomes prevalent. Abbundance of ketones and beta-oxybutyrate in systemic circulation facilitates preservation of valuable proteins which otherwise would have been converted to energy. The adaptation mentioned above lowers protein consumption significantly until virtually all utilizable fats have depleted. It is important that there is no lacking in mental capacity of individual, since brain can utilize the ketone bodies as a source of energy[26]

After this stage, the most violent phase of hunger is seen. During this period all remained triglycerides are expended and the remainder of existing muscle proteins, all stored away discretely, begin to get utilised. This situation is prevalent in the third and final phase of starvation and is life threatening, particularly for infants. Since the lower amount of adipose tissues is present in youngesters, transition to protein breakdown for metabolic fuel proceeds much more rapidly, resulting in protein defficiency, or Kwoseiorkor in severe cases[26]

The survival time for an individual having only water has been estimated to be 50-51 day. It has also been reported that a survival time might be 65 or 75 or, even 79 days[5].

In their review, Cahill and Oven reported the observations of Jeo and Bertholet who investigated the substance losses of some tissues of the persons who had died of hunger[4] Table 10 shows their resultss.

Table 10
The Average Losses of Some Tissues in Starvation

Type of Tissues	Bertholet's results	Jeo's results
Adipose	95%	97%
Spleen	69%	63%
Liver	62%	56%
Muscle	44%	30%
Kidneys	36%	—
Lungs	26%	—
Skin	25%	—
Bone	18%	—
Heart	3%	—
Brain and nervous sys.	2.2%	0%

Cahill and Oven report this statement of Dewey: "I have seen that the human body contains a vast amount of digestible substances. During lack of food brain can still meet its caloric need to keep the cooperation of the organs"4

Hunger may be divided into two main categories the first is the form of being to be accustomed to meals which may be called "psychological hunger" or "pseudo hunger", and the second as "physiological true hunger", which occurs after several weeks of nutritional deprivation[4]

It has been suggested that fasting may reduce the complications of surgery and improve the healing process. It is also believed that fasting is beneficial for renal failure. This would seem logical, since fasting results in a decrease in toxic elements in blood, ultimately lessening the load of the kidneys[5]

Results of serum protein electro phoresis assays on 20 fasting subjects by Aydar and Gunduz have demonstrated that a minute decrease in total protein occurs during fasting in contrast it's been shown that serum protein fractions of individuals with absolute hunger for 12-18 h. do not change. Their results do not agree with Consolosic-Mariani, Rapaport and Weimer's[6]

Wicklmayer et al. determined that following a 20 h period of hunger, the brain's glucose expenditure rate becomes 70 gm/day. and that the body's glucogenic amino acids do not suffice this need. Consequently, for a fast of 120 h 100 g or brain tissue is able to spend only 12 micromol of glucose[32]

Shellenberg et al. pointed out that in obese with hyperlipoproteinemia, fasting results in a decreased serum triglyceride and cholesterol concentrations, thus, lowering lipoprotein VLDL (Prebeta) and raising LDL(beta) fractions. The analysis done for four to five weeks led them to the conclusion that alpha-lipoprotein were not changed at all[33,34]

2. Comparison of Results:

There is no change in amino acid and blood glucose levels in the first week of absolute fast. However, after the fifth weeks of starvation the blood glucose level falls from 4.5 mM to 4.49 mM[26]

By ferriccyanide method of Hoffman, blood glucose levels have been found to be 52 mg/100 ml in fasting, 91 mg/100 ml after meals and 63 mg/100 ml after a 24 h fasting[35]

Ketone bodies had been seen in the rat hepatocytes after 48 h starvation test[36]

Hypoglycemia and increased esterified fatty acids with respect to normal persons had been observed in the obese individuals when they were only administered by tea, coffee, saccharine, chewing-gum with no calorie and syrup containing multivitamines for 4-14 days[37] Cahill reported a decrease of blood glucose from 80 mg/100 ml to 65 mg/100 ml [39]. This is 19 mg/100 ml. As it is seen on Fig 3 this decrease is 11 mg/100 ml in our investigation. Also, as shown in Fig 3, in IF, post-absorbtive blood glucose falls only to 83.91% (for control 95.86%).

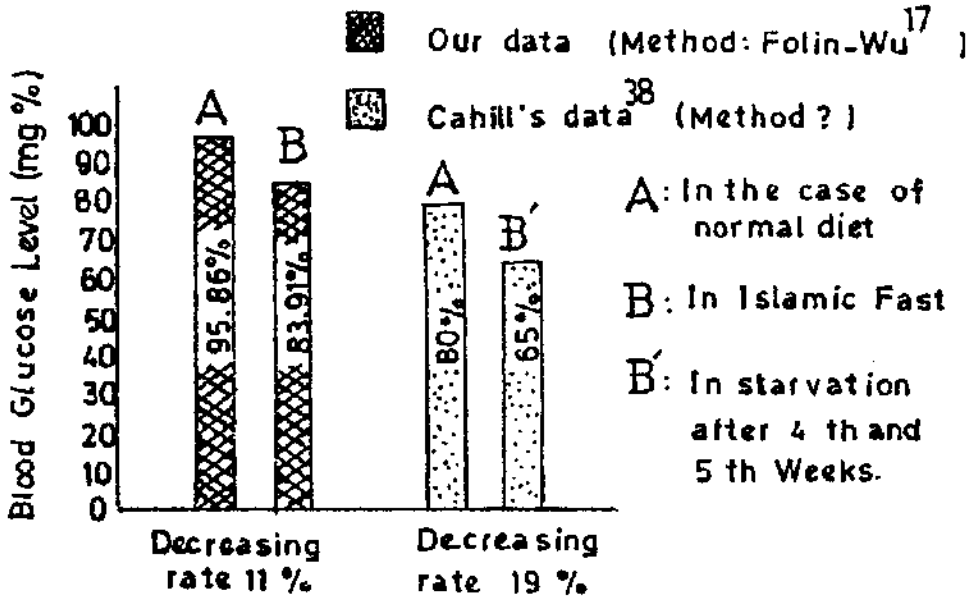

Fig. 3. Blood glucose levels in normal individuals, Islamic fasting and absolute hunger.

Even within the first week of absolute hunger, ketone bodies in blood increased from 0.02 mM to 5 mM, and five weeks later to 7.8 mM[26] in IF, no urinary acetone was determined (Table 6).

While normal FFA levels are 0.5 mM, in the first week of absolute hunger, it is 1.5 mM, and, in the fifth week, 2.0 mM[26] In our study, these levels were 12.22 mg/100 ml for controls, 8.14 mg/100 ml in fasting subjects (Table-3) However, FFA levels may easily change due to exercise, blood sugar level, psychological stresses, and epinephrine secretion. The lowest level of FFA during a day is prior to meals[22,39].

In the researche done on 11 obese subjects with average weight of 102.8 ∓ 6.7 kg, Finon et al. have shown that during a four-week absolute hunger 13.7 ∓ 2 kg were lost[40]. As shown in Table 4 The average weight of 54 individuals was 62.035 kg in controls, 61.124 kg during fast, and 62.016 kg after one month from *Ramadan*.

Table 1 shows that serum albumin levels. In our control group, it is 4.38 g/100 ml (as average) and, in fasting subjects, 4.57 g/100 ml. whereas, in starvation, it is 4.06 g/100 ml in the seventh day, and 3.85 g/100 ml in the 22nd day[40].

It has been found by Aydar and Gunduz that an absolute fast does not effect on serum albumin for 12-18 h. As shown in Table 1 and 7, our data are in agreement with theirs.

Schellenberg et al. stated that the serum levels of cholesterol and triglyceride in obese with hyperlipoproteinemia were decreased because of fasting[33,34]. We did also find that, in IF, the triglyceride levels were decreased from 136.05 mg/100 ml in controls to 104.54 mg/100ml in fasting subjects (see Table 4)

On the other hand, cholesterol was 186.40 mg/100 ml in controls and 183.6 mg/100 ml in the others (Table 2).

It has been recognized that the fraction of prebeta-lipoprotein (VLDL fraction) was decreased and that the fraction of beta-lipoprotein (LDL fract.) was increased, while alpha-lipoprotein value remained constant[33,34] In IF, we found that only alpha-lipoprotein fraction was increased, whereas there is no significant variation in prebeta- and beta-lipoprotein fractions, as can be seen in Table 9. On the other hand, a decreased alpha-lipoprotein level causes to atherosclerotic condition[41,42,43].

IDL levels are high and HDL-cholesterol levels are low in coronary artery disease[44] The increase of plasma VLDL and LDL directly inhibits the removal of cholesterol from the cells[45] HDL-cholesterol has the property of protection of a person from heart diseases[46]

It's known that the urinary excretion of urea and accordingly the excretion of nitrogen was increased within a few days of hunger[26] As shown in Table 3 and 6, blood urea level is 42.50 mg/100 ml in controls and 42.20 mg/100 ml in fasting subjects, also, for both cases, uric acid levels are 6.64 mg/100 ml and 6.47 mg/100 ml, respectively. In the partial urine of fasting subjects during IF, the excreted uric acid was 92.69 mg/100 ml, while it was 142.43 mg/100 ml in controls (here, the partial urine gives no appreciable information, but it may have relative consideration).

3. Some Original Aspects of Our Results:

Some results that we have not encountered in reports about IF and absolute hunger are given following.

1. Serum Density and Its Electrolytes (Tables 5 and 7)

During starvation, it is free to drink water. Thus, researchers may not be regard the blood density. But in IF, because of having no water we have to think that there may be a rise in blood density. Density measurement in question was 1.0417 in controls, and 1.0424 in fasting by Van Slyke's method[22,23] The difference is not significant. Because of their importance intra- and extracellular sodium potassium concentrations were determined and sodium was found to be 136.8 mEq/l in controls and 140.26 mEq/l in fasting individuals, and potassium 4.25 mEq/l for controls and 4.77 mEq/l for fasting. It's clear that the difference between two values is rather important. According to the data, the more concentrated blood can be interpreted as flow of intracellular fluid into extracellular compartment. An increased levels of potassium and sodium in fasting, compared with controls, may be due to any absorption from empty intestine to blood stream.

2. Serum Globulins

They do not show any important difference between two states (in fasting, 2.116 g/100 ml and in controls, 2.181 g/100 ml). As a result, we have no interpretation about them.

3. Serum Total Lipid Levels

For 40 controls, total lipid concentration was 515.80 mg/100 ml and for 40 fasting subjects, it was 495.75 mg/100 ml. The difference between the two volumes is not significant. Both of these range within normal levels of serum total lipid. In spite of this, some total lipid fractions may be regarded.

4. Phospholipids

Phospholipid value of controls was 185.14 mg/100 ml and that of fasting was 211.27 mg/100 ml. Phospholipid contains alpha-lipoprotein[43] We have previously noted that alpa-lipoproteins were

increased. These are all against atherosclerosis.

Since beta-lipoproteins have cholesterol[42] a decreased cholesterol and beta-lipoprotein levels may be due to decreased endogenous synthesis of cholesterol. Normally, the ratio of beta-lipoprotein to alpha-lipoprotein is less than 2.5. If this ratio is increased, there is a tendency to atherosclerosis. When it is decreased, an atherosclerotic patient may get better[42,43] In the present study, this ratio (45.13/14.53) is 3.106 $\mp$1.68 and (45.66/18.94) is 2.411 $\mp$ 1.38 (t =2.602, P = 0.01) in controls and in fasting subjects, respectively. The comparision of the two values suggests that intravenuous lipid stores can be utilized in IF, providing a cure for atherosclerosis.

Table 4 shows the body weights. The difference between the weightings (before *Ramadan* 62.031 kg, within *Ramadan* 61.124 kg) is not significant. At the end of the following month, the weightings of the same subjects are 62.016 kg. That minute amount of difference may be due to loss of water by body during fasting. As a result, it can be said that even thought the body does not have food and water its metabolic processes lead the body to a healthy position during fasting by useful changes in body. This is illustrated in Fig. 4 by comparing normal metabolic pathways with starvation state.

In Fig. 4, for the control group, the dominating energy metabolism is shown as broad lines. There are particularly sufficient glucose intake, glycogen synthesis, very low glucose utilization, and gluconeogenesis of low rate. A high amount of acetyl-CoA is formed from pyruvate. The transport of acetyl-CoA to TCA cycle is perfect. The amino acids from foodstuffs are sufficiently directed to pyruvate and TCA cycle. As a result, the energy need of the body is only provided by the foodstuff.

During absolute hunger, in the first 24h, since the carbohydrate reserves are begun to be used, a large amount of adipose tissue lipid and partially the muscle proteins will be utilized to meet energy need in the following days of hunger. Then most of the pyruvate which is formed from amino acids will be converted into oxaloacetate which can also be increased by deamination of aspartate. This oxaloacetate will be converted into glucose via phosphoenolpyruvate intermediate. In addition, the acetyl-CoA formed from the mobilized fatty acids is converted to betahydroxybutiric acid and acetone because of the utilization of oxaloacetate of TCA cycle in gluconeogenesis.

In Islamic fast, since two meals are permitted, there is no need for the carbohydrate reserves to be used. But for a long day-time period, a heavy physical activity man cause a little utilization of the sugar reserves and a low amount of lipid mobilization. All of the acetyl-CoA can enter into TCA cycle. Since the blood acetone levels is not increased and no acetone is seen in the urine, the matabolic pathways in IF are not the same as in absolute hunger. As a result, in IF, the metabolic chain is almost as perfect as in normal nutritional state. There is only a little mobilization of carbohydrate and lipid reserves. By means of this a frequent renewal of carbohydrate reserves occurs and a useful amount of lipid mobilization is observed (see Table 9). The points discussed here are summarized on Table 11.

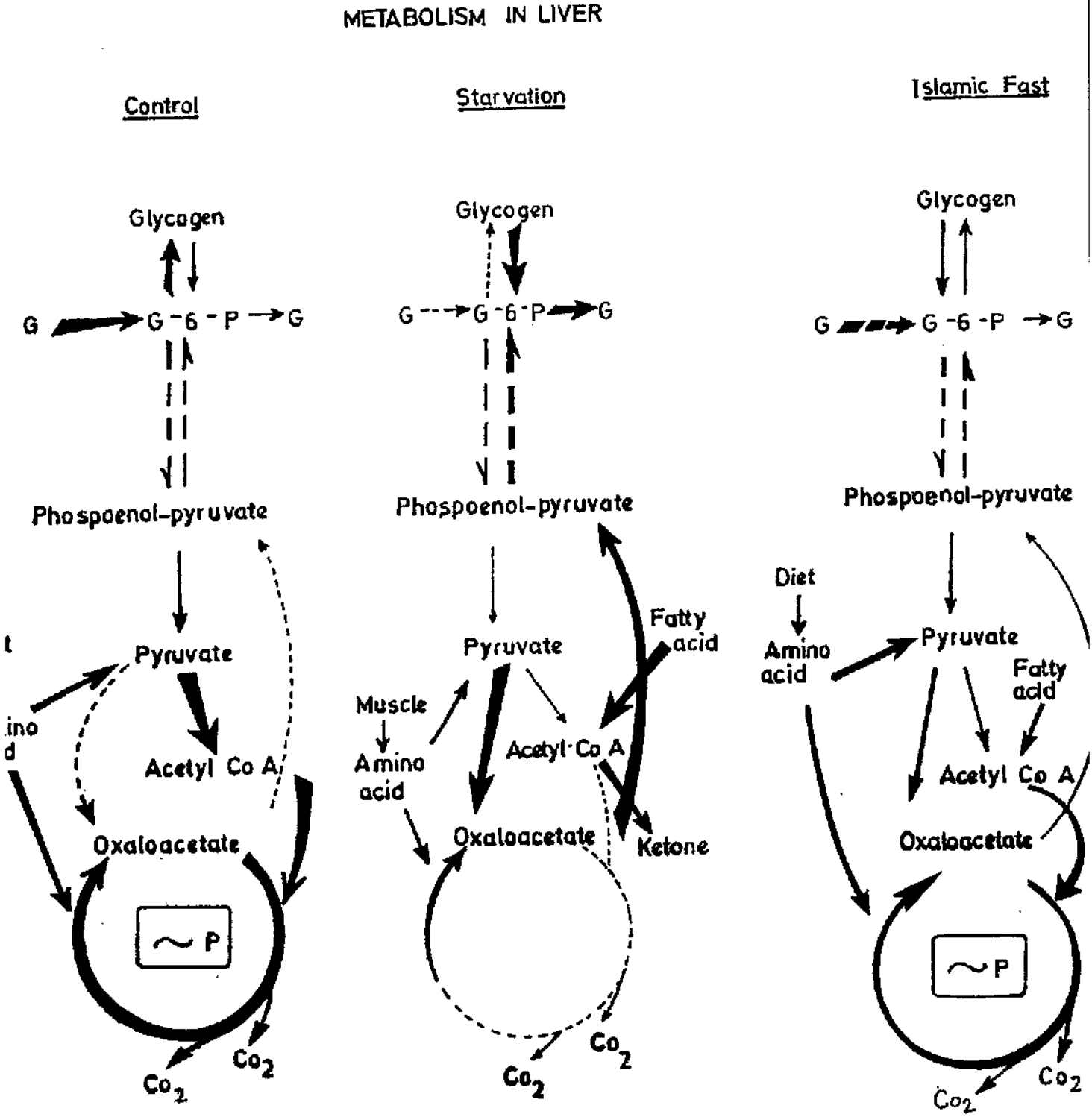

Fig. 4 Comparison of the metabolic pathways in the liver cell during normal nutrition, absolute hunger, and Islamic fast.

Table 11
A comparison of some values in absolute hunger and IF.

	Absolute Hunger	Islamic Fast
1. Blood and urine urea	Increased	Normal
2. Blood protein	Decreased	Normal
3. Blood glucose	75mg/100ml (after 5th week)	83.91mg/100ml
4. FFA in blood	Increased	Normal or little decreased
5. Ketone bodies in blood	Decreased	—
6. Acetone in urine	Present	Absent
7. Weight loss	High	Very little

When we evaluated the data in Table 11, as a result, we concluded that:

1. In IF, no physiological hunger (true hunger) table was encountered.
2. In IF, the features of hunger is not damaging, however, by means of mobilization of the fat depots, the lipid catabolism is accelerated in the physiological limits.
3. Nowadays' diseases, such as atherosclerosis, high cholesterol levels, hypertension, angina pectoris, infarction, and some renal failures can be protected by IF, so it has a medical prophylactic value or serves as a health gain exercise.
4. To sense hunger in IF is a psychological event, due to being accustomed to eating and drinking, any time he wants thus it can be called psychological hunger.
5. Except some disorders, for most diseases, IF is a cure.

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Part Five: *The Influence of Islam and its Teachings on Health of Human Being and Certain Diseases, Transmitted due to Un-Islamic Behaviour.*

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ISLAMIC MEDICAL EDUCATION: A MEAN TO FOSTER THE ISLAMIC CODE OF MEDICAL ETHICS

Prof. Dr. H. Jurnalis Uddin

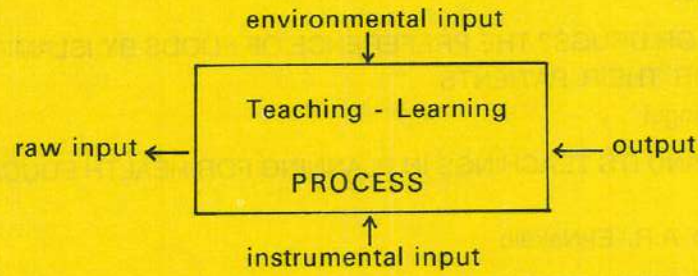
INDONESIA

INTRODUCTION

The first International Conference on Islamic Medicine has been more than 3 years behind. One of its essential result was the formulation of the Islamic Code of Medical Ethics which has been accepted unanimously by the conference. Almost 200 outstanding Muslim scholars, educators and researchers from more than 30 countries attended the paramount gathering. Every participant is expected to be back to their respective countries with new and fresh ideas and shall elaborate and carry out the recommendation of the conference. After quite a long time, a question should therefore be properly raised: what has been done in fostering the Islamic Code of Medical Ethics? in the following, an Indonesian experience, in this case, the YARSI Medical School, shall be put for ward for comparative study purposes.

MEDICAL EDUCATION ACCORDING TO THE ISLAMIC CODE OF MEDICAL ETHICS:

To understand the anatomy of a medical education, a system approach shall be adopted and an appropriate analysis shall be developed accordingly. A system approach is a chain, continuous and interlinkage activities to achieve a predetermined objective(s). The following diagram shows us the structure of a system;



The raw input is the high school graduates who after succeeded to pass the entrance test, will be engaged into a teaching and learning process in a medical school. They are expected to be medical doctors which are the output of the system. The teaching and learning process is substantially influenced by the environmental input, a.o. the laws and by laws which regulate the medical education, the social, political, economical and cultural situation will provide some impacts to a certain extent.

The instrumental input is of two kinds; the hard and soft wares. The hard ware is comprised of the building, laboratories, equipment, office facilities, libraries, lecturers etc. While the soft ware is consisted of the curricula and syllabi, teaching methodologies, evaluation system, planning and programming, organization etc.

Let us now make some quotation of the Islamic Code of Medical Ethics upon which the paradigm of the Islamic Medical Education should be elaborated.

1. ON THE BASIC PHILOSOPHY OF ISLAMIC MEDICAL EDUCATION:

- Medical education, despite being a speciality, is but one fiber in a whole mesh founded on the belief of God, His Oneness and Absolute Ability and that He alone is the Creator and Giver of life, knowledge, death, this world and the hereafter.
- Faith is remedical, a healer, a conqueror of stress and procurer of cure. The training of the doctor should prepare him to bolster "Faith" and avail the patient of its unlimited blessings.

2. ON THE OBJECTIVES OF THE ISLAMIC MEDICAL EDUCATION:

. In Planning the making of a doctor, a principle goal is to make him a living example of all that God loves, free from all that God hates, well saturated with the love of God, of people and of knowledge.

3. ON THE MEDICAL SCHOOL CURRICULA:

. Medical school curricula should include the teaching of matters of jurisprudence and worship pertaining to or influenced by various health aspects and problems.

. Medical school curricula should familiarise the student with the medical and other heritage of the era of the Islamic civilization those that lead to its eclipse and the way(s) to its revival.

. Medical school curricula should emphasized that medicine is worship both as an approach to belief by contemplation on the signs of God, as well as from the applied aspect by helping Man in distress.

. Medical school curricula should comprise the teaching and study of this Islamic Code of Medical Ethics.

4. ON MEDICAL TEACHER:

. Medical teacher owes his students the provision of the good example, adequate teaching, sound guidance and continual care in and out of classes and before and after graduation.

5. ON THE INFLUENCE OF THE ENVIRONMENTAL INPUT:

. Medical education picks from all trees without refractoriness or prejudice. Yet it has to be protected and purified from every positive activity towards atheism or infidelity.

. Medical education is neither passive nor authoritarian. It aims at sparking mental activity, fostering observation, analysis and reasoning, development of independence thought and the evolvement of fresh questions. The *Quran* blamed those who said: *AS SUCH WE HAVE FOUND OUR FATHERS AND WE WILL FOLLOW ON THEIR FOOT STEP* ... an attitude which is only conductive to stagnation and arrest of pprogress.

6. ON THE CHARACTERS OF THE OUTPUT (THE MUSLIM PHYSICIAN):

. The physician should be amongst those who believe in God, fulfil His rights, are aware of His greatness obedient to His orders, refraining from His prohibitions and observing Him in secret and in public.

. The physician should firmly know that "life" is God's ... awarded only by Him and reclaimed only by Him... and that "Death" is the conclusion of one life and beginning of another.

. The physician should be in possession of a threshold knowledge of jurisprudence, worship and essential of *Fiqh,* enabling him to give counsel to patients, seeking his guidance about health and bodily conditions with a bearing on the rites of worship.

. The physician should also know that the pursuit of knowledge has a double indication in *Islam.* Apart from the applied theurapeutic aspects, pursuit of knowledge is in itself worship, according to the Quranic guidance: *AND SAY ... MY LORD ... ADVANCE ME IN KNOWLEDGE* ... and *'AMONG HIS WORSHIPPERS ... THE LEARNED, FEAR HIM MOST"* ... and *GOD WILL RAISE UP THE RANKS OF THOSE OF YOU WHO BELIEVED AND THOSE WHO HAVE BEEN GIVEN KNOWLEDGE* .

7. ON MEDICAL PROFESSION:

Like all aspects of knowledge, medical knowledge is part of the knowledge of God *"WHO TAUGHT MAN WHAT MAN NEVER KNOW".* The study of medicine entails the revealing of God's signs in His creation... *AND IN YOURSELVES ... DO YO NOT SEE?* The prac,

tive of medicine brings God's mercy unto His subjects. Medical practice is therefore an an act of worship and charity on top of being a carreer to make a living.

- Medical practice shall never yield to social pressure motivated by enmity or fued be it personal, political or military.
- Medicine is a religious necessity for society. In religious terms, whatever is necessary to satisfy that necessary automatically acquires the status of a "necessity".
- Medical profession is considered (by Al,Gazali) as *fardh-kifaya* a duty on society that some of its members can carry in lieu of the whole.

THE ADVENT OF THE YARSI SCHOOL OF MEDICINE:

In April 1967 there were 5 Christian or non Muslim medical schools already operating in Jakarta, the capital of city of Indonesia. Those were The Atmajaya Catholic University, the Christian University of Indonesia, The Christian University of Jakarta, The Tarumanegara University and the Trisakti University. Not any Muslim medical institution was available on that time. In west Jawa the Maranata Christian University and the Parahiyangan Catholic University were dominating the region. In Sumatera island, another Christian University, namely the Methodist University of Indonesia was the only private university which has a medical faculty, in the whole island.

Along with the 7 private non,Muslim medical schools, there were 11 state owned medical schools, 3 in Sumatera, 5 in Java, 1 in Bali and 2 in Sulawesi.

That's mean the non Muslim medical schools constitute 35% of the whole medical education in the country. If they have equal quality, we can imagine, that among 1000 doctors produced in the country, 300 doctors will come from the non Muslim medical schools. And we could expect that most of them are non-Muslim doctors who will provide health services to 140 million people, where 90% of them are Muslim. Of the existing state owned medical schools, they follow the western style education, which is secular in nature. Teaching religion is not compulsory. Furthermore, as a Pancasila state (Pancasila means 5 Pillars) where the first pillar is to believe in One God, the state recognizes officially the 5 existing religions i.e. *Islam,* Protestant, Catholic, Hindu and Budha. In operational term, the religions have a right to get equal treatment from the state. Tolerance in observing one's religion is encouraged by the state. All religions are the same, that is the famous jargon.

As a consequence, secular doctors are the most common output of the whole state owned medical schools.

They may be Muslim doctors, but they put aside the Islamic jurisprudence in providing health services to the people. They may observe the obligatory prayer regularly, they fast in *Ramadhan,* some of them perform *hajj,* but once they get engaged with the patient either in their private practice or in the hospital, they leave the religion behind. The only guidance is the science and technology whatever available. The health service is nothing to do with observing one's religion. That was the situation in 1967. The need of real Muslim doctors is beyond question. In the sixties, the low rate between doctor and population made the health service rampant. In 1967 there were only 10,000 doctors available in the whole country. That's mean one doctor has to serve 14,000 people, not to say the unequal distribution of the doctors. Most of them crammed in big cities while the communication in the rural area, especially out side Jawa island were still far than sufficient.

During the sixties, the whole medical faculties could produce less than 1000 doctors annually. Efforts to overcome the shortage of physician have to be encouraged, not merely by improving the condition of the existing medical schools but opportunity to open new medical schools was wel, come to some extent by the government.

In April 15, 1967, Dr. H. Ali Akbar, Dr. Asri Rasad and myself with support of limited Muslim groups took initiative to establish the YARSI School of Medicine. Today this is the only Islamic Medical School in Jakarta which has to compete with the other 5 non,Muslim medical schools They are more established and well developed indeed.

THE OBJECTIVES:

The first question to be answered by the founders was what shall be the institutional objectives of the school?. After an intensive deliberation, the founders finally formulated the objectives as follow:

* to educate or help educate student to be a practicing Muslim physician, who shall be qualified as a physician and put their knowledge and skill into practice in conformity to *Islam.*
* to build or help build Islamic (university) hospital which shall have an Islamic sphere and provide health services according to Islamic teachings.

In operational term, the objective could be broke down, that after graduation, the student could has competences (cognitives), skills (psychomotors) and attitudes (affectives) a.o.;

- qualified health service provider that could solve health problems in the community at large. (As a developing country with limited health facilities, rampant communicable diseases, unsufficient communication especially outside Jawa island, the country has encouraged all medical schools to foster the Community Oriented Medical Education (COME) system. The main concern is not the individual as adopted by most of the clinicians but the sicked individual is taken as a representative of a suspected sicked community. It is the task of the doctor to diagnose and treat the disease of the sicked community mentioned)..
- able to conduct research, especially the health service research.
- a good practicing Muslim, who observe obligatory prayer, fast in the fasting month *(Ramadhan),* pay the obligatory charity *(zakat),* .perform *hajj* (if able), enjoining what is right, and forbidding what is wrong (Sura Al-i-'Imran : V110).
- His ways of thinking is always in the paradigm of *Islam* and as a consequence he is totally he will never contradict his service to his faith or *iman.*
- Whenever he start doing something he always says: In the name of Allah *(Bismillah).* and after completion, he says: Praise be to Allah *(hamdullah).*
- As a scholar he is always hungry with new knowledge and technology (acquired know, ledge) but at the same time he is also studying *Islam* (the perennial knowledge: *al-Qur'an, Hadith,* the Islamic jurisprudence etc.) with equal proportion.
- To a certain extent, he is always trying to his utmost not only to be a good practicing Muslim, but also to be a preacher, started from his own family and then to the community at large.
- The lady-doctor should have to wear dresses in conformity to Islamic teaching.

THE ENROLMENT:

The objectives could only be achieved if the new enrolment are Muslim students. That is the basic policy of the YARSI MEDICAL SCHOOL up to the moment. But as we live in a Pancasila state, we also received some non Muslim students, one Budhist, or one Hinduist or one or two Christians. Praise be to Allah, most of the Non Muslim students converted to Muslim after taking courses in Islam in the first year. It has to be noted that the school never provided special treatment for the non Muslim students.

To know how far the students understand Islam, the school carry out an inquiry along with the entrance test.

The inquiry is not limited to the theoretical knowledge on Islam, but the examiners also test the ability of the student to read *Qur'an,* to take ablution, to observe prayer and some basic know, ledge on faith *(tauheed)* and Islamic jurisprudence. According to our years of experiences, about 10% of the new enrolment can not read *Qur'an,* and about the same amount can not or never per, form prayer *(salat).* This is one of the gloomy sude of the result of 12 years of teaching Islam right from the elementary up to the senior high school in Indonesia. We could blame the curricula and syllabi, the quality of teachers, teaching methodology, or may be the impact of modern culture. But the fact is there. Instead of blaming the primary or secondary education, we launch a special program for this group. Two weeks before the beginning of the academic year, they have to join a special course on how to read *Qur'an* and how to observe prayer. It is expected that after comple-tion of the course, the student could join other students to observe prayer in the campus mosque which is compulsory during office hours.

ON THE CURRICULA AND SYLLABI:

Although the founders have succeeded to formulate the institutional objectives of the school, the real heavy task was how to break down the objectives into an applicable Islamic Medical curri-cula and sillabi. The first thing we ought to do is to explore any references available in the country. It was indeed not as easy task. It looked as if we have to find a needle in a mountain of sands. Up to 1967 not any Islamic medical school available in the country, so it was impossible to make a comparative study locally.

Actually at the beginning of the very first academic year of the school, we don't have enough time to consider the multicomplex Islamic aspects of medical education. What was urgently needed at that time was how to survive and compete with the existing and well managed non Muslim medical schools. So after a short deliberation, we came to a conclusion that it shall be better to adopt the curricula of the Faculty of Medicine of the University of Indonesia, the oldest and the most respected university in the country.

To achieve the religious objectives of the school, we just assigned 4 lecturers and asked them to teach the students in any possible way so that the students could read and write *Quran,* learn by heart some *ayat* and *hadiths* especially relating to health and medicine and observe all obligatory duties accordingly such as prayer, fast, *zakat,* and *hajj,* understand *Islam, Iman* and *ihsan* and some basic Islamic jurisprudence *(shariah).* Along with the above program, we open also course on Arabic which is the Quranic language. To our surprise, the lecturers were so ambitious that 700 hours were needed for the whole courses.

The basic framework of the earliest curricula was as follow:

1st year	:	Arabic language
(100 hours)	:	*Tauheed* (faith or *Iman)*
		Quranic reading
		Theory and practice of prayer, *(salat)*
2nd year	:	Arabic language
(100 hours)	:	Theory and practice of fasting, *zakat* and *hajj*
		Quranic reading
3rd year	:	Arabic language
(100 hours)	:	History of *Islam*
		Islamic jurisprudence
4th year	:	*Arkanul Islam, Iman* and *Ihsan*
(100 hours)	:	*Tafseer* (exegesis of *Ouran)*
		Hadith
5th year	:	*Muamalat* (the law of deeds)

(100 hours) : *Munakahat* (the law of marriage)
Tafseer (exegesis of *Quran)*
Hadith
6th year : *Da'wah* (Islamic Missionary)
(100 hours) : *Tafseer* and *hadith*
7th year : Islamic view on sociology, politics, economy etc.
(100 hours) : Islamic guidance on nursing, delivery, treatment etc.
Comparative religion: Catholics, Protestant, Budha and Hindu.

To be honest, right from the beginning we were in a state of doubt. Although the lecturers have tried to do their best to formulate the curricula, but they never broke down into detail the following issues:

- what shall be the instructional and specific behavioral objectives?
- what kind of (measurable) competencies should be mastered by the students after completing the courses?
- what shall be the parameters that the objectives have been successfully achieved or not?

We do understand that teaching religion could not be treated as what has been carried out in other disciplines such as anatomy, pathology, internal medicine etc. Because if a student gets grade A for anatomy, we shall be fully convinced that the student has competencies in that parti, cular field. But if we carry out a written exam of religion to the same student, and he also gets grade A, it does not guarantee that he is a good practicing Muslim. He probably knows theoretically how to perform prayer but he may never do it in his daily life. He undoubtedly understands how to fast, but he may never fast in the fasting month. He knows that *khamar* is *haram,* but he may drinks *beer* and *whisky,* etc. On the contrary, those who get grade D could be a practicing Muslim, he observes prayer, fasts in the fasting month etc. These are some of the problems in teaching religion.

But although we were fully aware of the shortcomings, formulating a workable Islamic medical curricula was not an easy task. Meanwhile some other questions were also emerged:

- if the western style educational system is generally justified as secular in nature, what kind of curricula which is unsecularistic or Islamic?
- if the objective of education is to pursue knowledge, what is actually the definition of know, ledge in *Islam?*.

It was not until 1979, came a rather comprehensive answers. An Islamic Education Series were jointly published by King Abdul Aziz University, Jeddah and Hodder and Stoughton, London, as a proceedings of the First World Conference on Muslim Education which was held in *Makkah Al Mukarramah* in 1977.

In one of its recommendation we could find the definition as follow:

- education should aim at the balanced growth of the total personality of Man through the training of Man's spirit, intellect, rational self, feelings and bodily senses. The training imparted to a Muslim must be such that faith is in fused into the whole of his personality and creates in him an emotional attachment to Islam and enable him to follow the Quran and the *Sunnah* and be governed by the Islamic values willingly joyfully so that he may proceed to the realization of his status as *Khalifatullah* to whom *Allah* has promised the authority of the universe.
- knowledge according to *Islam* falls into 2 categories:
  - **Perennial knowledbe** derived from the *Quran* and the *Sunnah* meaning all *Sharia*-oriented knowledge relevant and related to them.

* **Acquired knowledge** susceptible of quantitative and qualitative growth and multiplication, limited variations and crosscultural borrowings as long as consistency with the *Sharia* as the source of values is maintained.

Along with the definitions the conference also recommended that the core curricula of the university education should contain the following:

* the nature of man
* the nature of religion and man's involvement in it
* the nature of knowledge and wisdom and justice with respect to man and his religion.
* the nature of right action.

All of above issues should be referred to:

- the concept of God, His Essence and Atributes
- the Revelation, its meaning and message
- the Revealed Law and what necessarily to follow: The Prophet, his life and *Sunnah*.
- the history and message of the Prophet before him
- the *arkanul Islam*
- the religious science
- knowledge of Islamic ethics and moral principles and *adab*
- the knowledge of the Arabic language
- the knowledge of the Islamic world view as a whole.

Considering of what is demanded by the recommendation of the First World Conference on Muslim Education and the content of the current core curricula of the school, we came to a conclusion that we were already in the right track. It is true that some issues were not yet included, hence what we ought to do is only to make some adjustment.

Before we start the adjustment 3 important things happend and all these have to be put into consideration. These are:

- The school changed its curricula from 7 to 6 years following the general trend in medical education reformation in Indonesia.
- Although the former curricula was 7 years, where the last two years were spared for clinical clerkship in the hospital, the teaching of religion has never been continued in the 6th and 7th years. This was due to the heavy clinical program which left no time for the students to attend the courses. The other reason was the limited facilities, especially the teaching hospital. Even up to the moment, the school has no any single hospital of its own, and for that reason the school has to be fully depended to the other private hospitals which are used on cooperative terms.
- In 1978 the Department of Religious Affairs officially appointed a task force of 12 outstanding Muslim scholars* to scrutiny the Recommendation of the First World Conference on Muslim Education, and then formulate the curricula and syllabi for the university education.

In 1979 The Task Force succeeded to publish a series publications, comprising of:

1. Basic philosophy of teaching *Islam* in university education
2. The curricula and syllabi of teaching *Islam* in university education
3. Hand book of teaching *Islam* in university education
4. Textbook I : Basic principles of *Islam*
5. Textbook II: Advance understanding of *Islam*

* The author is also a member of the Task Force.

In 1980 the Department of Religious Affairs issued a decree that the curricula and syllabi formulated by the Task Force to be officially valid in all university education in Indonesia. It was also in this year, the YARSI SCHOOL OF MEDICINE started to foster the new curricula and syllabi. From this time on, we provided courses only to the first up to the fourth year students. Although we have a special program to be implemented along with the clinical instructions, but due to the unvaporable situation in our cooperative teaching hospital, which mainly have no Islamic sphere, the courses are omitted off for the time being.

Each academic year is divided into 2 semesters, and each semester has 16 meetings. The followings are the basic set up of the curricula and syllabi will not be discussed due to the limited of time.

1. FIRST YEAR STUDENT:

The instructional objectives:

* to enable the students know and understand of how to observe prayer *(salat)* accordingly
* to enable the students read and write *Quran*
* to enable the students understand Arabic (elementary)

After completion of the course, the students should have minimal competencies as follow:

o. able to observe prayer accordingly
o. able to read and write *Quran*
o. able to understand passive Arabic (elementary)

In the whole first year the courses are focussed in the psychomotoric domain of the students. Every student should get equal attention and reliteration is encouraged to those who are less able, especially in read and write *Quran* and prayer courses. For that purpose, the first year students are divided into small group of 10, and each group is coordinated by one assistant. It is understandable that the curricula is therefore very flexible and could be adjusted and depended on the achievement of the group and individual student.

2. SECOND YEAR STUDENTS:

The instructional objectives are as follow:

* to enable the students know and understand the Islamic view on the creature *(khalaqah)*
* to enable the students know, understand and observe obligatory *ibadah*
* to enable the students know, understand and promote his *Iman*
* to enable the students know and understand the Message *(Risalah)* and put into practice the Islamic jurisprudence *(Shariah)*
* to enable the students know, and understand *arkanul Islam*
* to enable the students know, understand and adhere to *akhlak* in confirmity to *Islam.*
* to enable the students know, understand and implement Islamic law.

After completion of the course, the students should have minimal competencies as follow:

o. understand the status and character of the Creator *(Al khaliq)* and the Creature *(khalaqah)*
o. able to observe prayer and fasting accordingly
o. perform Islamic regulation on speaking, personal appearance and Islamic wear (especially for girl-students)

In the 1st semester, the following topics will be provided (in form of lecture, group discussion and assignment):

A. The creature *(khalakah)* with subtopics as follow:
   1. the universe

2. Life and death
3. Man

B. The Creator *(Khaliq)* with subtopics as follow:
4. the scope of religion
5. the substance of *Allah*
6. the prove of the existence of *Allah*
7. the character of *Allah*
8. mid-semester exam.
9. the sovereign of *Allah*
10. the schools (madzhab) in *Islam*
11. the deeds of *Allah*
12. the understanding of faith *(iman)*

C. The message with subtopics as follow:
13. the Prophecy
14. the revelation and the Holy Books
15. The Prophet tradition
16. Semester exam

In the 2nd semester, the following topics will be provided:

D. Arkanul Islam, with subtopics as follow:
1. *Sahadatain* and *salat*
2. *Zakat*
3. Fasting *(siam)*
4. *Hajj*

E. *Akhlaq* and *Ihsan* with subtopics as follow:
5. *Akhlaq, Ihsan* and ethics
6. Norms and values
7. *Akhlaqul karimah*
8. The relation between *Akhlaq, Iman* and *Ihsan*
9. Mid,semester exam

F. *Shariah* and *ibadah,* with subtopics as follow:
10. the relation between *ibadah* and *shariah*
11. the resources of *shariah*
12. the relation between *aqidah* and *shariah*
13. classification of shariah
14. capita selecta
15. capita selecta
16. Final-exam.

3. THIRD YEAR STUDENTS:

The instructional objectives are as follow:

* to enable the students know and understand why man should adhere *Islam*
* to enable the students know and understand the role of religion in one's life
* to enable the students know and understand the relation between man and *Allah,* and the duties that followed to be observed
* to enable the students know and understand the relation between man and himself and the duties that followed to be observed
* continuation of the instructional objectives of the 2nd semester of the 2nd year, but with a deeper elaboration.

After completion of the course, the student should have minimal competencies as follow:

- understand and implement Islamic jurisprudence
- able to observe fasting and congregative prayer at the beginning of its time, regularly and continuously
- similar as those of the second year with addition of ability to implement the Islamic solidarity *(ukhuwah Islamiah).*

In the 1st semester the following topics will be provided:

A. WHY MAN SHOULD ADHERE RELIGION, AND THE RELIGION SHOULD BE ISLAM, with subtopics as follow:

1. Anthropological and philosophical analysis
2. The essence of man according to Islamic point of view
3. The role of *Islam* in human life.

B. THE RELATION BETWEEN MAN AND ALLAH:

4. *Ibadah*
5. The benefit *(hikmah)* of *ibadah*
6. *Niat* (intention)
7. Cleanliness *(thaharah)*
8. Cleanliness (cont'd)
9. Mid-semester exam
10. *Salat* (prayer)

C. THE RELATION BETWEEN MAN AND HIMSELF:

11. Fasting *(siam)*
12. Fasting (cont'd)
13. *Akhlak*
14. *Akhlak* (cont'd)
15. Capita selecta
16. Semester exam

In the second semester the following topics will be provided:

D. THE RELATION BETWEEN MAN AND MAN, WITH SUBTOPICS AS FOLLOW:

1. *Muamalah* (the law of deeds)
2. Division of *Muamalah*
3. *Muamalah,* in the view of science and philosophy
4. *Munakahat* (the law of marriage)

E. LEADERSHIP, WITH SUBTOPICS:

5. Leadership in *Islam*

F. SOLIDARITY IN ISLAM, WITH SUBTOPICS:

6. The flexibility of Islamic solidarity

G. ISLAMIC ECONOMY, WITH SUBTOPICS:

7. Islamic economics system
8. Patterns of prosperity of the *umma*
9. Mid-semester exam

H. ISLAMIC CULTURE, WITH SUBTOPICS:

10. The development of Islamic culture

I. ISLAMIC COMMUNITY DEVELOPMENT, WITH SUBTOPICS:

11. The role of mosque in Islamic community development

J. SCIENCE AND TECHNOLOGY, WITH SUBTOPIC:

12. Islam as the root of Science and technology

K. DEVELOPMENT, WITH SUBTOPIC:

13. Islam as agent of development
14. Capita selecta: History of Islamic medicine
15. Capita selecta: History of Islamic medicine
16. Final exam

4. FOURTH YEAR STUDENTS:

The instructional objectives are as follow:

- To enable the students know and understand the nature of one's life according to *Islam.*
- To enable the students know, understand and put into practice all kind of health service in conformity to *Islam*
- To enable the students know and understand of how to foster analytical way of thinking towards various new phenomenon in the field of medicine and health in conformity to *Islam* teaching.

After completion of the course, the students should have minimal competencies as follow:

- able to explain the nature of life according to the Islamic point of view.
- able to explain the Islamic point of view pertaining various medical/health phenomenons such as: blood transfusion, family planning, organ transplantation etc.
- able to provide health services in conformity to *Islam.*

In the first semester, the following topics will be provided:

A. THE NATURE OF LIFE, WITH SUBTOPICS AS FOLLOW:

1. The five lifes of a Muslim (the life in the soul world *(arwah)*, the life in womb, the wordly life, the life in the hereafter, the final life).
2. Baby delivery (suggested procedures in accordance to *Islam)*
3. The status of progeny in *Islam*
4. Circumcision

B. PATIENT AND TREATMENT, WITH SUBTOPICS AS FOLLOW:

5. Health care
6. Characters which should be possessed by medical and paramedical personnels
7. Health care by opposite sex health provider
8. The duty of the sick
9. Mid semester exam
10. Manners of visiting the sick
11. Health care procedures of a dying patient *(sakratul maut)*
12. Organ transplatation
13. Blood transfusion
14. Artificial insemination
15. Capita selecta: Islamic code of medical Ethics
16. Semester exam

In the second semester the following topics will be provided:

C. HEALTH/MEDICINE PHENONMENON, WITH SUBTOPICS AS FOLLOW:

1. Food and drink
2. Psychotherapy
3. Medicine with pig substance ingredients
4. The phenonmenon: fly in potable water
5. Biopsy
6. Fasting
7. Trans,sexual operation
8. Cosmetic operation
9. Mid-semester exam
10. Sexuology
11. Family planning
12. Breast-feeding
13. Procedures of treating the deceased
14. Autopsy
15. Capita selecta: Islamic code of medical Ethics
16. Final exam

The complete curricula and syllabi is available only in Indonesia language. An English edition is now considered to be urgent and hoped could be completed at the end of this year.

It is worthwhile to note here that all materials that should be elaborated in the medical curricula as recommended by the First International Conference on Islamic Medicine have been broke down in detail in our school.

ON MEDICAL TEACHERS AND TEACHERS ON ISLAM

It is quite obvious that producing Muslim medical doctors could only be achieved if all the teachers are good practicing Muslim medical professors and lecturers. They are not only qualified as university professors or lecturers, but also understand *Islam* and put into practice all their knowledge and skill in conformity to Islam. Our years of experience concluded that it is not easy to find out doctors or university professors with such qualification. Most of university professors or doctors were trained in a western style education and very secularistic in their way of thinking, and in any kind of their performances. Their understanding on Islam are very limited, and in some cases are biased and distorted. Their intention to know more of what *Islam* really is, are also very touching.

What we have to do was to select the least secular and those who have high spirit in *Islam* and have intention to study *Islam.*

Due to the limited number of doctors made recruitment a heavy task to deal with, Specialities in basic sciences were very scarce. The only alternative was to recruit university professors and lecturers from the University of Indonesia and employed them as part time teachers. They give lectures and instructions after office hours i.e., between 13.00 up till 15.00 hours, (at 16.00 hours most of Indonesian doctors have to work at their private clinic, which are very common in the country). So it is understandable that their involvement in the academic activities are very limited.

Their secular approach made the education inclined to follow the track of western style education. Having limited knowledge on *Islam,* no efforts to promulgate Islamic point of view on specific areas. So it went on as the jargon said: **science for the sake of science or science for the sake of utilization.**

Meanwhile we recruited also fulltimers from the newly graduates, not only from our school but also from other state medical schools. The basic sciences got the prime priority. This policy was also the only alternative, due to the government restriction of prohibiting the newly graduate to take specialities in clinical sciences before they accomplished their obligatory 3 to 5 years duty in rural areas. To the new full time staff we set up a carrier development a.o. post-graduate studies in their respective field either at home or abroad. A Magister of Science program is a must to any full time staff who angaged in the field of basic sciences such as: Biology, Anatomy, Biochemistry, Pathology etc. Along with this program, research training and even a Ph.D. program in Japan, are offered regularly to the staff.

But the most important program for the full time staff is courses on *Islam*, wherein write and read *Quran* and Arabic are also included. Courses are provided in form of lectures, group discussion, assignment and practice of obligatory *ibadah*, *khatib* (preacher) or *imam*. Congregative prayers in the campus mosque are compulsary not only to the full time staff but also to any university community right from the Dean down to the gardeners, from the senior students down to the freshman. All offices, laboratories, lecture rooms, libraries are closed when *azzan* (call to prayer) is resounded. Right after *salatul zhuhur* (noon prayer) a 15 minutes lecture on *Islam* is delivered by the Dean or, the *Imam* of the campus mosque, or the head of the Centre of Islamic Studies or one of the lecturers consecutively. A panel discussion is held once a week where students or lecturers are asked spontaneously to speak on specific phenonmenon or anything that relating to the day to day problems.

Attendances are routinely checked by the staff of the Center of Islamic Studies who bears the duty of upbuilding the Islamic community in the campus. To those (lecturers or senior students) who met the minimal requirement could be sent to other mosques to be preacher *(khatib)* at Friday prayer, or *khatib* at Eid prayer.

Recruitment of teachers on *Islam* is more difficult than medical teachers. We don't have solid experience like Al Azhar University in Egypt, which produces Muslim scholars, university professors, experts on Islamic jurisprudence etc. What we have only a deep well rooted *madrasah* school or the *Pesantren Education System.* This is actually a dormitary Islamic school which now offers 3 stages of education i.e.; *ibtidaiah* (elementary), *tsanawiyah* (junior high), and *aliyah* (senior high) education. During its earlier days, which was in the 8th centuries, or the beginning of Islamic era in the country, they followed the traditional system, where the *Kiyai* (head and owner of the pesantren) provided lectures on book based program. The santri or student should has to master one book well enough, before they could go on with other books. The Pesantren education system has proved to be fruitful to the country. Almost all the *ulemas, da'i,* experts on Islamic jurisprudence, politicians, even fighters during the colonial era and in the independence struggle came from these schools.

After independence day, the government established the Institute of Islamic Studies (Institut Agama Islam Negeri or IAIN) which now 14 in number and spread out all over the country. It is expected that the institutes will produce Muslim scholars, *ulemas,* Islamic lawyers, and also teachers on *Islam.* But post-graduate studies which shall produce university teachers, was just started during the last few years, so resources are also very limited. At the moment we have four teachers on *Islam,* one is a Ph.D. on Arabic Language and one,time diplomat in Middle East country, one is an IAIN graduate, and the other two are Pesantren graduates.

OTHER FACILITIES:

Campus mosque is a conditio sine quanon in upbuilding Islamic sphere in the campus. At earlier days we have a small temporary mosque and for Friday prayer we used the multipurpose auditorium with a capacity of 500 attendances. Since 1979 a permanent campus mosque was started built. The mosque is a 2 floors with a 20 × 20m size and expected to have room for 1200

prayers. The prayer shall be held in the upper floor, while the ground floor is planned for offices, meeting room, youth activities office, lecture rooms, library etc. The campus mosque lies at the east end of the campus on a 400m² ground, so extension could be easily made for prayers. Due to the limited resources, the campus mosque is far than completed. Up to the moment only the ground floor is used mainly for prayer purposes. But the activities in the mosque is promising. Not only the university community but also the surrounding community takes benefit of this House of Allah *(bait Allah)*. After *subh* lecture, Sunday morning lecture, commemoration of Islamic days such as first *Muharram*, birthday of Prophet Muhammad (ﷺ), *Isra'* and *Mi'raj*, *Ramadhan* activities etc. are the routine program of the mosque where the Islamic families from the surrounding are taking part actively. Special library on *Islam* was also established along with the medical library. This is managed by the Center of Islamic Studies in cooperation with the Library Institute who bears res, ponsibilities of all library affairs of the school.

ACHIEVEMENT AND PROBLEMS:

It could be generally concluded that the achievements are still far from expected and strenuous efforts are needed for better improvement. There is a general pattern among the students. The longer they engaged in the school activities, the lesser they committed to the Islamic guidances. Most of the attendances of the mosque activities such as congregative prayers, commemoration of Islamic days, involvement of student activities in *Islam* are coming from the first and second year students. Very few from the third and fourth year students and much less from the senior students who are at the final stage of their medical education. It is in the contrary of what should be properly expected. The first reason to this situation is the educational system of the school. The first and second year of the school are the critical period for the students. Those who cannot meet the minimal requirement of the academic achievement could be expelled from the school. It looked that this was the magic recipe to push the students to be involved in the mosque activities. From the third year on, no such regulation has to be faced by the students. They are free to choose. The school only persuades the students to commit all school regulations. With two years experiences in Islamic courses, we expect that there will be enough inner drive to motivate themselves to observe obligatory prayers, wear Islamic dress (for girl students), and participate in mosque activities.

The second reason is no *uswatun hasanah* (good example to be followed) from above, es, pecially from the senior students and lecturers. Some senior lecturers never observed their prayer in the campus mosque during office hours. The lady lecturers never wear dresses in accordance to *Islam.* Some students greated in Islamic ways: *Assalamu 'alaikum,* but the lecturers gave no similar anticipation. To some extent the situation made the students confused. The third reason is the unconducive environment. There was a girl student who has reached high spirit of *Iman* and always committed in almost all aspect of her individual life. She observes obligatory prayers, fasts in the fasting month and the most important one is she always wears dresses in accordance to *Islam.* Once the student was asked by her father to accompany him to attend a wedding ceremony and later surprised and startled her father who is also a Muslim. The girl wore a beautiful Islamic dress, covered her hair nicely, her blouse was loose and long sleeved and she wore along and loose pants. Her father strongly disagreed with her daughter and insisted to change her dress. But her daughter argued, that this should be the way a *Muslimah* dresses as said by her teacher at the YARSI MEDI, CAL SCHOOL. Her father was so exited and threatened her, that if she don't want to change her dress to a western style one, she has to quit from the YARSI MEDICAL SCHOOL. This is only one example of so many evidents in the country. Although we have a rich culture of our own, but actually we proned to imitate the western culture. Everybody in the street wear the western dresses, alcoholic drinks are easily found at the nearby stores or even at the small vendors along the street. Night clubs and massage parlour are easily available and get official license from the local government. So the society and the environment are not conducive to put into practice all Islamic regulation.

That is the gloomy side of the school's achievements. Let us now see the other side of the coin.

Once we enter the campus, we could sense the Islamic sphere around. Almost 50% of girl students wear Islamic dresses. When passing by everybody says *Assalamu'alaikum,* instead of good morning or its kind. Although we follow coeducational system, but we separate the girl students from the boy students. The girl-students have to take the right row and the boy students in the left and in between there is a 2 meters corridor. Every student has to sit at a fixed chair, so they are not allowed to move to anonther seat, let alone to sit among the boy or girl students row.

It is compulsary to close all offices, laboratories, libraries, lecture rooms when *azan* calls. Almost 90% of the campus community join the congregative prayer in the campus mosque and follow the after *zhuhur* lecture seriously.

Among the students we could find 30% of the student body who are Muslim student activist and dominate the student activities. Although the rest is the majority, but they are the silent majority. Among the full time lecturers we could find good practicing Muslims, although they knew nothing on *Islam* before they joined the school. Some of them have been trained to be skilled preacher or *Khatib* and have experiences to deliver *khotbah* in various mosques or at family groups. Recently plenty of new medical phenomenons have made confusion among the people such as test tube baby, sex identification of 16 weeks pregnancy, genetic engineering, etc. Explanation provided by the *ulemas* were considered unsufficient, mostly of the lack of scientific data to support the Islamic point of view.

Once the Muslim doctor of the YARSI SCHOOL of MEDICINE appears to explain from both scientific and Islamic point of views, it shall settled down most of the cases.

The curricula and syllabi on teaching *Islam* is always reviewed continuously. We provide courses on read and write *Quran,* Arabics, theory and practice of obligatory *ibadah, Islam, Iman Ihsan, muamalah, munakahat* and other essentials in *Islam,* along with health services according to *Islam,* Islamic view on various medical and health phenomenons. We have formulated the institutional, instructional and specific behavioral objectives and then broke down into detail how many semesters needed, what is the relevant teaching method needed to a specific area. It is surely far than perfect, but at least we have a clear track to go on.

It is true not all doctors produced by our school could bear the title Muslim doctors, due to the fact that at earlier days we don't have a clear curricula and syllabi, limited facilities, and other shortcomings. But we could expect the next production shall meet all the requirement to be good practicing Muslim doctors. But some of our graduates have proved, that they are properly entitled to bear the name of Muslim Doctor. In the middle of Kalimantan island, where rivers are the only way to connect villages, surrounded by heavy tropical forest, the YARSI graduate was warmly welcome by the villagers. Once the doctor joined the morning prayer (*salatul subh),* it roused the attention of the villagers, for it was very rare to witness a doctor in a remote village observed prayer in the mosque, especially morning prayer. They spontaneously asked the doctor to be the *Imam* of the congregative prayer and to be the *Khatib* of Friday prayer. The result is clear. The barrier of communication was instantly broken down, and the duty of the doctor could be easily accomplished.

CONCLUSION

The YARSI SCHOOL OF MEDICINE is the only Islamic medical school in Jakarta the capital city of Indonesia. It has to compete with the other 5 Non Muslim medical schools which are more developed and well managed. The aim of the establishment of the school is to produce Muslim Doctors who are not only qualified physicians but also put into practice their knowledge and skill in conformity to *Islam*. For that purpose the school has succeeded to formulate the curricula

and *syllabi* of courses on *Islam*. Compared to the recommendation of the First World Conference on Muslim Education *(Makkah, 1977)* and the Islamic Code of Medical Ethics which has the paramount result of the First International Conference on Islamic Medicine (Kuwait, 1980), we come to a conclusion that we are already in the right track. Although we are fully aware of various shortcoming, due to limited resources, expertises and facilities, we pray to *Allah* may He always bestows us with *taufiq* and *hidayah*, so that the school could be His mean to prove His Righteousness in this world.

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THERAPY BY FOODS OR DRUGS?

The preference of foods by Islamic physicians out of compassion towards their patients.

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EGYPT

The ancients differed in their appraisal of the comparative values of foods and drugs in the preservation of health and the cure of disease. To our knowledge, this started with Hippocrates who gave prime importance to diet and, not only wrote *Peri Diaitae*[1] where he described the individual qualities of foods, but permeated with the same notions all his writings, even those dealing with conditions, like fractures, seemingly unrelated to diet. Hippocrates recognized, however, the difficulty of making absolute statements and setting rigid rules owing to the variations existing in human temperaments, ages, countries, winds, and composition of food substances. What attracts attention is that in chapter LXVIII, 1 of this same work he declared that he wrote it to benefit those who lead strenuous lives in order to gain a living, and eat irregularly and at hazard.

It is indeed impossible to overestimate the importance given by classical Greek medicine to diet. Food was - apart from air - the only external thing to enter the body and to be assimilated by it. It was, therefore, before the role of micro-organisms was discovered, the only foreign agency to which disease could be attributed.

But, owing to ignorance of the chemical composition of foods, of the laws of assimilation and metabolism, and of the caloric and body needs, knowledge of food was based, on the one hand on empirical experience and, on the other, on religious and analogical considerations inherited from the Pythagoreans who maintained - a belief shared by Plato[2], that science is concerned with the purification of the soul and that the health of the soul depends on the health of the body.

Egyptian physicians (also) held that food, if subjected to insufficient or faulty digestion, could be transformed into morbid entities[3], and they influenced the school of Cnidos and, possibly, the school of Co[4] who professed smilar theories.

Arab physicians, although they recognized that foods and drugs constitute the pillars of therapy, differed in the importance they accorded to each.

The importance of diet was, however, stressed by many, of whom Avicenna who expressed it in several verse of his Canticum[5]: "To preserve health, medicine acts in two ways. To maintain the temperament give a similar diet. To alter the nature of the body, give its contrary (verses 791–798)[1].

"Having dealt with the preservation of health, start to deal with disease according to a single principle. Meet anything with its contrary: heat with cold, cold with its contrary; moisture with dryness; dryness with its contrary (verses 989-992)."

Avicenna apears here to have adopted the Galenic principle of treatment by contraries, opposed by Averroes[6], who took the view that medicines merely trigger the natural healing forces.

But the relation between diet and drugs was more than being one of mutual support, for they were regarded as comparable in quality and nature according to some simple principles:

1. The action of any substance introduced into the body is the result of a reciprocal action/ interaction between its nature and that of the body.
2. The nature of all beings, animal, vegetal, and mineral, is the result of the proportionate faculties of the elements, fire, air, earth, and water that compose it.
3. There are four faculties, two opposed to two: heat and cold; moisture and dryness.

4. The mixture of the faculties constitutes the temperament.
5. Temperaments are of two kinds: a first temperament made of the addition of the faculties; a second temperament resulting from the combination of the constituent faculties creating a new, different temperament.

The animal body, like foods and drugs, was also said to be made of the four elements, that are transformed into the four humors (blood, phlegm, and the two biles) from which arise the organs, each credited with the temperamet created by the combination of the humors that compose it.

This elegant construction, that put the body, foods, and drugs in the same frame, permitted the classical physicians to imagine their interactions, that Avicenna summarized by saying that everything eaten or drunk acts in the body either by its faculty, or by its elements, or by the totality of its substance.

What acts by its faculty cools or heats by its cold or heat, without being assimilated. What acts by its elements is transformed into the form of the organ but keeps its faculty. Thus blood engendered by lettuce is cold, while blood engendered by garlic is hot. What acts by the totality of its substance acts by the resultant of the mixture (we would say today by the combination) of its simples if anything different results from it[8].

There was thus no essential difference between the actions of the three. Any difference was one of degree:

In the first degree, the action was imperceptible.
In the second, action was perceptible but harmless.
In the third, action was harmful, but short of lethal.
In the fourth it was lethal. This was the nature of poisons[9].

Owing to this haziness of frontiers, scientists, like Avicenna in book II of the Canon[7] that deals with simples, discussed consecutively minerals, food substances, drugs and poisons, e.g. mandrake, storak, and lapis-lazuli; or lentils, honey, *Calotropis gigantea*, and scorpions; or iron pigeons, poplars, the terebinth tree, chameleons, vipers, and donkeys.

This is also clear in the gradation Avicenna establishes between what were called foods,medicinal foods, nutritional medicines, and poisons. If a substance is transformed and assimilated by the body without altering it, it is a food. If it is not assimilated by the body, it is a moderate medicine. If it is transformed by the body and transforms it: if it is assimilated by it, it is a nutritional medicine; if it is not assimilated it is a medicine *sensus strictu*. But if it alters the body without its being transformed, it is a poison[9].

In other words, what is completely mastered by the body is a food; what masters the body is a medicine; what masters the body at first and is later mastered is a medicinal food.

In the absence of any correct knowledge of chemistry and pharmacology, the faculties were deduced either from the rapidity of their alteration, or by their effects on the senses, or by inference from known actions. Thus substances that are easily heated or burnt were regarded as hot, and substances that easily solidify, as cold.

Taste was considered the most reliable of the senses. Nine tastes were recognized: insipid, astringent, acrid, salty, bitter, pungent, acid, sweet, and fatty. To each, specific actions were attributed.

Odours were less reliable because, although the vapours that are perceived by smell affect taste as well, they emanate from only part of the examined body whereas the organ of taste obtains contact with the whole.

Other sensations, like colour, touch, thickness, lightness, viscosity, fluidity, friability, solidity,

dryness, fatness, and heaviness, were also taken into account.

In addition, unknown qualities were inferred from known ones, but Avicenna and his peers insisted that they should be subjected to trial as the surest test for, otherwise, they were at best, guesse trials should, however, comply with strict conditions: the drugs should be devoid of accidental qualities; they should be equal in force to the illness; they should be tried on single illnesses and on opposed illnesses; their actions should be reproducible; and the timing of the response should be noted. In that way, Avicenna[10] listed no less than 49 different qualities.

It is worthy of note that these actions were not thought to be limited to the sense organs; they represented the actual action of these substances on the internal organs.

We have somewhat insisted on the lack of any absolute distinction between foods and drugs. This was the reason why some physicians preferred treating by diet and avoided drugs whenever they could. This was tersely expressed in a saying attributed by Ibn Abi Usaybi'a[11] to Rhazes: "If the physician can heal with foods without using any drugs, he accedes to felicity".

Ibn al-Nafis professed the same principles. "In spite of his wide knowledge of medicine and his perfection in all its branches, said one historian[12], he was not an able therapist. When he prescribed he never changed anybody's customary regimen; he did not prescribe any drugs if he could prescribe a diet, nor any compound medicine whenever he could do with a simple one. He would prescribe wheat gruel *(qamieh)* for ulcers, meat stew for flatulence and carob for diarrhoea... until the druggist at whose shop he used to sit told him: If you wish to prescribe such remedies, go and sit at the butcher's shop. But if you sit with me prescribe nothing but sugar, syrups, and drugs".

Although one suspects this to be a mere quip, it does illustrate, albeit in a caricatural way, the inclinations of this great physician whose therapies we cannot but condone, for gruel is an admirable dressing and carob is an effective astringent.

Another tale that confirms his intellectual honesty is his answer to someone who asked him with what he could treat a nodule. "By *Allah,* he answered, I do not know with what a nodule can be treated[12].

If the avoidance of side-effects were the only motive of Islamic Physicians, it would be ample reason to praise them. But the prevention of "iatrogenic" illnesses was not the only reason for the avoidance of drugs.. Physicians in the Islamic world received huge rewards from rulers and sovereigns, and they were accustomed to prescribe to their wealthy clients expensive drugs, imported at high cost from remote countries, China, India, etc.. Some, like Avicenna, prided in being too expensive to buy[13].

No doubt, some of them were more interested in amassing fortunes by any means. Bagdady[14] found Yassin el-Sinia'i to be an impostor and a quack, and Mussa Ibn-'Umrân to be extremely meritorious but inclined to serve rulers.

Many, however, were known for their generosity and charity, which they expressed in many sayings, like Rhazes's: A physician must be moderate, not entirely attracted by this world nor entirely turning away from the other, following a middle course between desire and awe.

Rhazes was said to be generous and obliging, benevolent to people, charitable to the poor and ill, appointing to them lavish rations and sparing no effort to treat and heal them by all means available to him[16].

In the same way Aly ibn-Radwan wrote in his autobiographical notes: "I always try to be humble in my dealings, keen to help grief, to discover the distress of the afflicted, and to assist the needy, my aim being to enjoy the pleasure of good deeds". He added: "There must come out of this some gain

to be spent... and what remains I spend on parents, comrades, and neighbours.

Another of his notes runs as follows. "A physician, according to Hippocrates, is one with seven qualities, of which the desire to cure patients stronger than the desire of gain, and the wish to treat the poor stronger than the wish to treat the rich[18].

This is the reason why many Islmic physicians expressed their concern over needy patients by writing on therapy by diet and cheap drugs.

In a recent article, Dr.S. Catahier[19] mentioned some of these treatises, of which a work by Rhazes *"Man lā iahdaruhu el tabīb"* (Who is not assisted by a physician), also called *"Tibb al Fuqarā'"* (Medicine of the poor), and another by *Ibn al-Jazzar al-Qayruwanč "Tibb al-fuqarā' wal-masākīn"* (The medicine of the poor and destitute) which was criticlly edited by Catahier who judged that its contents were inspired from Rhazes.

The purpose of Ibn al-Jazzar's work is clearly stated by him in his assertion that when he found that many poor and destitute failed to gain any benefit from his books owing to their poverty, he thought of relying on foods and drinks in treating his patientjs. This intention is stressed by the fact that he was also the author of a book on simple drugs and another on compound drugs[20].

In fact, Ibn al-Jazzar seems to have been a man of high principles. "Nobody could reproach him for any slip in Qayruan, and he never gave himself to pleasure, wrote Ibn Abu Usaybia[21]. When he attended weddings or funerals, he never ate there anything, and he wrote a treatise to warn against drawing blood when there was no need for it".

A similar work was another *"Tibb al-Fuqarā' (The Medicine of the poor) also mentioned by Catahier (loc. cit.) written by Jamal al-Din Yussuf al-Hambali[22], who noticed that the bodies of the rich are teeming with ailments because of their pleasure-filled lives and their rich fare, whereas illnesses are less common among the poor because they eat little and do not heap foods on foods, and remarked that if a poor man is taken ill, he needs cheap easily available drug.*

There thus seems to have been formed what we might call a "corpus" of works aiming at curing poor people with cheap drugs or with foods rather than drugs, to make treatment easily available to them.

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THE ROLE OF ISLAM AND ITS TEACHINGS IN PLANNING FOR HEALTH EDUCATION IS SHOOLS OF ISLAMIC WORLD

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INTRODUCTION

The Islamic world lives "a mental revival" based on *Islam* and its teachings. This "revival" or "renaissance" extends for many fields: politics, economics, education, medicine, etc. Suffice it to mention here just few of the scientific institutions in Islamic world: The International centre for Research In Islamic Economics, Jeddah, Saudi Arabia; World Centre For Islamic Education, Makka Al-Mukarramah, Saudi Arabia; The Islamic Educational, Scientific and Cultural Organization, Rabat, Morocco; Research Centre for Islamic History Art And Culture, Istanbul, Turkey; Islamic Medicine organization, Safat, Kuwait.

This study belongs to this sort of research which attempts to plan for "Health Education" in the schools of Islamic world, based on Islamic teaching in accordance with:

First: Teachings of *Islam* in respect of health is able to make the Muslim world supreme in health, cleanliness and progress in case those are followed.

Second: Health education at school is the most important thing to deepen the concept of health in the majority of people. Therefore, we should pay attention to its importance.

OBJECTIVE OF THE STUDY

Most studies dealing with health education in the islamic world are likely to ignore the role of *Islam* and its teachings in planning for health education in schools[1]. Such ignorance is commonly shared among the researchers of Islamic world as they do the same with their political, economic, social, educational, scientific, medical studies, etc.... Accordingly, these studies seemed to be isolated from *Islam,* which resulted in creating demolishing effects with regard to the scientific and mental life in most muslim countries:

First: With the absence of *Islam* and its teachings from political, economic and social life, *Islam* was restricted only to the thought that *Islam* is merely a religion without effects on life in general. Therefore, many generations of Muslim researchers inherited such a wrong idea without verification.

Second: As many muslim researchers ignored Islam and its teachings in their specialisations, their studies come as merely reflections of foreign studies. Instead of creation and development of

other efforts of knowledge they were satisfied with translation or imitation. So, most of their studies lost the Islamic characteristics. This led to make muslim researcher in the past unable to create his own culture which would be appropriate to the development of his society[2]. Therefore, we need to approach our studies from an Islamic point of view which explains *Islam* and its teachings in many fields: political, economic, and social.

The present study aims at demonstrating how to use the Islamic teachings as bases of health education, as well as to use them as tools for creating appropriate health environment. Undoubtedly, this study needs many details, a long time of researching and co-operation of many researchers in health education to make it clear and exact.

Why is the present study interested in planning for health education in the schools of the Islamic world?

There is a great shortage in books concerned with health education, in spite of the fact that the field of health education is very important. Its importance is due the fact that the pre-university stage lasts for a long period of time and it has more students than those in the university. In Egypt, for instance, the primary stage extends from the age of six to twelve. It includes 4.3 million pupils, who represent 75% of those who are between six and twelve. The preparatory stage includees 1.5 million pupils, who represent about 55% of those who are between thirteen and fifteen. As for the secondary stage, it includes about 975 thousands students, who represent 40% of those who are between sixteen and eighteen. Therefore, the three stages of the Egyptian school education have nearly seven million students representing 17.5% of the population. As for the university stage, it includes about 500,000 students representing about 12% of those who are between 19 and 22 and representing about 1.5% of the population. The students' enrollment in the preuniversity stage increased in Egypt since 1982 when the "Basic Education" system was iintroduced[4]. It is likely that schools in other Islamic countries include a great numbers of its population.

The Islamic world doesn't point to a geographic area of land but extends to include every muslim whatever his nationality is, that, the present study realises the differences between those countries whose citizens are Muslims, e.g. Egypt, Indonesia, Pakistan and Turkey and those where Muslims are few and ruled by people of different religions, e.g. European and American Muslims[5]. Because of the differences of health problems between the two groups and even between the Islamic countries themselves, it will be very difficult to set a general plan for health education in schools of the Islamic world. Although this world has its great materialistic and intellectual powers which represent thousand million Muslims who represent 1/5 of the population of the world and who control over a quarter of the world, besides, they share in world production; for example, they produce about 15% of wheat and rice, 10% of sugar, 99% of dates, 80% of cocoa-nut, 30% of olive, 43% of cotton, 80% of rubber, 60% of petroleum, 56% of tin, 40% of grape, etc[6]. It has also Islamic teachings which encourage co-operation and strength in every field, that it did not form an international health system to discuss Islamic world's problems in health and to set plans for solving them.

Although there are no Islamic health institutions following up health conditions of Muslims and planning for health education in schools of Islamic world, the programmes of health education all over the world pointed out that the experience of health education comes out of: (A) healthy life at school, (B) school health services, (C) teaching health subject, (D) the connection between school, family and society in this concern[7]. Therefore, any plan for health education in the schools of Islamic world have to deal with these four points.

First: The Islamic aim of school health education:

Before we discuss these four elements of school health education, we have to discuss first the aim of school health education. It is quite known that school health education aims at providing students with correct healthy behaviour in their bodies and minds[8], it also aims at creating general health knowledge among students[9]. We find *Islam* interested in these aims as religious necessities just to make Muslims strong and able to achieve their different religious duties, i.e. praying, fasting, giving alms, pilgrimage, struggling for the sake of *Allah* and the construction of the universe[10]. Undoubtedly, fixing in the minds of the students that health aim is an Islamic necessity is very likely to make them more and more interested in this aim. They will realise that Islam does not accept those who are weak in body. Prophet Mohammad (ﷺ) says, *"The strong believer is better and more accepted to Allah than the weaker"*. And *Allah*-highly exalted-says:

> *TRULY THE BEST OF MEN FOR THEE TO EMPLOY IS THE (MAN) WHO IS STRONG AND TRUSTY.*
>
> (S28: V26)[11]

and says:

> *MOHAMMAD IS THE APOSTLE OF ALLAH-AND THOSE WHO ARE WITH HIM ARE STRONG AGAINST UNBELIEVERS (BUT) COMPASSIONATE AMONGST EACH OTHER*
>
> (S48: V29)

He also says:

> *ALLAH HATH CHOSEN HIM ABOVE YOU, AND HATH GIFTEN HIM ABUNDANTLY WITH KNOWLEDGE AND BODILY PROWESS.*
>
> (S2: V247)[12].

So, the students will believe that health and strength are Islamic necessities, Muslims must follow according to the orders of *Allah* and His prophet. In addition, health education must secure the students from spiritual diseases which come when man keeps away from *Allah* and sinks in evil. This safety will help the students to be safe from body diseases and provides them with happiness and satisfaction. So, health education is interested in both body and spiritual diseases as Ibn Qayiem Al-jawzziah says:"Diseases are two types: heart disease and body disease and they are mentioned in the *Holy Quran*[13], then he speakes about the features and the ways of treating them. This is a good aim of health education to be followed when planning for health education in schools of the Islamic world.

Second: Elements of school health education:

1. School healthy life from the Islamic point of view:

The studies that deal with school health education try to speak about the importance of school health environment which depends on the place and the school-survey, the health conditions of school buildings[14]. School health environment is considered a good example for healthy life. School healthy life is a good repeated actual experience reached by means of healthy habits, and training

students to live according this correct healthy life[15]. In planning for health education in our Islamic schools we must benefit from all the literature written in Arabic and foreign references about creating school healthy environment for students to live in, but we must then concentrate on these matters:

A) Drawing the students attention that *Islam* is interested in creating healthy environment where diseases cannot exist because of cleanliness which *Islam* orders. By cleanliness we mean the complete cleanliness of bodies, clothes, customs, houses, food, drinks and sources of water[16]. There are many verses of *Quran* and speeches of the prophet (ﷺ) supporting this matter[17].

B) Drawing the students' attention that Muslims in the ages of revival were interested in these healthy principles in their educational institutions whether they were mosques or schools, etc. Islamic source-books speak about lavatory which was near the mosque for ablution and the sunshades which were built over doors and windows to protect people from sun and rain and to decorate it. There were also fountains full of water in the middle of the mosque or school to soften the temperature or in fear of a fire at night, bathrooms for taking baths, kitchens for cooking, clocks for knowing the time and for decoration, etc[18].

Unfortunately, the present books of school health education neglect these matters. This makes the students think that these things are products of the modern age not of Muslims. So, we are in bad need of studies to represent the great healthy environment which Muslims created for their educational institutions.

C) In addition to the importance of the healthy environment at school, we should have to mention, what was assured by some studies, that it is necessary in this concern, to provide a healthy atmosphere in relations between the staff members themselves and also good relation between teachers and students. For, this mutual good relations is no less important than the material part of the school environment[19]. Islamic teaching supported the connections among scientists and students and between them and their teachers. *Islam* makes those strong connection the most important feature of Islamic education[20].

In planning for health education in Islamic schools we must try to revive our Islamic traditions in this concern and to make all efforts to return to the real relationship between student and teacher which is necessary to make school life appeals to the students who, then, will come eagerly to their educational institutions.

2. School health services from the Islamic point of view:

"It would be ideal if all children from kindergarten to college come to school in perfect health. They do not. Experience has shown that of 100 children of school age 1 has a heart disorder, 20 have vision difficulties, 10 have hearing impairments, 15 are impaired nutritionally, 10 have some problem associated with growth, from 20 to 40 have some emotional or psychological disturbance, and practically all of them have one or more dental defects. Further more, an appreciable proportion of them have impairments such as allergies, orthopedic problems, ear nose and throat disorders and disorders of the skin, or are chronically fatigued. And then, in addition, there are those who live in the borderline of good health practice... who do not get enough sleep, recreation or fresh air and sunshine"[21]. It is clear that the receptivity of any student to learning will vary with his state of health. An ill child suffering from flu, measles or acute appendicitis will be physically absent from school. So his or her receptivity will be nil. A chronically ill child may also have difficulty in learning. A child suffering from anaemia, stunted growth from whatever reason, etc, will lack initiative and drive, and find it hard to apply himself to a set task[22]. That is why it is important for schools to introduce health services to its students to keep them in good health.

Many studies believe that there are six health services or activities the school must do to keep its students in good health[23].

a) To discover the infectious diseases of the students to protect them from them and to take the necessary procedures for cure[24].

b) To evaluate the health of the students and employees at school by making periodical exams which include students' weights and hights, by examining their teeth and all body organs, by examining urine and excrement, by examining breasts with rays, by making psychological examination from time to time for those who seem to have psychological problems[25].

c) To adjust defects and diseases by guiding the students to be interested in the cleanliness of their teeth or to make medical glasses.., etc. Some teachers should have notebooks to register the healthy conditions of the pupils and the school nurse can return to these notes[26].

d) Sudden accidents and diseases in school day must be paid attention[27].

e) To constract health services for the old students who have obstacles in hearing, sight, speaking, epilepsy, mentally defectives, enmity conduct, stealing, running away from school, disobaying, etc[28].

f) To observe the health of school environment and to make sure it follows the health conditions already mentioned[29].

We would like to draw attention that Islamic institutions provided their students with appropriate health services. They presented food, dwelling, cure, etc... . For example an Egyptian contemporary historian, when speaking of the school of Sultan Hassan (757 H) said:

"It had three kinds of doctors: one specialises in internal medicine, another in eyes, and the third is a surgeon"[30].

If you read the two travels of Ibn Jobair and Ibn Batotah, you will find shining pictures for the interest of Muslims in their educatioal institutions concerning the beauty of the buildings, introducing food, dwelling, cure, etc.. to the students[31]. Also, Muslim doctors did not suffice with giving lessons and lectures to the students, but went to patients in hospitals examining their health conditions and giving them the cure[32].

3. Teaching health from the Islamic point of view:

A) The subject of health education:

There has been disagreement among health educators: Is it better to have a special syllabus for health education? or is it to be taught through other subjects, especially atheletics, basic sciences, social sciences and domestic science?[33] This disagreement has been settled that there should be a separate special syllabus for health education. Students should be provided with complete and enough health education, as it has been proved that teaching other subjects only is no longer satisfactory. Teaching health through these subjects may concretise the student's educational experiences, but most reports in this concern point out this way of teaching can never replace direct health teaching as a seperate subject. There is a bad need for a special course in teaching comprising all subjects which relate to this course[34].

The school subjects coverd in the syllabus of health education in Arabic and foreign references are often about the human body and its functions, nutrition, the system of a healthy life: atheletics, resting, sleeping, cleanliness, etc.. as well as infectious diseases; their causes and their cures, and also first aid, etc. These subjects vary from an educational stage to another. What draws our attention

here is the neglect of *Islam* and its teachings in forming these health subjects despite the fact that there are many verses of holy *Quran* and *sunnah* dealing with such subjects. Suffice it to refer Al-Zahabi's book: *Al-Tib 'Al-nabawi* and to Ibn Qayyim Al-Jawziyyah's book: *'Al-Tib 'Al-nabawi* which cover most of these subjects[35].

Moreover, *Islam* concentrates, besides body medicine on "spiritual medicine", suffice it to refer to 'Ibn 'Al-Gawzi's *'Al-Tib 'Al-Rohānī,* 'Al-Shīrāzi's *'Al-Tib 'Al-Rohānī,* 'Ibn Hazm's *Risālah Fi Mudāwāt 'Al-nufūs wa Tahzīb 'Al-'Akhlāq Wa 'Al-Zuhd Fi 'Al-Razā'il.* 'Ibn 'Al-Gawzi in the introduction of his book says: "when I wrote a book in body medicine which I called *Loqat 'Al-Manāfi',* I liked to follow it with a book in spiritual medicine which I called *'Al-Tib 'Al-Rohāni*[36]. Muslim doctors paid attention to the health of body and spirit. Therefore, the writings of health education in our Islamic schools should be modified in order to take the Islamic attitude through the holy *Quran* and the prophet ﷺ sayings. Besides, we should add apart of "spiritual medicine" as dealt by our Muslim scientists, This is different from modern psychological treatment, since Islamic "spiritual medicine" is based on concretising the relation between man and his creator[37].

B) Methods of teaching health from Islamic point of view:

References of health educationt talk about different methods of teaching health. There is the direct method in which the teacher presents the health information and discusses them with the students. These is also the methods of projects in which the students achieve a specific health project thrpugh which they can obtain health information and health behaviour. Apart from these methods, there are the helping audiovisual aids:

1. Doing aids; like recognition of bacteria and parasites by using the microscope.
2. Observation aid; like demonstrations, field trips, exhibits class shows, moving pictures, Radio, Recorderings, Television, etc.
3. Symbolic aids; whether visual symbolic or verbal symbolic[38].

There is no doubt that we should make use of these aids when planning for health education in our Islamic schools with communicating the educational process with the "Islamic motive" whether in the teacher or the students. Teachers should also be good examples in this concern. Muslims had introduced some kind of literary health publications as *Da 'wat 'Al-'Atibā' 'Ala Mazhab Kalilah Wa Dimnah* written by 'Ibn Batlān, the medical doctor[39]. We can apply this method in our planning for health education in our schools.

4. The relationship between school, home and society from the Islamic point of view:

Students experience health at school, home or society in which they live. This experience must not be against the ideal health behaviour, Hence, health educators insist that there should be a relationship between the school and the students' parents in order that the school can give the students the necessary health experiences for their growth and maturity. Some correspondent in developing countries pointed out that 17% of the new students in his school suffer from malnutrition and he commented: "poverty is not the only cause of malnutrition", he assured that ignorance is the top cause of this[40]. Therefore, schools have to co-operate with local health authorities to raise the interest of the people in health aspects of life, and motivate them to change their unhealthy behaviour into sound healthy behaviour. To achieve this, our Islamic schools are in bad need to well trained teachers in health education, doctors, nurses and other health workers[41].

In the present writer's opinion, Islamic teachings may be an effective tool in creating public health consiousness at school, home, and in society. Health and educational authorities may take the charge to spread health behaviour using the Islamic motive. By using the "Islamic motive" it is easy to influence the people through mass media: broad casting, T.V., press, films, circulars, pamphlets, booklets and posters[42].

CONCLUSION

We have seen that *Islam* with its health teachings is a starting point in planning for health education in schools of the Islamic world whether in identifing the aim of health education or in talking about the four elements of health education: (1) the healthy life at school, (2) school health services, (3) teaching health, (4) the relation between school, home and society. We have also seen that the mixture of these four elements in *Islam* may result in special health education appropriate to our society.

Here, the present study insists on the importance of approaching the "faith method" of *Islam* in health education and the importance of re-writing health education books from the Islamic point of view. To start with, it is better for us to write "The Guide to Health Education" as a comprehensive reference for health educators and other health workers. This guide or catalogue should contain the subjects of health education from the Islamic point of view, and full information about the health position of Muslim countries, and also, how the Muslims in their golden ages had applied health principles in their educational institutions. This task needs the co-operation of many educationalists, doctors, historians, and Islamic scholars.

It is clear, that if we follow these broad lines in planning for health education in our schools, we will be able to build up a strong Islamic societies, characterised by strength of body, mind, and manners.

NOTES

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THE ROLE OF ANIMAL INDUSTRY AS RELATED TO HUMAN HEALTH & DISEASE IN QURANIC SCIENCES

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Medicine, like other sciences, drew its nourishment from the *Quran* and its philosophy of life. However, the Doctrine of harmony and balance in nature is the universal principle recognized by *Islam* and prevades every branch of Islamic studies. It is, therefore, not surprising if the principle of the balance between the nature and the humours became a part of the Islamic view of nature and influence the study and research of medicine in *Islam*. Thus it would not be far from truth to say that the principles of medicine, as of other Islamic sciences, are deeply rooted in the Islamic faith. In fact, the whole science of medicine is closely related to Qur'anic studies and the Islamic faith. The whole study of medicine is also related to the Islamic faith through the injunctions of the Holy Qur'an and *Hadith* of the Holy Prophet (ﷺ) concerning hygiene, better and healthy living. In short, the Islamic *Shari'ah* has issued directives regarding ablution, cleanliness, general hygiene, dietary habits, healthy foods and many other elements affecting the body and its health.

On the other hand, there is an intimate link between medicine and *Islam*. The human body is considered to be the formal residence of the soul *(Ruh)* and therefore closely related to both the spirit and the soul, thus presenting a two-fold aspect first, as the symbol of existence according to the famous dictum *(al-insan ramz al-wujud)*, whereby both soul and spirit are intimately related to and dependent upon the physical body of man because the former cannot exist in this world without the latter; second, man has to maintain his outward form in a good and healthy condition to exist at all, and for this reason the existence of the inner aspects (i.e. the spirit & the soul) become absolutely dependent upon the former. Therefore, the health and care of the body becomes an important matter both for medicine and religion, in order to keep man outwardly and inwardly in a healthy condition. Furthermore, it is necessary to keep the physical body very healthy so that the spirit and soul may also remain healthy and so help him in the service of both his material and spiritual attainment. Diet has, therefore, played an important role in Islamic medicine. It is a recognized fact that the food which a human being uses, effects not only his constitution but also the building up of his character, and hence in a complete code of life, it was necessery that human beings should tought ways of clean eating, clean drinking, clean dressing, clean appearance and clean habits of all kinds. These regulations are sometimes obligatory but very often of a recommendatory nature.

The first general rule regarding foods, is laid down in the following words in the Holy *Quran*

> *O PEOPLE! EAT THE LAWFUL AND GOOD THINGS OUT OF WHAT IS IN THE EARTH.*

Islam, also, has prohibited certain foods because of their ill effects and allowed all other pure, good and clean things

> *O MUHAMMAD! ASK THEM WHO HAS FORBIDDEN THE DECENT AND CLEAN THINGS THAT GOD HAS PRODUCED FOR HIS SERVANTS AND (WHO HAS FORBIDDEN) THE GOOD AND PURE THINGS OF LIFE, GRANTED BY HIM. SAY: ALL THESE THINGS ARE FOR THE BELIEVERS IN THE WORLD BUT ON THE DAY OF RESURRECTION, THESE SHALL BE EXCLUSIVELY FOR THEM. THUS DO WE MAKE CLEAR OUR REVELATIONS TO THOSE WHO POSSESS KNOWLEDGE.*

And in *Surah Al-Baqara*, we read,

O bELIEVERS! EAT OF THE GOOD AND PURE THINGS THAT WE HAVE PROVIDED FOR YOU AND BE GRATEFUL TO GOD, IF YOU ARE TRUE WORSHIPPERS OF GOD.

Then people in general are advised to eat good and pure things and not to indulge in impure, bad and harmful things, following their open enemy, the Devil.

O PEOPLE! EAT OF WHAT IS LAWFUL AND GOOD ON EARTH AND DO NOT FOLLOW THE FOOTSTEPS OF THE EVIL ONE, FOR HE IS YOUR OPEN ENEMY.

After stating the general principle with regard to food, the role of animal protein as well as animal products played in human health and disease according the verses in the *Quran* is worth mentioning. However, the study will include:

I. Animal Products & By-products as nutrients
II. Prohibitions and Food Hygiene.
III. Animal Products as Therapeutics

I. Animal Products and By-Products As Nutrients

The *Qur'an* has given very useful tips regarding a balanced diet which contains every useful ingredient necessary for the growth, strength and repair of the human body, including animal protein, fat, calcium, iron, salts etc. The most balanced diet consists of meat especially roast fat calf, or fish, fresh milk, cheese and fruits. The *Qur'an* makes indirect references to the importance of animal Protein in human diet on various occasions.

THERE CAME OUR MESSENGERS TO ABRAHAM WITH GLAD TIDINGS. THEY SAID, 'PEACE! 'HE ANSWERED 'PEACE! AND HASTENED TO ENTERTAIN THEM WITH A ROASTED CALF.

And in *Surah Al-Zariyat,* we read,

HAS THE STORY OF ABRAHAM'S HONOURED GUESTS REACHED YOU? WHEN THEY CAME TO HIM AND SAID, "PEACE!, HE ANSWERED, 'PEACE! (AND THOUGHT, THESE ARE) UNUSUAL PEOPLE. THEN HE WENT QUICKLY TO HIS HOUSE HOLD, BROUGHT A ROASTED FATTENED CALF, AND PLACED IT BEFORE THEM, SAYING, 'WILL YOU NOT EAT?

It is also stated that when the Holy Prophet (ﷺ) came to Madina, he sacrificed a camel to feast his friends, from which it is concluded that when a person comes home from a Journey, he should entertain his friends with excellents meals. Then the *Quran* also mentions the meat of fowls that one likes.

AND THE FLESH OF FOWLS, ANY THAT YOU DESIRE.

Fish is also considered to be food of very high protein and very important for human consumption. The *Quran* also refers to this fresh food in these words,

IT IS HE WHO HAS MADE THE SEA SUBJECT, THAT YOU MAY EAT THERE OF FLESH FRESH AND TENDER.

And again in *Surah Al-Fatir,* we read,

YET FROM EACH (KIND OF WATER) YOU DO EAT FLESH FRESH AND TENDER.

Then *Quran refers to the importance of animal protein in general in human diet.*

AND THE CATTLE HE HAS CREATED FOR YOU; FROM THEM YOU DERIVE WARMTH, AND NUMEROUS BENEFITS, AND OF THEIR MEAT YOU EAT.

And in *Surah Al-Mu'min,* we read,

IT IS GOD WHO HAS MADE CATTLE FOR YOU, THAT YOU MAY USE SOME FOR RIDING AND SOME FOR FOOD.

The usefulness of fresh milk is stressed in these words,

AND IN THE CATTLE THERE IS TRUELY A LESSON FOR YOU. WE GIVE YOU TO DRINK OF THAT WHICH IS IN THEIR BELLIES; THERE ARE IN THEM (BESIDES), NUMEROUS OTHER BENEFITS FOR YOU; AND OF THEIR MEAT YOU EAT.

And in *Surah Al-Nahl,* we read,

AND TRUELY IN THE CATTLE THERE IS A LESSON FOR YOU. WE GIVE YOU TO DRINK OF THAT WHICH IS IN THEIR BELLIES, BETWEEN THE REFUSE AND THE BLOOD, PURE MILK PALATABLE TO THE DRINKERS.

In the meantime the Holy Prophet (ﷺ) said

"I do not know any other food which can compete with milk in its nutrients. However, recent scientific work confirms the value of milk not only as nourishing food but also as medicament"

God Almighty bestowed His Favours upon the people of *Israeal* when they were wandering in the Sinai desert with the Prophet Moses, and gave them food comprising animal protein.

AND (WE) SENT DOWN ON YOU MANNA AND SALWA FOR YOUR FOOD SAYING, EAT OF THE CLEAN AND PURE THINGS WE HAVE BESTOWED UPON YOU.

And in *Surah Al-A'araf,* we read,

AND WE SENT DOWN MANNA AND SALWA FOR THEIR FOOD, SAYING,

EAT OF THE CLEAN AND PURE THINGS WE HAVE PROVIDED FOR YOU.

BUT THE UNGRATEFUL PEOPLE ASKED GOD TO CHANGE THE BETTER FOOD FOR WORSE.

And when you said

O MOSES! WE ARE WEARY OF ONE KIND OF FOOD, SO CALL UPON YOUR LORD FOR US TO PRODUCE FOR US OF WHAT THE EARTH GROWS, OF ITS HERBS, AND CUCUMBERS, AND ITS GARLIC, LENTILS AND ONIONS. HE SAID, WILL YOU EXCHANGE BETTER (FOOD) FOR THE WORSE (FOOD)?

This clearly establishes the superiority of animal protein foods over green or vegetable foods.

II- Prohibitions and Food Hygiene:

After discussing the general principle with regard to permissible foods, the *Quran* specifies the prohibited foods in these words which laid down the foundation for the science of meat hygiene,

> *O YOU WHO BELIEVE! EAT OF THE GOOD THINGS THAT WE HAVE PROVIDED YOU WITH, AND GIVE THANKS TO ALLAH, IF HIM IT IS THAT YOU SERVE. HE HAS ONLY FORBIDDEN YOU THAT WHICH DIES OF ITSELF, AND BLOOD AND FLESH OF SWINE, AND THAT OVER WHICH ANY OTHER NAME THAN THAT OF ALLAH HAS BEEN INVOKED, BUT WHOEVER IS DERIVEN TO NECESSITY, NOT DESIRING NOR EXCEEDING THE LIMIT, NO SIN SHALL BE UPON HIM; SURELY ALLAH IS FORGIVING, MERCIFUL.*

The same prohibition had already been revealed in *Surah ALNahl* while the Holy Prophet ﷺ was yet at *Makka,* in nearly the same words, whereas in, another *Makka* revelation, reasons are added for the prohitition, while in *Surah Al-Ma'ida* which is the latest revelation on the point, adds several things by the way of explanation,

> *THAT WHICH HAS BEEN KILLED BY STRANGLING, OR BY A VIOLENT BLOW, OR BY A HEADLONG FALL, OR BY BEING GORED TO DEATH; THAT WHICH HAS BEEN (PARTLY) EATEN BY A WILD ANIMAL, UNLESS YOU ARE ABLE TO SLAUGHTER IT (IN DUE FORM), THAT WHICH IS SACRIFICED ON STONE (ALTARS); AND (FORBIDDEN) ALSO IS THE DIVISION (OF MEAT) BY RAFFLING WITH ARROWS. THIS IS IMPIETY.*

It may be added that the Holy *Quran* Speaks of the first three forbidden foods, carrion, blood and pork as unclean things, while the fourth, the invocation of other than *Allah's* name at the time of slaughtering an animal, is called *fisq* or a transgression of the Divine commandment. The reason for this distinction is that there is uncleanness in the case of the first three, since they have a pernicious effect upon the intellectual, the physical or the moral system; while the fourth case, the spiritual side is affected, as the invocation of other than *Allah's* name or sacrificing for idols, associates one with idolatory. In this case the thing is not unclean in itself, like blood or carrion or pork; it is forbidden because the use of such food associates a man with idoltry.

According to the law of *Islam,* all animals that are allowed as food must be slaughtered in such a manner that blood flow out. According to *Fiqh,* four veins are cut off in slaughtering an animal, *halqum* or the windpipe, *mari* or the oesophagus and the *wadajan* or two external jugular veins. The idea underlying this particular manner of slaughter is causing the blood to flow so that the poisons contained in it should not form part of the food. The same appears to be the reason for prohibition of blood as food.

It should be noted that when an animal is slaughtered it is necessary that the name of God should be invoked. The Holy *Quran* lays down plainly:

> *AND DO NOT EAT OF THAT ON WHICH ALLAH'S NAME HAS NOT BEEN MENTIONED, AND THAT IS MOST SURELY A TRANSGRESSION.*

The Holy *Quran* expressly allows game:

> *SAY THE GOOD THINGS ARE ALLOWED TO YOU AND WHAT YOU HAVE TAUGHT THE BEASTS AND BIRDS OF PREY, TRAINING THEM TO HUNT YOU TEACH THEM OF WHAT ALLAH HAS TAUGHT YOU-SO EAT OF THAT WHICH THEY CATCH FOR YOU AND MENTION THE NAME OF ALLAH OVER IT*

Hadith makes it clear that the name of *Allah* is to be mentioned when letting off the beast or bird of prey. The animal caught may be eaten even though it is killed by the beast or bird of prey. The killing of game by throwing pebbles and hazel-nuts is however, forbidden. Killing it by arrow is allowed, since an arrow causes the blood to flow. Game shot with a gun must follow the same rule, but in both cases the *bismillah* must be uttered at the letting off the arrow or discharging the gun, and if the game is killed before it is caught and slaughtered, there is no harm. As regards the game of sea or water, it is all to be taken as slaughtered. However, fish and other water game, does not require to be slaughtered and it is allowed whether caught by a jew or a christian or a Magian, or by anybody else, so all fish which has been thrown out of the sea or river on dry land or which has been left by the water having receded from it, and which has therefore died before it is caught. Ibn Abbas, however, adds, unless you hate it, that is to say, it stinks.

III - Animal Products As Therapeutics:

Health is considered to be the normal state of the human body and illness a disturbing factor in Islamic medical science. Illness causes disequilibrium and medicine is given to remove the cause of such a state so that the body may come back to its natural state of health as soon as the state of disequilibrium is removed. It also shows that the body has the necessary power, resistance or natural force to bring it back to the state of equilibrium, reflecting the natural state of health of the human body. Medicines are mere aids to help the body and its natural order to remove or repel the obstruction that is the cause of the illness. Thus the medicines are not considered as the direct cause of the cure of sickness. But treatment is recommended for the removal of the cause of disease as the prophet (ﷺ) said,

> *"God has not sent down a disease without sending down a remedy for it".*

And Jabir reported God's Messenger (ﷺ) as saying,

> *"There is a medicine for every disease, and when the medicine is applied to the disease, it is cured by God's Permission."*

According to Usama bin Sharik, *when God's Messenger (ﷺ) was asked whether they should make use of medical treatment, he replied,*

> *"Yes, servants of God, make use of medical treatment, for God has not made a disease without appointing a remedy for it, with the exception of one disease, viz, old age".*

In this respect, the *Quran* mentions the great medicinal uses of honey for mankind.

> *AND YOUR LORD TAUGHT THE BEE TO BUILD ITS CELLS IN MOUNTAINS, ON TREES, AND IN (MENS) HABITATIONS, THEN TO EAT OF ALL THE PRODUCE (OF THE EARTH), AND FOLLOW WITH SKILL THE WAYS OF ITS LORD. THERE COMES FORTH FROM THEIR BELLIES A DRINK OF DIVERSE COLOURS, WHEREIN IS HEALING FOR MANKIND. TRULY IN THIS IS A SIGN FOR THOSE WHO REFLECT.*

However, the chemistry of honey is an eternal message to the scientists of the wonders of God's artistry in changing the nature, properties and uses of various substances in different combinations. It contains three different sugars forming (80%) & water (20%) plus various vitamines, minerals, emzymes and traces of protein. The bee produces three different useful products, the honey, the royal Jelly & the sting venom. However, the sting venom is a colourless aromatic fluid which contains formic acid, hydrochloric acid, Orthophosphoric acid, histamine, coline, triptophane, sulphur, traces of copper & calcium, proteins and volatile oil. It is used for treatment of rheumatic fever, sciatica,

some skin disease, conjuctivitis, enlargement of thyroid gland. & hypertension. The Royal Jelly promotes growth, is useful for treatment of duodenal ulcer, children malnutrition, metabolic disturbance, prostatitis & in regulating menstruation, hypertension. Moreover, it is also used as bactericidal agent.

The honey seems to possess immense medicinal value for various diseases. The latest research on various levels in different parts of the world has shown the innumerable benefits of this natural drink. It is extremely effective and useful for heart diseases and provides top-grade, ready made glucose for body weaknesses. It is also very useful for the eyes, and if used regularly, young people can get-rid-of their spectacles in a couple of years. It is used as medicine to cure several diseases because it contains the juice and glucose of flowers and fruits in the best form. Besides this, it is also used in preparing and preserving other medicines, because it does not rot. It also preserves other things from decay, that is why it has been used for centuries as a substitute for alcohol. And if the bee-hive is built at a place which bounds in certain medicinal herbs its honey does not remain mere honey, it is expected that if bees are used methodically for extracting the essence from herbs, fruits and other such useful trees, that essence will prove to be much better and more useful than the one obtained in laboratories.

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ISLAM AND THE CRITERIA OF NORMAL BEHAVIOR

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In the western literature and particularly modern psychology the very concept of normal human behavior has been controversial. Although psychologists and behavioral scientists have been studying non-patient population for years and came up with as many definitions of normal behavior as the number of studies. Nobody has solved this problem yet, either medically, or philosophically. The choice of approach was frequently related to particular scientific discipline, theoretical systems, or methodological procedures. Offer and Sabahim[1] are of the opinion that at present stage of knowledge, the distinctions between normal and abnormal behaviour are based on hypotheses, rather than on empirical evidence.

This paper discusses the issue and controversy as to who has the ultimate power and wisdom to determine and define the criteria of normal human behavior.

In the light of *Quran* and *Hadith* the study of human behavior as such and its application for the growth and development of a healthy society is the main purpose of divine guidance. *Islam* and the teachings of Allah's Apostle (ﷺ) clearly show us the direction of study and research in the field of human behavior, both individual and groups. The stories given in the *Quran* are the examples, explanations and indications of deviant as well as the expected normal human behavior. Thus, *Quran* and *Hadith* both jointly lead us to a comprehensive ongoing study of psychology both as a science and art.

It would be worthwhile to review the present stage of understanding of normality of human behavior or the confusion that exists in the current western literature. Franz Alexander[2] says, "First of all, we must remember that neurosis and normality are not wholly different. The psychology of neurosis and normality is the same in quality; the difference is merely quantitative". Walter E. Barton[3] states, "The phenomenon of a super state of good mental health, well beyond and above the mere absence of disabling illness, has yet to be scientifically demonstrated. We know little of it beyond occasional subjective, euphoric impressions of the subject". Eissler[4] has briefly reviewed the place which the term "normality" takes in Freud's work. In Freud's work the concept of normality serves as an operational tool to investigate by its contrast certain psychopathological phenomena, but not as a yardstick or measure of clinical evaluation. The psychoanalytical literature ascribes several meanings to the same concept of "normality". In its descriptive meaning, normality is viewed as subjective feeling. In its structured meaning it becomes an absolute psychic normality. Here, Freud raised the question whether an analysis could ever result in a condition in which all the patients' repressions had been lifted and every memory gap filled. There is no satisfactory answer to this. In economic meaning it becomes fictitious normality ego. In its dynamic meaning normality is viewed as harmony of the ego, which would be a temporary state of balance between ego and id. In its social meaning it becomes schematic. Thus from this vantage, depending on society and particular goals, certain concepts of normality may be conceived, such as absence of conflicts or passions in a person, such definitions certainly have no clinical validity and appears arbitrary from scientific viewpoint. In discussing the issue of positive mental health and normality, Marie Jahoda[5] remarks, "normality, in one connotation, is but a synonym for mental health; in another sense it was found to be unspecific and bare of psychological content. Various states of well-being proved unsuitable because they reflect not only individual functioning but also external circunstances". In discussing personality and normalcy, Ralph Linton[6] places heavy stress on the morms of the society and calls normality as a matter of the individuals' adjustment to the cultural milieu and of the degree to which his personality

configuration approaches the basic personality of his society. According to Linton, then the tests of absolute normalcy are the individuals' ability to apprehend reality, as understood by his society, to act in terms of this reality, and to be effectively shaped by his society during his developmental period.

Abraham Maslow[7] had dealt with the issue of "normal" and "abnormal" and has set certain criteria to judge and evaluate the normal. These criteria are highly intellectualized subjective feelings which cannot be generalized for even a small group of people.

Further to this, the relativist position culminates in the relativist definition of normality, according to which a normal person is one well adapted to the society he lives in. Money-Kyrle[8] says that a verbal definition of normality that fits both the clinical concept and is absolute in the sense of being independent of the standard of any arbitrarily chosen culture may be difficult to find. In dealing with normality, Carl R. Rogers[9] refers to his hypothetical person. This hypothetic person, according to Rogers would be synonymous with "the goal of social evolution", "the end point of optimal psychotherapy", "actualization" and so forth.

Another important aspect of the study of normality is its variability. For every unit and element in the universe, every organ and tissue and human beings and in respect both of its structure and its function, there is a natural range or variability in any population studied. Within this range efficient performance and adaptation to common stresses may be recognized. In general, the western psychology does not possess any general specific definition of normality and mental health from either a statistical or a clinical viewpoint. Thomas S. Szasz[10] is famous for his radical opinions in psychiatry and raises an important questions, "Who defines the norms and hence the deviations"?

In dealing with the issue of influence of the western psychology, Iqbal[11] says, "Unfortunately the present trends in the western psychology are by and large contrary to the Islamic ideology. The Muslim Psychologists who are trained in the western psychology are bringing home some adverse effects and ill teaching". Badri[12] says, "Theories and practices which are largely the product of the western civilization of Christians and Jews have, for a long time, dominated the social science department of universities in Muslim countries and the press, the radio and television have helped to establish their alien concepts among the Muslim masses". Sadiq & Iqbal[13] research, "An investigation of culturally oriented personality differences between Pakistani and American students", has revealed that the current psychological tests and measuring instruments developed in the west are by and large unsuitable for application in the Muslim population. The reason being that the very criteria of normality and standardization of human behavior is not very clear to the west. Some of the underlying concept in the making of these psychological tests are contrary to the Islamic ideology and then interpretation may be further misleading.

It is a scientific reality and fact that by merely looking at a product or machinery or watching its operation one cannot determine its optimum working capacity and criterion by performance. For such information one has to look into the operating instructions or its manual, manufacturer's specification and designer's or its creator's conceptualization of the product. The same principle should apply to the study of and understanding of human behavior. Therefore, in order to have an objective understanding of the criteria of human behavior, we have to see how the creator of mankind views and what is espected of this creation. He is the best of determiner of the criterion of human behavior. Such guidance is only available in a very concise form in the divine scripture which should be understood in a very scientific and practical point of view.

Quran says[14] in this respect:

> *HE TO WHO BELONG THE KINGDOM OF THE HEAVENS AND THE EARTH. AND WHO HAS NOT TAKEN A CHILD NOR IS THERE ANY PARTNER WITH HIM IN THE KINGDOM, AND HE MAKES ALL THINGS THEN MEASURES THEM OUT A COMPLETE MEASUREMENT.*

Here we see that Allah has varily made it clear for the mankind that there are criterion of human behavior and that there are measures thereof. Further to this He alone can determine such criterion and that only He can give this ability to man to discriminate between right and wrong.

Islam is the most natural way of life for human beings. The significance of religion is understanding of human behavior and molding the personality of human beings, Brohi[15] says, *"Islam* has regarded religion as a methodology and a technique for enabling mankind to live his life *(Hayatudduniyaa)* ably and effectively here below on earth, to be able to win the reward of an eternal life hereafter *(Akhirat).* The strategy of *Islam* was to present the perspective in which men could discover their real place in the scheme of things and also the purpose as to why he has been brought into being on earth. Islam invites man to understand his role on earth and help him fulfill the law of his own being to the end that he may be able to reap the rich harvest of eternal life".

Islam as a way of life has its major focus on helping develop a healthy personality, providing a universal criteria for universal normal human behavior and a balanced normal social life. This major focus on individual human growth and development would then result in a healthy and harmonious society on the earth. The individuals who will be creating such a balanced society will then ultimately be preparing themselves for the life hereafter.

For the last thousand years or so the Muslims have neglected this basic teaching of *Islam* and have blindly been following the western concepts. The Muslims adherance to *Islam* is only dogmatic and surely not pragmatic in nature. In the west the concept of psychology and human behavior is not more than two hundred years old. The western literature on mental health, mental illness and normalcy of human behavior prior to the European Renaissance is full of demonology and nothing else. The contemporary psychiatry and psychology in the west is more interested in the anatomy then in the psychology, and they have studied cadavers rather than living humans (Iqbal)[16].

We have seen that the western approach to define the criteria of human behavior has miserably failed. On the other hand *Quran* is very explicit about the criteria of human behavior as indicated in the following verses[17]:

> *AND WHEN WE GAVE UNTO MOSES THE SCRIPTURE AND THE CRITERION (OF RIGHT AND WRONG), THAT YE MIGHT BE LED RIGHT.*

Quran[18] says:

> *OH YE WHO BELIEVE! IF YE KEEP YOUR DUTY TO ALLAH, HE WILL GIVE YOU DISCRIMINATION (BETWEEN RIGHT AND WRONG) AND WILL RID YOU OF YOUR EVIL THOUGHTS AND DEEDS, AND WILL FORGIVE YOU. ALLAH IS OF INFINITE BOUNTY.*

The following verses[19] emphasize on the need to follow the divine criterion.

> *AND MOST CERTAINLY WE GAVE MOSES AND AARON THE CRITERION (FOR RIGHT AND WRONG) AND LIGHT AND A REMINDER FOR THOSE WHO, PRACTICE REVERENCE.*
>
> *THOSE WHO FEAR THEIR LORD IN THEIR HEARTS. AND THEY STAND IN AWE OF THE HOUR. AND THIS (QURAN) IS A BLESSED REMINDER WHO WE HAVE SENT DOWN. AND YOU THEN GOING TO DENY IT?*
>
> *AND MOST CERTAINLY WE GAVE ABRAHAM THE RIGHT PATH BEFORE, AND WE KNEW HIM.*

In another verse, *Quran*[20] says:

> *BLESSED IS HE WHO HAS GRADUALLY SENT DOWN THIS DISCRI-*

MINATION (CRITERION OF RIGHT AND WRONG) UPON HIS SERVANT, THAT HE MAY BE WARNED TO THE PEOPLE OF THE WORLD.

Quran presents a complete code and conduct of human behavior and the laws related to it. Thereby we can say that *Quran* is defining the code of ethics as well as the criteria for normal and abnormal behavior. There are examples given in *Quran* which are the basis for further research. The available data in *Quran* can help us in the understanding of human behavior, its nature and anticipation of the developments and growth processes. *Quran* is then supplemented by the *Hadith* of the Holy Prophet Mohammed (ﷺ) . When put it into applicable form and practice would our lives accordingly. These concepts and divine guidance are to be extracted and presented in the form of applicable format. Quranic observation provides guidance in all phases of life, and in all walks of human behavior including the clinical psychology, physical and mental health, social life and research in the cosmos and the subterraneans of the earth that will lead us to the *"Maarefat-e-illahi"* - in the understanding of the universe and the very nature and characteristics of *Allah Subhana hu wa taala.*

To conclude we can say that the function of the Muslim Psychologist and social scientist would be the integration of all the available knowledge formulated within the framework provided by *Allah.* A further research based on the study of *Quran* and *Hadith* is necessary to explore and define the criterion of human behavior and to find out what *Allah* means by the limits set for such discrimination and what are the measures he has devised to measure the criterion. Such integration and research would then be universal and culturefree. The development of Islamic Psychology for a universal application in itself would be an *"Ijtehad"*.

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SEXUALLY TRANSMITTED DISEASES AND ISLAM

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At the present time, Sexually Transmitted Diseases (STD) are the commonest infectious di, seases of the world. The World Health Organization's statistics recorded 200 million cases of Gonorrhoea and 50 million cases of Syphilis for the year 1982.

Many millions of the second generation STD's such as Chlamydia infectious and Virus infec, tious were also recorded in both the developed and the Third World countries.

Despite the progress made in the methods of diagnosis and treatment, the incidence of STD has soared to almost "epidemic proportions" throughout the world during the past twenty years. A review of the papers and journals on these diseases reveals the virtual abscence of any mention about guidance from any religious source, excepting for the injuctions in the Revealed Book of Islam, the Holy *Quran*.

In this paper an attempt is made to portray the global pattern of STD, the incidence of infection, classification of the traditional STD and second generation STD.

The paper discusses the reasons for the high level of infection and the demographic, behavioural and medical causes; consequences of STD are emphasised, especially neonatal infection and carcinoma of the cervix.

Much stress is laid on the moral code of the Islamic way of life for individuals, societies and entire nations with regard to sexual behaviour, health, education and the penal code pertaining to sexual crimes and lewdness. The paper is concluded with profound and practical guidance from the Holy *Quran* and the *Hadith*.

The highlight of the paper is to bring no notice that illicit sexual relationships between men and women are very widespread and evils of a decadent civilisation, thus leading to much morbidity, mental ill health and socio-economic problems throughout the world, Adultery and fornication which are the prime factors responsible for the high incidence and prevalence of STD, have been forbidden in the Holy *Quran* most explicity as in *Surah*24, *V* 2–3.

With the new dreaded disease Acquired Immune Deficiency Syndrome (AIDS) that is found mainly in homosexuals, the world faces a new threat, as no cure to date has been discovered, and which can entirely eliminated as in *Surah on Nisa* : V. 15. 16

The paper brings to the notice of mankind the attitude of Islam with regard to modesty in relations with members of the opposite sex. This forms a preventative measure against sexual vices and slander.

Prostitution and promiscuous relations which are major factors in the spreading of STD are strictly forbidden from the Holy *Quran* and the *Hadith*.

In their place Islam strongly encourage the institution of marriage so as to establish a fully harmonious and normal way of life between men and women. Islam and its mode of living have the ultimate solution to the scourge of sexually transmitted disease.

Sexually transmitted diseases (STD) have been with us for a very long time, and currently the incidence and prevalence of these diseases on a world scale has reached alarming proportions. With the process of urbanisation taking place in the so called developed countries during the Industrial revolution, the STD became increasingly prevalent. The diseases are spreading and resulting

in much morbidity, mental ill health and socio-economic problems in the developing countries, as the Industrial Revolution is taking place in these countries today.

At the present time sexually transmitted diseases are divided into "traditional" or "first generation" STD and "second generation" STD.

TABLE I

Organisms	**Diseases**
Bacteria	
Treponema Pallidum	Syphilis
Neisseria gonorrhoeae	Gonorrhoea
Haemophilus ducreyi	Chancroid
Chlamydia trachomatis (LGV Strains)	Lymphogranuloma venereum
Chlamydia granulomatis	Granuloma Inguinale
Chlamydia trachomatis (Genital Strain)	Nongonococcal Urethritis, Epididymitis, Cervicitis, Salpingitis, Neonatal disease
Ureaplasma urealyticum*	Nongonococcal Urethritis
Giardia vaginalis*	Vaginitis
Shigella*	Shigellosis
Viruses	
Herpes Simplex Virus*	Genital Herpes
Human Papilloma Virus*	Genital Warts
Cytamegalovirus*	Neonatal Disease
Hepatitis A and B*	Hepatitis
Organisms	**Diseases**
Protozoa	
Trichomonas vaginalis	Trichomaniasis
Entamoeba histolyticum*	Amoebiasis
Giardia lamblia*	Giardiasis
Ectoparasites	
Phtirus pubis	Pediculosis
Sarcoptes scabiei	Scabies

In many industrialised societies these "second generation" contagious infections present enormous problems in management, and it is unfortunate that health education among people is lacking to make societies aware of the wide range of sexually transmitted diseases (STD's) which exist today.

The emergence of antimicrobial therapy has not brought about a meaningful fall in the incidence of STD in the 1980's and it is well to remember that no infectious disease can ever be eradicated through effective curative therapy alone. The epidemiology and biology of STD's are involved and ill understood. Their paradoxical presence and increases prevalance in the age of powerful anti-

"Traditional" Sexually Transmitted Diseases.

* "Second Generation" Sexually Transmitted Diseases.

biotics is not at all surprising. Biologists and epidemiologists as well as STD specialists must therefore look at preventive measures rather than curative ones and question the moral code of human society.

INCIDENCE OF INFECTION

In many countries statistics relating to STD are poor and it is therefore difficult to assess the true incidence of STD. In some countries only the "first generation" STD are reported, the remainder being ignored or not being recognised. Under-reporting of these diseases is a world-wide problem, especially in countries where large numbers of patients are treated privately. This is especially so with regard to woman, as many of them prefer to be examined by private doctors, this is understandable but leads to both under-diagnosis and under-reporting. In many countries, where for cultural reasons, female patients may refuse to be examined by a male doctor, there is only a very vague idea of the real incidence of infection.

In this paper those diseases which cause only discomfort such as, trichomoniasis, molluscum contagiosum and pediculosis pubis are not considered. Only infections which pose the greatest danger to public health are discussed.

Infection by N. gonorrhoea: This organism causes cervicitis, urethritis, proctitis, pelvic inflammatory disease, Périhepatitis and of Bartholins glands in women. In men it causes urethritis, epididymitis and proctitis. In both sexes the organism may cause conjunctivitis, pharyngitis and septicaemia, and in neonates, ophthalmia, colonisation of the pharynx, vagina and rectum, and dissiminated infections may occur. The World Organization estimates 250 million new cases a year making this one of the most common infectious diseases known to man.

Since the middle 1950's there has been a steady increase in incidence in all countries. The sensitivity of the gonococcus to pencillin has shown a stepwise mutational increase for the past 30 years. These partially resistant strains (which are often resistant to other antibiotics as well) are particularly common in Africa, South East Asia and the Western Pacific. Since 1976 strains of gonococci have been isolated which produced a B lactamase, so that they are completely resistant to pencillins and to many cephalosporins. If these organisms become widely dissiminated throughout the world the pencillins, may in the near future, have to be abandoned for the treatment of gonorrhoea, with enormous medical and economic consequences, especially in the developing countries.

Infection by T. pallidum: The World Organisation estimates 50 million new cases a year. In the past 20 years there has been a gradual increase of this disease with all its systemic conseq, uences. The disease is prevalent largely in homosexuals, who in the industrialised societies are responsible for nearly 74% of early infections. In some parts of India and other developing countries syphilis has not been brought under control adequately. Venereal syphilis is on the increase in New Guinea, Fiji and New Caledonia. Patients with cardiovascular syphilis are still being documented in developing countries. A milder and modified form of neurosyphilis is not uncommon.

Infection by H. ducreyi: In clinical terms a combination of genital ulcers and inguinal adenopathy and abscess is how chanchroid appears. Though uncommon in developed countries it is still recorded and minor outbreaks recur usually in relation to travel to and from tropical countries. It is more common in countries with poor living conditions and bad sanitation. It is common in India and, in Zimbabwe, it comprises 16% of all STD's. It is more in men than in women and the reason for this sexual difference is not known. Scientific evidence supports the idea that the female genital tract constitutes a reservoir of infection and prostitutes play an important role in the epidemiology of chancroid.

Infection by Chlamydia trachomatis: Infections are divided into those caused by lymphogranu, loma venereum (LGV) strains and those accounted for by "oculo,genital" strains. LGV is charac, terised by a small initial lesion, followed by progressive lymphadenopathy. The disease is serious and chronic and its complications include genital elephantiasis, and a complex of rectal and peri, genital ulceration and fibrosis.

The disease has a world-wide distribution but it is more common in tropical and subtropical areas. It is difficult to state whether the incidence is increasing or not as there is much mis-diagnosis due to difficult laboratory techniques and under reporting of cases.

Infections by the "oculo-genital" strains are widely prevalent. Chlamydiae cause much non-gonococcal urethritis and epididymitis in males, urethritis, urethral syndrome, cervicites, salpingitis and perihepatitis in females Inclusion conjunctivitis in both sexes and neonates. In the neonate, colonisation of the pharynx, secretary otitis media and pneumonia also occur. C. trachomatis is thus a most important pathogen in the STD's. These infections are very prevalent in the industrialised countries. Other causes of NGU and PGU are organisms such as Ureaplasma urealyticum and it is not certain whether these cause as many complications as the chlamydia organisms.

Virus Infections; These diseases belong to the "second generation" group and are of immense importance. Herpes simplex infections cause recurent, painful genital and anal ulcerations; treatment is very difficult and attacks may be complicated by sacral radiculitis in retention of urine, and by viraemia, meningitis and other systemic effects. Infection can be transferred to the neonate from the mother during birth; there is an association between genital herpes and carcinoma of the cervix. Cytomegalovirus infections in infants are examples of other herpes virus diseaes which may cause neurological abnormalities in infants. At the present time there is no effective treatment for these infections. A very common STD is that due to human papilloviruses which cause anogenital warts. There is increasing evidence to show that human papillovirus is linked with some cases of cancer of the genital tract.

The hepatitis A and B viruses are now believed to be sexually transmitted. Hepatitis B is a major health hazard, especially in homosexuals and cancer of the liver may be linked to this infection. The incidence of the STD due to viruses has doubled in some countries in the past 5 years, particularly in the U.K. There is no effective antiviral treatment available at present and it would appear that they will present an increasing problem in the 1980's unless some preventive measures are undertaken.

Factors that contribute to a rise in STD

The present levels of infection are very high. What are the reasons for this rise in incidence? Although it is not possible to pinpoint all the important contributory causes, 3 groups can be de, lineated clearly.

i) Demographic causes: Young people are most vulnerable and sexually the most active members of modern societies. In "liberated" societies these people change sex partners frequently and are most likely to develop STD. In the past 50 years the number of young people in most countries has risen markedly. In "developed" countries the age of menarche is around 11 to 13 years. Thus there are more people at risk.

   In most countries there is a continuous movement of rural communities to the larger towns and cities. Social services are inadequate for this rapid migration of people and overcrowding, sharing of rooms, mixing of sexes and indiscriminate sexual intercourse. These factors contribute toward spread of infection. Seeking employment away from home, air travel and greater mobility of people in general, has accounted for casual sex contacts. This may be followed not

only by infection in the individual but also by the introduction of new infections, or new strains of microorganisms, into the "home" country.

ii) Behavioural causes: Extra marital and premarital sexual intercourse and free mixing of the sexes in Western society is generally accepted. These practices lead to STD. Pornographic films, sex boutiques, sex advertisements in the mass media influence people to early first intercourse and numerous sex partners. Prostitution is commoner than in the past and this also contributes to spread of STD. Addiction to a variety of drugs, especially alcohol, blunt the inhibitions and encourage promiscuity. The easy availability of oral contraceptives and intrauterine devices has contributed to the rise in incidence of STD. Loneliness in large cities has contributed to promiscuity and thus a rise in STD. The incidence in the number of homosexuals in the "developed" countries has proved to be of great importance in the increase in prevalence of STD.

iii) Medical causes: The free availability of antibiotics without prescription encourages the appearance of resistant microorganisms. Inappropriate antibiotics are also causing a major problem; inadequate dosage and treatment by quacks. Resistant cases are likely to rise. Symptomless infections increase the difficulties of controlling STD. In many countries contact tracing is not employed and this causes spread of STD. In many countries medical schools give scant regard to teaching about STD and religious teaching with regard to illicit sex is virtually nonexistent.

SEQUAELEA OF STD

The current high levels of infections result in a whole range of complicating problems:

Local complications:-

Epididymitis.

Infertility with its sociological problems in the developing countries. As high as 30% in sub-Saharan Africa.

Salpingitis; 2,5 billion dollars spent in USA in 1979 on gonorrhoea and its complications alone. Ca cervix.

Systemic complications: systemic effects of syphilis are well known. Septicaemia following N. gonorrhoea is not uncommon. Reiter's syndrome virnemia.

Neonatal infections: neonatal gonococcal ophthalmia still occurs in many countries. Gonococcal septicaemia. Infection with chlamydia in the neonate can be serious. Neonatal in, clusion conjunctivitis now out numbers gonococcal ophthalmia by 9:1 and its incidence is very high in trachomatis. Infection of the respiratory tract may cause secretory otitis media and chlamy, dial pneumonai.

Babies may be affected by Herpes simplex virus during birth. A wide spectrum of diseases may follow and damage to the central nervous system can be caused. Many neonates die of this infection.

Carcinoma of the Cervix. Early age of first intercourse and multiple sex partners are the two main factors concerned in the epidemiology of cervical carcinoma. A sexually transmitted carcinogenic agent might be involved in its pathogenesis and has been focusse on Herpes simplex virus type 2. There is a possibility that papillovirus may be involved in aetiology of cervical car, cionoma. Whatever the mechanism, it is certain that women who are at risk ofor STD are also at risk, later in their lives, for cervical cancer. The aspect of medical care which is important in screen, ing high risk cases is totally lacking in many countries of the world and the incidence of cervical carcinoma is rising.

DISCUSSION

STD, throughout the world today, gives rise to enormous problems. There has been a marked rise in incidence in all countries. Although much progress has been made in methods of diagnosis and treatment, the STD are now the commonest infectious diseases in the world and are responsible for enormous public health problems in all parts of the world.

In the developing countries the "first generation" STD are still very common. Although these have declined to some extent in the developed countries, new diseaes have emerged. Health and sex education in sophisticated countries have altered the trends of rising STD. The resistance of organisms to more powerful antibiotics is ever present with us and curative therapy alone is pro, ving to be inadequate. It behoves us to concentrate our efforts to the preventive aspect of diseases and return to some moral standards as ordained in religious teachings of the sematic religious and codes of life. In particular, guidance from the Holy *Quran,* is most explicit on the moral code of life for individuals, societies and nations, to serve for a harmonious and normal way of life and act as a deterrant for sex crimes and lewdness.

HOMOSEXUALITY IN MALES

In most parts of the "developed" World and some third World countries, the incidence of sexually transmitted diseases (STDS) in homosexual men, is reaching major proportions; it is presenting the medical profession with a new challenge. Homosexually, as practised in society to, day, has resulted in the emergence of opportunistic infections constituting a major problem for the clinician, the therapist and microbiologist.

In this review article an attempt is made to present various STD's found amongst homosexual men, the possible reasons for their occurrence and ways to prevent their spread.

It is appropriate initially to define the term homosexual male; a man who has oral-genital, penile anal or oral-anal sexual contact with another man[1].

The homosexual male population transmits three main groups of microbial agents. These are viruses, enteroparasites and bacteria. As tabulated in Table 1 due to the sexual and social habits adopted by this section of the population, results in it constituting a large reservoir for these micro, organisms. Oropharyngeal and rectal areas are common sites for STD's in homosexual males.

VIRAL DISEASES IN HOMOSEXUAL MEN

Herpes simplex virus and hepatitis B virus (HBV) infections are commonly found in homosexual men. Several investigators have reported a high prevalence of hepatitis B surface antigen and antibody in homosexual males [1,2,3,4]. Since saliva, urine and semen may transmit the HBV, infections can occur through anal sex, fellatio, analingus or mouth to mouth transmission of salvia[2]. The number of casual male sexual contacts and the duration of regular homosexual activity correlates well with seropositivity. Trauma to the rectal mucosa has also been related to the seropositivity of HBV infection [4]. There seems to be an increased prevalence of hepatitis A virus (HAV) infection in homosexual men as compared to heterosexual men[5]. Non-A non-B hepatitis may also be transmitted by homosexual men. Anorectal herpes infections are also encountered[2]. Complicating sacral radiomyelopathy in herpes proctitis has been reported[6]. Most recently, generalised and in some cases fatal herpes infections have been found in homosexuals with acquired immune deficiency syndrome (AIDS).

ENTERIC PROTOZOAN INFECTIONS

In homosexual males amoebiasis and giardiasis are the 2 commonest protozoan infections transmitted sexually. The mode of transmission is due to the practice of oral-anal sex [2,7,8]. A number of colonic and rectal conditions is found commonly in homosexual men. The "Gay Syndrome"

as it is called, comprises several proctological complications of anal intercourse, due to infections diarrhoea caused by amoebiasis and shigellosis and viral illness like hepatitis and herpes[2]. These enteric infections can remain asymptomatic and serve as carrier states, thus providing a ready reservoir for the spread of these diseases. These infections should be vigorously treated to avoid the development of systemic complications such as amoebic abscesses of the liver and brain[2]. Camy, lobacter infections, enterobiasis and typhoid fever have also been reported to be homosexually transmitted[2].

BACTERIAL DISEASES

NEISSERIAL INFECTIONS

Both N. gonorrhoeae and N. meningitidis are responsible for disease in homosexual males after sexual transmission, but the commoner offender is N. gonorrhoeae. The life style and mode of sexual practice of homosexuals causes gonorrhoea to occur on ectopic anatomical sites namely, the pharynx and non-rectal area[9].

Many diseases occuring in these sites are silent and produce minimal symptoms and therefore go untreated. This creates an ever growing reservoir for further spread of these infections. The patient himself is at risk of developing local and systemic complications.

N. meningitidis causes disease more commonly in homosexuals than in heterosexual men. Ano-rectal infection is the most common manifestation followed by infections of the urethra (urethritis c stenosis).

NON-GONOCOCCAL URETHRITIS

This condition is becoming commoner in male homosexuals. The most likely organism is chlamydia trachomatis. The place of Ureaplasma urealyticum infection as a cause of non-gonococcal urethritis has not been clearly defined but work is been carried out to determine whether this organism has any role to play.

SYPHILIS

In homosexual men syphilis occurs in new sites, the anorectal region. The changes occuring here may be either asymptomatic or extremely painful. The silent anorectal location of syphilis may serve as a reservoir of the disease. Although the fully blown syndrome is uncommon today, syphilis occuring in new locations amongst homosexuals is common.

ENTERIC PATHOGENS - SHIGELLOSIS

Recently shigellosis has been recognised to occur in homosexual men. The bacillus is probably acquired by oral-anal or oral-genital contact[10].

ACQUIRED IMMUNE DEFICIENCY SYNDROME - AIDE

In the past 5 years a disease of as yet unknown aetiology has affected numerous cases with a mortality rate of up to 41%". Patients have succumbed as result of developing rare tumours or opportunistic infections. This disease is known as AIDS. Reports of new cases in the U.S.A. are received at a rate of 15 to 20 per week.

The syndrome occurs in 5 groups of patients:

1) Homosexual or bisexual men – 75%
2) "Mainline" drug addicts – 12%
3) Immigrants from Haiti – 6%
4) Heterosexual haemophiliacs receiving Facto VIII concentrates.
5) Others: No known risk group.

IMMUNOLOGICAL STATUS ASSOCIATED WITH AIDS.

There is a disturbance in cell mediated immunity in AIDS. Although humoral immunity has been found to be normal, increased level of serum immunoglobulins have been reported. There is a decreased number of lyphocytes in the peripheral blood, and decreased numbers and percentage of helper - T cells; increased numbers of suppressor cells; decreased delayed hypersensitivity to several antigens[12]. It remains to be seen whether this disease is a new entity or whether it has been present for some time and has remained undiagnosed. Elucidation of its aetiology is also a major problem, through the possibility of an infectious agent must be considered.

The grounds for incriminating an infectious agent are that the spread of AIDS resembles HBV infection: A long incubation period; possible sexual transmission or via blood products II; clustering of cases; prodromal illness of fever, diarrhoea lymphadenopathy, night sweats and weight loss[12]. The "Agent" may be cytomegalovirus (CMV)[12].

Other factors contributing to AIDS are the use of drugs, the foremost of these being amyl nitrite which is used as a sex stimulant; sperms from multiple partners can also act as vehicles for carrying CMV; promiscuity is a persistent finding in nearly all cases of AIDS.

Up to the present time the immunological defect seems to be irreversible and attempts by immunologists to stimulate a favourable immune response have not been successful. With the uncertainty about the cause of AIDS, there is very little that the clinician is able to do as regards treatment, except emphasise, as in most afflications, the role of preventive medicine. With Quranic advice as given at the beginning of this article, one hopes to discourage homosexuality and its practice as an abomination for mankind.

TABLE 2

MICROBIOLOGICAL ORGANISMS CAUSING SEXUALLY TRANSMITTED DISEASES IN HOMOSEXUAL MALES

Viruses	:	Hepatitis B Virus Hepatitis A Virus Herpes simplex virus (type I & II) Cy to megalo virus Condylomata acuminata
Enteric Protozoa	:	Entamoeba hystolitica Giardia lamblia
Bacteria	:	N. gonorrhoeae, N. meningitidis, Treponema pallidum chlamydia trachomatis Ureaplasma urealyticum Shigella Salmonella Champylobacter
Others	:	Scabies Pediculosis

TABLE 3

Opportunistic infections caused by the following:

Protozoan parasites	:	Pneumocystis carinii[12]. Toxoplasma gondi [12]
Fungi	:	Cryptococcus neoformans [12] Candida albicans
Bacteria	:	Mycobacterium Mycobacterium tuberculosis Mycobacterian avium-interacellulare complex
Viruses	:	Cytomegalovirus [12] Herpes simplex
Neoplastic diseases	:	Kaposi's sarcoma [12] Burkitt's - like cell carcinoma of the tongue
Autoimmune disease	:	Autoimmune Thromnocytopenic purpura

Physical damage due to disease lead to neurological and cardiovascular abnormalities, sterility and arthritis.

Psychological damage: most victims suffer from "veneresphobia": guilt feelings, worried about whether they are fully cured. Fear of being ostracised by society if discovered. Sexually inadequate and anxiety. Psychoneurosis. Acute depression Marital disharmony.

Suggested measures to halt the rising trends in all types of STD are:-

1) legalised prostitution - regular medical check of brothels
2) Improved Rx facilities
3) Introduction of sex education. Should include family life education and education in religion.
4) Improve social standards. Coordinated medical, public health, legislative and social therapy approach.

Quranic guidance, however, has final solution:-

Duties of commission for the individuals:-

Happiness of moral self through fostering of physical well,being.

1) satisfaction of natural appetites:-

   a) hunger and thirst
   "... AND EAT AND DRINK, BUT BE NOT IMMODERATE AND INTEMPERATE..."
   (S7:V31)

   b) sexual appetite permitted by the Holy *Quran* through lawful marriage only, and marriage has been enjoyed.

The very spirit of Sexual Immodesty prohibited.

The Holy *Quran* says:

"AND COME NOT NIGHT TO ADULTERY: FOR IT IS A SHAMEFUL (DEED) AND AN EVIL OPENING THE ROAD (TO OTHER EVILS)".

(S17:V32)

The words "come not nigh" imply abstinence from the very spirit of sexual immodesty, as also the immodest attitudes and behaviour that cause temptations in relations between the sexes.

This stern moral attitude of Islam may be compared with the attitude and behaviour, incurred in the "Western" communities, where, because of freedom of promiscuity; adultery "has become fashionable". There is a lesson in this for all those Muslims who advocate the adoption of western culture. Alas; the social evils of the West are only too fast penetrating the Muslim communities also under the spell of modernisation.

Indecency, lewdness and everything abominable in thought and word and dead, prohibited. The Holy Qur'an has commanded:

... AND DRAW NOT NIGH TO INDECENCIES, WHETHER OPEN OR SECRET ...

(S6:V151)

.... AND HE FORBIDDETH LEWDNESS AND ABOMINATION AND WICKEDNESS...

(S16:V90)

Defiling one's spiritual and moral purity illicit sexual gratification, including homosexuality and self-abuse is prohibited.

SAY THOU (O PROPHET!) TO THE BELIEVING MEN THAT THEY SHOULD LOWER THEIR GAZE (IN THE SPIRIT OF SEXUAL MODESTY) AND GUARD THEIR PRIVATE PARTS (AGAINST MISUSE): THAT WILL MAKE FOR GREATER PURITY FOR THEM. AND ALLAH IS WELL-ACQUAINTED WITH ALL THAT YE DO

AND SAY TO THE BELIEVING WOMEN THAT THEY SHOULD LOWER THEIR GAZE AND GUARD THEIR PRIVATE PARTS (AGAINST MISUSE).

(S24:V30,31)

These verses lay down the duty of abstaining from defiling one's purity by illicit sexual relations and sexual self,abuse: The only way of satisfying the sexual appetite recognised by the Holy *Quran* as legitimate and chaste is that of marriage between man & woman duly soleminised (S23:V5–7), (S70:V29–31). All other ways are prohibited.

In difference to self-reform is condemned. The greatest of moral diseases consists in the indifference one has for self-reform. The presence of this disease among the clergy is strongly condemned by Islam and the *Qur'an says*

DO YE ENJOIN RIGHT CONDUCT ON THE PEOPLE, AND FORGET (TO PRACTISE IT) YOURSELVES, AND YET YE STUDY THE SCRIPTURE? WILL YE NOT UNDERSTAND? .

(S2:V44)

Spreading lewdness in any form, and thereby enticing others in vice, is prohibited.

SAY: THOSE THINGS THAT MY LORD HATH INDEED FORBIDDEN ARE: (INDULGING IN AND SPREADING, AT ANY LEVEL AND ANY HOPE OF), SHAMEFUL DEEDS (OR LEWDNESS), WHETHER OPEN OR SECRET.

(S7:V33)

Illegitimate and immoral sexual relations violates one's own chastity and honour of others as well as the sanctity of the institution of family life. One of the ends of sexual duties (Legitimate) is the preservation and promotion of the family is the basic unit of society. This point is basic to the *Qur'anic* social philosophy. And that is why adultery and fornication are prohibited.

AND COME NOT NIGH TO FORNICATION AND ADULTERY: FOR IT IS A SHAMEFUL (DEED) AND AN EVIL, OPENING THE ROAD (TO OTHER EVILS)".

(S17:V32)

(THE TRUE SERVANTS OF GOD ARE THOSE WHO) ... DO NOT COMMIT ADULTERY (NON FORNICATION) ... .

(S25:V68)

Homosexuality is strongly condemned and abstinence from it is a duty. Speaking of the Sodomites, the Holy *Qur'an* says:

"WE ALSO (SENT) LUT: HE SAID TO HIS PEOPLE: "DO YOU COMMIT LEWDNESS SUCH AS NO PEOPLE IN CREATION (EVER) COMMITED BEFORE YOU? FOR YE PRACTISE YOUR LUSTS ON MEN IN PREFERENCE TO WOMEN: YE ARE INDEED A PEOPLE TRANGRESSING BEYOND BOUNDS" ... AND WE RAINED DOWN ON THEM A SHOWER (OF BRIMSTONE): THEN SEE WHAT WAS THE END OF THOSE WHO INDULGED IN SIN AND CRIME?"

(S24:V33)

CONCLUSION

Thus, in the Islamic way of life, there should be an active struggle for creating an atmosphere conductive to morality and awakening the moral consciousness of one's fellow-beings by word and deed.

The Holy *Qur'an* declares:

BY TIME (AS IT HAS UNFOLDED THROUGH THE AGES, RECORDING MAN'S SUCCESSES AND FAILURES), VERILY MAN IS IN A STATE OF LOSS, BUT NOT THOSE WHO HAVE FAITH AND DO (CONTANTLY) RIGHTEOUS DEEDS, AND EXHORT ONE ANOTHER TO TRUTH, AND EXHORT ONE ANOTHER TO ENDURANCE (IN THE SERVICE OF TRUTH) .

(S103:V1–3)

Evasion of this struggle leads to calamities of high magnitude, which affect the innocent and the guilty alike:

AND FEAR THE CHASTISEMENT THAT SHALL NOT AFFLICT THOSE ALONE WHO AMONG YOU DO WRONG; AND KNOWN THAT VERILY ALLAH IS SEVERE CHASTISING .

(S8:V25)

YE (O MUSLIMS!) ARE THE BEST (IDEOLOGICAL) COMMUNITY THAT HATH BEEN RAISED UP FOR MANKIND. YE ENJOIN RIGHT CONDUCT AND FORBID ALL THAT IS WRONG (- EVIL): AND YE BELIEVE IN ALLAH ... .

(S3:V110)

Evasion of this struggle leads to calamities of high magnitude, which is not always possible for every Muslim to fulfil; Consequently, while it is the duty of every Muslim to co-operate in it, to the best of his or her ability, it is necessary that there should be a trained, disciplined and devoted

band of Muslims who should lead the struggle. And this is what the Holy *Qur'an* has enjoined:

> *LET THERE ARISE OUT OF YOU A BAND OF PEOPLE INVITING TO ALL THAT IS GOOD, ENJOINING WHAT IS RIGHT, AND FORBIDDING WHAT IS WRONG; THEY ARE THE ONES WHO ATTAIN FELICITY .*
>
> (S3:V104)

By combining our resources, both medical and religious, we have the only successful way of combatting and ridding mankind of the scourge of STD, Inshallah.!

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AIDS: THE ROLE OF ISLAMIC SEXUAL RULES IN PREVENTION

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INTRODUCTION

In 1981 the first cases of the acquired immuno-deficiency syndrome (AIDS) were reported in the U.S.A. as cases of pneumocystis Carinii pneumonia in association with the rare skin malignant disease, Kaposi Sarcoma[1]. These early cases were identified in young homosexual men from California and New York[2]. Soon a world-wide concern steadily escalated as more and more cases were being described.

In the last two and a half years more than 2000 cases AIDS have been reported from all over the United States and other western countries. Of all cases reported 71% were reported in young male homosexuals[3]. In addition AIDS has been reported in women who were sexual partners of men with AIDS[4].

All the epidemiological data collected up to now about this mysterious syndrome point to the important role of person-to-person transmission occurring through sexual contact. This route of transmission could be very important since up to now, the majority of patients reported are young male homosexuals, especially those with several sex partners.

The world-wide concern and tension that accompanied the spread of this syndrome is justifiably arising from the fact that the causative agent(s) of this syndrome is still unknown in addition to the high mortality rate associated with this syndrome.

AIDS is characterized by a remarkable immunological deficiency affecting mainly the cellular arm of the immune response. This immunological defect resides mainly within the T-lymphocyte population. The humoral immunity is usually normal. In these patients there is a marked lymphopenia with mainly a decrease in the helper subset of the T-lymphocyte. This leads to an inversion of the TH: TS ratio[5,6].

THE PREVALENCE OF ADULTERY IN A SOCIETY

Abdullah Bin Omer reported that the prophet (ﷺ) said,

> *'...."Whenever adultery and homosexuality become spread in a society and they make them public then plague and other diseases which were not previously known to their predecessors will appear and spread among them]".*

In this *Hadith* the term *Fahisha* (الفاحشة) is used to signify both homosexuality and illegitimate sexual relationship between a man and a woman i.e. adultery. Both these two practices have now become prevalent and accepted attitudes among various age groups and social classes in the western permissive society. As a result of this sexual permissiveness, it is rather not surprising to find a high incidence of various and serious sexually transmitted diseases in these societies. The appearance of the new syndrome, AIDS, mainly transmitted by sexual contact is a good example of these serious sexually transmitted diseases. It is important to note here that the *Hadith* did not only mention the spread of the *Fahisha,* but also stressed the fact that these societies have gone too far in their

permissive attitude to the extent that they make it public and accept the *Fahisha* as the normal forum of sexual relationship. This situation within the western societies, is very much similar to the one described in the *Hadith* with regards to both the spread and publicity of the *Fahisha* in its broad sense i.e. adultery and homosexuality.

According to the *Hadith* there is a clear warning that if *Fahisha* becomes spread in a society and reaches a high level then plague or plague-like diseases could spread. There is no mention, up to now, of the appearance of plague among the people of these societies. However, there are some similarities between plague and AIDS in relation to the epidemiological patterns. For instance, both diseases are known to ocur in the form of epidemics and the perhaps the person-to-person route of spread may be of some importance. Furthermore in both conditions the mortality rate is very high. Due, perhaps, to these similarities it is not surprising that the term "Gays' Plague" is now being used by the public in the U.S. to coin AIDS. The use of this terminology i.e. Gays' Plague for this syndrome that occurs as a result of the spread of adultery and homosexuality confirms what has already been mentioned in the *Hadith* about one thousand and four hundred years ago. Due to the fact that the causative agent(s) and some other aspects of AIDS are still unclear, it may be possible that the on-going and future research in this disease may indicate a possible relationship between plague and AIDS.

The recent description of this new Syndrome as a consequence of sexual permissiveness which was not known to previous conservative generations is also another confirmation of what has already been mentioned in the *hadith* that the spread of the *Fahisha* will ultimately lead to the appearance of serious diseases which were unknown to the previous generations.

In another *Hadith* the prophet Mohammed (ﷺ) . Said:

"Whenever adultery becomes spread in a society death will increase"

The fact that AIDS is associated with a very high mortality rate i.e. about 40%[5] confirms what was stated in the above mentioned *Hadith.* This high mortality rate may be resulting from either the occurrence of severe infections with opportunistic organisms or the development of some forms of Cancers e.g. Kaposi Sarcoma or both. In addition to AIDS other sexually transmitted diseases which are associated with the spread of adultery and homosexuality e.g. Syphilis, Cervical Cancer, Genital Herpes, B-hepatitis etc. have always been associated with various and serious complications and death may be a terminal complication.

PREVENTIVE MEASURES AGAINST AIDS AND SIMILAR DISEASES

NOR COME NIGH TO ADULTERY: FOR IT IS A SHAMEFUL DEED AND AN EVIL, OPENING THE ROAD TO OTHER EVILS

(S17: V32)

Islam has laid down every clear measures preventing the appearance of such diseases by stressing the importance of healthy and legitimate sexual relationships. It has encouraged marriage and facilitated its procedures. The prophet Mohammed (ﷺ) advised the youth to get married when they have the means to do so and he explained the uses of marriage as a deed that protects one from adultery and controls his vision from unnecessary looking at foreign women.

In addition *Islam* prohibited not only adultery and homosexuality, but also all the illegitimate ways and means that stimulate and initiate the desire for committing adultery e.g. complete integration in life between males and females, the projection of women as sex symbol and drinking of alcohol.

In the above mentioned verse " ولا تقـربوا الزنـا " *"NOR COME NIGH TO ADULTERY"* does not mean that Muslims should avoid adultery, but it actually carries a much wider meaning that

they should also avoid the ways and means which will stimulate and initiate the desire to have illegitimate sexual relationships.

SUMMARY

1- The appearance and spread of *Fahisha "adultery and homosexuality"* will lead to a high incidence of serious sexually-transmitted diseases.

2- It may also lead to the appearance and spread of more new and serious plague or plague-like diseases e.g. AIDS which were not known previously.

3- The spread of these diseases in association with the sexual permissiveness in a society will eventually be related to a very high mortality rate.

4- Islam has laid down clear preventive measures against these diseases by encouraging youth to get married and by prohibiting adultery and homosexuality.

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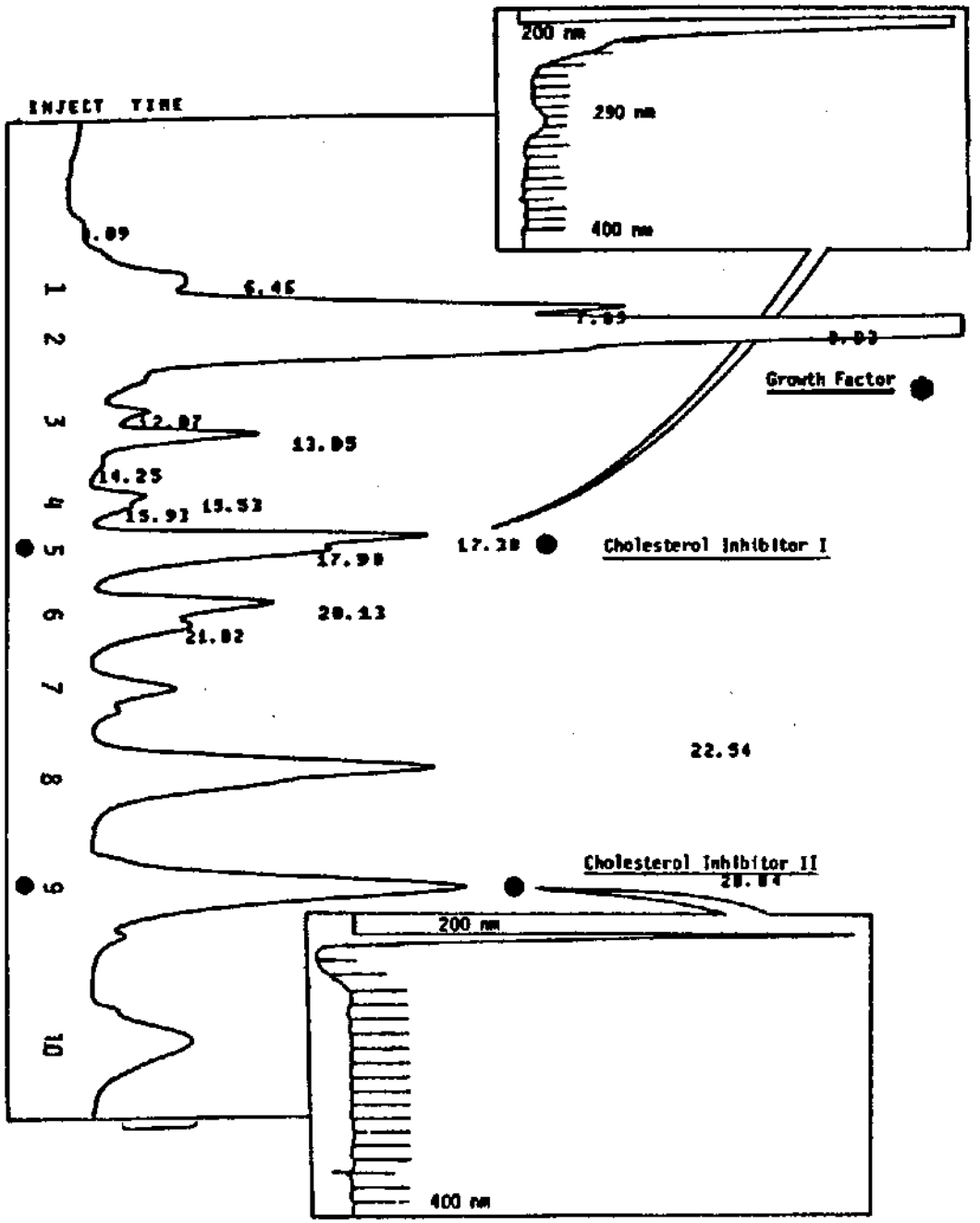
FIGURE 1; HPLC SEPARATION OF DIFFERENT COMPONENTS OF PETROLEUM ETHER SOLUBLE FRACTION OF HPBF



DIFFERENT COMPONENTS OF NONPOLAR SOLUBLE FRACTION OF HPBF WERE SEPARATED BY HPLC USING BECKMAN ULTRASPHERE C_{18} IP COLUMN (25 CM × 10 MM I.D.; 10μ PARTICLE SIZE). SAMPLE (10μ1) WAS ELUTED WITH METHANOL AT A FLOW-RATE OF 1 ML/MIN AT 700 PSI AND USING 200 NM AS A DETECTING WAVELENGTH. EACH PEAK WAS SCANNED BETWEEN 200-400 NM.

FIGURE 2a: Mass spectrum of cholesterol inhibitor I from HPBF

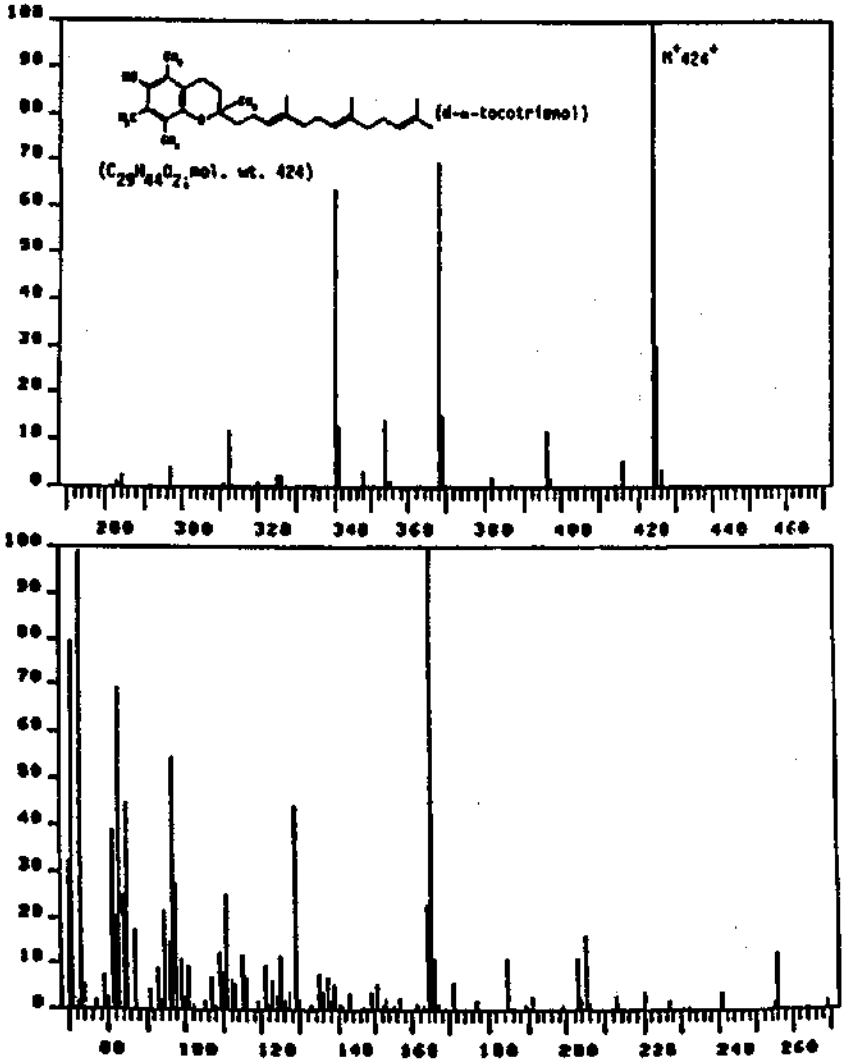


FIGURE 2b: Ultraviolet absorption spectrum of purified cholesterol inhibitor I.

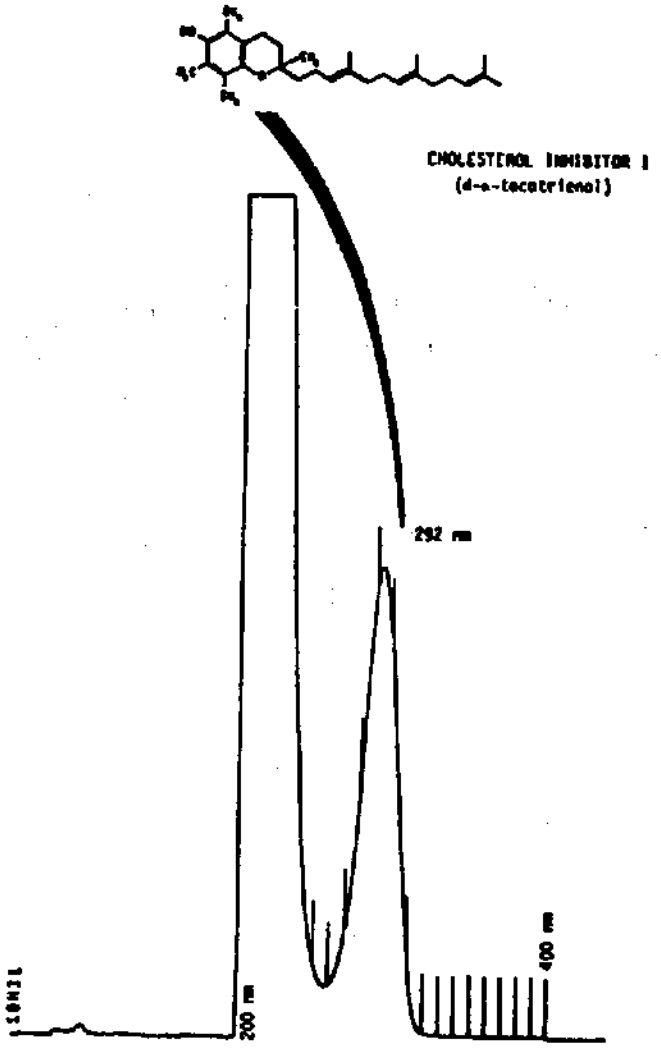
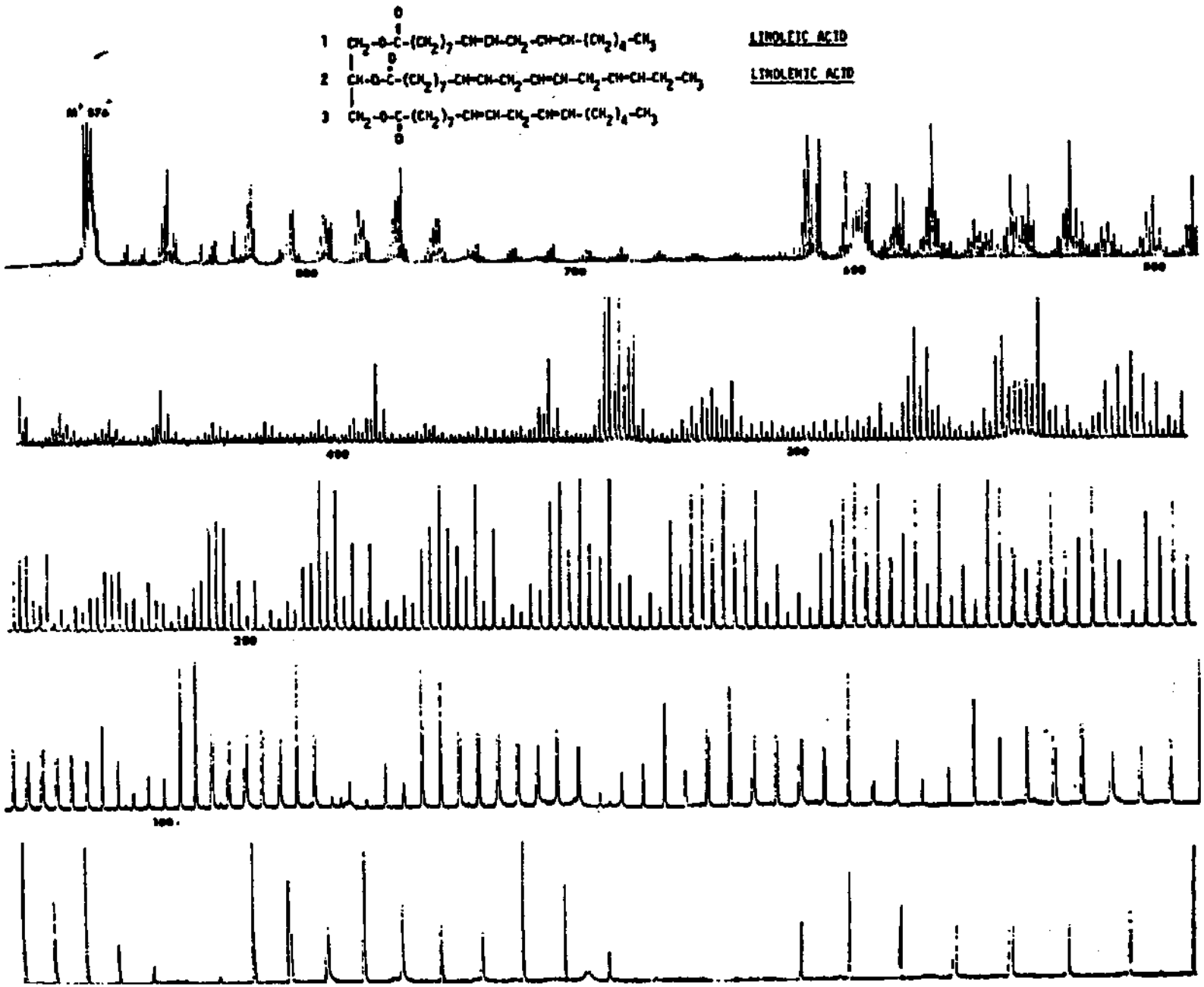
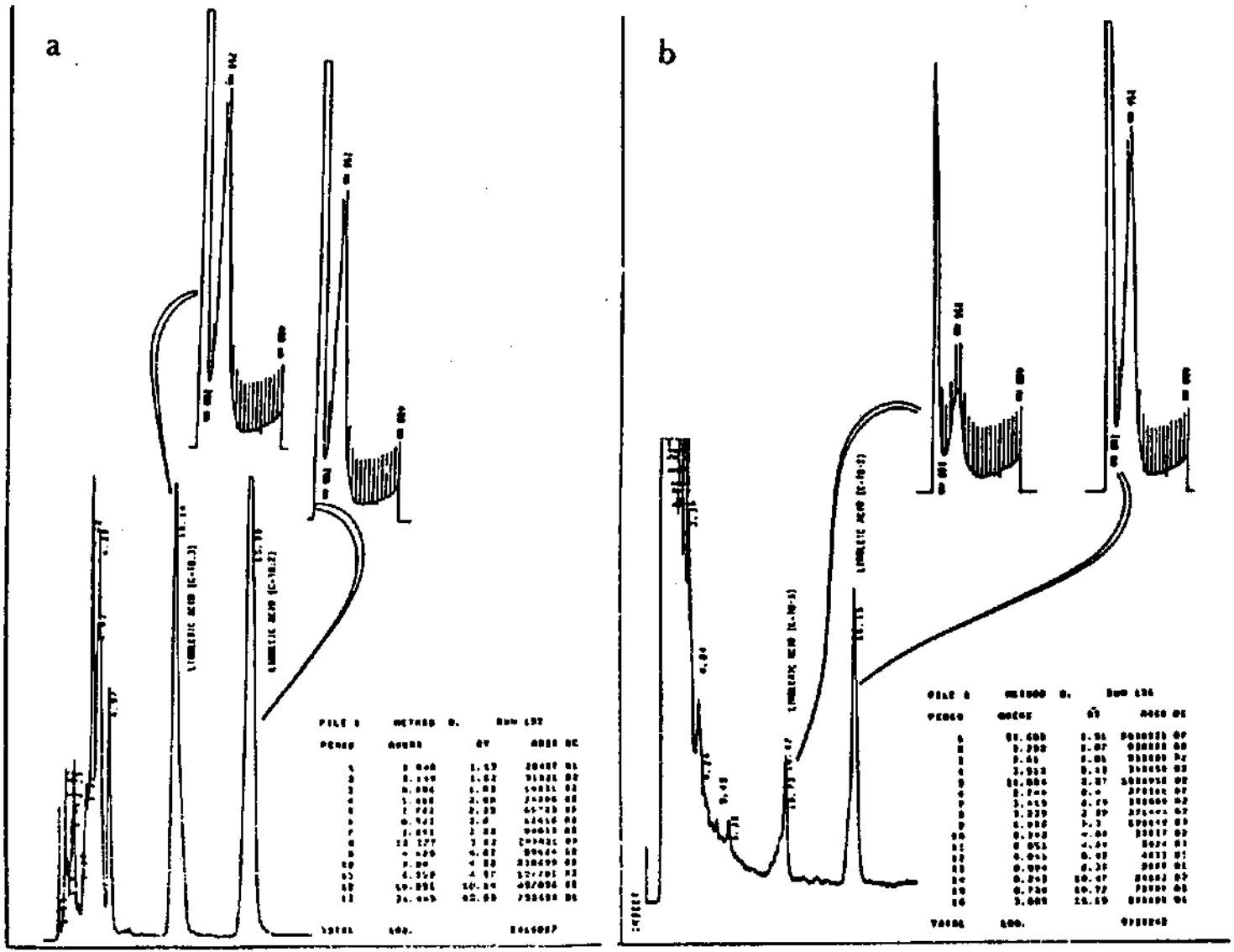


FIGURE 3; MASS SPECTRUM OF CHOLESTEROL INHIBITOR II (M^+878$^+$; $C_{57}H_{98}O_6$) OF PESF OF HPBFK.



FIGURES 4 (a,b): HPLC OF P-BROMOPHENACYL ESTERS DERIVATIVES OF STANDARD LINOLENIC AND LINOLEIC ACIDS (4a) AND ACIDS OBTAINED FROM CHOLESTEROL INHIBITOR II (4b) $M^{+}876^{+}$) oF PESF OF HPBF.



PREVENTIVE MEDICINE IN ISLAM : APPLICATION OF ISLAMIC TEACHINGS IN RELATION TO THE CONTROL OF SOME COMMUNICABLE DISEASES

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INTRODUCTION

Thanks to Almighty Allah and Peace and Prayers Be Upon his Prophet.

Preventive Medicine is largely determined by culture and religion. Islamic teachings are rich with preventive measures. The present study attempts to out-line some of these teachings and show how they can be effectively applied to control many Faecal-borne, Air-borne, and Water-borne diseases. Some of these are real major health hazards in various parts of the world including some Islamic countries (due to ignorance in applying the Islamic teachings properly).

MATERIALS

A Control of Faecal-borne Diseases.

1. One of the common routes of transmission of diseases is ingestion of contaminated food[1] examples typoid, dysentry, poliomylitis, viral hepatitis... etc. In purely human infections the micro-organisms spread usually from the fœces of the case or carrier to the mouth of the susceptible individual. The direct transmission of fæcal pathogens from case to contact via hands or utensils is clearly influenced by hygenic standards in a community[2]. The frequency of direct fæcal-oral transmission of pathogens is related to the development of a community. If resources are available for improving sanitation and for health education, progress is possible.

   Islam teaches to use the left hand to clean and wash after defecation and urination so that no soiling reaches the mouth. The right hand is always kept clean for eating. This programme blocks the fæcal-oral transmission of diseases. These instructions are clearly stated in two *hadiths*[3].

   > *(A) Umar Bin Abu-Salama reported: I was under the care of Allah's Messenger (ﷺ) and as my hand used to roam about in the dish he said to me. Boy mention the name of Allah, eat with your right hand and eat from what is near to you. Acording to Bukhary and Muslim*[4].
   >
   > *(B) Aisha+ said "the Messengers right hand was for his ablution++ and food and his left hand was for evacuation (washing after urination and defecation) and any thing repugnant" according to Abu-Dawood*[3].

2. Almost all bacteria and ova of parasites survive better in cool, moist, and shady places. *Ultra-violet light* from the sun has bactericidal activity, but this favourable effect is almost negligible in shady places, so growth of bacteria and parasites is better in these places[5]. It has been reported that the eggs of Ascaris lumbricoides can survive up to two years and remain infectious under these conditions. Consequently it is highly advisable not to urinate, or defecate in

+ *Prophet's wife*

++ *Ablution is the cleaning for prayers.*

shady places (e.g. near or under trees or near dwellings). *This instruction was indicated by the Prophet* (ﷺ) *more than fourteen hundred* years ago as it is stated in the *hadith.*

> *Abu Huraria[+] reported: "The Messenger of Allah* (ﷺ) *said: Be on your guard against two things which provoke cursing. They (the hearers) said: Messenger of Allah, what are those two things which provoke cursing? He said: easing on the thoroughfares (where people walk) or under the shades (where they take shelter and rest)." According to Muslim[4].*

3. Many parasites including hookworms and strongyloides infect people by skin penetration[6]. It usually happens when people walk around bare-footed, therefore roads, paths, and shady places are risk areas for those-bare-footed. Urination and defecation in these places provides the best chance for the parasites to invade their hosts. *Islam preceeded modern science by advising not to urinate or defecate in these place* and encouraging its followers to wear shoes when they walk around. It is stated in the *Hadith.*

   (a) *Abu-Huraira reported: "The Messenger of Allah* (ﷺ) *said: Be on your guard against two things which provoke cursing. They (the hearers) said: Messenger of Allah what are those two things which provoke cursing? He said: Easing on the thoroughfares (where people walk) or under the shades (where they take shelter and rest)." According to Muslim[4].*

   (b) *Jabir reported: "I heard Allah's Apostle* (ﷺ) *saying: during and expedition in which we also participated: make a general practice of wearing sandals, for man is riding as it were when he wears sandals." According to Muslim.*

   Nawawy stated[7] .in explaining this *hadith* that it means that the one wearing shoes is like someone riding in regard of more easyness, less effort, and safety of the feet from roughness or thorns on the road while walking.

B. Control of Air-borne Diseases.

Many infectious diseases can be transmitted by breathing or blowing droplets into the water we drink or the food we eat. Examples of such diseases include. Influenza, Herpes simplex, Poliomyelitis, Mumps, Rubella, Common cold, Streptococcal sore-throat, Chickenpox, Tuberculosis and others mainly viral. Accordingly it is highly indicated not to breath or blow in what we drink and to cover our face with a cloth or hands while sneezing and yawning[8]. *Islam directed its followers to practice these preventive measures from the Prophet's days onwards.*

> *Abdullah Bin Abbas said: "The Messenger of Allah* (ﷺ) *advised not to breath or blow in the pot. (any container of water or food." According to Abu-Dawood.*

It is referred to in the *Hadith* that

> *"The Prophet* (ﷺ) *advised not to blow in the fluid (which we drink). A man (of his companions) said: what about the little dirt I see in the pot? the Prophet said: Discard it. The man said but I don't get enough drink in one breath? The Prophet said: then take the pot away from your*

mouth. (so that he breathes outside it then have another drink and so on)." According to Tirmizy.

In this *Hadith* the argument between the Prophet (ﷺ) his companion and his insistance not to breath in the container brings the issue to the level of a command and indicates that the Prophet ﷺ realized how harmful it is, *a fact which was not clear to his companion at that time but very obvious to modern preventive medicine.*

Abu-Huraira reported that "when the Messenger of Allah (ﷺ) sneezes he covers his face with his hands or cloth which also lowered its sound". According to Abu-Dawood & Tirmizy[3].

Abu-Saeed Al-Khudari reported that the Messenger of Allah (ﷺ) said: "if one of you yawns he should put his hand on his mouth..." According to Muslim[4].

C. Control of Water-borne Diseases.

1. (a) Many pathogenic bacteria such as Cholera Salmonella, Shigella, and Leptospira species survive well in stagmant water[9].

   (b) Many Parasites such as Entameba histolytica, flukes, round worms (Trichuris Trichuria), Schistosomes, and others require a free living stage outside the human body to complete their life cycle. Urinating or defecating these into stagmant water will propogate their growth and facilitate their spread[6].
   Islamic instructions stated from the days of the Prophet (ﷺ) provide preventive measures which limit the extent of these problems and control them. It is stated in the *Quran*[10].

FOR GOD LOVES THOSE WHO TURN TO HIM CONSTANTLY AND THOSE WHO KEEP THEMSELVES PURE AND CLEAN

(S1: V222)

Abu-Huraira reported that he heard the Messenger of Allah ﷺ saying: No one of you is to urinate in the constant water which does not flow then showers in it."[4] *According to Muslim.*

2. Drinking contaminated fluids causes many diseases, so it is highly advisable to have clean drinks. This is stressed in various *Hadiths.*
   It came in the *Hadith* that

"The Messenger of Allah(ﷺ)advised not to blow in the fluid. A man (of his companions) said: what about the little dirt I see in the pot? The Prophet Said: Discard it." According to Tirmizi.

This *Hadith* indicates the importance of purity of water in two ways:

(a) It reminds us of the danger of droplet infections.

(b) It leads us to discard any impurity in what we drink as a general rule but the methods of doing this vary with time.

DISCUSSION AND CONCLUSIONS

We have seen that there are a large number of communicable diseases which can be controlled and prevented by following tenets of *Islamic*. Because of the ignorance of some muslims to these teachings certain preventable and controllable diseasesexist among them and some of these are endemics in their areas. Example 1. Tuberculosis is a common Air-borne disease in some Islamic Countries and interestingly enough El-Hassan and Taj Eldeen[11] reported that most of Primary abdominal tuberculosis in the Sudan was due to Human mycobacteria although it is known to be due to Bovine Mycobacteria. They think that a possible explanation is the practice of churning milk in rural areas. The milk is poured into a skin bag to half fill it. The bag is then distended with air blown *through the mouth* (which is prohibited in *Islam*) and churning is begun. The butter is eventually removed and the remaining milk *"robe"* is commonly consumed without boiling or heating. This practice is found in other parts of the Muslim world.

2. Schistosomiasis is an endemic water-borne disease in Egypt, Sudan and other tropical countries[6,12]. In Egypt alone there are fourteen million cases (14,000,000)[13].
3. Hookworms, stronglyoides and other round worms are common in tropical countries (including Islamic countries) and their incidence is increased by the habits of urination and defecation in the shades, common roads, and water and while people walking bare-footed. Muslims get *Guilt* if they do these things. Finally one might say: All preventive measures you discussed are known to modern preventive medicine. So what is new? And the answer is that in this paper we showed that:
   (a) these measures were known to muslims for more than fourteen hundred years as part of their religion.
   (b) *Islam* strongly stressed hygiene.
   (c) Some muslims do not know these instructions so they suffer from many disease.

RECOMMENDATIONS

1. Muslims have to adhere to these instructions first because they are part of the religion and a muslim gets guilt if he does not comply to them, and secondly they have proved to be of significant value to health.
2. "Islamic health education" is very essential. Muslim doctors and health workers should learn and teach these instructions to the community.
3. Medical Schools in the muslim world should also teach Islamic health instructions which are relevant to Preventive Medicine.

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PART SIX

INVITED LECTURE

CHAPTER ONE

(Invited Lecture)

REPORT ON THE SESSION

This session was held in the morning hours from 8.30 to 9.15, under the chairmanship of H.E. Dr. Abdul Rahman Abdullah Al-Awadi. Dr. Attila Hincal was moderator. At this session, an invited lecture was given by Prof. Dr. Ihsan Dogramaci on "BREAST FEEDING IN ISLAM".

Editors

BREASTFEEDING IN ISLAM

Dr. Ihsan Dogramaci

TURKEY

It is only recently that modern scientific research has brought to light the paramount importance of breastfeeding to the health of the child. *Islam* has known and emphasized this fact for some 1400 years. As one who has devoted his life to child health, this seemed a fitting topic for me to speak on at this conference.

During my training in pediatrics in the United States some 40 years ago, a number of leading pediatricians were doubting the superiority of breast milk over "more scientifically" prepared, and I am saying "more scientifically" in quotations, formula. These formulae were designed to meet the needs, sometimes very special, of the individual newborn. An example of such a special instance was the nutritional need of a prematurely born or low birthweight baby requiring more protein than a full-term baby of normal weight. As we know, the protein content in cow's milk is three to four times higher than in human milk, and therefore in such instances formulae prepared from cow's milk were presumed to meet the baby's needs better. In the United States at that time, when discharging their patients from the obstetric wards, it was routine for the doctors to prescribe a formula to be given to the baby. In the case of poor families, however, or where there was no refrigeration, breastfeeding was acceptable. The convenience for the mothers of not breasfeeding was considered an additional advantage, especially in industrialized countries where women are often used in the labor force. In the 1940s, more than three-quarters of the babies were already being bottle-fed before leaving the maternity ward and when breastfeeding was instituted the duration was usually for 2–3 months. By 5–6 months of age no more than 5% of babies were still receiving mother's milk. These figures reflect the general population, and among the better educated the incidence was far less.

The trend towards artificial feeding spread to some of the developing countries, too. As an example (figure 1), in the Philippines in 1950 some 90% of babies were breastfeeding, while in the year 1978 the percentage dropped to 66 among the urban poor population. In the same country in the same year, not more than 27% of the mothers in the elite brackets of society were breastfeeding their babies[1].

To underestimate the benefits of breastfeeding is in contradiction to the teachings of *Islam,* where breastfeeding is a must for all mothers who can do so and weaning should be at about two years of age.

Yesterday at the inaugural session I quoted two verses in this connection from the Holy *Quran.* Now I am going to add some more.

The verse from Al-Ahqaf is interpreted as follows:

WE HAVE ENJOINED MAN TO SHOW KINDNESS TO HIS PARENTS. WITH MUCH PAIN HIS MOTHER BEARS HIM, AND WITH MUCH PAIN SHE BRINGS HIM INTO THE WORLD. HE IS BORN AND WEANED IN THIRTY MONTHS .

The verse from El-Baqharah tells us:

MOTHERS SHALL SUCKLE THEIR CHILDREN FOR TWO WHOLE YEARS; (THAT IS) FOR THOSE WHO WISH TO COMPLETE THE SUCKLING. THE DUTY OF FEEDING AND CLOTHING NURSING MOTHERS IN A SEEMLY MANNER IS UPON THE FATHER OF THE CHILD .

The English of the Luqman verse is:

WE ENJOINED MAN TO SHOW KINDNESS TO HIS PARENTS, FOR WITH MUCH PAIN HIS MOTHER BEARS HIM AND HE IS NOT WEANED BEFORE HE IS TWO YEARS OF AGE.

The English of the Story verse is:

AND WE INSPIRED THE MOTHER OF MOSES, SAYING: SUCKLE HIM

Further, in the *Hadith,* the Prophet (ﷺ) insisted that mothers should whenever possible breastfeed their children. According to certain witnesses, the Prophet (ﷺ) even indicated, in one of his *Hadiths.* that those mothers who can breastfeed their babies and yet do not do so will be called to account.

Research during the past ten years has given us much new knowledge regarding the properties of human milk, properties entirely unknown earlier, and its superiority has been so well established that even in the most developed and industrialized countries mothers are again breastfeeding their babies. I would like to illustrate this trend.

In the United States, for example (figure 2), in 1971 fewer than one-quarter of mothers in the maternity wards were breastfeeding their babies during the first days of life, and at 5–6 months of age only 5.5% of babies were still receiving breast milk.. In the mid-1970's, when the new knowledge was made available about the unmatchable qualities of breast milk, mothers, especially in the more educated groups, started breastfeeding their babies so that by the year 1980, of the mothers in the maternity wards, more than double the number (55.3%) were found to be breastfeeding. Nearly 5 times as many mothers (24.9%) were continuing to breastfeed when their infants were 5–6 months old[2].

The same trend was also observed in the Scandinavian countries. In Norway, for example (figure 3), in 1970 the incidence of mothers breastfeeding at 3 months was 22%, but this increased in the years that followed to reach some 70% in 1980[3]. These are the published figures, and we are informed that during the last four years the increase has been continuing.

Why did this happen? It is because the most sophisticated investigations, carried out in laboratories in the West, have shown that the doubts regarding the uniqueness of breast milk, which had been prevalent for some 30–40 years in the West, were entirely unfounded. Of course, this was no news for the Islamic world.

Let me share with you some of the recent advances in our knowledge concerning the composition and functions of human milk. For many years pediatricians had been misled by the fact that in cow's milk there is 3–4 times as much protein as there is in human milk. Of course quality is always more important than quantity but it is only very recently that research has taught us just how ideal is the quality of the relatively small percentage of protein in human milk.

In table 1 we see that what is important is the whey protein content, for it is this which fosters the development of the child. There is more than 70% of it in human milk and less than 20% in cow's milk[4]..

It has also been discovered that the protein content of human milk is indirectly proportional to the maturity of the newborn baby. In other words, the smaller the baby, the higher the protein content of the mother's milk[5]. Further, the protein content in human milk is not constant in the mother. It varies from day to day and even at different times during the same day, to suit the exact needs of the suckling.

In table 2 we see that the distribution of amino acids in human milk is such as to meet the very special requirements of the human baby. Here are a few examples:

- an excess of phenylalanine and tyrosine is known to be harmful for neonates, and there are only very small amounts of these amino acids in human milk[1].
- for the growth of an infant, and especially of a neonate, cystine is very important. Human milk, unlike cow's milk, is rich in this amino acid[1,6].
- normally cystine is converted from methionine. Cow's milk contains more methionine than human milk, but neonates are unable to convert methionine into cystine due to the immaturity of the enzyme system[6].
- and the last point, taurine is one of the most important of the amino acids, especially for brain development, and it is of interest to note that the taurine content of human milk is 30–40 times higher than that of cow's milk[7,8].

Biochemically human milk has further advantages over cow's milk and in the following table we see these advantages.

TABLE 3

FURTHER BIOCHEMICAL ADVANTAGES OF HUMAN MILK

- Low sodium concentration in breast milk protects the newborn against dehydration and hypernatremia[4].
- 50–70% of iron is absorbed from human milk compared to 10–30% from cow's milk[9].
- Human milk contains a zinc-binding molecule, picolinic acid, which leads to more efficient absorption of zinc from mother's milk than from cow's milk[10].
- The ratio of calcium to phosphorus in breast milk is more suitable for bone mineralization than the ratio of those minerals in cow's milk[11].
- The cholesterol content of human milk is higher than in cow's milk (0.16 vs. 0.110 grams per liter)[12].
- The essential fatty acid content is higher in human milk than in cow's milk (10.6% vs. 2.1%)[4].
- Better absorbed 2-attached palmitic acid content is higher in human milk than in cow's milk (74% vs. 39%)[13].
- The presence of bile-salt dependent lipase in human milk makes the fats more absorbable[13].
- Substantial amounts of epidermal growth factor (EGP) are present in human milk[14].

Besides its biochemical properties, there are certain biological factors in human milk which make it anti-infective and this explains why babies who are not breastfed are so much more prone to infectious diseases. The anti-infective properties in human milk include the following:[15–17].

- The presence of live cells, including lymphocytes, neutrophils and macrophages in human milk, contributes significantly to its anti-infective properties. The numbers of these cells are highest in colostrum and they appear to secrete IgA, lactoferrin, lysozyme and interferon. Interferon may inhibit the activity of certain viruses.
- Immunoglobulins, namely secretory immunoglobulin A (SIgA), are present in large amounts in colostrum and to a lesser extent in mature human milk. SIgA is resorbed only in significant amounts but has an effect against certain bacteria such as E. coli, shigella, salmonella and Vibrio cholerae. There are also SIgA antibodies against certain viruses, including rota virus, which is the commonest diarrhea agent, against polio virus and against Coxsackie, enterovirus, influenza A and respiratory syncytial virus.
- Lactoferrin, a protein which binds iron to itself, is found in human milk. It has a bacterial static effect on E.coli, streptococcus mutants and staphylococcus aureus.

- Lysozyme which contributes to bacterial lysis, is present in amounts several thousand times higher in human milk than in cow's milk.
- Breast milk contains "bifidus factor" which promotes the growth of lactobacillus.
- Lactoperoxydase in human milk acts with hydrogen peroxidase and thiocyanate ions and thus exerts a bacteriostatic effect on streptococci.
- Finally complements (and especially C3) help bacterial opsonization and phagocytic killing.

Some bottle-fed babies may gain weight faster than their breastfed counterparts. The quantity of breast milk is adjusted to the need of the growing baby, whereas formulae are given in the quantities and strengths the mother wishes, and she may give more than necessary in order to make sure her baby gains weight. This may make some parents happy, but we know now that such babies are more prone to obesity, hypertension and coronary disease in adult life[18].

The psychological factors attached to breastfeeding in contrast to artificial feeding have been well established, and therefore I am not going to expand on them.

How long should the baby be breastfed? The first six months are a must, but up to two years is very desirable in many cases as ordered in the Holy *Quran* and the *Hadith*. In this connection one of the publications of the World Health Organization, A Manual for the Treatment of Acute Diarrhoea of the Programme for the Control of Diarrhoeal Diseases (WHO/CDD/SER/80.2) states:

> Exclusive breast feeding for 4–6 months – – offered as often and as freely as the infant desires it and continued breast feeding up to at least two years of age are most important in the prevention of infantile diarrhoea. Breast milk is the best food for infants and has immunological properties which help prevent infection including diarrhoea.

Jelliffe and others are among those who advocate the same two-years period whenever feasible. In short, the West, after exhaustive investigations, has come to what was ordered 1400 years ago in the Holy *Quran*.

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DECLINE IN BREASTFEEDING
(Philippines)

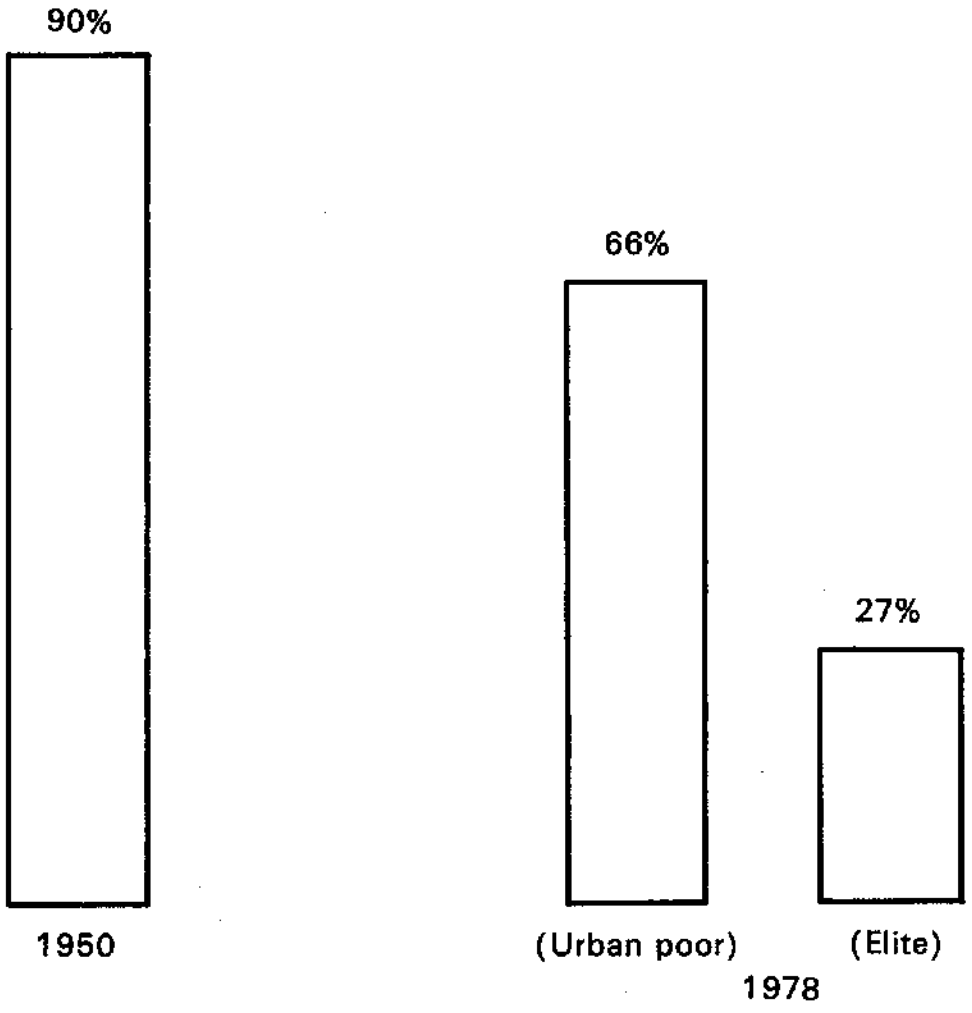


FIGURE 1

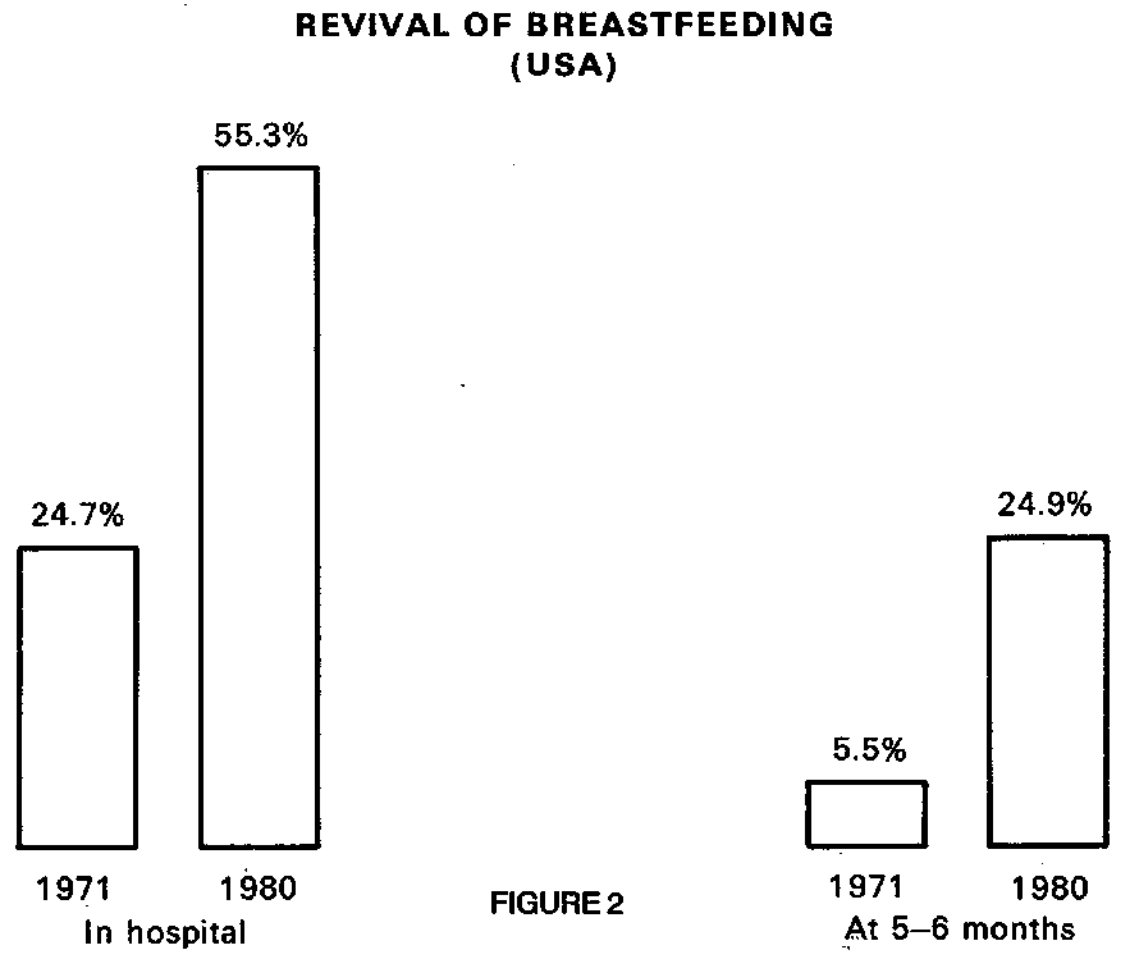
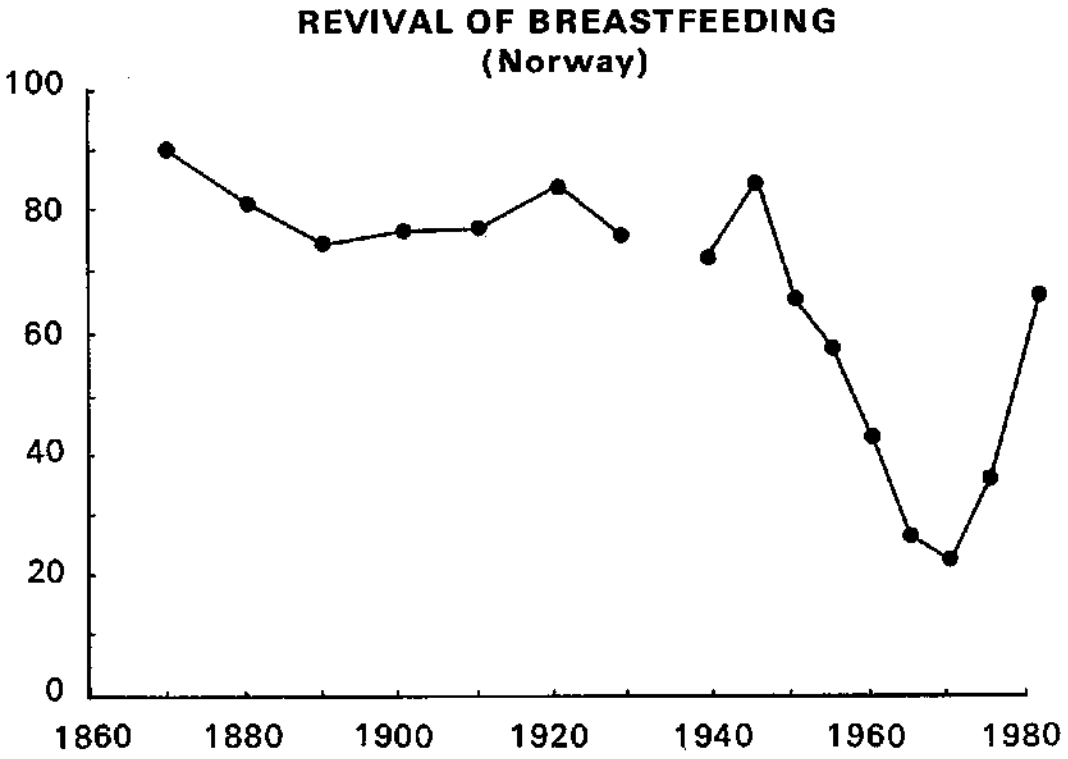


FIGURE 2



Percentages of mothers breastfeeding at three months in Oslo, Norway, 1870–1980.

FIGURE 3

TABLE 1

TOTAL PROTEIN CONTENT	
Human Milk	Cow's Milk
1.0%	3.5%
WHEY PROTEIN CONTENT (Biologically very important)	
Human Milk	Cow's Milk
> 70%	< 20%

TABLE 2

COMPARISON OF THE AMINO ACID CONTENT OF HUMAN MILK AND COW'S MILK

Phenylalanine and tyrosine	Human milk contains less (excess may be harmful for neonates)
Cystine	Richer in human milk (essential for growth)
Methionine	Richer in cow's milk (neonates cannot convert to cystine due to the immaturity of enzymes)
Taurine	30–40 times richer in human milk than in cow's milk (important for brain development)

TABLE 3

FURTHER BIOCHEMICAL ADVANTAGES OF HUMAN MILK

- Low sodium concentration in breast milk protects the newborn against dehydration and hypernatremia
- 50–70% of iron is absorbed from human milk compared to 10–30% from cow's milk
- Human milk contains a zinc-binding molecule, picolinic acid, leading to more efficient absorp, tion of zinc from mother's milk than from cow's milk.
- Calcium,phosphorus ratio in breast milk is more suitable for bone mineralization than this ratio in cow's milk
- Cholesterol content of human milk is higher than in cow's milk (0.16 vs. 0.110 grams per liter)
- Essential fatty acid content is higher in human milk than in cow's milk (10.6% vs. 2.1%).
- Better absorbed 2-attached palmitic acid content is higher in human milk than in cow's milk (74% vs, 39%)
- Presence of bile-salt dependent lipase in human milk makes fats more absorbable
- Substantial amounts of epidermal growth factor (EGF) present in human milk.

TABLE 4

BREAST MILK CONTAINS THE FOLLOWING ANTI-INFECTIVE PROPERTIES

- Live cells (lymphocytes, neutrophils, macrophages)
- Immunoglobulins (specifically S-IgA)
- Lactoferrin (bacteriostatic effect on E.coli, streptococcus mutants, staphylococcus aureus)
- Lysozyme (lysis of gram-positive bacteria)
- Bifidus factor (promotes lactobacillus flora)
- Lactoperoxydase (bacteriostatic against streptococci)
- Complements (specifically C3, helps bacterial opsonization, phagocytic killing)

PART SEVEN

PHARMACOLOGICAL EVALUATION FOR SOME PLANTS MENTIONED BY THE MUSLIM SCIENTISTS

Part Seven: *Pharmacological Evaluation for Some Plants Mentioned by the Muslim Scientists.*

CHAPTER ONE

(Papers Presented)

REPORT ON THE SESSION

This session was held from 9.30 to 12.30 under the chairmanship of Hakim Mohammed Said and co-chairmanship of Dr. Matin Tanker. Dr. Shehab Ahmed Shehab was the moderator. At the beginning of the session the chairman gave his opening remarks.

This was a scientific session in which seven research scholars and scientists presented their papers on very interesting topics under the main title, "PHARMACOLOGICAL EVALUATION FOR SOME PLANTS MENTIONED BY THE MUSLIM SCIENTISTS?". At the end there were general discussion.

Editors

OPENING REMARKS OF THE CHAIRMAN

Hakeem Mohammed Said

Excellencies, Delegates, Ladies and Gentlemen. First of all, I feel, my pleasant duty is to express my feelings of gratitude to the organizers of this conference who have given me the honour to preside over the third session, this morning. As you know that we are dealing with a very vital and important subject of the conference, i.e. "Pharmacological evaluation for some plants mentioned by the Muslim scientists". Since we have short time at our disposal, I shall avoid to give any assessment before inaugurating this third session, but I feel justified to say that yesterday evening, we were discussing and trying to reach to a decision about the link between mind and heart. I think, we could not reach at any definition and we could not decide what is the relation between the heart and the mind of the human body or human being. I presume this is not a very recent point of reference, but this topic is as old as human being himself. So far, no one has explained and I think it shall always be difficult to explain that how the man has the power to grasp knowledge.

Yesterday, when we were discussing about mind and heart, it reminded me of the presence of the smallest DNA which only can be seen with the help of a powerful microscope. That one DNA is capable of absorbing and reserving 10,000 fool-scap pages in it.

In that sense, I would say that we are not able to understand human being and cannot claim to do so, but the administration and effects of drugs on the human body is based on tests. I would say that we physicians are dealing with human body without properly understanding the
of the human being and so it shall be difficult to explain that. As far as herbs are concerned, I shall quote one instance here, that one industrious scientist of sub-continent or I should rather say of Pakistan, Dr. Salimuzzaman Siddiqui F.R.S., has been working on one medicinal plant i.e.*Rauwolfia Serpentina* for the last 50 years and still, today he cannot say that he has found all the contents of this one herb. So far, I think he has isolated 21 alkaloids from this plant and he is not sure how much more alkaloids are still present in *Rauwolfia Serpentina*. Today, research work in the medicinal plants is not a very easy subject, so to speak.

I have taken enough time. Thank you very much. I think at the end of the session if we have time we will be able to discuss more.

A SURVEY OF RESEARCHES ON THE ACTIVE PRINCIPLES OF TURKISH MEDICAL PLANTS

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TURKEY

There are about 186 genera of medicinal plants growing in Turkey. Since 1930's numerous plants have been subjected to research concerning their chemical constitution.

A survey of such publications indicates that medicinal plants have been the interest of pharmacists mainly; most of the researches having been carried out in the research laboratories of the pharmacy faculties in Turkey; whereas research groups consisting of chemists, agriculturists have also paid great attention to medicinal plants and contributed vastly to the elucidation of plant chemistry in Turkey. Whatever degree he has, the researcher in plant Chemistry has almost always been a member of the university staff. The medicinal industry has not been much interested in medicinal plants up to now.

Although the researches have been realised in the universities and not in various centers, it is not possible to say that such work has been carried out according to a central plan and programme; on the contrary, the plants have been selected rather at random. But in spite of this, so to speak wide-spread nature of the selection of research material, one can detect three distinct aims of the researcher. The first is to determine the chemical constitution of Turkish medicinal plants, which remained unknown untill 1950's or even 1960's. The second aim is to testify the verity of the activity of plants used in folk medicine; and the third is to determine whether the Turkish botanical species may be substituted for the species stated in pharmacopeaes and codices.

Probably, the first aim caused the researcher's inclination to all kinds of medicinal plants, those containing alcaloids, glycosides, volatile oils, phenolics, steroids, etc. Plants consisted a vast and unknown field for the researcher.

The second and third aims, restricted this field, more or less to the pharmacist, as it is natural for the pharmacist to be involved in the scientification of folk medicine and also of Turkish botanical species. Isolation of completely new chemical compounds, and discovering completely new plants with pharmacological activity has not been the major aim of the Turkish researcher untill recently.

Thus more than 120 genera and 280 species containing alcaloids, glycosides, carbohydrates, volatile oils, flavonoids and phenolics, steroids, lipides, triterpenoids, etc., have been analysed. About 30% of these publications date before 1970's and consist mainly of qualitative and quantitative determination of the constituents by classical reactions and chromatographic methods. Since 1970's, researchers have tried to overcome the financial difficulties in obtaining modern apparatus and have tried to utilise the modern methods which have developed incredibly during the last 15 years. Table I gives an idea about the distribution of work done on medicinal plants from the point of view of the active principles. Table II covers a great majority of the genera worked up with.

Publications have numerically increased since 1970's and consist not only of determination but also of isolation, purification and structure elucidation of the active principles.

Plants carrying alcaloids, volatile oils and flavonoids always have had the prominence. The first doctorate thesis prepared by a Turkish pharmacist[16] dated back to 1932 and was on *Papaver somniferum*, the most important *alcaloid* plant in Turkey. Lately work has concentrated on thebein yielding Papaver species such as *P. fugax, P. bracteatum,* etc.[17-25].

Table 1

	Number of plants		Number of publications	Number of publications before 1970's
	Geneva	Species		
Alcaloid bearing plants	24	70	36	9
Volatile oil bearing plants	24	82	37	12
Flavonoids, Phenolics bearing plants	25	54	34	3
Glucoside, Carbohydrate bearing plants	20	55	34	16
Steriod, lipide triterpernoid bearing plants	25	26	27	5

Table 2

Active principles	Family	:	Genera
Alcaloids	Berberidaceae	:	Epimedium (2), Berberis (1)
	Boraginaceae	:	Symphytum (3,4)
	Cannabinaceae	:	Cannabis (5)
	Compositae	:	Achillea (6)
	Cucurbitaceae	:	Ecballium (7)
	Dioscoreaceae	:	Tamus (7)
	Ephedraceae	:	Ephedra (8,9)
	Leguminosae	:	Genista (10)
	Liliaceae	:	Merendera (11) Colchicum (12)
	Papaveraceae	:	Glaucium (14,15) Corydalis (13), Papaver (16,17-25), Fumaria (26))
	Ranunculaceae	:	Aconitum (27,28), Delphinium (29)), Thalictrum (30,31))
	Solanaceae	:	Nicotiana (32), Hyoscyamus (33,34,35) Mandragora (7,35), Datura (35), Atropa (35)
	Zygophyllaceae	:	Peganum (36))
Volatile oils	Cannabinaceae	:	Humulus (37)
	Compositae	:	Achillea (6), Artemisia (38,39,40,41) Pyrethrum (42), Santolina (43)
	Cupressaceae	:	Juniperus (44,45), Thuja (46)
	Geraniaceae	:	Pelargonium (47)
	Graminae	:	Cymbopogon (48)
	Labiatae	:	Lavandula (49), Mentha (50,51,52,53) Origanum (43,54,55), Salvia (56,57,58,59) Satureia (60), Sideritis (60), Teucrium (43), Thymbra (61,62) Thymus (63,64), Ziziphora (43,65)
	Lauraceae	:	Laurus (43)
	Myrtaceae	:	Eucalyptus (66,67),
	Rosaceae	:	Orthurus (69),
	Rutaceae	:	Ruta (70)
	Tiliaceae	:	Tilia (71)
	Umbelliferae	:	Echinophora (72)
	Pinaceae	:	Abies (68)
Flavonoids, Phenolics	Berberidaceae	:	Berberis (73)
	Compositae	:	Achillea (74), Chrysanthemum (76), Gnaphalium (77), Helychrysum (78-84), Matricaria (86), Inula (85), Notobasis (87), Silybum (88,89), Antennaria (75)
	Euphorbiaceae	:	Euphorbia (90,91)
	Geraniaceae	:	Pelargonium (92)

	Hypericaceae	:	Hypericum (93)
	Labiatae	:	Salvia 94,95, Thymus (96)
	Leguminosae	:	Glycyrrhiza (97) Genista (98)
	Liliaceae	:	Asphodeline (99)
	Polypodiaceae	:	Dryopteris (100,101)
	Rosaceae	:	Crataegus (102)
	Rutaceae	:	Ruta (103)
	Scrophulariaceae	:	Digitalis (104), Verbascun (105)
	Umbelliferae	:	Smyrnium (106)
Glycosides and carbohydrates	Asclepediaceae	:	Marsdenia (107)
	Caryophyllaceae	:	Saponaria (108)
	Equisetaceae	:	Equisetum (109)
	Labiatae	:	Salvia (110)
	Leguminosae	:	Glycyrrhiza (97,111) Astragalus (112), Ceratonia (113,114)
	Liliaceae	:	Urginea (115), Smilax (116)
	Orchidaceae	:	Orchys (117), Ophyris (117), Serapias (117) Himantoglossum (117), Anacamptis (117)
	Polygalaceae	:	Polygala (118)
	Primulaceae	:	Primula (119), Cyclamen (120,121)
	Ranunculaceae	:	Helleborus (122,123,124) Adonis (125)
	Rhamnaceae	:	Rhamnus (126,127)
	Rubiaceae	:	Cruciata (128)
	Scrophulariaceae	:	Digitalis (129-135)
	Strycaceae	:	Styrax (136)
	Umbelliferae	:	Ferula (138,139) Ammi (137), Smyrnium (140)
Steroids, lipids, triterpenoids and others	Anacardiaceae	:	Pistacia (141)
	Celastraceae	:	Evonynus (143)
	Compositae	:	Gundelia (144), Achillea (74), Cnicus (145), Inula (146)
	Cruciferae	:	Boreava (147), Eruca (142)
	Cucurbitaceae	:	Cucumis (148)
	Euphorbiaceae	:	Ricinus (149)
	Hamamelidaceae	:	Liquidambar (150,151)
	Labiatae	:	Sideritis (152), Salvia (110,153)
	Liliaceae	:	Merendera (154)
	Myrtaceae	:	Myrtus (155)
	Phaeophyceae	:	Sargassum (156), Phyllophora (157)
	Punicaceae	:	Punica (158)
	Ranunculaceae	:	Paeonia (159), Clematis (160)
	Rosaceae	:	Crataegus (102)
	Scrophulariaceae	:	Digitalis (161)
	Solanaceae	:	Withania (162)
	Styracoceae	:	Styrax (163)
	Umbelliferae	:	Smyrnium (110,164).

Species like *Digitalis ferruginea, D. lanata* among glycoside bearing plants have been examined for determining whether they are equivalent to the officinal species or not.

Most of the Turkish Labiatae plants carrying volatile oils have been analysed by GLC since 1970's, and those species which can be substituted instead of the officinal plants, and those with economic value have been determined.

Again recently, completely new alcaloids[10,26,27] and flavonoids[85,94,95] have been isolated and described. There are also publications indicating for the first time, the occurence of compounds previously not known to occur in certain genera[77,104], and also publications on structure elucidation of compounds with doubtful chemical structures[151].

Lately plant extracts are being scanned for various pharmacological activities, such as antiglycemien, antibiotic, antifungal, antilypomic and specially for antitumour properties. A research group[165] has scanned about hundred Turkish plants for neoplastic activity and found five of them very promising.

More promising results are to be expected, when research groups can establish better collaboration among one another.

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EFFECT OF SOME FOLK MEDICINES ON THE URETER
(An experimental study)

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EGYPT

INTRODUCTION

Since ancient times man has used herbs and local flora to alleviate many of his diseases and body disorders. The value of plants as drugs is due to the presence of active substances in such plants inducing organic influences in the human body. These substances can be alkaloids, tannines, etc (Mahmoud[1]. Although an immense number of synthetic drugs are used in the treatment of patients with renal colic and urinary calculi, yet some of these drugs have unwanted ill effects. This stimulated us to study the effectiveness of the so called folk medicine agents occasionally used in the treatment of renal colic. In this work a study of the pharmacologic effects of some famous folk medicine drugs in common use were tested on the intact dog ureter. This could be a primary step before the study in humans.

MATERIAL AND METHODS

Experimental Model:

A total of 35 adult mongrel male dogs weighing from 10-12 Kg. were used for acute experiments. A forearm vein was used to give thiopentone sodium (Pentothal) anaesthesia. This was given at a dose of 25 mg/Kg./B.W. . Stability of the anaesthesia was maintaned by injection of 25 mg of 5% pentothal solution every ½ hour as needed. A femoral vein was exposed and canulated for continuous saline infusion at a rate of 5 drops/minute. The abdomen was opened through a mid line incision. The intestines were packed to one side and covered with warm saline towels. The left kidney was mobilised and freed from its surrounding fat so to abolish the effect of respiratory movements on the ureteral tracings. The bladder was opened anteriorly to identify both ureteric orifices. A 6 french ureteral catheter was passed via the right ureteric orifice up to the renal pelvis. A silk ligature was applied around the lower part of the right ureter; which was exposed extravesically, to prevent leakage of urine around the catheter. This catheter was used to collect the urine into a graduated test tube. Another ureteric catheter (4 F.) was passed up to the left ureter for a distance of 10 cm and was fixed in this position by a stitch applied around the ureteric orifice in the bladder wall. The distal end of this catheter was connected to a pressure transducer coupled to a multichannel dynograph recorder (R. 511 A, Beckman).

Ryle tube was passed to the stomach of each dog via the nose. Its position was verified by palpation of the tip of the tube in the stomach through the open abdomen. Saline-wash of the stomach was done to evacuate the gastric contents before administration of the drugs.

Experimental Protocol:

A period of half an hour was allowed for stabilization of the animal to obtain a stable recording of ureteric peristalsis. The frequency of ureteral peristalsis per minute, basal pressure and amplitude of contraction and urine volume were recorded for ½ hour and were used as control before administration of the drugs.

The following drugs were given:

1) *Zea maize hair extract (glycoalkaloid).*

The extract was prepared from *Zea maize* hair in the Faculty of Science, Al-Azhar University. It was given intravenously in a bolus dose of 0.5 mg/Kg. in 5 experiments.

2) *Jerusalem stone (Zitonet Israel): (5 experiments)*

This stone was ground to a powder. 5 gms of the powder were dissolved in 25 ml. of fresh lemon juice. The solution was given via the Ryle tube at frequent doses of 2 ml. every 15 minutes until an effect is noticed on the tracings of ureteral peristalsis.

After the end of each experiment the stomach was opened to verify the absorption of the injected drug.

3) *Cymbopogon proximus (Halphabar):* (5 experiments)

This was prepared by adding 5 gms of the dry plant to 500 ml water. The solution was boiled to obtain a decoction of 100 ml volume. Only 2 ml of this solution was injected into the lumen of the stomach via the Ryle tube, the dose was gradually increased and the effect on the ureteral peristalsis and urine volume were recorded.

4) *Ammi visnaga decoction:* (5 experiments)

Five grams of *Ammi visnaga* seeds were added to 500 ml water and boiled to obtain a decoction of 100 ml volume. 2 ml of the decoction were given via the Ryle tube. The dose was gradually increased and the effects on the ureteral activity and urine out-put were studied.

5) *Ambrosia maritima:* (5 experiments)

The decoction was prepared by boiling 5 grams of the dried plant in 500 ml water until a decoction of 100 ml volume was obtained. 2 ml of the decoction were ingested in the Ryle tube. The dose was gradually increased and changed on the ureteral peristalsis and urine volume were noted.

6) *Barley decoction:* (5 experiments)

Five grams of the seeds were boiled in 500 ml water to obtain solution of 100 ml volume. 2 ml of the decoction was injected in the Ryle tube. The dose was gradually increased and the effects on the ureteral activity and urine volume were studied.

7) *Petreselinum crispum:* (5 experiments)

The decoction was prepared by boiling 5 grams of the green plant in 500 ml water to obtain a solution of 100 ml volume. 2 ml of the decoction were given via the Ryle tube. The dose was gradually increased and changes in the ureteral activity and urine out-put were recorded.

In each experiment the changes in the ureteral peristalsis and urine volume were continuously monitored for a period of 3 hours after each drug administration, This period was chosen arbitrarily since the stability of the vital signs of the animal under anaesthesia were affected after 5 hours as a maximum period.

RESULTS

A) Effects on ureteral peristalsis:

Are shown in Tables (1 & 2) and Fig. (1, 2, 3, 4, 5, 6 & 7).

* Zea maize hair extract: It produced a significant decrease in the frequency, basal ureteric pressure and amplitude of ureteral peristalsis.
* Jerusalem stone (Zitonet Israel): Significant increase in the frequency, basal pressure and

decrease in the amplitude was noted after drug administration.

* Cymbopogon proximus (Halpha bar): It elicited significant decrease in the basal pressure and amplitude of peristalsic waves and insignificant decrease in the frequency of ureteral contractions.
* Ammi visnaga: Significant increase in the basal pressure was observed following drug administration and insignificant decrease in the frequency and amplitude of ureteral peristalsis.
* Ambrosia maritima: The drug produced significant decrease in the frequency of ureteric peristalsis and the basal pressure but no significant change in the amplitude of ureteric peristalsis.
* Barely: Significant elevation of the basal pressure was observed and significant decrease in the amplitude of the ureteral peristalsis.
* Petroselinium crispum: Produced significant decrease in the frequency and amplitude and significant increase in the basal pressure.

B) Effects on the urine volume:

All tested drugs apart from (Halpha bar) produced a significant increase in urine out-put.

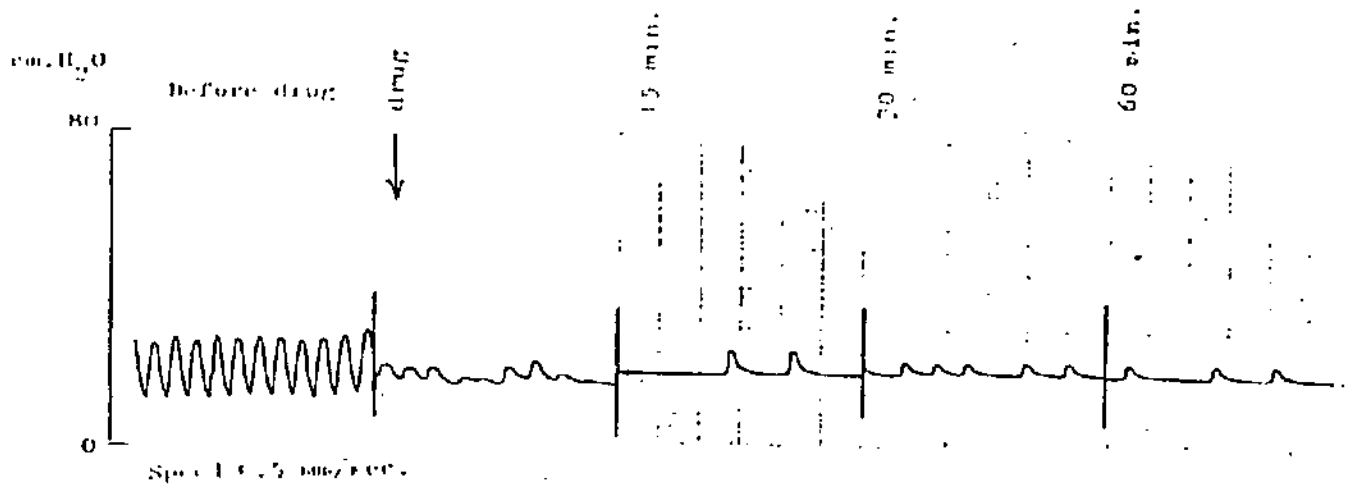

Fig. 1. Effect of Glycoalkaloid on Ureteral Peristalsis in dogs

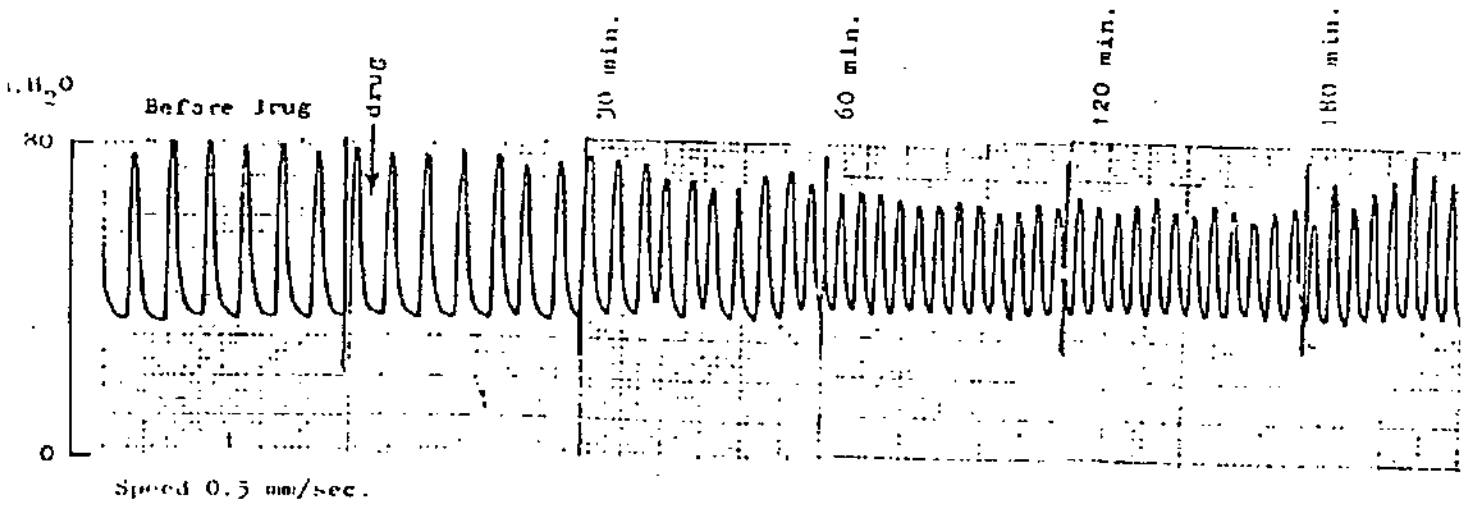

Fig. 2. Effect of Jerusalem stone (Zitonet Israel) on Ureteral Peristalsis in Dogs

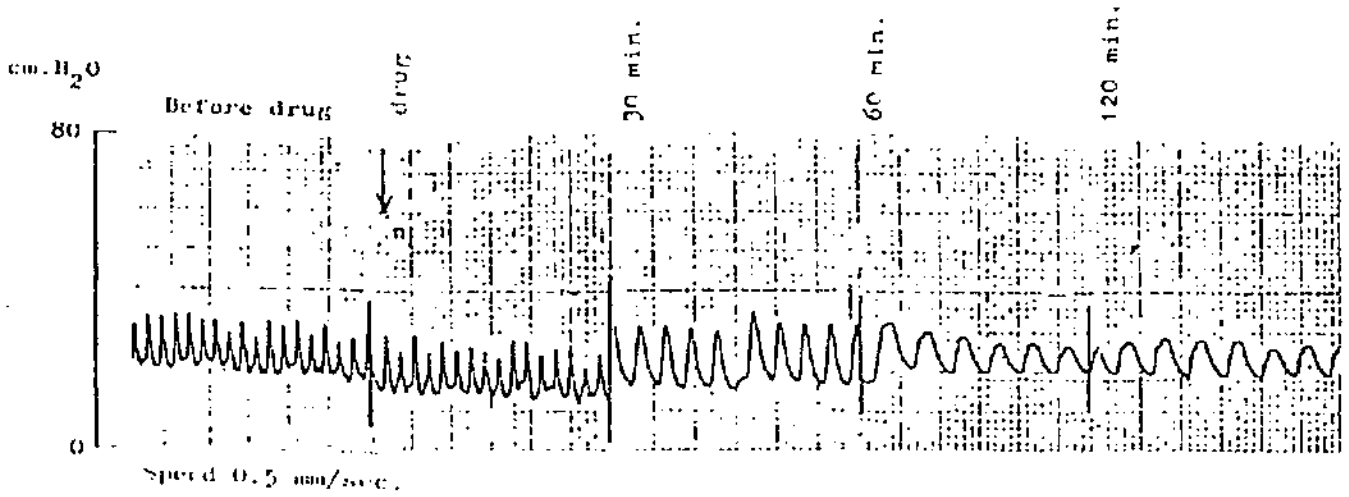

Fig. 3. Effect of Halphabar on Ureteral Peristalsis in Dogs

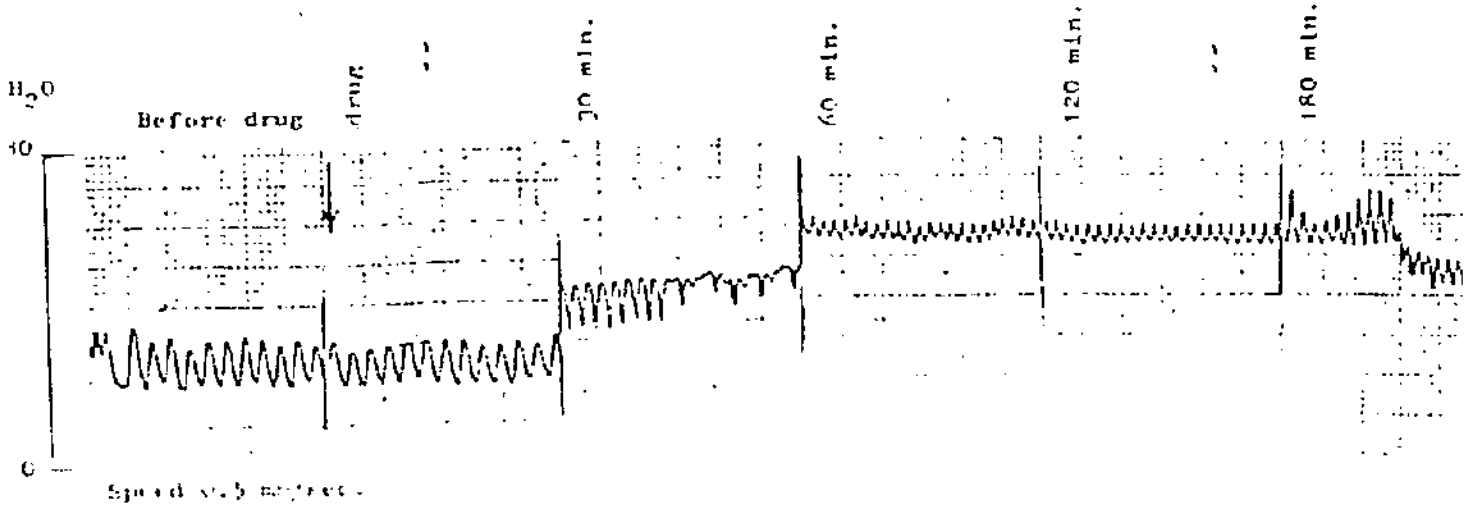

Fig. 4. Effect of Ammi visnaga on Ureteral Peristalsis in Dogs

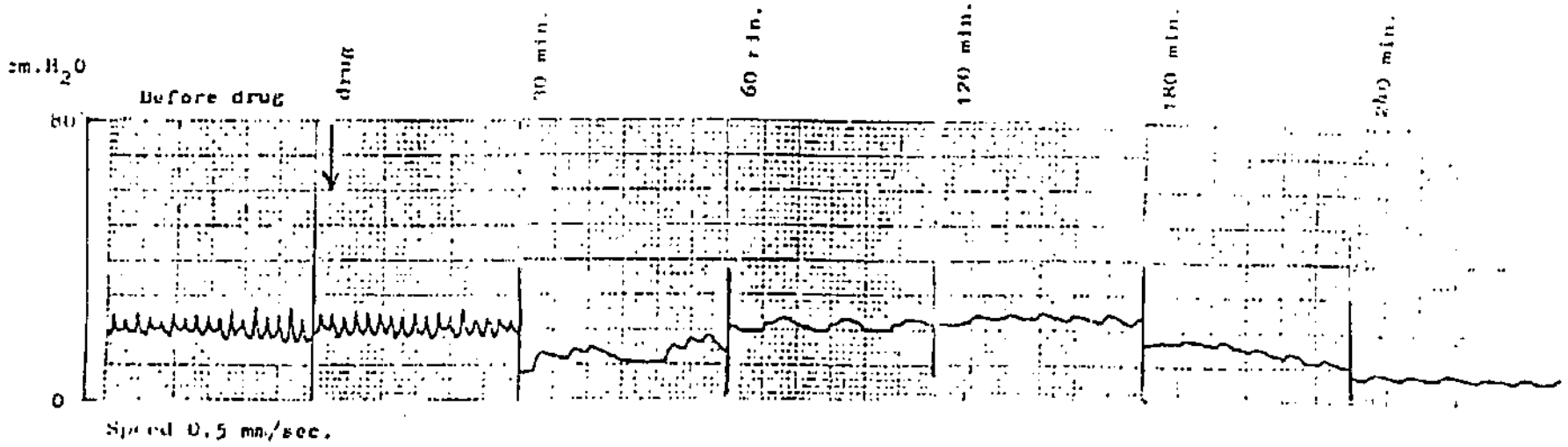

Fig. 5. Effect of Ambrosia M. on Ureteral Peristalsis on dogs

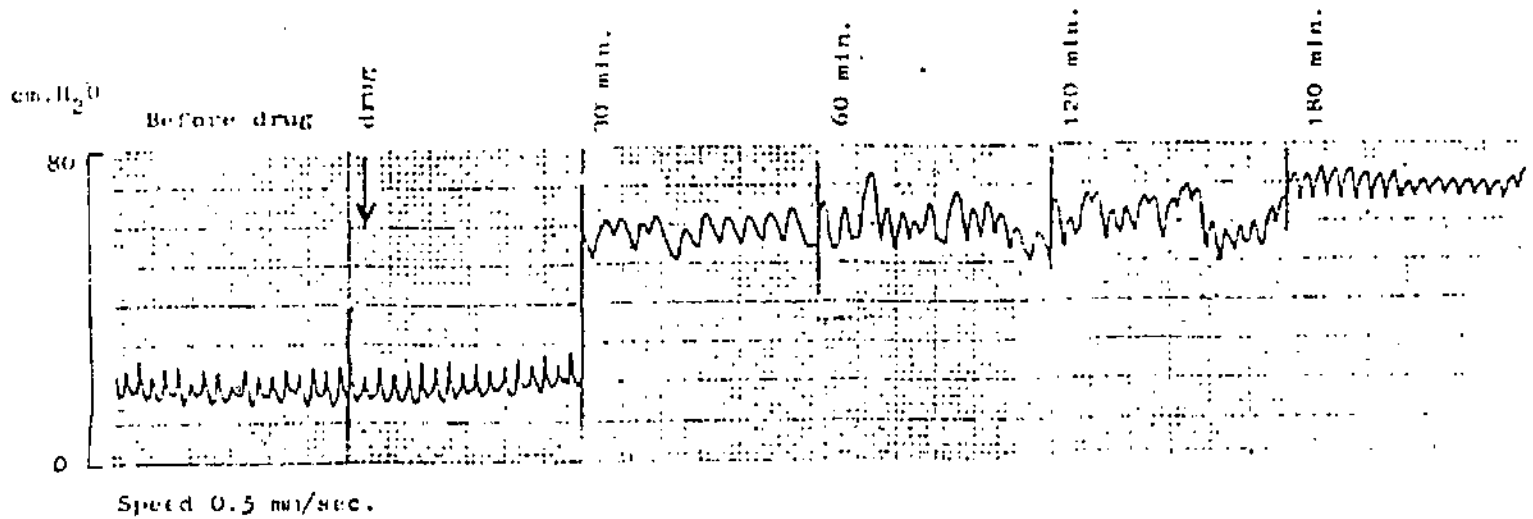

Fig. 6. Effect of Barley on Ureteral Peristalsis in Dogs

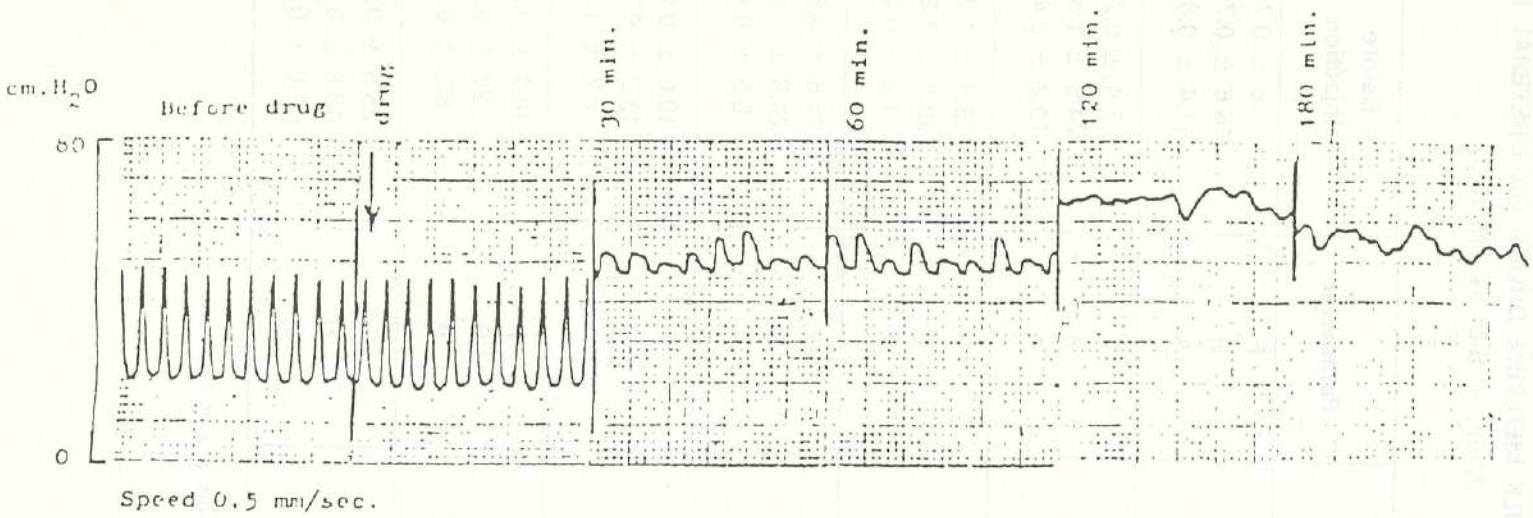

Fig. 7. Effect of Petroselinum Crispum on Ureteral Peristalsis in Dogs

TABLE (1)

EFFECT OF SOME FOLK MEDICINE DRUGS ON URETERAL PERISTALSIS

(Mean + S.E. IN CM H_2O).

Drug-n	Parameter	Before injection	After injection (one hour)
* Zea maize hair extract (Glycoalkaloid)	F	8 ± 0.7	5 ± 0.44#
	B	16.6 ± 0.72	14 ± 0.44#
	A	11.4 ± 0.81	8.8 ± 0.37#
* Jerusalem stone (Zitonet Israel)	F	7.4 ± 0.29	12.6 ± 0.72#
	B	24.8 ± 1.36	32.8 ± 1.5#
	A	10.2 ± 0.41	5.6 ± 0.5#
* Cymbopogon proximus decoction (Halpha bar)	F	13.4 ± 1.2	11.6 ± 1.2
	B	29.8 ± 1.39	23.2 ± 0.89#
	A	4.9 ± 0.4	8.2 ± 0.48#
* Ammi visnaga decoction	F	15.6 ± 0.67	14.8 ± 1.3
	B	24.8 ± 1.2	30 ± 0.63#
	A	5.6 ± 0.4	5 ± 0.44
* Ambrosia maritima decoction	F	10.6 ± 0.68	9 ± 54
	B	13.2 ± 0.74	13.2 ± 0.74
	A	5.2 ± 0.36	4.1 ± 0.36
* Barley decoction	F	10.2 ± 0.8	9.6 ± 0.24
	B	28 ± 0.83	36 ± 7.1#
	A	8.8 ± 0.58	7 ± 0.63#
* Petroselinium crispum	F	25.6 ± 0.24	7.6 ± 0.5 #
	B	19.8 ± 0.66	45.8 ± 1.75#
	A	8.6 ± 0.67	7 ± 0.38#

: Statisticaliy significant difference from preinjection level.
F; Frequency of peristalsis/minute.
B; Basal ureteric pressure in cm H_2O.
A: Amplitude of peristaltic contraction in cm H_2O.
n; 5 experiments for each drug.

TABLLE (2)
CHANGES IN URINE VOLUME AFTER ADMINISTRATION OF THE DRUG

Drug: N	urine volume in ml/hour mean ± S.E.		
	Before injection	After one hour	After 3 hours
* Zea maize hair extract (glycoalkaloid)	12 ± 0.6	19.9 ± 0.6	14.6 ± 9#
* Zitonet Israel	12 ± 9	14.6 ± 0.9	20.6 ± 9#
* Cymbopogon proximus (Halphabar)	12.5 ± 0.48	12.7 ± 0.5	11.5
* Ammi visnaga	11.6 ± 0.8	12 ± 0.7	13.8 ± 0.6#
* Ambrosia maritima decoction	13.4 ± 0.4	19.1 ± 0.4	24.3 ± 0.9#
* Barley decoction	14.2 ± 0.4	18.5 ± 0.4	20 ± 0.4#
* Petreselinum cryspum decoction	14.3 ± 0.7	15.3 ± 0.3	18.7 ± 0.8#

#: Statistically significant difference from preinjection level.
N: 5 experiments for each drug.

DISCUSSION

The occasional unwanted ill-effect of the synthetic drugs used in the treatment of renal colic and urinary calculi coupled with the known success of some folk medicine agents in the relief of these conditions have stimulated us to examine the effect of some folk medicine agents on the ureteral peristalsis in the experimental animals.

The experimental set up used in this work, entails studying the effect of folk medicine drugs on the intact dog ureter. The kidney was mobilised and dissected from the diaphragm to abolish the effect of respiratory movements on tracing the ureteral peristalsis.

This experimental study is a urodynamic assessment of the changes in the ureteral activity following administratioin of folk medicine drugs. Simultanous measurement of the urine volume with the changes in the ureteral activity was done. There are some pitfalls in the experimental set up which included the presence of indwelling ureteral catheter in the ureter, which acts as a foreign body exciting the ureteral peristalsis. However we observed a decrease in the ureteral activity in some of the tested materials. We agree that simultanous recording of the blood pressure should be done in any pharmacological experiment, unfortunately this was not done. Nevertheless our results are reproducable and in accordance with the results of other investigators.

Zea maize hair extract:

In this study the extract produced decrease in the frequency, basal ureteric pressure and amplitude of contraction, this decrease in the ureteral activity was observed after drug administration and even after the diuretic action was noted. This effect could explain the antispasmodic effect of the drug. These results are in accordance with the findings of El-Zayat et al. [2,3], who noted a direct inhibitory effect of *Zea maize* hair extract on the isolated dog ureter and rabbits jejunum. Guerrero[4] proved that *Zea maize* hair extract has a diuretic action.

Jerusalem stone (Zitonet Israel):

Probably this is the first experimental monitoring of the effect of this important drug among folk medicines on the ureter. In the present work the drug produced significant increase in the frequency of ureteral peristalsis and basal pressure, with a reduction in the amplitude of contraction. In addition there was evident increase in the urine out-put in the first hour and up to three hours. The increase in the frequency and basal pressure could be attributed to the diuretic action of the drug, while the decrease in the amplitude could be due to the antispasmodic action of the nitrogenous bases. Abdel Rahim et al.[5] found that the drug was beneficial in the management of renal colic and urinary calculi as it assisted the passage of the ureteric and renal stones. They suggested that the diuretic action to the drug could be possibly due to it's lithium carbonate content, while the antispasmodic action to the nitrogenous bases.

Cymbopogon proximus (Halphabar):

Significant decrease in the basal ureteric pressure and amplitude of contraction was noted on testing the drug. This decrease in the ureteral activity could be explained by the antispasmodic action. Ghaleb[6] found that halphabar has antispasmodic action, producing inhibitory effect on the isolated intestine and guinea pig ileum.

Ammi visnaga:

This drug has long been used in Egypt as an antispasmodic. Since it has a direct action on the smooth muscle fibres Helmy[7]. In 1967, Mahran[8] proposed that an aqueous infusion of *Ammi visnaga* has an antispasmodic and diuretic effects. On the other hand Al-Bialy[9] noted that Khellin was completely disappointing in most of his cases. In the present work although significant increase in the urine volume was observed with *Ammi visnaga*, yet there was no increase in the frequency or amplitude of ureteral peristalsis. This could be attributed to the antispasmodic action of the drug. On the other hand elevation of the basal pressure could possibly be due to its diuretic effect.

Ambrosia maritima L (Damssissa):

On the basis of the famous clinical effect amongst folk medicines as antispasmodic, the drug was tested experimentally. There was decrease in the ureteral activity although the decoction produced evident diuretic effect after one and up to three hours. This decrease in the ureteral activity could possibly be explained by the antispasmodic action of the nitrogenous bases or alkaloids and volatile oils in the plant. These findings are in accordance with Sorm[10] and Mahran[8] who found that it has antispasmodic and diuretic action.

Barley:

Mahran[8] postulated that the aqueous infusion and decoction of barley has a diuretic effect. In this

work an increase in the basal pressure and decrease in the amplitude of ureteral contraction were noted. The increase in the basal pressure could be due to the prominent diuretic effect of the decoction. Reduction in the amplitude of ureteral peristalsis could be possibly be due to the antispasmodic action.

Petroselinum crispum:

Aliev et al.[11] mentioned that the plant contains alkaloids, glycosides, volatile oils, organic acids, vitamin C and K. It has a hypotensive action. However, it increasesed the amplitude of the heart beat. This effect was attributed to depressant action on the central nervous system. Watt et al.[12] found that the active component in the fruit is a piol which has abortifacient effect through stimulation of uterine tissue. Moreover, Franswarth et al.[13] attributed the carminative and anti spasmodic action to the volatile oils in the plant.

In this work significant decrease in the frequency and amplitude with increase in the basal ureteric pressure and increase in urine out-put were noted. The decrease in the ureteral activity could be due to the antispasmodic action of the volatile oils and alkaloids in the plant. The elevation in the basal pressure could be attributed to the diuretic effect of the drug.

These observations of the effect of folk medicine agents are preliminary. Further study is recommended to investigate the effect of each agent used and its active ingredient on ureteral function. The present results indicate that some folk medicine agents have an inhibitory effect, while others have stimulatory action on ureteral activity. Moreover most of the tested agents produced a diuretic effect. These actions need to be studied in human before explorating their effect in human situations.

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SAUDI MEDICINAL PLANTS AND THEIR CONTRIBUTION TO ISLAMIC MEDICINE

Dr. Mohammed Abdulaziz Al-Yahya

SAUDI ARABIA

INTRODUCTION

Arabian peninsula is the birth place of herbal drugs the use of folk medicine has existed here since the time immemorable. According to ancient Arabian physicians there is no disease that cannot be cured by plants. The knowledge of herbal medicine has been carried from generation to generation, which has helped in building up of a rich heritage of folk medicine in this region of the world. Although the tide of the synthetic medicine has greatly suppressed the use of crude drugs of natural resources, still a large number of people of different countries have faith in this system of medicine and use herbal drugs to alleviate their sufferings[1-11]. Apart from effectiveness and easy availability, these drugs are more suitable to the climatic conditions that prevail in these countries.

Arabs have made a lot of contribution for the development of herbal medicine during the middle ages. Galen in second century AD was an extremely prominent authority on plant medicine, even today the term Galenical is applied to simple vegetable extractives.

During the golden age of Islamic Tibb, the researches and writings of Arab physicians stood on a firm foundation which was based on their extensive thoughts and experience. The Arab medical sciences propagated very fast throughout the world with the propagation of *Islam*. The pilgrimage to Makkah and Al-Madinah by the muslims favoured the spread of this science. The students and researchers from Spain, Africa, Asia and other countries had many chances to contact with Arab physicians and scholars.

The Kingdom of Saudi Arabia is rich in its plant resources (more than one thousand plants have been mentioned in Flora of Saudi Arabia). A large number of herbal drugs are still being used in the Arabian folk medicine, only very few of these plants have been studied for their chemical and biological properties[12-16].

The need to evaluate phytochemical constituents and their biological activities is not only important for the development of new therapeutic agents but the novel chemicals isolated from plants with some biological activity give a guideline to the chemist to synthesise very useful semi-synthetic drugs such as homatropine from atropine. Studies on the toxic plants could help in the diagnosis and treatment of poisoning in man and animals caused due to their ingestion, on a more rational basis. They may lead to the development of specific antidotes[17]. The lack of interest in the biological evaluations of crude plant preparation has been a major obstacle in the development of drugs from natural resources[18].

Realizing these facts the scientists in the Kingdom are now taking initiative to work on a more systematic and organized manner to evaluate therapeutic efficacy and side and toxic effects of herbal drugs used in folk medicine. The present study is an attempt to enlist some of the drugs used in the Kingdom of Saudi Arabia in various ailments with special reference to their botanical and vernacular names, family, habitatic, chemical constituents and medicinal uses. The phytochemical and biological studies have been undertaken in our laboratories on ten of these medicinal plants.

MATERIALS AND METHODS

A list of fifty Saudi Medicinal plants, which are used in folk medicine has been prepared on the basis of surveys of different regions, interviews made with herbal practitioners and literature avaialble. The plants were collected from different regions of Saudi Arabia in sufficient quantities and identified by an expert taxonomist to determine their botanical names and family. The data collected included vernacular names of the plant in Arabic, geographical and ecological distribution, parts used, chemical constituents, pharmacological actions and medicinal uses. The details are mentioned in Table-I.

Pharmacognostical, phytochemical, pharmacological, biochemical, haematological, antimicrobial and toxicity studies are being undertaken on these plants to justify their therapeutic use and toxicity. The data of 10 plants have been presented in this report.

1. PHYTOCHEMICAL SCREENING

200 gms of plant material were ground to make coarse powder. The qualitative chemical analysis of the powder was carried out for the presence or absence of alkaloids, cardiac glycosides, cynogenic glycosides, anthraquinones, flavonoids, saponins, coumarins, sterols and triterpenes, tannins, glucosinolates, volatile oils and volatile bases according to the methods mentioned by Farnsworth[17]. About 500 gms of the dried powder of the plant were extracted successively in a Soxhlet, first with non-polar solvent (chloroform), then with polar solvent (96% ethanol). The solvents were removed at low temperature under reduced pressure and the extracts were stored in refrigerator for biological studies.

2. PHARMACOLOGICAL STUDIES

i) Neuropharmacological Screening

Neuropharmacological studies were carried out in mice, weighing 30-40 gms, according to the scheme of Irwin[19]. Ethanol extract in the dose of 500 mg/kg of body weight was administered intraperitoneally, the animals were observed for excitation, tremors, twitches, motor activity, motor co-ordiatnion, pinna, corneal reflexes and respiratory changes. Rectal temperature was recorded and mortality within 24 hours was noted.

ii) Cardiovascular Screening

The effect of the plant extracts on blood pressure and heart was studied. Blood pressure studies were carried out on normotensive rabbits of either sex, weighing 1.5 to 2 kg. The animals were anaesthetized with 25% urethane (1.5 to 2 g/kg. i.v.). Supplement doses of the anaesthetic were given via polyethylene cannula advanced from juglar vein. The cannula was connected through carotid artery to Stathem pressure transducer for recording of B.P. on a Narco physiograph. Femoral vein was cannulated for the administration of plant extract.

Effect of the drug on heart was recorded using isolated rabbit heart (Langendorff's preparation) using Ringer's solution. Force of contraction of heart was recorded on Narco physiograph using Myograph F60 transducer.

iii) Smooth and Skeletal Muscle Studies

The effect of plant extracts on smooth muscle was studied on isolated guinea pig ileum. Guinea pigs of either sex weighing 300-400 gms (fasted overnight) were killed by a blow on the neck and bled out. The abdomen was opened and 2 cm ileum from the ileocaecal junction was taken out and hanged in a tissue bath containing Tyrode's solution (Bath solution was continuously aerated and maintained

at 37°C). The extract was added to the bath and contraction of relaxation produced was recorded using a Myograph F60 transducer a Narco physiograph. Antagonism or potentiation of acetylcholine and histamine induced contraction was also studied.

Skeletal muscle studies were carried out on frog's rectus abdominis muscle. The rectus muscle was suspended in a bath containing frog ringer solution with a constant supply of oxygen. The muscle was stretched with a load of 2 gms for 30 minutes before the responses of the drug were observed. Contraction induced by the extract and antagonism or potentiation of acetylcholine were recorded on a Narco physiograph.

3. BIOCHEMICAL AND HAEMATOLOGICAL STUDIES

The effect of plant extracts were studied on the haematology of rats. The animals were treated with 400 mg/kg body weight of extract intraperitoneally, two hours following the administration of extracts the rats were sacrificed and blood samples were collected for biochemical, haematological and coagulation studies. The results are mentioned in Table 2.

i) Studies on Glucose, Cholesterol and Electrolytes in Serum

Serum cholesterol and glucose levels were determined spectrophotometrically using Biomerix Kits. Serum electrolyte were estimated using flame photometer.

ii) Haematological Studies

The effect of alcoholic and chloroform extract in the dose of 400 mg/kg body weight of rat was studied on red blood cells (RBC), white blood cells (WBC) and haemoglobin using Contraves Digcell 3100h Haematology system (Contraves AG Zurich).

4. MICROBIOLOGICAL STUDIES

The ethanol and chloroform extracts of plants were tested for their antimicrobial activities. The extracts were tested against standard strains of *Staphylococcus aureus, Escherichia coli, Proteus vulgaris, Pseudomonas aeruginosa, Candida albicans and Bacillus subtilis.* The parameter included radial streaking on the agar containing 1 and 2 mg concentrations of extract, disc-agar-diffusion, whereas each disc carrying 1 and 2 mg concentrations of extract and minimum inhibitory concentration (MIC), using tube dilution method[20].

RESULTS AND DISCUSSION

The preliminary studies related to the prevalance and distribution of herbal traditional drugs in the Kingdom of Saudi Arabia revealed that this system still enjoys popularity in rural and urban areas of the Kingdom. Inspite of a very efficiently organized channel of health care centers and availability of all modern drugs, many people still have faith in the folk medicine and use herbal drugs to alleviate their sufferings. The system is not well organized, elderly people and house wives in the families know quite a good number of herbal drugs for the treatment of minor ailments. Almost each little *Hojrah* or village has herbal folklorist who often prescribes herbs for common diseases. The medicinal herbs growing in one part of the country are also used in the other regions of the country indicating the consistency in the medicinal use of different plants. It was observed that most of the phytotherapists try to conceal the information they have about the names and curative properties of herbs they use for the healing purposes. However, many of these herbalists are very cooperative and parted with the information they had about the herbal drugs, especially for the academic purpose. Based on this informations a list of 50 medicinal plants has been prepared which gives the details regarding the arabic names, family and species of the medicinal plant, with geographical and

ecological distribution, parts used and therapeutic usefulness. The literature was serveyed and it was found that most of these plants have never been studied for their chemical and biological properties. Out of the list of fifty, 10 plants namely *Alhagi maurorum, Artemisia herba-alba, Calotropis procera, Cressa cretica, Heliotropium europaeum, Marrubium vulgare, Peganum harmala, Periploca aphylla, Tamarix aphylla* and *Thymus vulgaris* were studied in our laboratories for their phytochemical and biological properties. The results are depicted in Table 2. Our phytochemical studies revealed that most of these plants are rich in sterol and/or triterpenes, flavonoids, alkaloids, coumarins, and cardiac glycosides contents, these constituents might be responsible for their therapeutic values. Preliminary pharmacological screening on ethanolic extracts of these plants showed that 20% of these plants increase force of contractions of myocardium, 30% has tranquilizing/depressant effect on central nervous system, 20% produced relaxation of smooth muscle. Our results on biochemical study showed that the ethanolic extracts of *Marribium vulgare* has significant hypocholestraemic effect and might be useful in patients with atheroclerosis, while the ethanolic extracts of *Peganum harmala* and *Galotropis procera* have hyperglycaemic and hyperkalaemic activity respectively.

Antimicrobial studies showed that *Thymus vulgaris* has a highly significant antibacterial and antifungal activity, the ethanolic extract of this plant was found to have bacteriostatic effect against *S. aureus, Pr. vulgaris, C. albicans* and *B. subtilis* microorganisms. The growth of *B. subtilis* was inhibited by *Artemisia herba-alba* and *Heliotropium europaeum,* while the ethanolic extract of *Tamarix aphylla* was found to be effective against *Pr. vulgaris.* The results of this study clearly indicates that the herbal drugs being used in the folk medicine have significant biologically active constituents and the systematic studies on the pharmacology and toxicity study suggested to justify the basis of therapeutic use of these herbs to cure various ailments of human beings.

SUMMARY

The scientific literature on fifty plants, which have been used in the folk medicine for the last many decades in Saudi Arabia, have been briefly reviewed. Ten of them were subjected to further pharmacognostical, phytochemical, pharmacological, biochemical, haematological and antimicrobial studies in our laboratories. They have been found to possess chemical constituents of varying nature i.e., alkaloids, cardiac glycosides, flavonoids and coumarins, etc. Some of these plants exhibit promising pharmacological activities. It was worthwhile to note that one of them. *M. vulgare* possesses significant hypocholestremic activity while others showed cardiac stimulant, CNS depressant and smooth muscle relaxant activities. Few of them were found to be effective against the microorganisms, *Pr. vulgaris, C. albicans* and *B. subtilis* in the antimicrobial screening tests. These observations provide justification for further detailed studies on the pharmacology and toxicity of these plants in order to establish a rationale for their therapeutic usefulness.

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TABLE I
CLASSIFICATION AND PROPERTIES OF MEDICINAL PLANTS OF SAUDI ARABIA

Sl. N°.	Family and Name of species.	Geographical and Ecological Distribution.	Chemical Constituents.	Medicinal use.	Pharmacological properties.
	ASCLEPIADACEAE				
1.	Calatropis procera (Ait.) Ait. F.	S. Hijaz, Nefud, Najd N., S. & E. Regions.	Calotropin, Calotropagenin, Calotoxin & Calactin.	Rheumatic pains, elephantiasis, leprosy, cough.	Diphoretic, expectorant, Emetic (Root bark); Purgative, rubefacient, caustic, abortifacient (Latex).
2.	Periploca aphylla Decne.	S. Hijaz and Najd.	Resin, tannin and glucoside.	Cerebral fevers, swellings and tumours.	Stomachic, febrifuge, and purgative.
	BORAGINACEAE				
3.	Heliotropium europaeum Linn.	N. & S. Hijaz & E. Region.	Alkaloids	Snake bite.	Emetic.
	COMPOSITAE				
4.	Artemisia herba-alba Asso.	Najd, N. & E. Regions.	Sterols, flavonoids, Minerals and amino acis.	Intestinal worms.	Anthelmintic.
	CONVOLVULACEAE				
5.	Cressa cretica Linn.	N. & S. Hijaz, Najd, Rub-Al Khali, N. E. Regions.	Alkaloids, sterols and fatty acids.	General weakness and sexual debility.	Tonic, aphrodisiac, expectorant, antibilious.
	LABIATAE				
6.	Marrubium vulgare Linn.	S. Hijaz and S. Region.	Alkaloids, glycoside, volatile oil, fixed oil, resin, tannin, fat and vitamin.	Ch. bronchitis, cough, dyspepsia, jaundice, amenorrhoea, rheumatism.	Stimulant, expectorant, resolvent, anthelmintic, alterative.
7.	Thumus vulgaris Linn.		Volatile oil, triterpenoid, saponins, flavonone, Caffeic acid, tannins and resin.	Rheumatism, skin diseases, whooping cough, bronchitis, hookworms, intestinal antiseptic.	Antiseptic, anthelmintic, expectorant, carminative, diuretic, emmanagogue, sedative, antispasmodic, antifungal.
	LEGUMINOSAE				
8.	Alhagi maurorum Medic.	Najd, N.Hijaz. N. & E. Regions.	Tannin, Coumarin, flavonoids, ascorbic acid.	Rheumatism, migrane, general debility.	Laxative, diuretic, expectorant, diaphoretic, restorative, aperient, aphrodisiac.

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TABLE I contd...

Sl. N°.	Family and Name of Species.	Geographical and Ecological Distribution.	Chemical Constituents.	Medicinal use.	Pharmacological properties.
	MALVACEAE				
9.	Abutilon Figarianum. Webb.	Southern Region & S. Hijaz.	Mucilage and Asparagin.	Fever (root), Diuresis (bark).	Diuretic, demulcent, laxative (seeds), astringent (bark)
10.	Gossipium arboreum Linn.	N. & S. Hijaz, E. Najd & E. Region.	Minerals; N, K_2O, Cl, Fe_2O_3 Mgo.	Fevers (root); gleet, catarrh, Gonorrhoea, cystitis (seeds).	
11.	Malva Parviflora Linn.	N. Hijaz, E & W Najd, Nefud, Rub-al-Khali, N & E Regions.	Amino acid and fatty acid.	Cough and bladder ulcers (seeds) Poultice for wounds, bruised limbs, tape worm (leaves).	Demulcent, Nerve tonic, and Emmenagogue.
12.	Sida alba Linn.	S. Hijaz.	Alkaloids.	Gonorrhoea and fevers.	Demulcent, refrigerant, diphoretic & tonic.
	MELIACEAE				
13.	Melia azedarach. Linn.	S. Hijaz and Najd.	Azaridin alkaloid, sugar, tannin and resin.	Round worms, leprosy, scrofula, nervous headache, glandular swelling.	Anthelmintic, stimulant and antispasmodic (bark); diuretic, antilithic, and emmanagogue (leaves).
	MOLLUGINACEAE				
14.	Gisekia Pharanaceoids Linn.	N. & S. Hijaz, E. Najd.	Tannins.	Taenia infection.	Aperient, Aromatic, Anthelmintic, purgative.
15.	Glinus lotoides Linn.	N. & S. Hijaz, S. & E. Regions.	Oils and fatty acids,	Tonic, bilious attacks, boils.	Purgative.
16.	Mollugo Cerviana (L) Ser. in. DC.	S. Hijaz & E. Najd.	Hydrocyanic acids, resin and gum.	To promote lochial discharge, gout and rheumatic complaints.	Stomachic, aperient, uterine, stimulant, antiseptic & febrifuge.
	MORACEAE				
17.	Ficus carica Linn.	S. Hijaz & S. Region.	Sugars, malic acid, citric acid, enzymes, fixed oil, ficusin, rutin & tannins.	Kidney and bladder stone, piles, weakness, ulcers.	Aperient, emollient, laxative, demulcent, tonic, antobtrusive.
	NICTAGINACEAE				
18.	Boerhavia diffusa Linn.	N. & S. Hijaz, S. Region.	Punarnavine alkaloid fat. and Pot. nitrate.	Diseases of heart and kidneys, gonorrhoea, dropsy, asthma, oedematous swellings (root); jaundice (leaves juice).	Stomachic, laxative, diuretic expectorant, diphoretic, emetic.

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TABLE I contd....

Sl. No.	Family and Name of Species	Geographical and Ecological Distribution	Chemical constituents.	Medical use.	Pharmacological properties.
	OLEACEAE				
19.	Olea Europea Linn.	North Nijaz.	Glucoside and tannins.	Diarrhoea (fruit); Intermittent fever, scrofula, blood spitting (Haemoptysis), Eye diseases (leaves and bark).	Astringent, tonic (fruit) smooth muscles relaxant (leaves & bark).
	OXALIDACEAE				
20.	Oxalis Corniculata Linn.	S. Hijaz, Najd, E. & S. Regions.	Ascorbic acid, Pyruvic acid, dehydroascorbic acid.	Fevers, biliousness, corns, warts, inflammation.	Refrigerant, astringent, anti-scorbutic, appetiser, cooling.
	PAPAVERACEAE				
21.	Argemone maxicana Linn.	N. & S. Hijaz	Alkaloids, berberine, protopine, argemexitin.	Blisters and indolent ulcers, malarial fevers, scabies (Juice); scorpion bite, tape worm and ch. skin diseases (root), Toothache (smoke of seeds).	Diuretic, alterative, hypnotic (Juice); Laxative, nauseant, emetic, expectorant and demulcent (seeds).
22.	Papaver rhoeas Linn.	E. & S. Regions.	Alkaloids, rhoeadine, morphine, narcotine and apomorphine; glucosides.	Sedation and Narcosis (Juice); low fevers (leaves & seeds).	Narcosis and sedation, tonic.
23.	Papaver somniferum Linn.	E. Region.	Alkaloids, morphine, Codein, thebaine, noscapine, narceine, papaverine; sugar.	Painful states, diarrhoea, dysentry, cough and asthma.	Astringent, narcotic, somniferous, sedative, anodyne, antispasmodic, aphrodisiac.
	PLANTAGINACEAE				
24.	Plantago lanceolata Linn.	Najd & E. Regions.	Glucoside, fats, fixed oils, nicotinic acid, carotene & tannins.	Wounds, inflammed surfaces and sores.	Diuretic, purgative and haemostatic (seeds); Anti-inflammatory (leaves).
25.	Plantago major Linn.	S. Hijaz and S. Region.	Resin, sterols, pectin, mucilage, glucoside, choline, protein, fat, organic acid.	Urinary disorders, dysentry and griping pain.	Demulcent, aperient, antispasmodic.
26.	Plantago ovata Linn.	E. & W. Najd, Rub-al-Khali, N. & E. Regions.	Mucilage, fixed fatty oils, proteins, glucoside.	Chronic diarrhoea & dysentry, gonorrhoea, urethritis, haemorrhoids, rheumatism & gout.	Demulcent and mildly astringent, diuretic.

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TABLE I contd....

Sl. N°.	Family and Name of the Species.	Geographical and Ecological Distribution.	Chemical constituents.	Medicinal use.	Pharmacological properties.
	POLYGONACEAE				
27.	Emex spinosus Linn.	E. & W. Najd, N. & E. Regions.	Antharaquinones.	Dyspepsia, biliousness, colic, stomach, disorders.	Stomachic, purgative, diuretic, antispasmodic, appetiser.
28.	Rumex nepalensis. Spreng.	S. Hijaz.	Chrysophanic acid, nepodine, tannins, anthraquinone derivatives.	Intestinal parasites, colds and headache, abdominal pain.	Purgative, astringent, antispasmodic.
29.	Rumex vesicarius Linn.	S. Hijaz, E. Najd, S & E. Regions.	Rumicin, emodin, tannin, protein, fat, carbohydrates, Ca, P, Fe, thiamine, riboflavin, Vit. A. & C. nicotinic acid.	Nausea, anorexia, dysentry, scorpion bite.	Stomachic, diuretic, astringent, antidote scorpion sting.
	PORTULACACEAE				
30.	Portulaca oleracea Linn.	N&S Hijaz, E.Najd and E. Region.	Alkaloids, glycosides, volatile oils, Vit.C, iron, fat, organic acids.	Scurvy, liver disorders, dysurla, haemoptysis, urinary diseases.	Diuretic, refrigerant, alterative, astringent, emollient, demulcent.
31.	Portulaca quadrifida Linn.	N. & S. Nijaz.	Mucilage, potassium oxalate,	Skin diseases, erysipelas, dysuria, worms, urinary disorders.	Diuretic, vermifuge.
	RANUNCULACEAE				
32.	Nigella sativa	N. Hijaz.	Alkaloid, ketones, terpenoids, aliphatic alcohols, volatile oils & fatty acid.	Indigestion, anorexia, fever, diarrhoea, dropsy, intestinal worms.	Digestive, stimulant, carminative, aromatic, diuretic, diaphoretic, stomachic, anthelmintic, emmanagogue.
	RHIZOPHORACEAE				
33.	Rhizophora mucronata Lam.	S. Hijaz & S. Region.	Tannins.	Diarrhoea, dysentry, haematuria.	Astringent.
	ROSACEAE				
34.	Cotoneaster nummularia Fisch. & Mey.	Najd & E. Region.	Hydrocyanic acid.		Aperient, stomachic and expectorant.

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TABLE I contd....

Sl. N°.	Family and Name of the Species.	Geographical and Ecological Distribution.	Chemical constituents.	Medicinal use.	Pharmacological properties.
	RUTACEAE				
35.	Ruta chalepensis. Linn.	S., Hijaz and S. Region.	Fixed oil, rutin.	Convulsions, fevers, catarrh, colics, amenorrhoea, epilepsy.	Antispasmodic, sudorific, abortificient, anthelmintic, emmanagogue, rubifacient antiepileptic.
	SALICACEAE				
36.	Salix tetrasperma Roxb.	Najd & S. Region.	Tannin (bark) Ca, C. & N. (leaves).	Rheumatism, epilepsy, piles, bladder stones, VD, swellings, fevers.	Sedative, analgesic, antilithic (leaves): febrifuge (bark).
	SALVADORACEAE				
37.	Salvadora persica Linn.	N. & S. Hijaz, S. Region.	Alkaloid, resin (bark); sugars, fat, alkaloid (fruit).	Scurvy, painful tumours, piles, rheumatic joints (leaves); fever, amenorrhoea (bark); bladder stones (fruit).	Aromatic, deobstruent, carminative, diuretic and anthelmintic (leaves); tonic, stimulant and emmanagogue (bark); digestive, lithotripic, diuretic & carminative (fruit).
	SAPINDACEAE				
38.	Dodonaea viscosa Jacq.	N. & S. Hijaz, S. Region, E. Najd and E. Region.	Alkaloid, glycoside, resin, gum, tannins, flavonoids, sterols and saponins.	Gout, rheumatism, wounds, burns, fevers, sore throat.	Alterative, laxative, febrifuge, sudorific, tonic.
	SOLANACEAE				
39.	Datura fatuosa Linn.	Najd, S. Hijaz and S. Region.	Alkaloids, fixed oils and Vit. C.	Insanity, fever, catarrh, asthma cerebral complications, tuberculosis & diarrhoea.	Bronchodilator, sudorific, febrifuge.
40.	Datura stramonium Linn.	N. Hijaz, Nafud, E. Najd, S.N. & E. Regions.	Alkaloids, atropine, hyoscine & hyoscyamine.	Colics, rheumatism, gout, bronchitis and asthma.	Antispasmodic, anodyne, narcotic, sedative, bronchodilator.
41.	Hyoscyamus muticus Linn.	S. Hijaz and Najd.	Alkaloids, hyoscine, & hyoscyamine.	Colics, asthma, sea sickness.	Antispasmodic, sudorific, bronchodilator, intoxicant.
42.	Nicotiana rustica Linn.»	N. Hijaz.	Alkaloid, nicotine, oil, resin, fat, gum.	Tetanus, strychnine poisoning, rheumatic swellings, syphilitic nodes, skin diseases, nasal polyp. ch. giddiness and fainting.	Antispasmodic, sedative, emetic, anodyne.

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TABLE I contd.....

Sl. No.	Family and Name of the Species.	Geographical and Ecological Distribution.	Chemical Constituents.	Medicinal use	Pharmacological Properties.
43.	Solanum nigrum Linn.	N. & S. Hijaz, E. Najd, N.S. & E. Regions.	Alkaloids, glucoside, resins, fat, volatile oil and Vit. C.	Dropsy, jaundice, ch. enlargement of liver, fever, anthrax, pustules, burns, herpex, rheumatic joints, gonorrhoea, and heart disease.	Expectorant, sedative, diaphoretic, cathartic, hydragogue, anodyne, alterative, diuretic, cardiac tonic.
44.	Withania somnifera (L) Dun. In. DC.	N. & S. Hijaz, E. Najd, S. & E. Regions.	Alkaloids, volatile oil, fatty acids, tannins and Vit. C.	General debility, rheumatism, dyspepsia, anorexia, cough and dropsy.	Tonic, stimulant, alterative, aphrodisiac, narcotic, diuretic, abortifacient.
	TAMARICACEAE				
45.	Tamarix aphylla (L(Karst.	N. & S. Hijaz, E. Najd, E.N. & S. Regions.	Tannins.	Sexual debility, eczema capitis.	Astringent, tonic, aphrodisiac.
	TILIACEAE				
46.	Corchorus olitorius. Linn.	South Hijaz.	Glucosides and saponins.	Ch. cystitis, gonorrhoea, dysuria, fevers.	Demulcent, tonic, diuretic, febrifuge.
47.	Corchorus trilocularis Linn.	South Hijaz.	Glycoside, oil.	Fever, obstruction of abdominal viscera.	Demulcent, febrifuge.
	UMBELLIFERAE				
48.	Apium graveolens Linn.	Najd.	Glucoside, volatile oil.	Asthma, Bronchitis, liver and spleen disorders, colic, dropsy, lumbago, rheumatism, sexual debility.	Aphrodisiac, stomachic, diuretic, carminative, tonic, astringent, cordial, laxative, appetiser, stimulant, emmanagogue, abortifacient, antispasmodic.
49.	Coriandrum sativum.Linn.	N. Hijaz, Najd and E. Region.	Volatile oil.	Dyspepsia, flatulence, vomiting, flatulent colic.	Stimulant, aromatic, carminative.
	ZYGOPHYLLACEAE				
50.	Peganum harmala Linn.	N. Hijaz, E. Najd. N. & E. Regions.	Alkaloids, resins.	Tapeworms, fevers, asthma, colic, jaundice, amenorrhoea.	Narcotic, anodyne, emetic, emmanagogue.

TABLE 2
PHYTOCHEMICAL AND BIOLOGICAL SCREENING OF SOME SAUDI MEDICINAL PLANTS

Sl. N°.	Botanical Source	Part Tested	Chemical Constituents.	Cardiovascular Effects		Behavioural Effects			Skeletal Muscle	Smooth Muscle	Antimicrobial Activity Against.	Biochemical and Haematological Activity.
				Heart	B.P.	CNS ST/DP	RESP.	TEMP.				
1.	Alhagi maurorum Medic.	AP	FD, TN, SL/TP, SN, AQ.	FCI	TF	ST	RR	NC	NC	NC		
2.	Artemisia herba-alba Asso.	WP	AL, FD, TN, SL/TP, VO, AQ.	FCD	TF	ST	RR	NC	AAC	NC	B. subtilis	
3.	Calatropis procera (Ait) Ait.F.	AP	AL, CG, FD, TN, SL/TP, SN	FCI	TF	ST	RR	NC	AAC	C	—	Hyperkalaemia.
4.	Cressa cretica Linn.	WP	AL, FD, TN, SL/TP, CN	NC	TF	DP	RS	HT	AAC	AAC	—	—
5.	Heliotropium europaeum.	WP	AL, FD, TN, SL/TP, VB, VO.	NC	TF	NC	NC	NC	AAC	C	B.subtilis.	—
6.	Marrubium vulgare Linn.	WP	CG, FD, SL/TP	NC	TF	DP	RS	HT	AAC	C	—	Hypocholesterole-mia.
7.	Peganum harmala Linn.	AP	AL, FD, TN, VB, SL/TP.	FCD	TF	ST	RS	HT	PAC	AAC	—	Hyperglycaemia.
8.	Periploca aphylla Decne.	AP	AL, CG, FD, TN, SL/TP, SN	FCD	TF	DP	RS	HT	AAC	C	—	—
9.	Tamarix aphylla (L) Karst.	AP	AL, CG, FD, TN, SL/TP, SN	FCD	TR	ST	RR	NC	PAC	C	Pr. vulgaris.	—
10.	Thymus vulgaris Linn.	WP	FD, TN, SL/TP, VO, AQ, CNG	NC	TF	NC	RS	NC	AAC	NC	S. aureus. Pr. vulgaris, C. albicans, B. subtilis.	—

ABBREVIATIONS

WP = Whole plant, AP = Aerial parts- VO = Volatile oil; VB = Volatile base; AL =Alkaloids; CG =Cardiac glycosides; AQ = Anthraquinones; FD = Flavonoids; SN = Saponins; CN = Coumarins; SL/TP = Sterols/triterpenes; TN = Tannins; GC = Glucosinolates; FCI = Force of contraction increased; FCD = Force of contraction decreased; RR = Rapid respiration; RS = Slow respiration; NC = No change; TF = Transient fall in BP; TR = Trasient rise in BP; HT = Hypothermia; AAC = Antagonise acetylcholine; AH = Antagonise histamine; SR = Significant rise in B.P.

C = Contractions; ST = Stimulation; DP = Depression; PAC = Potentiation of acetylcholine induced contractions; BAT = Contraction blocked by atropine; BAH = Contractions blocked by anti-histamine; PH = Potentiation of Histamine induced contraction; BGM = Blocked by gallamine.

STUDIES ON HYPOGLYCEMIC ACTIVITY OF POTERIUM SPINOSUM LINN

Dr. Abdul Waheed and Prof. M. Ataur Rahman
PAKISTAN

INTRODUCTION

Poterium spinosum is reputed for its antidiabetic properties in common man of Jordan. The use of this plant in these populations suggests the need for experimental assessment concerning its hypoglycemic effect in laboratory animal, as well as in induced diabetic conditions. *Poterium spinosum* is reported in "Flora Europoea"[1]as sarcopoterium in family Rosaceae. The presence of antidiabetic properties in roots and other parts of plant does not seem to be reported earlier, hence the present study was undertaken to investigate the hypoglycemic activity of *Poterium spinosum* extract on administration in normal and alloxanised rats and suggest the possible mechanism of action.

MATERIAL AND METHODS

Poterium spinosum was collected during the Summer season in Jordan. It was air dried and washed of any dust. Whole roots were chopped to fine pieces and 100g were immersed in 500ml of distilled water for 30 minutes. It was then boiled for 30 minutes so that the volume of water remained approximately one third of its original volume. Then the extract was filtered. The filtrate was brick red in colour and was further concentrated to 125ml. Solid content was found to be 2.37 percent on dried root basis in the extract. On qualitative analysis, the extract gave positive tests for the flavonoid, tannin and saponin while it was negative for alkaloids.

Male albino rats weighing between 200 300g of Wister Sprague Dawley strain obtained from the animal colony of Jinnah Postgraduate Medical Centre, Karachi, were used throughout this study. They were kept in the animal house at about 27°C. In case death occured in the diabetic animals, the number was made up from a duplicate group of the same date.

Alloxan monohydrate (obtained from Sigma Chemical Co.,USA) was prepared as 5 percent solution in double distilled water, and 200mg/kg body weight was injected in animals fasted overnight for 14—18 hours [2]. Food and water was supplied immediately after injection. *Poterium spinosum* water estract and phenformin hydrochloride solution in water were administered through a stomach tube fitted to a syringe. The dose of poterium spinosum and phenformin hydrochloride was expressed in terms of solid present in the extract and the solution of phenformin hydrochloride.

Blood samples were collected as required from tail or by direct heart puncture. The animals were fasted for 12 to 16 hours before they were sacrificed. The animals were stunned by a blow over the head, blood was collected directly from the heart, inserting heparinized syringe. The blood was pooled from each group for lactate and pyruvate determination. Rats were killed by dislocation of the neck. The liver was rapidly removed and pressed between metal clamps previously cooled in liquid nitrogen. The time elapsed between dislocation of the neck and deep freezing the tissue was not more than 10 seconds. The frozen liver was pulverized in a mortar to a fine powder with frequent addition of liquid nitrogen. The powder was transferred to a weighed plastic centrifuge tube containing 2ml of frozen 30% (w/v) perchloric acid. After a rapid reweighing, the tissue (1-2g) was mixed with perchloric acid, care being taken that no thawing occured. Ice cold 5ml distilled water was sadded and the mixture was immediately homogenized in the centrifuge tube with a pestle driven by a low speed

motor. This was continued for about 2 minutes untill thawing was complete. Protein was removed by centrifugation in a refrigerated centrifuge at 1000x g for 10 minutes. The supernatant fluid was adjusted to pH 5-6 with 20% (w/v) potassium hydroxide and after standing for 30 minutes in cold, the precipitate was centrifuged. The supernatant fluid was then shaken for 30 seconds with 0.1 g/ml florisil 60 100 mesh (obtained from Merck, Darmstadt, W. Germany). This treatment removed flavins from the solution and decreased the slow non enzymatic oxidation of NADH, while the recovery of the metabolites determined was not affected. The florisil was removed by centrifugation and the supernatant fluid was used for the analysis.

Glucose was determined by the method of Nelson Somogyi[3], enzymatic assays were performed for lactate and pyruvate by Sigma Kit[4] and triglyceride was determined by Sigma Kit[5].

RESULTS

Figure 1 shows the hypoglycemic effect of *Poterium spinosum* in alloxan diabetic rats treated with 5, 10, 50 and 100mg of the extract and normal rats treated with 10mg of the extract. The maximum hypoglycemia was observed in all the alloxanized diabetic rats after 3 hours of treatment with *Poterium spinosum*. The group which was administered oral dose of 10mg/Kg body weight of *Poterium spinosum* extract showed the maximum hypoglycemia (60% blood glucose decrease as compared with zero hour) after 3 hours, when compared with other groups given different doses. Thus 10mg/kg body weight was used in further experiments.

Effect of *Poterium spinosum* on blood metabolite concentrations' is shown in table I. A significant increase was observed in diabetic rats in glucose, lactate and triglyceride levels as compared with control rats. When *Poterium spinosum* was administered to the diabetic rats, blood glucose level was significantly decreased while lactate, pyruvate and triglyceride were increased as compared with diabetic control group. The treatment of diabetic rats with phenformin hydrochloride showed similar effect as the oterium spinosum. There was a significant increase in glucose and lactate levels of diabetic rats as compared with that of normal control rats (Table I). In diabetic rats 3 hours after treatment with *Poterium spinosum*, a significant decrease in hepatic glucose concentration was observed when compared with diabetic control. Treatment with phenformin hydrochloride did not show any significant effect on hepatic metabolite concentrations in diabetic rats as compared with diabetic control.

DISCUSSION

Apart from effects on hormonal status or hormonal responsiveness of tissues, pharmacological hypoglycemia may be produced by the three main metabolic actions: stimulation of glucose uptake and utilization by tissue, inhibition of glucose production by liver, or inhibition of the supply of glucogenic precursors by peripheral tissues[6].

In our study glucose level decreased in both liver and blood and there was an increase in blood lactate (Table I) which may partly be due to increased peripheral glucose utilization and increased glycolysis or partial inhibition of hepatic gluconeogenesis. The hypoglycemia may not be due to diminished release of gluconeogenic precursor by peripheral tissues because blood lactate and pyruvate level were increased (Table I). Reduced level of serum triglyceride in diabetic rats treated with *Poterium spinosum* may be due to the oxidation of free fatty acids rather than due to esterification. The possible mechanism of action of *Poterium spinosum* may be either through increased glucose uptake and glycolysis with increased lactate production from periphery or b\

partial inhibition of hepatic gluconeogenesis, which is also observed in phenformin hydrochloride treatment.

As *Poterium spinosum* extract was not found to be effective in normal rats (figure 1) but was effective in alloxan diabetic rats, its action is not dependent on insulin production or insullin protection. In alloxan diabetic rats the insulin is decreased and therefore any fall in blood sugar by a hypoglycemic agent would be by its direct action or by action or by helping in some way the action of poorly available endogenous insulin, The action of *Poterium spinosum* is comparable to that of phenformin (Table I).

Phenformin and other biguanides do not affect insulin secretion but increase glucose utilization apparently because they inhibit oxidative metabolism of glucose and consequently increase anaerobic glycolysis within the cells. They also decrease glucose absorption.

The formation of insulin tannin comlexes have been shown to be biologically active. Three flavonoid compounds were isolated from *Ficus bengalensis,* which possessed hypoglycemic activity [7]. It is conceivable that probably *Poterium spinosum* contains some flavonoid and tannin compounds, which exert hypoglycemic action by complex formation with endogenous insulin. From the results it is concluded that *Poterium spinosum* is a potent oral antidiabetic agent and the exact mechanism of action is not known which could be useful for oral treatment of diabetes.

ACKNOWLEDGEMENT

The authors are grateful to Mr. Hamid Al-Qudah for providing roots of Poterium spinosum from Jordan.

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TABLE I

Effect of treatment of Poterium spinosum Extract and Phenformin on Body and Liver weights and Blood and Liver Glucose, Lactate and Pyruvate.

The values are expressed as mean ± s.e.m. The number of observations is given in parentheses.

		Glucose		Lactate		Pyruvate		Triglycerides	
	Body weight (gm)	Liver weight (gm)	Blood (mmole / L)	Liver umole / g)	Blood mmole / L)	Liver mmole / g)	Blood mmole / L)	Liver umole / g)	Blood (mg/dl)
Normal Control	254.0 ± 9.0 (10)	5.3 ± 0.2 (5)	4.1 ± 0.3 (5)	6.5 ± 0.7 (5)	1.6 ± 0.1 (5)	1.5 ± 0.2 (5)	0.05 ± 0.004 -(5)	0.02 ± 0.002 (5)	30.0 ± 4.8 (5)
Diabetic Control	227.7 ± 9.8 (10)	5.7 ± 0.1 (5)	20.1° ± 2.0 (5)	19.7° ± 1.3 (5)	2.6 + ± 0.2 (5)	2.6× ± 0.2 (5)	0.05- ± 0.003 (5)	0.03 ± 0.007 (5)	332.0° ± 24.0 (5)
Diabetic rats treated with Poteriun spino sum (10mg/Kg)	229.0 ± 7.7 (10)	5.6 ± 0.1 (5)	10.4** ± 0.5 (5)	8.2** ± 0.9 (5)	3.8** ± 0.3 (5)	3.7 ± 0.5 (5)	0.1** ± 0.003 (5)	0.04 ± 0.007 (5)	260.2* ± 16.4 (5)
Diabetic rats treated with Phenformin (100 mg/Kg)	228.0 ± 9.5 (10)	5.4 ± 0.1 (5)	14.3* ±0.9 (5)	17.0 ± 0.5 (5)	3.9*** ± 0.2 (5)	3.6 ± 0.5 (5(	0.1** ± 0.002 (5)	0.06 ± 0.01 (5)	311.8 ± 34.7 (5)

* P < 0.05, ** P < 0.01*** P < 0.001, when compared with diabetic control

× P < 0.05, + P < 0.01o P < 0.001, when compared with normal control

RESEARCHES ON THE ANTIMICROBIAL ACTIVITY OF THE VARIETIES OF GLYCYRRHIZA GLABRA L. GROWING IN TURKEY

Drs. Nazire Ozkal, Lester Mitscher, Steve Drake

TURKEY

Glycyrrhiza glabra L. is an economically valuable plant which has been much studied, even in quite recent years. The extracts of licorice roots have been used for various purposes in curing a great deal of illness in both folk medicine and medical treatment. Even nowadays they are being used[1].

In our previous researchs, according to our morphological and anatomical studies on *G. glabra* grown naturally and widespread especially over the East, South, and South-east of Anatolia, we have distinguished 4 varieties such as: *G. glabra* var. *glandulifera* form *(a)*, - form *(b)*, - var. *glabra* and var. *violaceae*[1]. And also we have determined and compared the chemical constituents of the roots of these varieties which we has distinguished[2].

This time, in this study, the antimicrobial activity of the Turkish varieties were detected and also compared with the activity of *G. glabra* var. *typica* which is known in commerce as Spanish licorice.

The samples on which we have studied, were collected from the fields along the roads and sandy places of stream and river beds by digging up the ground at a depth of 0.5–1 m. After removing the overground parts of the plant, the underground parts were air-dried and powdered.

1– A serial extraction was applied to these powdered samples (Scheme 1).

2– Then the solutions of the samples at a concentration of 100 mg/ml in Dimethyl-sulfoxide (DMSO) have been prepared from each fraction. And the Minimum Inhibitory Concentration (MIC) of these solutions have been determined at 100 and 1000 mg/ml level by agar-dilution streak method.

The microorganisms that have been used during the activity test were:

- **Staphylococcus aureus**
- **Escherichia coli**
- **Salmonella gallinarum**
- **Klebsiella penumoniae**
- **Mycobacterium smegmatis**
- **Candida albicans**

The varieties which are growing in Turkey and on which we have studied, showed antimicrobial activity in-vitro against only 2 of these microorganisms. They were *Staphylococcus aureus* and *Mycobacterium smegmatis*. However Spanish licorice was also active against *Candida albicans* besides these 2 microorganisms (Table 1).

3– The majority of the biological activity was found in MeOH extract (supposed to be the neutral terpene-steroid fraction). So the residue of this bioactive fraction was dissolved in $CHCl_3$ and the $CHCl_3$ solution was applied to a silicic acid column packed in $CHCl_3$ (sample: adsorbent ratio was 40:1 and diameter:height ratio was 14:1). The column was first eluted with $CHCl_3$ and then with different percentage of MeOH and $CHCl_3$. And the collected fractions were applied to TLC. The adsorbent was silicagel G/UV_{254} (Polygram precoated 0.25 mm plates) and the eluting Solvent was MeOH:$CHCl_3$ (5:95). The fractions that showed the same spots were combined to make new fractions.

Both the new fractions combined after TLC and the total mixture of these fractions and also the authentic samples were seperately applied to HPLC under the same conditions. And the retention times of these solution were determined individually.

As Column: ODS (Excalibar) reverse phase was used.

Mobil phase was MeOH:H_2O (A% : 50), gradient system was applied at the beginning.

A% flow rate: 2ml/min.
Total flow rate: 2ml/min.

In addition to the detection of the retention times, the solution of the authentic samples and the total fraction was injected to the column together. In this manner, the bioactive compounds of isoflavan structure such as: glabrene, 3'-methoxyglabridin and also in smaller-quantities Hispaglabridin A and B,4'-o-methyl glabridin, glabrol (flavanone), Phaseollin-isoflavan have been confirmed (Formula 1). Besides, it was seen that one of the obtained peaks was identical to formononetin which is antimicrobially inactive.

Finally, when HPLC chromatogram were examined, it was understood that Turkish samples don't contain "Glabridin" which is active against Candida albicans and which is found in commercial Spanish licorice (-var. typica) (chrom. 1, 2, 3, 4, 5). This also proved the antimicrobial activity, test[3,4].

It is obvously seen that the formononetin peak is higher than the peaks of the other compounds identified both in Turkish and Spanish licorice samples (Chrom. 3, 4, 5).

And again, when we look at the chromatograms of Turkish samples, it is observed that the higher peaks belong to 3'-methoxyglabridin and glabrene (Chrom. 1, 2, 3). On the contrary to this, Hispaglabridin A and B peaks are higher on the Chromatogram of Spanish sample (Chrom. 5). It was also understood that 3' methoxyglabridin is the major bioactive compound of Turkish samples as its peak was the highest of the others.

By the HPLC seperation of the MeOH extracts of both Spanish and Turkish samples, we obtained 2 small peaks which were identified as O-acetyl salicylic acid and Salicylic acid by comparison with the authentic samples. Before our research, these 2 compounds have been first determined in commercial Spanish licorice roots' extract[4]. Curiously, aspirin seems not to have been encountered directly in nature before. As the peaks were too small, the quantity present in the plant might be relatively small but its presence in licorice extracts might lead to some therapeutic effect.

On the chromatogram of the MeOH extract of *G. glabra* var. *glandulifera* form *(b)* (One of Turkish samples), there are two unknown peaks that we haven't identified yet. (Chrom 2).

As a result of our studies we have detected that all Turkish licorice varieties [*G. glabra* var. *glandulifera* form *(a)*, -var. *glandulifera* form *(b)*, -var. *glabra* (samples collected from Mus and Tatvan) show antimicrobial activity which equals that of Spanish licorice, against *Staphylococcus aureus* and *Mycobacterium smegmatis*.

Moreover, our studies on Turkish *G. glabra* var. *glandulifera* have indicated that this variety also has antimicrobial activity, although it was reported in one of the research-papers that *G. glbra* var. *glandulifera* known as Russian licorice is biologically inactive against the microorganisms 3, 4 .

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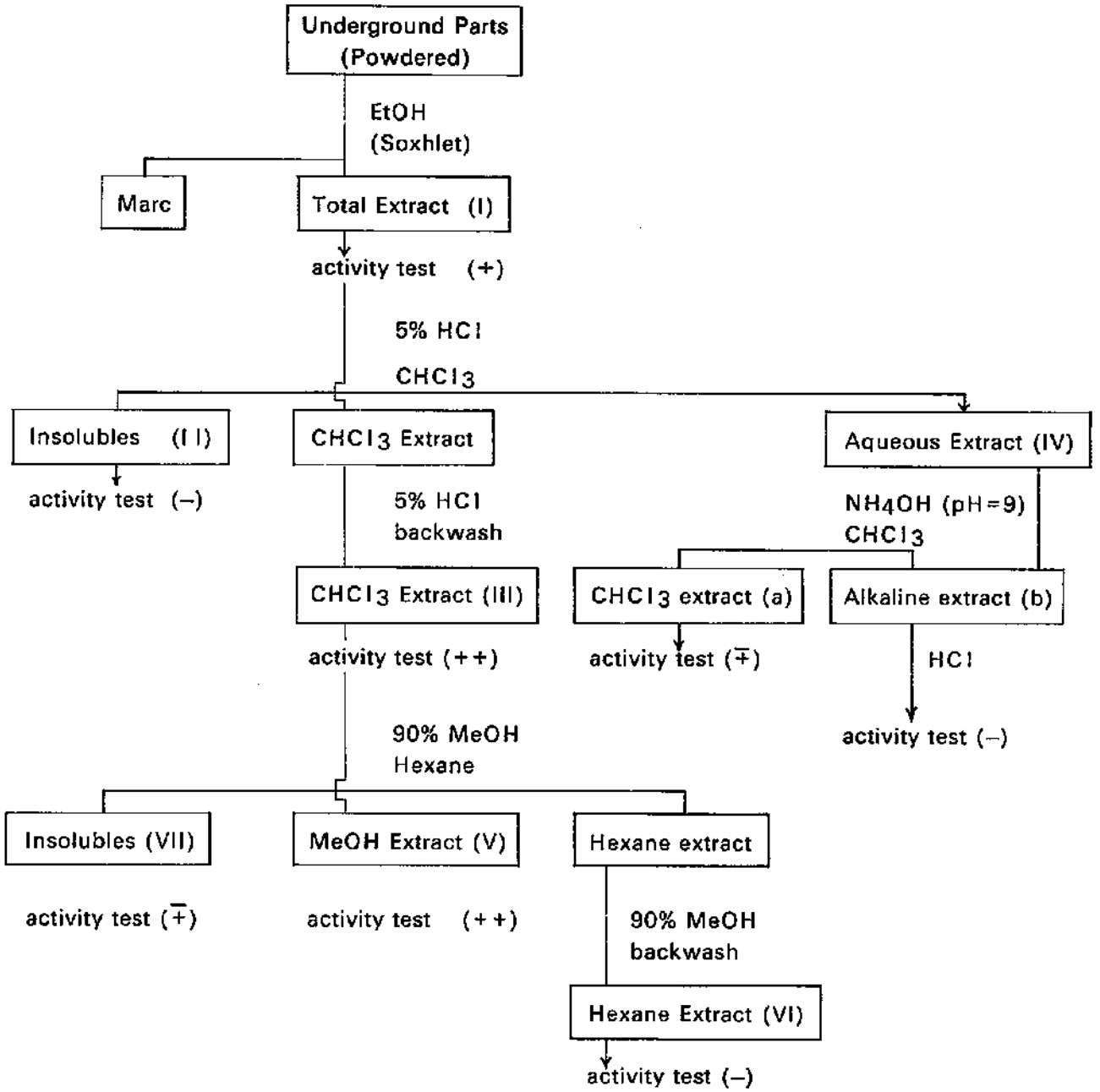
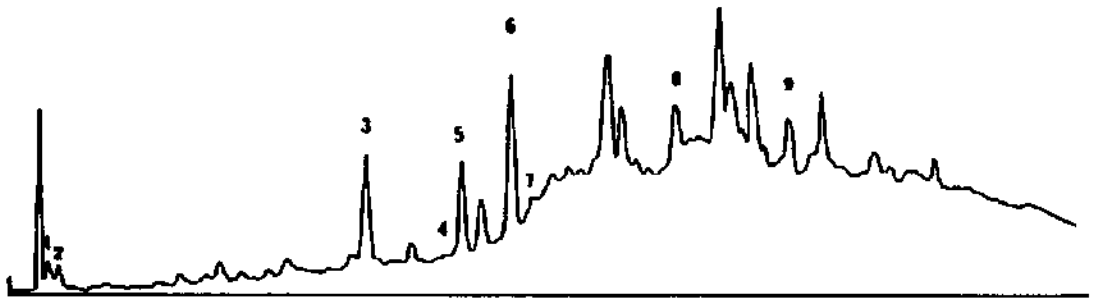


Scheme 1. Extraction of the underground parts of the Varieties of **Glycyrrhiza glabra.**

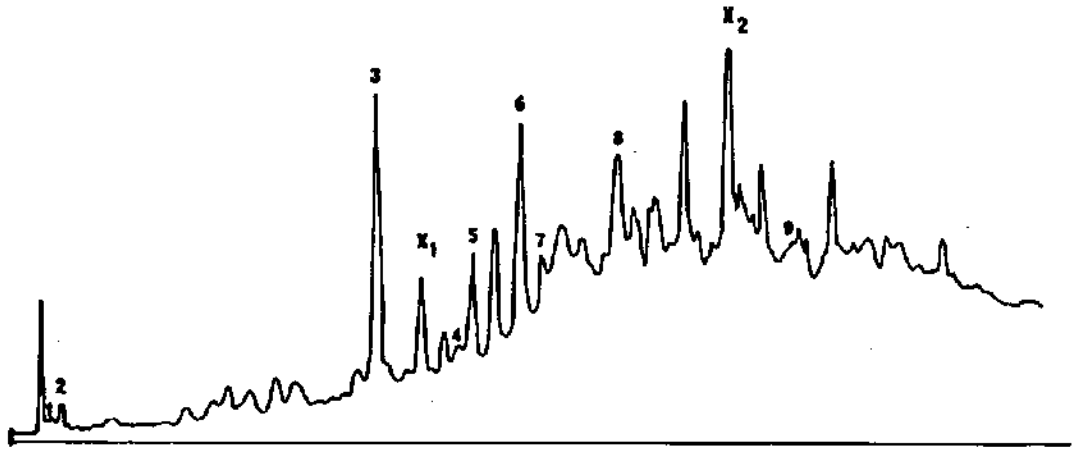
TABLE 1: IN-VITRO ANTIMICROBIAL ACTIVITY OF THE DIFFERENT FRACTIONS OF THE VARIETIES OF G. GLABRA.

Varieties	EtOH extr. (I)	Ins. $CHCl_3$ extr.) (II)	$CHCl_3$ extr. (III)	Aq. ext. (VI) $CHCl_3$ extr. (a)	alcal. extr. (b)	MeOH extr. (V)	Hex. extr. (VI)	Ins.(MeOH) extr. (VII)	Microorganisms
G. glabra var. glandulifera form (a)	1000 1000 –	– – –	1000 < 100 –	– 1000 –	– – –	1000 < 100 –	– – –	– 1000 –	S. aureus M. smegmatis C. albicans
G. glabra var. glandulifera form (b)	1000 1000 –	– – –	< 100 < 100 –	– 1000 –	– – –	< 100 < 100 –	1000 1000 –	< 100 1000 –	S. aureus M. smegmatis C. albicans
C. glabra var. glabra (Mus)	1000 1000 –	– – –	< 100 < 100 –	– 1000 –	– – –	< 100 < 100 –	– – –	– 1000 –	S. aureus M. smegmatis C. albicans
G. glabra var. glabra (Tatvan)	1000 1000 –	– – –	1000 < 100 –	– 1000 –	– – –	< 100 < 100 –	– – –	– ± 1000 –	S. aureus M. smegmatis C. albicans
G. glabra var. typica (Ticari Ispanya meyani)	—	– – –	< 100 < 100 1000	– – –	– – –	< 100 < 100 1000	– – –	– ± 1000 –	S. aureus M. smegmatis C. albicans

Minimum Inhibitory Concentration has been tested at 100 and 1000 µg/ml levels.

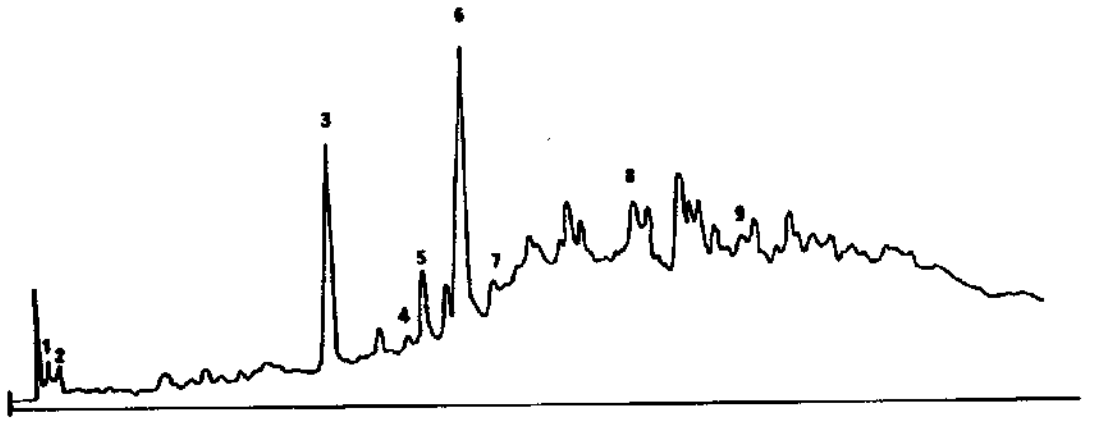


Chrom. 1: HPLC Chromatogram of the MeOH extract of *G. glabra* var. *glandulifera* form (a)



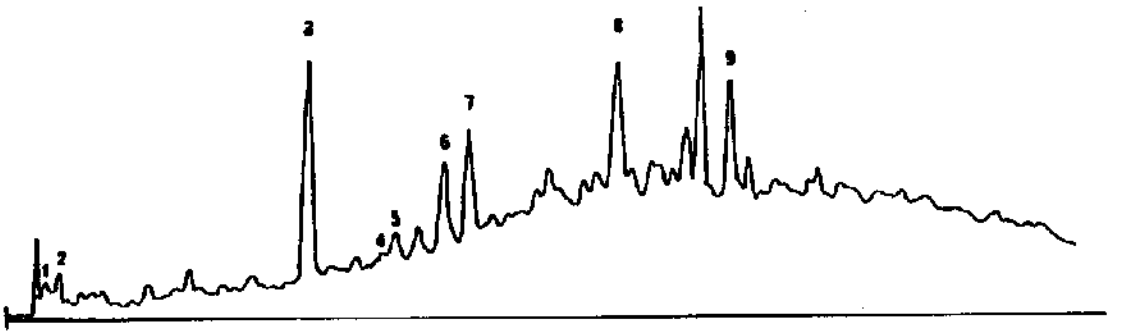
Chrom. 2: HPLC chromatogram of the MeOH extract of *G. glabra* var. *glandulifera* form (b).

(1) O-acetyl salicylic acid
(2) Salicylic acid
(3) Formononetin
(4) Phaseollinisoflavan
(5) Glabrene
(6) 3'-Methoxy glabridin
(7) Glabridin
(8) Hispaglabridin A Glabrol 4',O-methylglabridin
(9) Hispaglabridin B

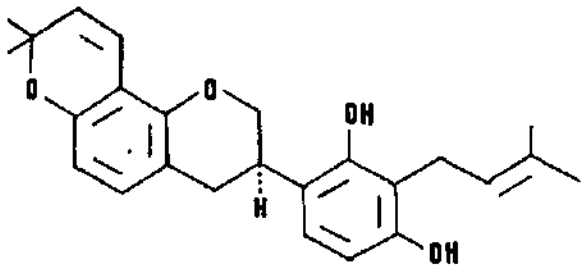


Chrom. 3: HPLC chromatogram of the MeOH extract of *G. glabra* var. *glabra* (Mus.).

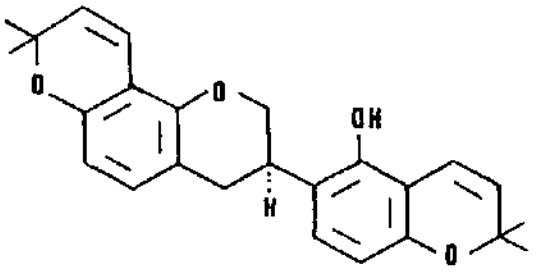
Chrom. 4: HPLC chromatogram of the MeOH extract of *G. glabra* var. *glabra* (Tatvan).



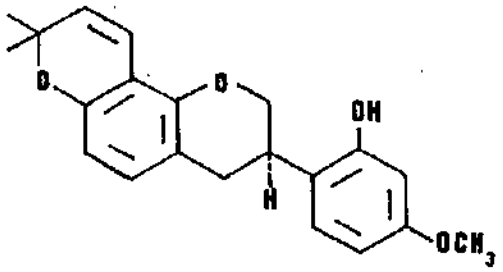
Chrom. 5: HPLC chromatogram of the MeOH extract of **G. glabra** var. **typica** (Commercial Spanish licorice).



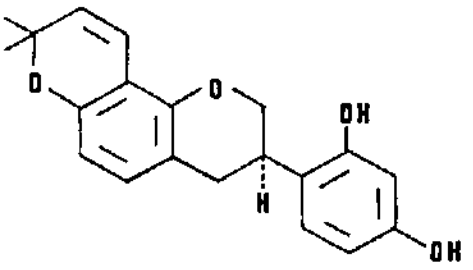
Hispaglabridin A



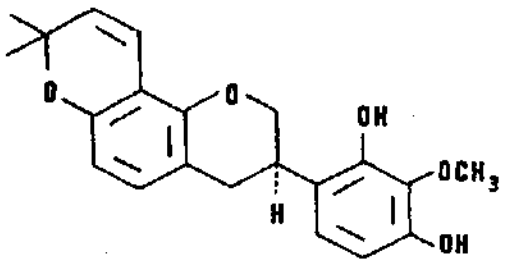
Hispaglabridin B



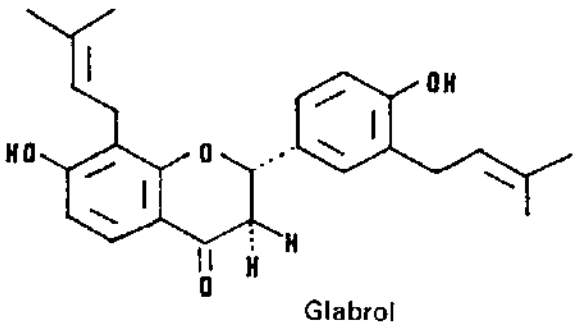
4',O-methylglabridin



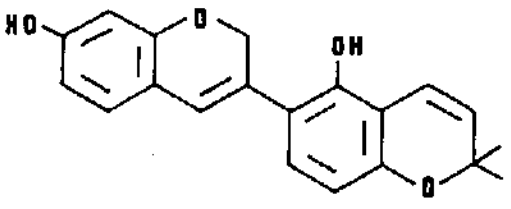
Glabridin



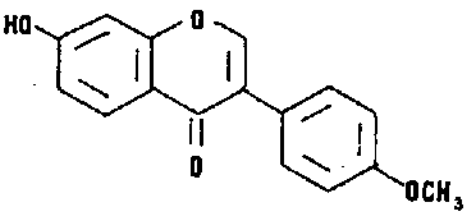
3',methoxyglabridin



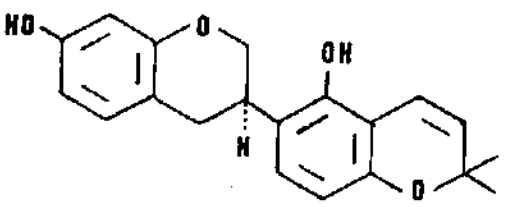
Glabrol



Glabrene



Formononetin



Phaseollinisoflavan

Formula 1

THE ISLAMIC CONTRIBUTION TO THE KNOWLEDGE OF OPIUM AND PAPAVER SPECIES

Drs. Turhan Baytop and Günay Sariyar

TURKEY

Opium poppy is a well known medicinal plant cultivated in Central Anatolia since a time as nearly as the Hittites period (B.C. 2000). Let us notice the similarity present between the word "Haşşika", which is the Hittite name for opium poppy, and the word "Haşhaş", the Turkish name used today for the same plant. As meaning, it is closely related with the Hittite words corresponding to "to sleep" and "to be calmed"[1].

Dioscorides (first century A.D.) gives us information about the poppy species used in medicine, the collection of the opium, its analgesic and narcotic properties. All that he mentions is in fact very close to what we know today about it[2].

The same information is more or less repeated in Ibn el-Beithar's treatise, written about twelve centuries after Dioscorides[3]. The monographs written in the following years bring nothing specially new about this drug[4].

The first chemical investigations on Anatolian opium are made between 1864-1867 by Faik Pascha. He detected a great variation of morphine contents (2.1 to 21.3 %) in this drug, when he examined many specimens collected from different opium producing regions [5,6]. He concluded that these differences were due to the degree of adulteration then applied.

In Turkey, the first research on opium poppy is made by Hüsnü Sarim (Çelebioglu) in Berlin University, where he investigated the development of laticiferous vessel in the young plant[7].

Investigations on the alkaloids of wild *Papaver* species began in 1967. Shargi and Lalezari detected a high amount of thebaine in a *P. bracteatum* sample growing in Iran[8]. Thebaine has no narcotic or analgesic effect but can easily be converted into codeine. This alkaloid and the species containing it have therefore gained importance and more emphasis is given to investigations on *P. bracteatum.*

Investigations on the alkaloids of Turkish wild *Papaver* species have shown that *P. bracteatum* growing in Munzur Mountains is rich in the baine[9,10]. Later other species such as *P. cylindricum, P. fugax* and *P. triniifolium* collected from Eastern Turkey have been found to contain the same alkaloid. Among these species, *P. fugax* is reported to contain the highest guantity of the baine[11,14]. Besides thebaine, some other alkaloids of medicinal importance like papaverine and narcotine have also been isolated from these species.

Some new alkaloids have been obtained from wild *Papaver* species of Turkish origin. Two new alkaloids of the benzyltetrahydroisoquinoline type were isolated from *P. pseudo-orientale* growing in Sivas Yildizdag, which we named as macrantaline and macrantoridine[15]. From *P. pilosum* and *P. apokrinomenon* two new alkaloids which were named as amurinine and epiamurinine have been isolated[16]. l-methoxyallocryptopine has been obtained from *P. curviscapum* as a natural product[17].

Studies on the alkaloids of *Papaver* species of the sections Macrantha and Miltantha have shown the existence of many chemical strains in Turkey[14,18,19]. For example, there are 5 chemical strains in *P. fugax,* 2 in *P. armeniacum,* 2 in *P. triniifolium* and 4 in *P. tauricola.*

A high amount of narcotine has recently been obtained from P. rhopalothece which is an annual

Papaver species and grows only in Western Anatolia. It is observed that people use this plant as an antitussive. It is very likely that its sedative effect is due to this compound[20].

Investigations on the alkaloids of the section Pilosa have revealed the high yield of glaucine in *Papaver* species which is also well known for its antitussive property[21].

Systematic studies on annual *Papaver* species of Turkey have recently been made by A. Baytop and co-workers and the chromosome numbers of some of them are given[22].

Wassel, the Egyptian scientist worked on rapid changes of the major alkaloids of *P. somniferum* during the development of the fruit[23]. El-Masry and co-workers have also reported the existence of N-methylasimilobine as a major alkaloid in *P. rhoeas* growing in Egypt[24].

The Iranian scientists have isolated a new alkaloid of tetrahydroprotoberberine type from *P. pseudo-orientale,* which they named as aryapavine[25].

Alkaloids of Iraqi origin of some *Papaver* species have been studied and some of them like *P. persicum* (syn: *P. tauricola*) and *P. glaucum* are found to have chemical strains[26].

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USE, ABUSE AND PRESENT STATE OF SCIENTIFIC KNOWLEDGE OF KHAT.

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SAUDI ARABIA

INTRODUCTION

The Prophet Mohammad (ﷺ) communicated the Islamic message to his followers, which are sacredly embodied in the Holy Book, *"The Quran"*.

> *(THIS IS) A SCRIPTURE WHICH WE HAVE REVEALED ONTO THEE THAT THEREBY THOU MAYST BRING FORTH MANKIND FROM DARKNESS UNTO LIGHT, BY THE PERMISSION OF THEIR LORD, UNTO THE PATH OF THE MIGHTY, THE OWNER OF THE PRAISE.*

This verse from the Holy *Quran* clearly emphasises to bring about a significant change from pagan life to shining life of *Islam*. Following the teachings of *'Quran'* that

THOU SHALL NOT DRINK WINE OR ANYTHING INTOXICANT

Muslims were strictly forbidden to take any alcohol — however, consumption of Khat (a psychostimulant plant material) was controversial for a long time. According to some authors Khat enjoyed divine blessings and no private or public religious ceremony took place without ritual chewing of this leaf, and some Muslim communities regarded it as a gift from heaven. According to Laurent[1], while the Christians were allowed to consume alcohol, Muslims were devoted to Khat consumption.

Muslim countries in the Middle East impose heavy penalties equivalent to those for opium or cannabis for anyone who carries or uses Khat. The first Islamic country to enforce restriction on Khat was Saudi Arabia; when in 1956, a Royal Decree was issued prohibiting the planting and use of Khat.

In Yemen, the prohibition could not be strictly imposed due to some reasons. According to Laurent[1], the consumption of Khat is less common in Christians, perhaps because they are allowed to consume alcohol. However, some Christians in Harar used Khat and the Bishop of Harar in Ethiopia also considered it as a divine blessing. During the colonial era, a series of laws were enforced in Aden, Djibouti and Somalia to prohibit the use of Khat. However, these legal restrictions proved ineffective and inappropriate and were soon abrogated.

Khat is defined as the leaves and young shoots of *Catha edulis*, a species of the plant, family Celastraceae, which grows wild or is cultivated in Eastern Africa and Southern Arabia and more specifically in Democratic Yemen, Ethiopia, Kenya, Madagaskar, Somalia, Tanzania and Yemen Arab Republic. The inhabitants of these regions are known to chew Khat customarily in order to obtain its stimulant effects. Central stimulation by Khat can manifest itself in euphoria, a feeling of well being, mental alertness, excitement; and enhancement and familiation of associations. The after effects are usually insomnia, numbness and lack of concentration. The continuous and excessive use of Khat can however produce serious side effects. The consumer becomes irritable and quarrelsome, is difficult to handle and antagonistic to all forms of authority. He lives in a dreamworld and becomes mentally divorced from reality and suffers a deterioration of character. He becomes increasingly apathetic, dull in intellect and unable to concentrate; he is no longer able to work and becomes a burden to his

family and friends. The excessive use of Khat may thus create considerable problems of social, health and economic nature. These problems and the current scientific knowledge about Khat has been reviewed in this communication.

HISTORY

It is generally accepted that Khat probably originated and was used in very ancient times in the Ethiopian uplands. A fascinating but not adequately supported hypothesis identifies in Khat the magic smoke that inspired the Delphic pythoness, Holmer's "nepenthe" offered by Helen to Telemacus, and an energetic medicine that Alexander the Great used to cure his army[2].

The first recorded documentation of Khat seems to be a manuscript of the first half of the 14th Century by the Sultan of Ifat, Sadar AbDin, in which he states his intention of planting Khat in the enemy city of Marad after its conquest (MS 143, Bibliotheque Nationale, Paris). From the Harar area, Khat was introduced to its present day territories of Somalia, Djibouti, Yemen, Kenya, Madgaskar, Tanzania and down to South Africa. The introduction of Khat to South West Arabia is attributed to Sheikh Abu Zerbin in the year 1424[3].

BOTANY

Khat is known to grow wild mostly on hillsides and mountain slopes at altitudes of 1500-2000 m above sea level. The first botanical description of Khat was given by P. Forskal who called it Catha. His description was published posthumously in "Flora Aegyptico-Arabica" edited by K. Niebuhr in 1775. The plant has been named *Catha edulis* Forsk in his honour. Khat appears in many varieties and shows a wide range of adaptability. Most taxonomists consider that the genus Catha consists of the single species, *Catha edulis* which belongs to celastraceae family. The stems, the mid ribs and the prominent veins of Khat vary in a spectra of colours which ranges from green to red. For this reason it is a common practice to distinguish two dominant types of Khat referred to as "white" and "red" Khat[4]. Recently we have described the botanical and pharmacognostical aspects of the Saudi Arabian variant of *Catha edulis*[5].

PATTERN OF KHAT CHEWING

Immediately after picking, Khat branches and sprouts are prepared in bundles tightly wrapped in banana leaves in order to keep them fresh. This procedure is essential since the dried and old leaves lose a great part of their effect probably because some major compound(s) undergo decomposition reaction[6].

Khat chewing has become some kind of social institution. The chewing usually takes place in parties with special patterns where friends gather after work. Parties with men only are more common but sometimes one may witness mixed parties with two or more couples sitting together or the women having a separate session in the same household.

The amount of Khat chewed is variable. It depends on the consumer and the duration of the party. The average amount per person is one bundle of Khat. Only tender leaves and stems are chewed, this makes upto 50 g of fresh material. The juice is swallowed with the saliva; the residue is not spat out too soon, but gathered in the cheek and kept usually for the whole period of chewing. The bolus thus accumulated makes a characteristic bulge in the cheeks of the chewer. During Khat chewing considerable amounts of liquids (tea and soft drinks) are also ingested. The need for liquids is due to the fact that some active principle of Khat provokes the dryness of mouth.

SOCIAL AND ECONOMIC ASPECTS

The literature on the social and economic effects of Khat use suggests that it contributes to family instability because of the economic drain of the family's resources. In spite of this fact, Khat has become the basis of a life style and plays a dominant role in celebrations, marriages and political meetings. Indeed withdrawal from Khat results in social isolation[7]. Khat chewing has become common both in the urban and in the rural societies of many of the countries known to grow Khat and in their neighbouring countries which import it for their consumption. Even the school and college boys are known to consume large amount of Khat for its stimulant effect.

According to Kervingant[8], the continued use of Khat causes loss of appetite leading to malnutrition. The undernourished system becomes an easy prey to acute and chronic diseases. The consequent rise in morbidity is reflected in an increase in social assistance costs. The consumer's mental faculties are numbed, he loses his will to work, his efficiency becomes low. He loses interest in his family which could be due to his inability to provide the financial support and also to the impotence produced by chronic Khat consumption. The family too may suffer from malnutrition and become liable to contact various infective or deficiency diseases or turn to begging, theft or prostitution in order to earn the livelihood. Finally, there may be a serious economic balance-of-payments problems in those countries where the Khat import accounts for the loss of a sizeable proportion of their national income. The price of Khat on the market follows the law of demand and supply. The average cost of one bundle i.e., about 50g of fresh chewable material is around 10US $ and it may at times rise to 30-30US $.

MEDICAL ASPECTS AND DEPENDENCE

The consumer gets a feeling of well being and mental alertness with loquacity, excitement and sometimes anxiety[9]. To achieve the climax of such feelings they continue chewing for four to six or even more hours. The after effects in such people are usually insomnia, numbness, lack of concentration and anorexia. Extensive descriptions are reported by Halbach[9], Hughes[10] and by a WHO advisory group[11]. The above studies point out the following effects: constipation probably due to the astringent effect of tannins, anorexia, stomatitis, œsophagitis, gastritis, meteorism, paralytic ileus, cardiovascular effects such as tachycardia, palpitation sometimes with extrasystoles, hypertension, myocardial insufficiency, cerebral haemorrhage, migraine, hyperthermia, sweating, mydriasis, impairment of sexual activity in man, pulmonary œdema, hepatotoxic effects etc.

The excessive use of Khat induces some degree of psychic dependence[12]. Khat seems, however, not to cause physical dependence or withdrawal syndrome. Aggressive behaviour and toxic psychosis have not been clearly evidenced in Khat users; reactive depression, anxiety and irritation seem to be the most serious psychic effects[10]. The pleasant effects of Khat are a strong inducement for many to procure the necessary suplies often at the expense of vital needs such as food and drugs[12]. Khat chewing habit thus creates the problems of social, health and economic nature.

THE INTERNATIONAL INTEREST AND SCIENTIFIC STUDIES

Before the second world war, the amount of Khat consumed was very limited. Khat chewing spread with the improvement of transportation, liberalization and urbanization. The question of Khat chewing and its undesirable consequences has been raised several times in the inter national forums since the days of the League of Nations. The 24th Session of the Commission on Narcotic Drugs of the United Nations adopted a resolution recommending research on Khat with special reference to the analysis of active substances, their pharmacological actions and their effects on users from a socio-economic point of view[13].

CHEMISTRY OF KHAT

The chemical studies have revealed that Khat leaves contain a great number of compounds such as alkaloids, glycosides, terpenoids, tannins and flavonoids etc. More than forty alkaloids have been detected in this plant. Many of these are cathedulins of low molecular weight ranging between 600 and 1200[14]. From the point of view of biological activity, the phenylalkylamines are the most important. Cathine ((+) — norpseudoephedrine) was considered until recently to be the main sole active principle of Khat. The cathedulins have not been shown as yet to possess any pharmacological activity.

A new phenylalkylamine compound, not previously reported in nature has recently been found in greater but variable quantities. The chemical structure of this compound has been established and it has been designated as cathinone[15,16]. Cathinone is much more potent stimulant than cathine[16]. It is a highly unstable compound in the presence of oxygen and undergoes decomposition reaction leading to the formation of a dimer[16]. The "red" type of Khat considered superior by users seems to contain cathinone in greater quantities than the white type[4]. Similarly the fresh sample of Khat leaves is also considered to possess greater amount of cathinone as compared to the old dried material.

Apart from the cathedulin and phenylalkylamine alkaloids, tannins and triterpenoids, the studies of El Sissi and Abd Alla[17] have established the presence of some flavonoid compounds including kaempfero, quercetin and myricetin in the fresh leaves of Khat. The recent study of Gellert et al[18] has shown the presence of dihydromyricetin and its 3-0- rhamnoside in the fresh leaves. The flavonoids may be responsible for some of the pharmacological actions of Khat[5,19].

PHARMACOLOGICAL ACTIONS

Pharmacological studies have been mostly carried out on the two active principles of Khat cathine and cathinone. The amphetamine like stimulant effect of Khat was initially attributed to cathine[9,20,21,22]. However, this attribution was disputed by reports showing that plant extracts from fresh leaves contained an unknown compound more active than cathine[23]. Recent studies have shown that 1-cathinone is the principal active constituent in the fresh leaf and it rapidly decomposes into the less potent cathine[24]. In this context, it is interesting to note the observations of May et al[25] who have shown that dopamine B-hydroxylase catalysed ketonization of cathine to cathinone, demonstrated in vitro, may also be responsible for its bioactivation to cathinone in the human system and this may account for its pharmacological activity which is qualitatively similar to cathinone and may also explain the delay in the onset of action and a much longer duration of cathine as compared to cathinone. Cathinone has been shown to be approximately 10 times more active than cathine and has an immediate onset of action and a short duration of activity.

Both cathine and cathinone have been shown to possess amphetamine like actions on gross behaviour, body temperature, locomation, stereotyped and operant behaviour and food intake in the experimental animals. They also enhance electrically stimulated noradrenergic transmission, the mechanism of action of both amines is believed to be the release of transmitter at the end of nonadrenergic neurous[11].

Apart from the marked central effects, Al-Meshal et al[5] and Tariq et al[19] have reported the gastric anti-ulcer activity of Khat and the flavonoidal fraction of its crude extract on Shay rats and against phenylbutazone and reserpine induced ulcers in rats and the histamine induced ulcers in guineapigs. Their results suggest that the gastric anti-ulcer activity may be present in the component(s) of its flavonoid fraction. Further studies in order to pinpoint the exact active principle are under progress.

FOLK MEDICAL USES OF KHAT

Some medicinal employment of Khat has been noted in the countries where it has been used as a stimulant. The most observations have been made by Peters[26]. It could be presumed that most of the mentioned customs are rather out-of-date today.

Somaliland:

Khat seems to have a limited medical use among the Somalis. The only uses that have been quoted by Peters are to stimulate urinary activity, and to aid the treatment of genito-urinary diseases, such as retention of urine, and gonorrhea. Besides, there is a belief that the chewing of Khat leaves affords a protection against malaria.

Arabian Peninsula:

In the past century it was claimed by informants from some non-specified Arab tribes that a twig of Khat carried in the bossom is a certain safeguard against infections. It was also believed that the land where it grows is secure against the infection of plague (e.g., Bubonic plague). Use is also made of it as an astringent medicine.

Ethiopia:

Like the Somalis, the Ethiopians also make a limited use of Khat as a specific medicine. Merab records that dervishes chew small fragments of Khat leaves and spit it on the sick when pronouncing a benediction. Christians as well as Muslims prepare an infusion which they administer to the invalids[2].

Southern Africa:

In South Africa an infusion of Khat is used as a remedy for coughs, asthma, and other diseases of the chest[27]. The shoots are also used by the Bushmen as a specially nourishing food. In Tanganyika the leaves are used for influenza, and the roots are also eaten to cure stomach aches[28].

Europe:

Also in Europe there has been some interest for introducing this natural drug in medical treatment. It would appear that it could be used, in the first place, as a general stimulant. Various authors have recorded uses for Khat extracts as medicinal substances. Bertherand in 1889 attributed to Khat a great number of possible uses[29]. Peters reported that some pharmacists of Lyon launched a product, prepared from Khat extracts, called Neo Tonique Abyssin in 1910, but the supply soon stopped because of the difficulty in obtaining the raw ingredients at the outbreak of the First World War.

In 1913, a London pharmacist began to manufactue products based on Khat. Dr. Martindale marketed three products: (1) catha-cocoa milk, (2) catha-cocoa glycerophosphate... a nervous tonic and stimulant in which milk powder is combined with catha extract and calcium glycerophoshpate, and (3) effervescent pheno phtalein with catha.... a mild tonic laxative. Extract of catha was also put up in tablet form.

Neither the 1948 edition of the British Pharmacopoeia nor the British Pharmaceutical Index of 1949 mentions these preparations. However, the Extra Pharmacopoeia lists two preparations under the heading of Catha edulis as an adulterant or substitute for tea[30].

Miscellaneous:

The Eastern Mediterranean report quotes a recent author who described how a certain magical spirit personified in magical Muslim lore, was regarded as the Patron Spirit of Khat. This spirit comes in aid to women in difficult labour. When invoked, it becomes incarnate and materializes in a human medium. The medium chewing some Khat leaves spits on the genitals of the parturient woman. This, he said, according to their belief, acts as a fire-whip on the spirit producing uterine pain[31].

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DISCUSSION

A Participant

I would like to ask Dr. Ernediz a question. She mentioned about 200 plants, but she did not give their names and talked about only 5 plants. Further more, she did not mention anything about pharmacological effects of these plants. She only gave the number of plants. I do not know what is the use? Do you have any comparison between the plants which you found in Turkey and other plants found outside Turkey, from the pharmacological point? This is my first question. I mean, do you have any information about the comparison between the Turkish plants mentioned in this paper and plants abroad, from the pharmacological point of view? You said you have some species of *Chirata,* which has effect on the heart and on cardiovascular system. Do you have any comparative work between *Chirata* found in Turkey and abroad, in this regard?

The other question is to the 2nd speaker, Dr. Abdul Waheed. I noticed that in most of the papers, all speakers mentioned about the plants or the structure of plants, saying they do so and so, but they did not specify exactly which constituent of these plants could give these effects. I would like him to give an answer to this question.

Dr. Mohammed says that one of the Saudi Arabia's plants, which we use in medicine has no side-effect. I do not think there is any such thing which has no side-effect.

Dr. Ernediz

I did not read the names of plants one by one, inspite of the fact that they are mentioned in the paper, because of shortage of time. If you want to know the names of plants, I think all the papers are going to be published and all the tables I had shown here, will be published with our papers.

The answer to the second question is that the plant constituents change from place to place. You do not have the same plant constituents. Of course, I have done all this work myself. If you want further details, I may give you. The 5 plants, I mentioned they have been screened for activity. I can give you much better information about it. I can give you the literature if you like.

The Participant

My question was not this. It was not exactly a question, but I noticed that most of the speakers did not specify the type of compound which effects or which has pharmacological activity. Does it mean the whole plant or the constituent of the plant? This does not mean that we can use this plant for pharmacological effect or for therapeutic use. I would like you to specify a little bit about, what type of compound has this activity. Could you?

Dr. Bayhan Cubukcu

I think, I should answer this question, because those 5 plants were from my work. Three of them contained glyco-protein and they were really most active and they were in the 2nd phase of clinical trial. I am going to talk shortly in the afternoon about the work on other plants which have this activity. So, I will save for that. Is that satisfactory enough?

The Participant

My question is about the hypoglycemia i.e. hypoglycemic activity. Dr. Abdul Waheed used Alloxan (Bullan) to destroy the Beta cells of pancreas and you said that blood glucose level increased 5times.It means you used it on rats. This gives me another question. I am sorry about that. It means that blood glucose will rise to 350 - 400, when the normal blood glucose is 70 - 85. something like that. You said, you used it specially on

diabetic animals. It is not a complete destruction to the beta cells. You used only one species of animal. Why didn't you try other species of animal. This is the first question.

You said the mechanism of the action was made through the liver. What about the other glands or the hormones? Have you removed the pancreas, for example? Have you used GTT? Do you have information about that?

Dr. Abdul Waheed

Actually this study was a preliminary study and now we are conducting the 2nd phase; studies to isolate its active ingredients.Which is its active ingredient? It was the first study, because in that, I did not have the isolation of its active ingredients. So, that is why we used the extract in crude form and second, as you said about the animals, they were not completely destroyed and they were partial diabetic. We can not say about the exact mechanism, because we have not done uptil, now, the exact mechanism of action. For exact mechanism, you need a very detailed programme and lot of time is also needed. This study was done in about one and half year. So, we have programme to do a detailed study. First, to isolate its active ingredients then to determine the exact mechanism of action. I have mentioned only 4 - 5 metabolites. With the help of 4 - 5 metabolites, you cannot say that this is its mechanism of action. At least you have to do 10 - 20 metabolites, different in blood as well as in liver, then you can say possibly, even then you can not say exactly, because there are so many mechanism of actions, which are not known just now. So then, we will be able to say something about it.

PART EIGHT

CLINICAL EVALUATION FOR SOME PLANTS MENTIONED BY THE MUSLIM SCIENTISTS

Part Eight: *Clinical Evaluation for some Plants Mentioned by the Muslim Scientists.*

CHAPTER ONE

(Papers Presented)

REPORT ON THE SESSION

This session was conducted from 13.30 - 15.00 by Dr. Bayhan Cubukcu and Dr. Yusuf Ahmed as chairman and co-chairman. Dr. Onazy Al-Onazy was the moderator. This session was a scientific one held on Applied Research. In this session, seven papers were presented on "CLINICAL EVALUATION FOR SOME PLANTS MENTIONED BY THE MUSLIM SCIENTISTS?". At the end discussion was allowed.

Editors

THERAPY WITH DRUG PLANTS

Prof. Dr. M. Darwish Sayed

EGYPT

The knowledge about the drug plants of the Ancient Egyptians came to us through the offerings of the dead found in tombs, the earliest designs and scorptions on the walls of temples, the records available in such Papyri as Ebersa Papyrus (1500 B.C.). These offerings, designs inscriptions, Papyri and writings show that old Egyptians were acquainted with a great number of drug plants and their products.

Moreover, a lot of drug plants were recorded by Romans and Arabs. In fact some books written by old Arab Scientists are still recognised as useful references in the field of drug plant therapy. Amongst these Arab Scientists are Ibn-Sina, Ibn Bitar, El-Razy, Daoud El-Antaki and others.

The recent forward step taken by W.H.O to recognise Medicinal plants as an effective source of therapeutic agents gave a significant push to international concern and research in the field of therapy with drug plants.

Examples of Drug Plants Already Industrialised

1 - Ammi majus

The plant is common in fields and waste places of Egypt. The fruits are used as a public remedy for the treatment of Leukoderma. The first to describe this drug and to use it in the Arab Countries was Ibn El-Bittar who lived in the 13th century. The chemical analysis of the fruits led to the isolation of ammoidin (X anthotoxin), ammidin (imperatorin) and majudin (bergaptene), to the presence of which is attributed the activity of the drug.

Meladinine a drug containing both ammoidin and ammidin, in the form of tablets and paint by Menyelis Co., is found to increase the pigmentation of normal skin and induce repigmentation in idiopathic leucoderma (vitiligo).

2 - Ammi Visnaga

The perennial herbaceous plant is common in waste places of the Nile-Delta. The fruiting pedicales are used as tooth-picks and the fruits, in the form of decoction, as a diuretic in renal colic, by the Egyptian public since the days of Ancient Egyptians. The fruits has been found to contain two bitter principles, khellin and visnagin. Khellin is useful in the treatment of angina pectoris, whooping cough and to relieve spasms of ureter, kidney and gall bladder. Khellin was also found to have anthelmintic, anti-anaphylactic, anti-atherosclerotic, anti-diabetic and anti-ulcerogenic effects. Khellin was introduced in therapeutics since 1945 under various pharmaceuticals forms by Memphis Co. — known by the trade name of Lynamine. Several formulations (ampoules, drops, tablets, potions, suppositories) containing khellin are produced by Memphis Co. and Misr Co.

3 - Cymbopogon proximus

An ascending densely tufted perennial grass, common on hills and rocky grounds of Elba and the sandy coast of Red-Sea in the Southern boundaries of Egypt. The entire dried herb known as "half bar" has been used for centuries by the Bisharin and Ababda tribes of Aswan Province in the form of a decoction to produce diuresis, to allay colicy pains, to help the removal of small stones from the urinary tracts and as an antipyretic in fevers. Recently the active principle "Proximol" has been

isolated by the close co-operation between a team of scientists in the Faculty of Medicine (Cairo Univ.) and the National Research Centre. Proximol (a Sesquiterpenoid) possesses unique antispasmodic properties as it produces relaxations of the smooth muscle fibres without aboalishing the propulsive movement of the tissue. The success of proximol in the propulsion of renal and ureteric calculi is attributed to the pharmacological characteristic where ureteric dialtion occurs without paralysis and preserving the propulsive waves. It is quite a safe drug and prolonged use in the recommended therapeutic doses did not show any side effect. The drug is produced by Kahira Pharmaceuticals and Chemical Industries Co. in the form of drops and tablets.

4 - Nigella Sativa

The seeds of *Nigella sativa* known in Arabic as "Habbet el Barakah" are used, in folk medicine, by the Egyptian public as a diuretic and carminative, while its expressed oil is used in asthma, respiratory opression and coughs. The active principle "Nigellone" has been isolated from the volatile oil fraction and is found useful in the treatment of bronchial asthma. The drug "Nigellone is produced by Misr Co.

5 - Aloe vera

The aqueous extract of *Aloe vera,* an ornamental plant cultivated in more than 100 Acres), has been recently produced by El-Nile Co., under the trade name "Aloderm". Aloderm produced in the form of cream and lotion promotes healing of wounds, burns including sunburn, radiodermatitis and ulcers and helps in Acne vulgaris treatment.

Examples of Drug-Plants under Investigation fo Industrializations

1 - Urginea maritima

Squill bulb represents a drug which is known to mankind since antiquity. Ancient Egyptians used the bulbs and their extracts (as Vinegars) in treating combat hydropsy, one of the striking symptoms of cardiac failure. The bulbs contain reasonable percentage of the cardiotonic glycosides. The plant grows abundantly wild in different localities. Since the last decade, the drug Industry in Egypt depends totally on the squill for the preparation of galenical and pharmaceutical products. The purified glycosidic constituents are used in the treatment of cardiac diseases. The glycosides have the advantage of being useful in treatment of cases refractory to, or no longer respond to Digitalis and Strophanthus therapy. The annual consumption of cardiacs in Egypt is very high.

2 - Phytolacca americana

Earlier investigations of the roots resulted in the isolation of a saponin whose physiological activity was correlated in all respects to the reported physiological activity of the roots. Recently the saponin was found to possess a high spermatocidal acitivity. A clinical application (as ointment) of the toxic substance on 100 fertile cases eager to secure contraceptive and followed up for a period of one year revealed that none of the individuals complained of any discharge or irritation and no conception took place. The substance is recommended as an effective local contraceptive drug.

3 - Euphorbia species

The genus Euphorbia is represented in Egypt by about 40 species. A number of alleged folkloric

uses has been ascribed to several *Euphorbia* species which are known by their production of substances with several biological activities. *Euphorbia* species — most of which possess antileukemic activity — are used widely in folk medicine for treating cancer of stomach, liver and uterus. Its use in treatment of asthma as well as for skin diseases were reported.

4 - Glycerrhiza glabra

The roots and rhizomes of the plant growing in Egypt were investigated for their glycerrhizine content. The glycoside is an important cortisone substitute without the side effects resulting from withdrawal of cortisone. Standards of exotic liquorice are cited in many Pharmacopoeias.

5 - Cynara scolymus

This edible plant is widely cultivated in Egypt. The extract of *Cynara* causes a simultaneous drop in blood cholestrol and stimulates the liver and kidney functions. It produces diuresis with increased elimination of blood nitrogen which recommends its therapeutic use in biliary diseases and in cases of nephritis.

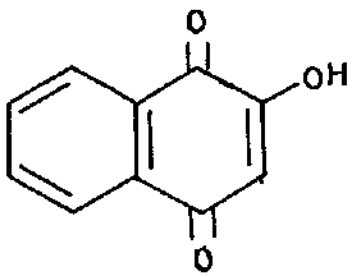
6 - Solanum laciniatum

Solanum laciniatum is very rich in alkaloidal glycosides. Its alkamines are steroidal in nature, which are now very valuable from the economical point of view in the pharmaceutical industry, as it can be converted chemically to steroidal hormones.

7 - Lawsonia species

The leaves of this plant were recommended by ancient Egyptians to treat fungal infections of the skin. It was also stated that the leaves should be fermented over night before use.

The recent phytochemical investigation revealed the presence of a compound given the name *Lawsone* which proved to be a safe and effective antifungal. It is to be mentioned that to isolate this compound, however, the leaves have to be macerated in water over night before extraction (fermentation prior to extraction), the fact which complies with the old Arab observation.



2-hydroxy-1,4 naphtho quinone

LAWSONE

Need not to mention that the examples cited are by no means, and can never be a comprehensive list of the medicinal plants, now in use, nor the only known sources of important therapeutic agents.

The present situation, whether at the national, or international level, arouses a very important question that needs a sufficiently accurate and clearing answer, which is: What is, or could be the future of therapy based on medicinal plants and/or their active constituents.

A lot of factors make the answer of this question a must, of which the following are the most important factors:-

a — Medicinal plants contributed a lot in the field of therapeutic medicine. Infact some diseases remained uncurable for a long period of time, until an effective and safe compound was isolated from a medicinal plant and was the only and still is the best curative agent.

b — The range of safety is very encouraging in most of the cases, using medicinal plant constituents.

c — Some very important complex compounds can be synthesised from starting materials, isolated from certain medicinal plants, thus achieving economy and saving time and effort. e.g vitamin A from citral aldehyde (Eucalyptus citrodora), cortisone from sapponins of different plants e.g agave, solanum etc.

d — A lot of important plant constituents were still unsubstitutable by synthetic compounds ie has never been succussfully synthesised if any e.g. volatile oils, enzymes.

Accordingly, it can be concluded that medicinal plants must be exposed to a thorough and comprehensive investigation from all aspects to explore their therapeutic property or properties. The Arab world is known to be rich in medicinal plants wheather cultivated or wildly grown. For this purpose I recommend establishing an Institute for Medicinal Plants, which could be responsible for the following targets:

1— Exploration of Medicinal Plants growing in the Arab region.
2 — Establishing a herbarium where authentic samples can be kept as references for identification of unknown samples.
3 — Phytochemical and Pharmacological investigation with reference to traditional use.
4 — Establishing a pharmacopoeia for recognised medicinal plants.
5 — Industralisation of medicinal plants which prove to be of therapeutic importance.
6 — Establishing means of communications between different schools interested and/or concerned with medicinal plants to encourage exchange of experience and researches.

The following Departments could be a base for the suggested Institute:

a — Medicinal chemistry and Pharmacognosy Department.
b — Department of cultivation of medicinal plants.
c — Department of Pharmacology.
d — Department of Pharmaceutical technology and Industrial Pharmacy.
e — Department of Marketing.

COMPONENTS AND BIOLOGICAL PROPRIETIES OF GARLIC - ALLIUM SATIVUM L.

Prof. Jerzy Lutomski

POLAND

From among several hundred species of the genus Allium garlic plays the most important role in therapeutics. Grown by man for hundreds of years, garlic has been known not only because of its specific organoleptic proprieties but also because of its biological activity. The general therapeutic activity of garlic is ascribed to alkylpolysulfides - the derivatives of cysteine, to flavonoids, saponins, amino acids, vitamins and mineral salts. In literature four main kinds of garlic activity are usually mentioned:

- antisclerotic[11,12,18,21,34]
- slightly lowering blood pressure[27,46]
- antibacterial, especially in infectious gastro-intestinal diseases[20,21,22]
- toning up old age diseases[27, 46] and lately probably also stimulating the psychophase /hypophyse/ and the hormonal system[14] .

1. COMPONENTS

Garlic includes volatile sulphuric compounds that, existing in the garlic oil, give it the characteristic unpleasant smell. Alliin - amino acid, the alkyl-derivative of cysteine that appears in quantities up to 0.2% [43], belongs to the main biologically active constituents of garlic[8,9,16,41] .

Fig. 1 Formulae of alliin[1] and allicin[2]

Alliin[1] is a non-active compound that only under the influence of the enzyme called alliinase transforms into allicin[2] - a substance active pharmacologically. Under the influence of the enzyme the alkylsulfoxides of cysteine transform further into alkylpolysulfides and sulfides. Besides the corresponding alkylsulfoxides of cysteine the final products of the enzymatic degradation are: pyroracemic acid and ammonia.

Fig. 2 The enzymatic degradation of alkylcysteinesulfoxide. In case when R=R' some symmetrical derivatives arise, e.g. diallyl/allicin/; when in turn R≠R' some mixed derivatives arise, e.g. methylpropyl.

Another group of the organic sulphuric compounds characteristic of garlic consists of γ-glutamylpeptides, mainly derivatives of cysteine. The biological proprieties of those compounds have not been thoroughly explained yet. According to Virtanen [45] the compounds perform a certain role in the process of metabolism that stimulates the growth of plants. From among the compounds belonging to the group in question, Kominato [24] isolated a thioglycoside that he called scordinine. Scordinine is a complex of peptides consisting of fructuronic acid, allylmercaptan and a peptide that, besides other amino acids, includes also glutamic acid[29] .

In the preventive treatment of arteriosclerosis one should apply medicines that hamper aggregations of thrombocytes. Substances of that kind exist also in garlic. They are: adenosine[25] and methylallyltrisulfide. Adenosine appears in many seasoning and medicinal plants. The concentration of adenosine in garlic is exceptionally high/56 mg%. Reuter, Deininger and Wagner[33] proved that adenosine hampers aggregations of thrombocytes and improves the flow of blood in coronary vessels.

In recent years some other sulphuric components of garlic have also been proved to possess strong abilities to hamper the aggregations. A group of Japanese research workers[2] have lately found a substance called methylallyltrisulfide that is responsible for the check of the aggregations.

The constituents mentioned above and other substances of garlic have been defined many times[1,19,25,26,31,34].

All of them have been presented in Table I A,B,C.

Once more would I like to call your attention to the constituents that are important from the biological point of view. Those are: allicin/A/ formed from alliin of strong antibiotic proprieties with the help of the enzyme alliinase; methyl-2-propenyltrisulfide that hampers the aggregations of thrombocytes/B/, saponins with hypoglyceamic properties, flavonoids lowering blood pressure, scordinine and garlicin with antiobiotic activity and adenosine that hampers the aggregations of thrombocytes/C/.

2. ANTISCLEROTIC PROPRIETIES OF GARLIC

There are still some more constituents of garlic/besides those mentioned above/that play an important antisclerotic role. Allicin and other sulfoxides influence the high density lipoprotein/LDL/. Some constituents of garlic are generally considered to decrease the level of blood cholesterol and triglycerides.

Despite the fact that more and more experiments are done upon animals and people [10,12] the question whether garlic may be administered as an efficatious remedy in the preventive treatment and therapy of arteriosclerosis, still remains unanswered. The problem was to be, at least partly, solved by the research supervised by the Polish Institute of Medicinal Plants and carried over a clinical evaluation of the West German garlic pharmaka called Ilja Rogoff(R)/producer: Woelm-Pharma Eschwege, West Germany/.

3. MATERIALS AND METHODS

The research was carried in ambulatory conditions upon 82 workers employed in one of the Polish Baltic-sea ports. The age of the patients ranged from 45 to 60. They were divided into two groups, group A and group B /Table 2 . Patients from group A were treated with a drug of series A whereas patients from group B were treated with a drug of series B. It was done according to the principle of doubly blind trial, in congruence with the plan of randomization worked out in the Institute of Medicinal Plants in Poznan. The drug of series B was a placebo.

During each of the examinations

1. the clinical symptoms/headaches, giddiness, sleeplessness, efficiency and general condition of the constitution, frame of mind, gastric disorders/were estimated by the patients themselves; a general estimation of the obtained results was done by the conducting doctor.
2. each of the examinations was accompanied with 3 psychological tests.
3. blood pressure and pulse were measured
4. the following parameters were controlled: the levels of triglycerides, total cholesterol and sugar, fibrynolytic activity and electrocardiogram.

In the initial period of the research some of the patients showed moderate rise of blood pressure, especially the diastolic one, and heightened values of total cholesterol and triglycerides in the blood serum.

The drugs were administered 3 times a day, 2 pills before meal throughout the period of 12 weeks/ 1 pill included 50mg of Bulbus Alli. sat. sicc./.

Most of the examinations were done 4 times, thus: directly before the administration of the drug/initial research/, after 4 weeks, after 8 weeks, and finally after 12 weeks.

The patients did not take any other medicines neither in the course of treatment nor in the period preceding it/at least 2 weeks/.

The results of the experiment, showing some differences within the course of treatment, were submitted to a statistic computer analysis done by the so called Student's Test.

4. RESULTS

The recapitulation of the observations made by the conducting doctor, proved the drug of series A to have a very beneficial influence upon subjective conditions of the patients. They have been relieved of headaches, giddiness, sleeplessness and gastric disorders. By comparison to the drug of series B the drug of series A was found to have a better influence upon the subjective conditions of the patients. The drug turned out to be the most effective in case of headaches. As far as the improvement of subjective conditions was concerned the difference between the drugs of series A and B was the greatest/ see Fig. 3, Table 3.

A psychologic examination carried on with the help of three tests did not show any important differences within the compared groups.

The average frequency of pulse remained unchanged in the course of treatment in both groups/ Table 4.

The average levels of blood pressure, both the systolic/min. 150mm Hg/ and diastolic/100mm Hg/ ones were statistically significantly lowered with patients of group A. The drop in blood pressure with patients of group B did not show any features of statistic significance after 8 and 12 weeks of treatment. 17 patients of group A and only 8 patients of group B showed some normalization of blood pressure/see Table 5.

The drug Ilja Rogoff® with rutin lowered the systolic blood pressure on the average by 16mm Hg, whereas the placebo drug/group B/ lowered the systolic pressure only by 9,6 mm Hg.

Contrary to group B the average level of total cholesterol in group A was lowered significantly or on the limit of significance /Tables 6 and 7 . A comparison of average concentrations of lipides fractions in groups A and B led to the claim that the hypolipemic effect was similar in both groups.

The electrocardiographic examination did not contribute to the results of the experiment.

5. DISCUSSION

While comparing the results obtained after the administration of the Ilja Rogoff® drugs of series A and B, one might notice a predominance of series A, especially within the range of the subjective symptoms registered by the conducting doctor. One observed the abatement of such symptoms as: headaches and giddiness, flatulences and feeling of fulness in the abdominal cavity, sleeplessness. Many patients asked for the repetition of the treatment with the drug of series A. That was, to a certain extent, *a test prefering the pharmaceutical of series A.*

As an exact comparative analysis [3] of the remaining results had shown, some hypotensional and hypolipemic effects were much more distinct with the patients of group A than with those of group B. The normalization of blood pressure, which was determined by some exactly established criteria, was observed after 12 weeks of treatment with the drug Ilja Rogoff® in 77% of patients.

The fact that the level of cholesterol /Table 7 drops by 3.1% in group A and rises by 2.7% in group B, testifies the significance of differences[3] on the level of 0.5 and points to *a beneficial drop of the level of cholesterol with the patients suffering from elementary hyperlipemia,* as a result of the administration of the garlic pharmaceutical[4,5,6,12,16,31,42] .

The observations of the influence of the garlic drug on the level of triglycerides did not give satisfactory results. In the course of numerous examinations[4,5,6,16,42] a distinct drop in the level of cholesterol and triglycerides was observed. Patkov[31] showed that garlic may hamper the development of some specially hard forms of hyperlipemia.

The studies carried by Sainani[36] proved that garlic lowers the level of triglycerides in blood. With the patients with a raised sugar content in blood the statistic differences between groups A and B concerning the effect upon hyperglicaemia were not significant.

6. CONCLUSION

The comparison of the results obtained from the clinical experiments with the garlic pharmaka to the placebo, made according to the principle of a doubly blind trial showed very good effects in decreasing the symptoms of arteriosclerosis.

1. With many patients an improvement of psychic and physical conditions was observed; symptoms characteristic for arteriosclerosis such as headaches, giddiness, sleeplessness and flatulences abated.
2. The tested drug lowered blood cholesterol, especially with patients with raised level of cholesterol.
3. The garlic drug was proved to possess also some hypotensional proprieties. After 12 weeks of its application normalization of blood pressure occured with patients suffering from light hypertonia.
4. Considering the vegetable origin of the drug in question and its perfect tolerance/no symptoms of its undesired activity were observed / one should state that garlic may be useful and efficient in the therapy and preventive treatment of arteriosclerosis.

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TABLE I

Part A

THE ACTIVE CONSTITUENTS AND COMPOUNDS IDENTIFIED IN GARLIC

No.	Constituents		%	References
1.	Water		64.0	37
2.	Ash		1.45	37
3.	Cellulose		0.8	37
4.	Lipides		0.06	37
5.	Carbohydrates			20
6.	Muscuses			20
7.	Volatile compounds containing organic sulphuric compounds:		0.10–0.36	40,41,43
	a. alliin - amino acid			
	b. allicin - obtained from alliin with the help of the enzyme allii-nase, antibiotic proprieties			
	c. sulfides /mono/:	dimethylsulfide		30
		2–propenylmethylsulfide		30
		di-2-propenylsulfide		30
	d. sulfides /di/:	dimethyl disulfide		30
		methylpropyldisulfide		35
		methyl-2-propenyldisulfide		30,35
		dipropyldisulfide		35
		di-2-propenyldisulfide		20,35,44
		propyl-2-propenyldisulfide		36

TABLE I
Part B
THE ACTIVE CONSTITUENTS AND COMPOUNDS IDENTIFIED IN GARLIC

No.	Constituents		%	References
7.	e. sulfides /tri/:	dimethyltrisulfide		30
		methylpropyltrisulfide		30
		methyl-2-propenyltrisulfide - hampers the aggregations of thrombocytes		2,30
		di-2-propenyltrisulfide		30
	f. thiols:	methanethiol		30
	g. thiosulfonates:	2-dipropenylthiosulfonate		19
	h. the remaining s sulphuric compounds:	sulphurdioxide		39
	i. alcohols:	2-propen-1-ol		19
8.	*Saponines:*	sitosterol glycoside with hypoglycaemic proprieties	0.0159	23,38
9.	*Flavonoids:*	lowering blood pressure		7,25,38
10.	Vitamins:	A,B_1,B_2,C,PP		15
11.	Vestigial elements:	Mg. Fe, Zn, Mn, Cu, Mo, Co, B, J		15
12.	*Scordinine:*	thioglycoside of an antibiotic activity		24
13.	*Garlicin:*	antibiotic proprieties		28
14.	*Adenosine:*	nucleoside hampering the aggregations of thrombocytes	0.056	17,33,34

TABLE I
Part C
THE ACTIVE CONSTITUENTS AND COMPOUNDS IDENTIFIED IN GARLIC

No.	Constituents	%	References
15.	Compounds with some proprieties of sexual hormones		15,41
16.	Choline	7.0	37
17.	Sinistrine of the insulin type		13,20,32
18.	Enzymes: alliinase, arginase, myrosinase, peroxidase, tyrosinase, desoxiribonuclease		13,15,16

TABLE 2
CHARACTERIZATION OF THE 2 GROUPS OF PATIENTS

Group	A	B
The number of patients	44	38
Men	20	20
Women	24	18
Age/average/	45–60/52/	45–59/53/
Weight/average/	82 kg	76,5 kg
Height/average/	165 cm	166 cm

TABLE 3

THE ESTIMATION OF THE SYMPTOMS DONE BY THE PATIENTS

	Improvement		No changes		Worsening	
	A	B	A	B	A	B
Physical condition	24 54.5%	14 38.8%	20 45.5%	20 55.5%	0 0%	2 5.7%
Efficiency	16 36.4%	7 18.9%	27 61.3%	30 81.1%	1 2.3%	0 0%
Frame of mind	16 36.4%	6 16.2%	27 61.3%	30 81.1%	1 2.3%	1 2.7%
Sleep	25 59.5%	16 44.4%	16 38.1%	18 50 %	1 2.4%	2 5.6%
Headaches	26 66.7%	16 48.4%	13 33.3%	17 51.6%	0 0%	0 0%
Giddiness	21 56.8%	12 38.7%	16 43.2%	19 61.3%	0 0%	0 0%
Digestion	21 52.5%	13 37.1%	19 47.5%	22 62.9%	0 0%	0 0%
Average	51.8%	34.6%	47.2%	63.4%	1 %	2 %

Legend: A: Ilja Rogoff® garlic pills
B: Placebo

TABLE 4

AVERAGE FREQUENCY OF PULSE /per min./.

Examination	Group A	Group B
Initial	75	76
After 4 weeks	74	75
After 8 weeks	74	76
After 12 weeks	74	76

TABLE 5

THE CHANGES OF BLOOD PRESSURE WITH 36 PATIENTS SUFFERING FROM LIGHT HYPERTONIA

Blood pressure	Group A	Group B
Normalization	17=77.3%	8=57 %
No changes	4=18.2%	4=28.6%
Worsening	1= 4.5%	2=14.4%

TABLE 6

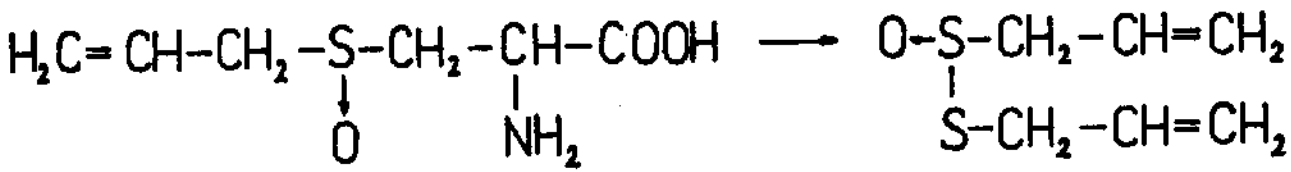
THE LEVEL OF TOTAL CHOLESTEROL/mg/100ml/ AND TRIGLYCERIDES /mmol/1/ IN BLOOD SERUM

Examination		Group A		Group B	
		chole-sterol	trigly-cerides	chole-sterol	trigly-cerides
Initial		212	2.52	221	2.38
After 4 weeks		204	3.32	223	2.61
After 8 weeks		202	2.72	217	2.15
After 12 weeks		205	2.40	225	2.50
P	$\frac{1}{2}$	0.05	0.1	0.5	0.6
	$\frac{1}{3}$	0.05	0.5	0.5	0.5
	$\frac{1}{4}$	0.05	0.02	0.5	0.5

TABLE 7

REGISTER OF PATIENTS WITH HEIGHTENED VALUES OF CHOLESTEROL /mg/100ml/ AND TRIGLYCERIDES/mmol/l/ IN THE INITIAL PERIOD

Examination		Group A		Group B	
		chole-sterol /n=5/	trigly-cerides /n=11/	chole-sterol /n=5/	trigly-cerides /n=11/
Initial		276	3.88	290	3.83
After 4 weeks		255	2.86	301	3.27
After 8 weeks		257	3.95	252	2.63
After 12 weeks		275	3.20	287	3.37
P	$\frac{1}{2}$	0.1	0.05	0.4	0.05
	$\frac{1}{3}$	0.1	0.5	0.05	0.05
	$\frac{1}{4}$	0.6	0.05	0.05	0.1



(1) Alliin

(2) Allicin

Fig. 1

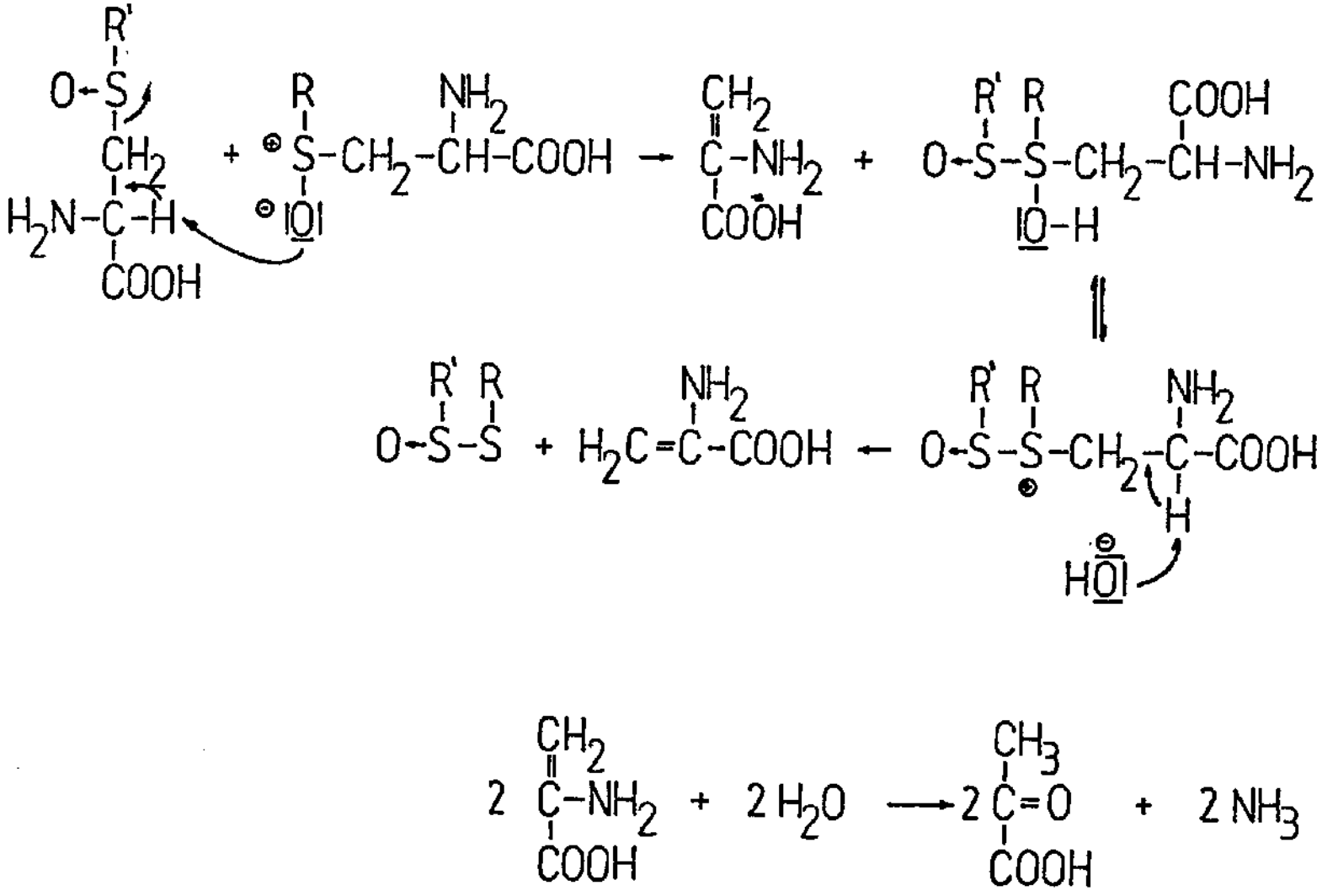


Fig. 2

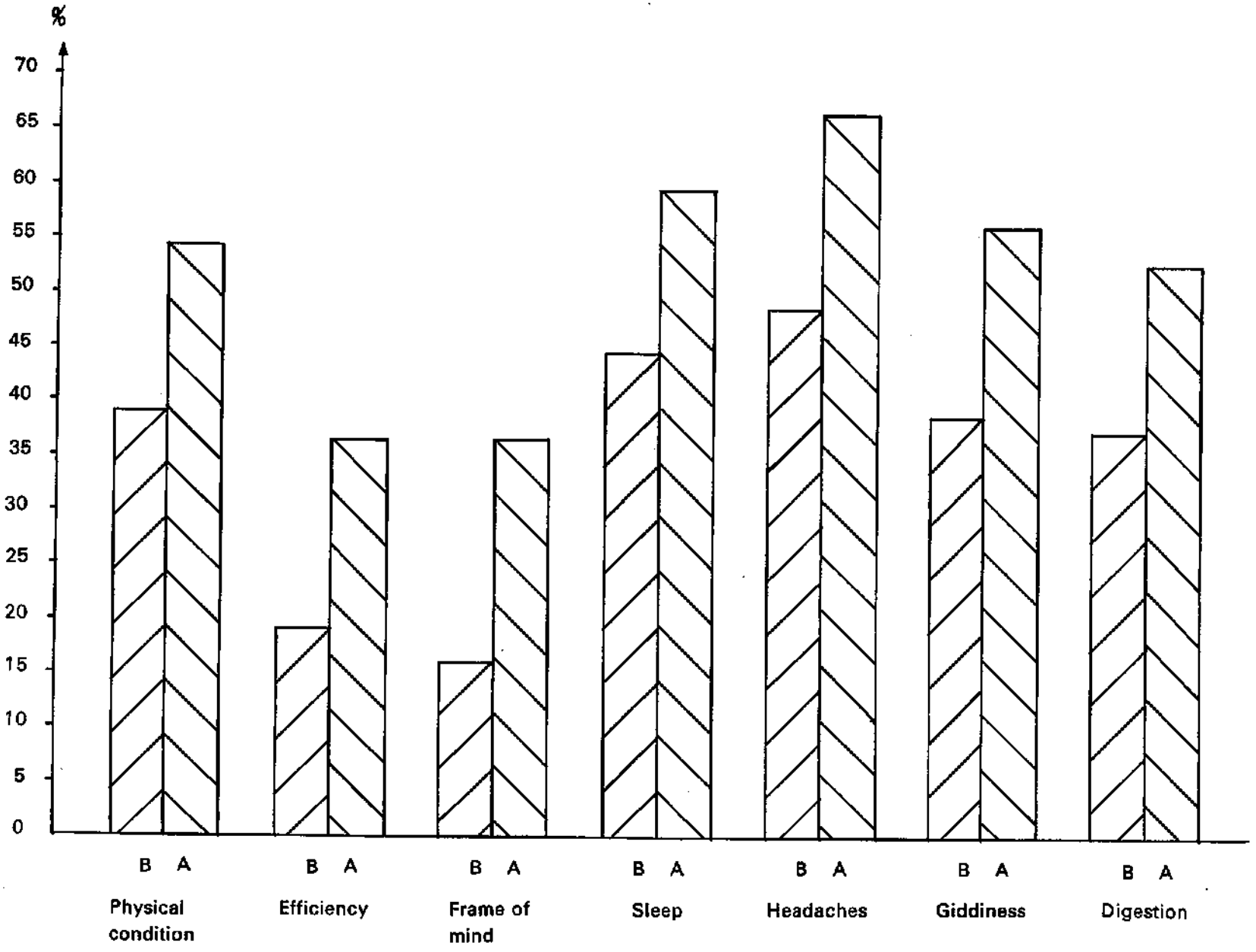


Fig. 3: The improvement of the symptoms in % A = Ilja Rogoff[R] B= Placebo

A MODEL SCIENTIFIC RESEARCH ON A DRUG OF ISLAMIC MEDICINE. HYPOCHOLESTEROLEMIC EFFECT OF ALLIUM SATIVUM LINN. AND ITS POTENTIAL PROTECTIVE ACTION AGAINST CORONARY HEART DISEASE

Dr. Yusuf Ahmed

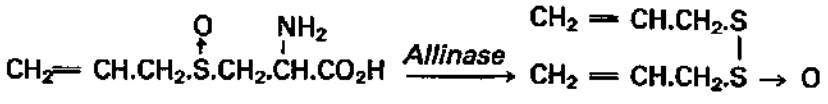
PAKISTAN

INTRODUCTION

For centuries people have revered the extraordinary medicinal properties of garlic *(Allium Sativum, Linn).* The Babylonians used it to treat disease as early as 3000 B.C. In Egypt, garlic was believed to give slaves the strength to endure hard labour and to give soldiers courage in the battle field. After intense fatigue a clove of garlic slowly chewed, and swallowed, has been reported to act as a very powerful restorative.[1]

In Islamic Medicine, too, garlic has been extensively used, and prescribed. In 1893 Dymok[1] summarised the old literature on garlic. Under its history and use, he records, among other things, "Garlic is the ثوم (thum) of the Arabians and سیر (sir)of the Persian..... A decoction of garlic in milk is given in small doses in hysteria, flatulence, sciatica, and heart disease....." These claims in the past have been made on the basis of personal experiences of old physicians. However, during the last few decades hypocholesterolemic properties of garlic have been widely reported (2-15). The magnitude of this action ranges from a modest 14% lowering of serum cholesterol in humans[12] to a lowering of 80% in cholesterol-fed hypercholesterolemic rabbits[3]). Garlic was fed in these various studies as the raw cloves, steamed or fried cloves, as garlic (oil) pearls, powder, as juice or extract or as the essential oil.

In most of the studies made so far it has been assumed that hyocholesterolemic activity in garlic resides only in the very small quantity (about 0.25%) of the (essential) oil, which is responsible for the flavour and taste of the herb. In 1944 C.J. Cavallito and J.H. Bailey[16] isolated this oil, which in its pure form is pale yellow to colourless, is of a very repulsive taste and has the true concentrated odour of garlic. They succeeded in isolating from it *'allicin'* a sulphur compound, and determined its structure as diallyl disulphide-oxide (I). An amino acid *allicin* is also present in garlic. Its structure has been determined to be S-allylcysteine sulphoxide (II). In the intact clove *'alliin'* and the enzyme *allinase* are kept apart by the cell walls. However, when the clove is cut the enzyme *allinase* reacts with alliin and converts it into *allicin,* which has the characteristic garlic odour.



I — *Alliin* (S-allylcysteine sulfoxide)

II — *Allicin* (diallyl disulfide-oxide)

The effects of maturation and of the postharvest changes in garlic on this hypocholesterolemic property have not been studied. Such effects might explain some of the inconsistencies in the results

of various studies of different garlic products. *Alliin*[17] and *allicin*[18] two pure products isolable from garlic have been shown to lower cholesterol levels of cholesterol-fed[17] and normal[18] rats. But this activity does not account for the total activity of the whole garlic paste. Besides, according to recent *Japanese* work*, *allicin* taken in large quantities can destroy the membranes of the red blood cells, and inflame the gastro-intestinal tract. These reports prompted us to look for hypocholestrolemic activity of garlic in its various extractives in non-polar, to progressively more polar solvents, and to confirm this activity through a study of their action on various enzymes, which have been well studied and well established for the synthesis of cholesterol in the body.

The previous studies have been mostly made using rabbit or rat as the model animal. The overall effects of garlic and its constituents on lipid metabolism in chicken have not been described. Work done on rats and rabbits is of value, but chicken (or quail) is a better model[19] to study atherosclerotic changes, because the lipoproteins of chicken (or quail) are more closely related to those of the humans[19].

In this study we describe the effects of feeding garlic or garlic extracts on hepatic 3-hydroxy-3-methyl glutrayl-coenzyme A (HMG-CoA) reductase, cholesterol 7α-hydroxylase, pentose-phosphate pathway enzymes and fatty acid synthetase (FAS) activities. These enzymatic activities reflecting the control of overall lipid metabolism were measured, along with serum lipid components: total cholesterol, LDL-chol (low and very low density lipoprotein bound cholesterol), HDL-chol (high density lipoprotein bound cholesterol), and triglycerides, in layer and broiler pullets after a fasting-refeeding regimen that induced lipogenic activity.

MATERIALS AND METHODS

Materials: Experimental materials and enzyme reagents were obtained from renowned supliers. Cholesterol was recrystallised fresh twice from glacialacetic acid, and dried in vacuum. Steam-distilled commercial garlic oil was of J. Manheimer, Inc., Long Island, NY. Garlic bulbs and the diet components were purchased locally. All other chemicals were of analytical grade.

Pullets, diets, experimental design: White Leghorn pullets (layers) 33-37 days of age and the crossbred broiler pullets (broilers) 21 days of age were purchased from a local hatchery. The pullets were randomly distributed into groups (8 layers; 6 broilers), which were placed in a threetier battery. Commercial grower mashes formulated for layers and broilers were fed prior to the start of the experiments. At 8 weeks of age, pullets in each group were weighed and returned to the battery. The experimental diets were based on commercial formulations. The layer diet contained 78% corn, 16% soybean meal (44% protein), 2% alfalfa meal (17% protein) and 1.5% meat and bone meal. The broiler diet consisted of 70% corn, 23.5% soybean meal (44% protein), 2% alfalfa meal (17% protein) and 2% meat and bone meal. Mineral and vitamin supplements are given as footnotes to Table 1&2 (all tables are given at the end of the paper). The experimental diets were modified with the substitution of 3.8% garlic paste or a solvent fraction or garlic oil equivalent to 3.8% garlic paste for an equal quantity of corn. The groups of pullets, which had been established 2 or 4 weeks prior to the experiment, were randomly assigned the experimental diets. The layers were fed the diets *ad libitum* for 24 days. The control group of broilers was fed *ad libitum* for 24 days; the experimental broiler groups were fed isogravically with the control. Feed consumption of the broilers was recorded. Water was given *ad libitum*. At the end of the 24-day feeding trial, the pullets were fasted for 24 hours and then refed for 72 hours. Blood samples were taken from wing veins of the broilers at the end of the

* *Personal Communication (Prof. Kitabara, S. Kunamoto University)*

fasting period. After refeeding, the pullets were weighed, killed by severing the carotid arteries and blood samples were collected. The livers were removed, washed, chilled on ice, weighed and then prepared for analyses.

Preparation of the garlic paste and solvent fractionations: Garlic bulbs (1 kg) with the outer and inner husks removed yielded 760g cloves. The cleaned cloves were homogenized to a paste with a commercial Waring blender. One-half of the garlic paste was mixed with sufficient corn to provide 7800g of mixture for the formulation of the "garlic paste" experimental diet for the layers or 7000g for the broilers. The remainder of the paste was stirred with light petroleum ether (500 ml) for 2 hours. After standing for 1 hour, the solvent was decanted. The procedure was repeated twice. The last extraction was completed by filtering the solvent through a sintered glass funnel under vacuum. The three extracts were combined and then concentrated to dryness under vacuum at 60°. The semisolid garlic residue was lyophilized, and the resulting powder was extracted successively as described above with methyl alcohol and water. The final residue was dried overnight in an oven at 60°. The fractionation yeilded 1.4g (1.1%) petroleum ether-soluble fraction (PESF), 34.2g (26.4%) methyl alcohol-soluble fraction (MESF,), 79.3g (62.4%) water-soluble fraction (WASF) and 12.1g (9.5%) of residue. The values in parentheses correspond to the percent dry weight in each fraction. Each fraction was taken up in a minimal volume of the appropriate solvent and added to sufficient corn to give 7800g or 7000g. The experimental diets thus contained the specific solubles in quantities equivalent to those in a 5% garlic bulb (3.8% garlic paste) diet. The solvent was removed from each diet by air-drying the mixture spread thinly in a pan overnight in a fume hood.

Preparation of liver homogenates and assays of enzymes: The liver homogenates were prepared in 0.1M Potassium phosphate buffer, pH 7.4, containing 4 mM $MgCl_2$, 1 mM EDTA, and 2 mM dithiothreitol. The tissue was chopped and suspended in the buffer (1:2, wt:vol), and homogenization was done at 0-4° with a Polytron homogenizer. The 100,000 x g supernates (cytosols) and precipitates (microsomes) were stored at-20° prior to assay for enzymatic activities.

Assays for HMG-CoA reductase and cholesterol 7α-hydroxylase have been described[20,21]. The activities of glucose-6-phosphate dehydrogenase, 6-phospho-gluconate dehydrogenase, malic enzyme, citrate-cleavage enzyme and fatty acid synthetase in the cytosol were assayed spectrophotometrically at 25°[20,21]. Protein concentrations were estimated by a modification of the biuret method with bovine serum albumin as a standard[22].

Estimation of serum cholesterol and triglyceride concentrations: Cholesterol and triglyceride concentrations in serum samples were estimated by using Worthington "Cholesterol Reagent" and "Triglyceride Reagent", kits.

Low density (LDL) and very low density lipoproteins (VLDL) were isolated from the serum (100μl) by precipitation with a mixture of phosphotungstic acid, 9.7 mM (10μl) + $MgCl_2$ 0.4 M (10μl). After tanding for 5 minutes at room temperature, the mixtures were centrifuged at 2000 xg for 10 minutes, the supernatent was removed and used to determine the level of cholesterol in high density lipoprotein (HDL). The precipitate was dissolved in 0.1M sodium citrate (100μl), and the level of cholesterol (LDL + VLDL) was estimated by using the above method. This measure was used to verify the accuracy of the estimates of LDL-chol which were calculated from (totalchol) — (HDL-chol + triglycerides/5) according to previous reports[23,24].

Expression of data and statistical methods: Enzyme data are presented as specific activities units/(miligram cytosolic or microsomal protein. minute). Statistical comparison of results was performed by a one-way analysis of variance. When the F test indicated a significant effect, the differences

between the means were analyzed by a protected least squares difference test[25].

RESULTS

The average weight gain of the groups of layers fed the experimental diets (384.0 ± 13.3g) was equal to that of the control diet group (381 g) Table 1). Although feed consumption was not monitored in this experiment, the above data suggest that the incorporation of the garlic products into the diets did not decrease feed consumption. Significant treatment effects were shown for all aspects of cholesterol and lipid metabolism save that of the HDL-chol concentrations (Tables 3,4). HMG-CoA reductase activity in all experimental groups except the group fed the garlic residue exhibited less than 30% of the control activity ($P < 0.01$). The solvent extracts — PESF, MESF and WASF — were the more potent sources of the HMG-CoA reductase inhibitor ($P < 0.01$) compared to garlic paste and garlic oil (Table 3). A similar but less pronounced pattern of inhibition was found for cholesterol 7 α-hydroxylase (MESF, 49%), fatty acid synthetase (PESF, 71%), malic enzyme (MESF, 73%), glucose 6-phosphate dehydrogenase (MESF, 61%) and 6-phosphogluconate dehydrogenase (WASF, 68%). In the parentheses are shown the most effective treatment and enzyme activity as percentage of control (Table 3).

The above pattern of enzyme inhibition by the various garlic factors was expressed in the serum levels of cholesterol and triglycerides (Table 4). All garlic products except the residue lowered the serum cholesterol level, specifically the LDL-chol fraction. The MESF was most potent, lowering cholesterol and LDL-chol by 25 and 41%, respectively. HDL-chol was not affected by the treatments. These lowerings of the total cholesterol and LDL-chol are reflected in the ratios of total cholesterol: HDL-chol and LDL-chol: HDL-chol shown in Table 4.

A similar experiment was carried out by using pullets of a commercial broiler strain bred for high rates of gain and feed efficiency. The basal diet fed the broilers contained 23.5% soybean meal (44%) and 70% corn (Table 2). Garlic (3.8%) or the 3.8% equivalent garlic extract was added to the diet at the expense of corn. Feed consumption (18.84 ± 0.17 kg) did not vary between groups; the control group gained an average of 755g, a 53% increase in body weight. The group fed the WASF gained 828g, a 52% increase inbody weight. Gains by the groups fed PESF and MESF were equal to that of the control group, whereas groups fed the garlic residue and garlic oil gained 667 and 683g, respectively, increases of 43% in body weight. The major deviation in body weight gain was recorded for the group fed garlic paste. The average weight gain of this group was 632g, only a 40% increase in body weight. Feed consumption by this group was 18.60 kg; whether or not the 3.8% dilution in the energy density of this diet influenced this weight performance could not be determined.

The results shown in Table 5 confirm that factors extracted from garlic suppress hepatic HMG-CoA reductase. Feeding the MESF and WASF of garlic reduced this activity by 66-68%. HMG-CoA reductase was lowered by 50% or more by each of the remaining garlic treatments except that of the extracted residue. These suppressions of HMG-CoA reductase are reflected in cholesterol levels of serum taken from fasted and from refed pullets and in the LDL-chol levels of refed birds (Table 5). The MESF, the most potent source of this suppressor, lowered total cholesterol by 25% and LDL-chol by 43%. HDL-chol was not affected by the cholesterol-suppressive agents of garlic. Compared to the control, fatty acid synthetase activity was significantly lower in each of the experimental groups except that fed the extracted residue. The MESF and WASF of garlic were the more potent suppressors of this activity (Table 6). This impact of garlic on fatty acid biosynthesis was also manifested in the inhibition of two pentose-phosphate path enzymes, malic enzyme and citrate cleavage enzyme (Table 6). Glucose-6-phosphate dehydrogenase and 6-phospho-gluconate dehyd-

rogenase activities were low compared to fatty acid synthetase and malic enzyme activities. The low pentosephosphate pathway activities in the avian liver (Tables 2,4) have also been reported by others[26,27].

In general, the impact of garlic and of soluble fractions of garlic on lipid metabolism in layers was confirmed by using a broiler strain of chicks. All garlic treatments except that involving the extracted residue were associated generally with reduced lipogenic cholesterolopoietic activities and with lower serum total cholesterol and LDL-chol levels.

DISCUSSION

Serum cholesterol levels fall when chickens as well as other species[2,15,17,18] are fed garlic-supplemented diets. Neither the mechanism of the hypocholesterolemic action nor its agent has been clearly defined. When fed in conjunction with cholesterol, garlic decreased the incorporation of acetate into cholestero[10,11] and increased fecal bile acid and neutral sterol excretion[14]. Both actions are consistent with the lowering of serum cholesterol. Anomalously, the activity of HMG-CoA reductase was increased and that of cholesterol 7 α-hydroxylase decreased[10]; both responses would be consistent, in cholesterol-fed animals, with the elevation of serum cholesterol.

In chickens fed diets essentially free of cholesterol, the suppressive action of garlic is clearly at the level of cholesterol biosynthesis. The suppression of HMC-CoA reductase is manifested in the decreased serum concentrations of LDL-chol and total cholesterol. The garlic-mediated change in the LDL-chol: HDL-chol ratio of the pullets (-30%) is very similar to the change reported in the cholesterol-fed rat[14].

Addition of steam-distilled garlic oil, a product widely reported to be a cholesterol-suppressive agent[2,4,6,10], at a level (0.014%) equivalent to the addition of 3.8% garlic paste elicited similar responses.

The suppressor, readily extracted from garlic paste with the sequential aplication of solvents of increasing polarity, was not sharply defined in terms of polarity. The broad distribution suggests either the presence in garlic of polar and nonpolar mediators of cholesterol biosynthesis or alternatively the presence of an active substance conjugated in various forms to the extent that it is distributed among the solvents employed. An inhibitor of fatty acid oxygenases, present in onion and garlic and in steam-distilled garlic oil, exhibits a similar lack of definition in terms of polarity[28]. *Alliin*[17] and *allicin*[18], the highly polar, odorous compounds in garlic, reported to lower plasma cholesterol, are readily extracted in the methanol step of the fractionation sequence. These compounds conjugated in less polar form could be the active agents in the PESF. However, the demonstration that the odourless WASF is as effective as the MESF in supressing HMG-CoA reductase implies that compounds other than those previously identified[17,18] are involved in the garlic-mediated suppression of cholesterol biosynthesis.

Key lipogenic enzymes were suppressed to varying degrees by the garlic additives. Differences in the potenecy of the lipogenic suppressor in each of the solvent fractions were recorded. This discrimination was not expressed towards HMG-CoA reductase, perhaps due to the presence of sufficient suppressor in each solvent extract to dampen this enzyme to some residual level of activity, a level 35% of control in broilers and 25% of control in layers. In layers, HMG-CoA reductase, cholesterol 7 α-hydroxylase, total serum cholesterol and serum LDL-chol values were each clustered about two points, a high point for control and garlic residues treatments and a low point for the five garlic treatments.

The above study establishes the cholesterol lowering properties, on modern scientific lines, of an Islamic herbal medicine for which in the past claims had been made to be effective in heart disease purely on the basis of experience and tradition only.

Cholesterol is a normal constituent of the body. Its daily turn over in an average human body is about 200 mg, a good part of which is produced endogenously (mainly by the liver). Thus in a life span of 70 years, the body produces about 50 kg of cholesterol. Its major concentration in the body is in the brain, spinal chord, liver, and blood. It forms an integral of cell membranes. It is the precursor of bile acids, adrenal and sex hormones. It is therefore difficult to imagine that this endogenous cholesterol should heavily contribute to the destruction of our cardiovascular system. It has been reported[29] that in a variety of pathological conditions, in combination with calcium, fibrin, collagen etc., it forms a large part of the lesion (scars, tubercles, gumata old fibroids, thrombi, cholesteatomata), and performs a repair function. Thus it is possible cholesterol starts accumulating as a consequence of the lesion and not as its cause. This idea finds strength from recent findings[30] that cholesterol even if briefly exposed to atmosphere pricks oxygen, resulting in oxygenated products, the presence of which in micro quantities can only be demonstrated by extremely sensitive techniques developed very recently. Further it has been shown[30] that of these 25-hydroxycholesterol when consumed even in pico-gram quantities causes lesions in aorta of rabbit.

We have recently started a project to look:

i- How garlic (or its fractions) can regulate the delicate balance between LDL and HDL (the serum lipoproteins) in the body. As LDL is responsible to provide cholesterol through its circulation wherever needed in the body, whereas HDL directs it to liver where it is converted into bile acids and is excreted.

ii- Whether garlic (and its fractions) can prevent formation of lesions, or reverse the process where lesions have already been formed on account of the intake of oxygenated products of cholesterol (or oxygenated lipids in the process of prolonged frying of foods).

This study, we hope, will place in our hands an effective natural dietary product to counter arteriosclerosis in humans. The serum cholesterol-lowering synthetic drugs (triparanol, estrogens, chlofibrat etc.) at present in use in modern medicine, have serious side-effects, and their prolonged use turns out to be harmful[29].

The Reasons for Decline in Research on Traditional Medicinal Plant Drugs: Until the beginning of the current century most of drugs in use were of vegetable, mineral, or animal origin. Most of them had to be procured from the tropical areas of the world. With the advent of Organic Chemistry in Europe a good deal became know about the chemical structure of the pure compounds which could be relatively easily isolated and luckily also turned out to be the active principles (active in much smaller dosage) responsible for the major total effect of the bulky herbal drug. This gave fillip to the synthesis of drugs — using structures of the active principles as templates — from simple and locally available raw materials from the coal and petroleum distillation industries. This also obviated the dependance on tropics for costly herbal drug materials, and long wait involved in their import.

The symthesis made possible the production of drugs on a much larger scale in a factory, and at a much cheaper cost, Simple screening and quality control procedures were soon evolved, and even some very simple structure molecules proved to be equally effective. The number of drugs started multiplying and it gave rise to a very profitable, and profit-oriented pharmaceutical industry. This way very powerful, and fast-acting tools became available to the medical profession. But in this process both medical profession and pharmaceutical industry relegated from a noble human service to a

purely materialistic business.

However, within a few decades of the use synthetic drugs, many started showing very serious side-effects — a few were even irreversible resulting in fatalities. This necessitated strict government controls in Europe, and more so in America. Today to put a new research drug on the market by a pharmaceutical company in the U.S.A., it has been estimated, it requires an expenditure of nearly 60 million dollars, and a time lag of 3-7 years to get the final FDA approval. After this huge expenditure (research + FDA + manufacturing/ packaging/ marketting/ promotional and patent coverage costs) the firm is in hurry to recover costs and to make profits, as inspite of all the precautions, the drug is likely to manifest side-effects, or face a competition from a better or faster acting drug within a decade or even earlier. The pharmaceutical firms in the industrialized countries are therefore reluctant to take up research on herbal drugs, as they may be safe but are usually slower acting and require huge expenditure enumerated above, and are likely to take longer to get FDA approval.

There is far too great a stress on animal trials even in the case of innocous dietary herbals for their investigation to regulate some body processes, first for the fear that humans may not be used as guinea-pigs, although humanbeings have been using these herbals in their diet for the last many centuries, without suffering any ill effects. On the other hand when very potent synthetic drugs are withdrawn on showing side-effects, have the humanbeings been not used as guinea-pigs in the intervening periods?

A few of the drugs, which have been withdrawn, or put on very restricted careful use in developed countries, are still being marketted by multinationals in developing countries, just to reap fat profits.

In this whole process, the worst sufferers are the developing countries, which are dependent on industrialized countries for drugs, or drug raw material suplies at a cost which they cannot afford, and at the same time they have ceased to investigate their own herbal drugs, which at least could be developed within the countries, and after establishment of their activity on modern scientific lines, could possibly be used in the vast rural areas where they could be grown.

What has been Wrong in Research on Herbal Drugs in the Developing Countries: In doing research on medicinal plants in developing countries, we have been copying the example of Europe and America. Instead of establishing the clinical activity/efficacy for which the drug had the reputation of curing a disease, we in most cases have been resorting to extraction procedures, whereby we succeed in isolating some crystalline product(s), and call it "Active Principle"; determine its structure with the powerful tools now available, and are content with publications on novel and complicated structures only. In a still fewer cases these crystalline (or pure) products are subjected to general pharmaccological screening and finding no or very poor activity, are declared the herbal drug of no use. It is quite possible that in the extraction process we may have missed the actual "Active Principle".

Probably for the same reasons, a few of huge programmes, at a cost of billions of dollars at N.I.H. (U.S.A.) and similar institutes in Europe or elsewhere on medicinal plants to discover curative agents against some of the killer diseases (like cancer and heart disease etc.) have met with very little success, and have been drooped.

What Can or Should Now be Done?: These days traditional doctors lack the modern knowledge, and assistance of available sophisticated techniques for diagnosis of disease, and facilities for research on drugs. They rely on their imperical visual observations, and on descriptions of the use of herbal drugs for the treatment of disease developed a few centuries back. These descriptions, no doubt, are the sum total of personal experiences spread over many centuries. Some of the

descriptions may have been disorted through translations. However, if properly investigated, they may be proved to be treasure houses worth rediscovery.

In a W.H.O. report it has been observed[31] that chances of clinical verification of claims of herbal drugs are almost 50:50 if investigations are made in collaboration with traditional healers. In Asia and Africa where traditional medicine is still practiced and people go to these healers of their own free will. Suitable observation teams comprising traditional healer, clinicians, and scientists should work together to provide modern aids in diagnosis of disease, and the course of disease and cure should be monitored together. The observations should be made with a sympathetic rather than the common preconceived antagonistic attitude[32]. Then the observations showing definite promise should be repeated by other teams and on larger number of patients, taking care that botanically the herbs used are properly and correctly identified and recorded[32]. For the curative herbs so discovered quality control procedures should be developed and these standardized products could be used in health-care programmes, at least in the developing countries. For further study extractions may be made carefully monitoring where the **activity** is going. Most active fractions then should be investigated in detail for isolation of the active principles, and determination of their structures.

The start should be made with herbal drugs which are dietary, and hence through their long use have proved to be nontoxic, and hence there should be no hesitation in their trials directly on humans, as is being proposed to be done in establishing the hypocholestrolemic properties of garlic in the treatment of arteriosclerosis in an extension of the above reported study.

With the growing cost of health-care — almost becoming unbearable for the common man — and manifestation of serious side-effects on prolonged use of some of the synthetics, there is already a growing tendency even in America, Europe, and other developed countries to go back to the natural drugs, which is particularly manifest from a very rapid growth in healthfood stores there. Many of the herbs are being sold and used as health-foods to avoid long, rigorous, cumbersome, and costly FDA approvals, which certainly are unnecessary, at least, in the case of dietary herbs.

Logically, to correct the (natural) disorders of the human body, one should look to the natural diets (including, herbs) with which man has interacted for centuries, and has accummulated the imperical knowledge. The Scientists (including medical scientists) should get together at the sites where such herbals grow and are used, first to confirm on modern scientific lines, the imperical knowledge which exists there, then record it and standardize for common use. It may then be extended for extractions, isolations, structure determination, and study of the mechanisms of the observed actions. Through such an approach, I am sure, we shall soon discover many effective and safe medicinal agents even for the so far unconquerred killer diseases. Besides affordable health-care. Programmes, particularly for the poorer nations can be developed. In the past we have done the process in the reverse order, and therefore have achieved little success.

TABLE 1

Composition of the layer diets and layer weight gain

Groups	Diet[1,2]		Body wt		Gain in wt
	Corn	Garlic fractions	Initial[3]	Einal[4]	
	%	%	g		%
Corn (control)	78.000	—	459 ± 64[5]	840 ± 95[5]	83
Corn + garlic paste	74.200	3.8	508 ± 84	900 ± 101	77
Corn + garlic PESF	77.980	0.014	487 ± 69	880 ± 97	81
Corn + garlic MESF	77.658	0.341	486 ± 72	853 ± 85	76
Corn + garlic WASF	77.207	0.793	482 ± 59	868 ± 98	80
Corn + garlic residue	77.879	0.121	494 ± 32	892 ± 102	81
Corn + garlic oil (commercial)	77.986	0.014	456 ± 60	824 ± 86	81

TABLE 2

Percent composition of broiler diets, initial and final body weights and feed consumption

Groups	Diet[1,2]		Body weight			
	Corn	Garlic fractions	Initial[3]	Final[4]	Gain in wt	consumption
		%		g	%	kg
Corn (control)	70.000	—	1414 ± 128	2169 ± 145[5]	53	18.85
Corn + garlic paste	67.200	3.800	1587 ± 135	2219 ± 115	39[a]	18.60
Corn + garlic PESF	69.986	0.014	1552 ± 74	2296 ± 82	48	18.94
Corn + garlic MESF	69.658	0.342	1640 ± 48	2418 ± 92	47	18.96
Corn + garlic WASF	69.207	0.793	1583 ± 51	2411 ± 99	52	18.95
Corn + garlic residue	69.879	0.121	1516 ± 108	2183 ± 121	44[a]	18.64
Corn + garlic oil (commercial)	69.986	0.014	1598 ± 150	2281 ± 182	43[a]	18.93

[1]PESF, MESF and WASF stand for petroleum ether-, methanol- and water-soluble fractions of garlic, respectively. Five grams of garlic bulb yielded 3.89 garlic paste. Fractionation of 3.8g garlic paste yielded 14 mg PESF, 342 mg MESF, 793 mg WASF and 121 g residue. Commercial garlic oil was added at the level of the PESF. [2]Each diet also contains soybean meal (44% protein), 23.5%; alfalfa meal (17% protein), 2.0%; meat and bone meal, 2.0% dicalcium phosphate, 1.0% calcium carbonate, 0.5%; iodized salt, 0.5%; vitamin and mineral mixture, 0.5%. Vitamin and mineral mixture provides

per kilogram diet: vitamin A, 3000 IU; cholecalciferol, 500 IU; riboflavin, 2.5 mg; calcium pantothenate, 3.0 mg; vitamin B-12 0.005 mg; zinc sulfate ($ZnSO_4$), 70 mg; and manganese dioxide (MnO_2), 25.0 mg. Grit (5.0%) was also incorporated at the expense of each diet. [3]Eight weeks of age. [4] Twelve weeks of age. [5]Mean ± SD; n = 8 chickens per layers and 6 broiler group. [*]Significantly different from control at $P < 0.01$.

TABLE 3.

Effects of garlic fractions on hepatic anzyme activities in 12-week-old layers[1,2]

Diet	HMG-CoA reductase[3]	Cholesterol 7α-hydroxylase[4]
Corn (Control)	909 ± 70[a] (100)[7]	1.14 ± 0.08[a] (100)
Corn + garlic paste	253 ± 40[b] (28)	0.72 ± 0.04[b] (63)
Corn + garlic PESF	193 ± 30[c] (21)	0.61 ± 0.03[c] (54)
Corn + garlic MESF	159 ± 30[c] (17)	0.56 ± 0.04[c] (49)
Corn + garlic WASF	192 ± 28[c] (21)	0.65 ± 0.05[bc] (57)
Corn + garlic residue	781 ± 62[a] (86)	0.93 ± 0.06[d] (82)
Corn + garlic oil (commercial)	230 ± 30[b] (26)	0.67 ± 0.05[c] (59)

Fatty acid synthetase[5]	Malic enzyme[6]	Glucose-6-phosphate dehydrogenase[6]	6-Phosphogluconate dehydrogenase[6]
175 ± 14.0[a] (100)	450.8 ± 42.0[a] (100)	11.8 ± 1.8[a] (100)	45.0 ± 7.0[a] (100)
158 ± 12.0[ac] (90)	396.6 ± 30.0[ab] (88)	8.7 ± 0.8[b] (74)	31.5 ± 3.0[b] (70)
124 ± 11.0[b] (71)	407.6 ± 46.0[a] (90)	9.1 ± 1.9[a] (77)	32.4 ± 2.0[b] (72)
141 ± 11.0[c] (81)	331.2 ± 37.0[b] (73)	7.2 ± 0.7[b] (61)	33.3 ± 4.0[b] (74)
145 ± 8.0[c] (83)	368.4 ± 32.0[b] (82)	7.9 ± 1.8[b] (67)	30.5 ± 6.0[bc] (68)
172 ± 13.0[a] (98)	450.2 ± 45.0[a] (100)	10.8 ± 2.3[ab] (92)	38.6 ± 2.0[ac] (86)
160 ± 4.0[a] (91)	412.4 ± 40.0[ab] (92)	7.7 ± 1.2[b] (65)	36.0 ± 4.0[abc] (80)

[1]Experimental period was 4 weeks; time of killing was 0800. Data expressed as means ± SD; n = 8, HMG-CoA reductase, 3-hydroxy-3-methylglutaryl-CoA reductase. PESF, MESF and WASF stand for petroleum ether-, methanol- and water-soluble fractions of garlic, respectively. [2]Values not sharing a common superscript letter are different t $P < 0.01$. [3]Picomoles of mevalonic acid synthesized per minute per milligram of microsomal fraction. [4]Picomoles of [^{14}C] cholesterol into 7α-[^{14}C] hydroxycholesterol per minute per milligram of microsomal fraction. [5]Nanomoles of NADPH oxidized per minute per milligram of cytosolic fraction. [6]Nanomoles of $NADP^+$ reduced per minute per milligram of cytosolic fraction. [7]Percentages of respective control activity data are in parentheses.

TABLE 4

Effects of garlic fractions on serum lipids in 12-week-old layers[1,2]

Concentration in Serum		
Diet	Cholesterol	Triglycerides
Corn (control)	168.0 ± 2.0[a] (100)[3]	125.1 ± 12.0[a] (100)
Corn + garlic paste	132.8 ± 10.0[b] (79)	98.1 ± 10.0[b] (78)
Corn + garlic PESF	128.6 ± 8.0[b] (76)	113.1 ± 10.0[a] (90)
Corn + garlic MESF	126.5 ± 4.0[b] (75)	92.6 ± 11.0[a] (71)
Corn + garlic WASF	134.7 ± 11.0[b] (80)	96.3 ± 10.0[b] (77)
Corn + garlic residue	152.2 ± 14.0[a] (91)	121.7 ± 10.0[a] (97)
Corn + garlic oil (commercial)	128.9 ± 7.0[b] (77)	115.1 ± 7.0[a] (92)

Concentration in serum			
HDL-chol	LDL-chol	Total cholesterol HDL-chol	LDL-Chol HDL-chol
mg/100 ml			
57.0 ± 4.0[a] (100)	86.0 ± 7.0[a] (100)	2.95 (100)	1.50 (100)
55.5 ± 8.0[a] (97)	57.7 ± 5.0[b] (67)	2.39 (81)	1.03 (69)
56.2 ± 8.0[a] (99)	59.4 ± 4.0[b] (69)	2.29 (78)	1.05 (70)
57.0 ± 5.0[a] (100)	51.0 ± 4.0[b] (59)	2.22 (75)	0.89 (59)
54.7 ± 6.0[a] (96)	60.7 ± 5.0[b] (71)	2.46 (83)	1.10 (73)
53.5 ± 4.0[a] (94)	74.4 ± 7.0[a] (87)	2.84 (96)	1.39 (93)
54.5 ± 3.0[a] (96)	61.2 ± 6.0[b] (71)	2.36 (80)	1.12 (75)

[1]Experimental period was 4 weeks; time of killing was 0800 hours. Data are means ± SD; n = 8. PESF, MESF and WASF stand for petroleum ether-, methanol- and water-soluble fractions of garlic, respectively. [2]Values not sharing a common superscript letter are different at $P < 0.01$. [3]Percentages of respective control activity data are in parentheses.

TABLE 5

Effects of garlic fractions on hepatic HMG-CoA reductase activity and serum cholesterol in 12-week-old broilers[1,2]

Diet	Sereum Cholesterol				
	HMG-CoA reductase[3]	Total (fasted)	Total (refed)	HDL-chol	LDL-chol
			mg/100 ml		
Corn (control)	890 ± 44[a] (100)[4]	158.3 ± 5[a] (100)	163.1 ± 6[a] (100)	59.3 ± 4[a] (100)	74.6 ± 6[a] (100)
Corn + garlic paste	448 ± 29[b] (50)	147.2 ± 4[b] (93)	149.3 ± 4[b] (92)	56.2 ± 3[a] (95)	50.9 ± 7[b] (68)
Corn + garlic PESF	380 ± 27[c] (43)	139.7 ± 3[b] (88)	142.6 ± 3[b] (87)	56.7 ± 2[a] (96)	46.8 ± 6[b] (63)
Corn + garlic MESF	280 ± 27[d] (32)	122.8 ± 7[c] (78)	122.2 ± 4[c] (75)	58.6 ± 3[a] (99)	42.2 ± 4[b] (57)
Corn + garlic WASF	300 ± 25[d] (34)	129.6 ± 2[c] (82)	132.5 ± 8[c] (81)	57.3 ± 2[a] (97)	44.7 ± 5[b] (60)
Corn + garlic residue	720 ± 40[a] (81)	152.6 ± 4[a] (96)	153.7 ± 6[a] (94)	58.1 ± 5[a] (98)	66.8 ± 6[a] (90)
Corn + garlic oil (commercial)	410 ± 25[b] (46)	137.4 ± 6[b] (87)	133.8 ± 3[c] (82)	55.8 ± 4[a] (94)	57.9 ± 5[b] (78)

[1]Experimental period was 4 weeks; time of killing was 0800 hours. Data are means ± SD; n = 6. HMG-CoA reductase, 3-hydroxy-3-methylglutaryl-CoA reductase; PESF, MESF and WASF stand for petroleum ether-, methanol- and water- soluble fractions of garlic, respectively. [2]Values not sharing a common superscript letter are different at $P < 0.01$. [3]Picomoles of mevalonic acid synthesized per minute per milligram of microsomal fractions. [4] Percentages of respective control activity data are in parentheses.

TABLE 6

Effects of garlic fractions on hepatic lipogenic enzymes in 12-week-old broilers[1,2]

Diet	Fatty acid synthetase[3]	Glucose-6-phosphate dehydrogenase[4]
Corn (control)	246 ± 19.0^{a} (100)[6]	15.8 ± 0.5^{a} (100)
Corn + garlic paste	182 ± 11.5^{b} (74)	10.7 ± 0.6^{b} (68)
Corn + garlic PESF	171 ± 8.0^{b} (70)	9.2 ± 0.4^{b} (58)
Corn + garlic MESF	118 ± 7.5^{c}(48)	6.7 ± 0.2^{c} (42)
Corn + garlic WASF	122 ± 9.0^{c} (50)	7.0 ± 0.3^{c} (44)
Corn + garlic residue	226 ± 18.2^{a} (92)	13.7 ± 0.6^{d} (87)
Corn + garlic oil (commercial)	167 ± 7.0^{b} (68)	8.8 ± 0.2^{b} (56)

6-Phosphogluconate dehydrogenase[4]	Malic enzyme[4]	Citrate-cleavage enzyme[5]
48 ± 0.4^{a} (100)	307.9 ± 26^{a} (100)	8.6 ± 0.2^{a} (100)
35⅝ ± 0.3^{b} (68)	268.7 ± 22^{a} (87)	6.7 ± 0.3^{b} (78)
31 ± 0.7^{c} (65)	262.3 ± 24^{ab} (85)	6.2 ± 0.4^{b} (72)
24 ± 0.6^{d} (50)	224.6 ± 17^{b} (73)	5.0 ± 0.2^{c} (58)
28 ± 1.0^{e} (58)	263.5 ± 16^{ab} (86)	5.2 ± 0.1^{c} (60)
40 ± 1.4^{f} (83)	267.4 ± 22^{a} (87)	6.9 ± 0.2^{b} (80)
30 ± 0.6^{c} (63)	240.0 ± 24^{ab} (63)	5.9 ± 0.2^{b} (69)

[1]Experimental period was 4 weeks; time of killing was 0800 hours. Data are means ± SD; n = 6. PESF, MESF and WASF stand for petroleum ether-, methanol- and water-soluble fractions of garlic, respectively. [2]Values not sharing a common superscript letter are different at $P < 0.01$. [3]Nanomoles of NADPH oxidized per minute per milligram od cytosolic fraction. [4]Nanomoles of $NADPH^{+}$ reduced per minute per milligram of cytosolic fraction. [5]Nanomoles of product formed per minute per milligram of cytosolic fraction. [6]Percentages of respective control activity data are in parentheses.

A DOUBLE BLIND TRIAL OF MASTIC (SALADIN) AND PLACEBO IN TREATMENT OF DUODENAL ULCER

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INTRODUCTION

Mastic is used for hundreds of years by Traditional Healers *(Attareen)* for relief of upper abdominal pain and acidity in many parts of Mediterenian region. The group of workers had a 65 years old female patient who was suffering from both benign gastric and duodenal ulcers which did not respont to currently used anti-ulcer drugs, but she responded dramatically to oral Mastic which was prescribed for her by a local Traditional Healer in both relief of symptoms and healing of her ulcers.

The history of Mastic is lost in antiquity but both Pliny and Theophrastus mentioned it and the employment of Mastic in medicine dates back to the thirteenth century (Claus, E et al 1970).

Ibn Al-Jazzar (Died at 980 A.D.) the great Arab physician reported it for treatment of stomach ulcers. Also Ibn Al-Baytar (Died at 1248 A.D.) the other famous Arab physician mentioned it in treatment of intestinal ulcers (Materia Medica).

Mastic had been used since long time by oriental women as Masticatory (British Pharmceutical Codex). Mastic had been used by oriental women as Breath sweetner (Claus, E et al 1970). The oil of Mastic is used by the Arabs for food and lights (Baily, L.H. 1935). Mastic is also used as a part of food in many parts of Mediterrenean region such as in sweets and drinks (Tanker, M and Tanker, N 1976). Mastic is a common article in oriental bazaars (Claus, 1970). In our country Mastic is used in a spiritous drink called Arakk Al-Mustakki. In many parts of Turkey and Iraq particularly in Ninevah, Mastic is used as a part of many diets and sweets.

The resin of Mastic by itself or in a spiritous solution is used in Dentistry as a filling for carious teeth (Wren, R.C 1971), (British Pharmaceutical Codex 1949), (Maritindale, the extra Pharmacopoeia, 1978). The Mastic paint, (Pigmentum Mastiche Compositum) is used as a surgical varnish as protective covering for wounds and to hold radium needles in position (Martindale, the Extra-Pharmacopoeia, 1978). So far no side effects had been mentioned from use of Mastic in the last edition of Martindale the Extra-Pharmacopoeia (1983, p.315).

Because of high incidence of active duodenal ulcer found in Arbil area among patients with dyspepsia subjected to Upper G.I.T. endoscopy (Al-Habbal, M.J. & Huwez, F,U. 1982) and because of failure of some patients with duodenal ulcer to respond to the currently used anti-ulcer drugs and/or development of side effects to those drugs, the group of the workers decided to conduct a double blind control clinical trial on Mastic against placebo in treatment of duodenal ulcer, in Arbil Teaching Hospital.

PATIENTS AND METHODS

60 patients with endoscopically proved duodenal ulcers entered the clinical trial. They were divided into two almost equal and well matched groups regarding age, sex and severity of duodenal

ulcer; one group as a test group given Mastic and the second group given Lactose as placebo. Duodenoscopy (one forward viewing) was used for assessment of ulcer healing as duodenoscopy is the only satisfactory method for assessment of ulcer healing (Editorial, BMJ, 1980).

Both groups were studied as follows:

1. Nature of the procedure was explained to patients and their consents were taken.
2. Pregnant and lactating women were excluded.
3. Patients below 20 years old were excluded.
4. Patients with pyloric stenosis were excluded.
5. All patients were advised to stop smoking and to avoid fried food, and aspirin.
6. All the drugs which promote ulcer healing were stopped. Patients with history of anti-ulcer drugs less than one month duration before the trial were excluded.. Antacids (Gastrigel or Sinador tablets) were allowed to be taken on demand and daily demand were recorded.
7. Mastic (SALADIN) or placebo were given in single daily dose (1gm) before breakfast and for two weeks.
8. Both patients and Endoscopist were blind regarding the treatment.
9. At the end of the treatment, clinical evaluation and follow up duodenoscopy were done by the same Endoscopist. Ulcer healing was reported when the site of the original ulcer was completely replaced by epithelial tissue without appearance of other new ulcers (Chalabi, A.M 1979).

RESULTS AND DISCUSSIONS

60 patients with endoscopically proved duodenal ulcers entered the clinical trial; 22 patients did not attend the follow up duodenoscopy and they were excluded. 38 patients completed the clinical trial (66%) and the number of the cases with their sex and age distribution of the two groups are shown in Table I. The results of the clinical trial are as follow:

1. Out of the 20 patients on Mastic who completed the trial 16 patients had complete symptomatic relief (80%) while 14 patients had complete endoscpic healing (70%), Table 2 & 3.

2. In the control group 18 patients completed the trial and only 9 patients (50%) had complete symptomtaic relief only 4 patients (22.3%) had complete endoscopic healing, Table 2 & 3.

It was concluded that Mastic produced highly statistically significant difference over placebo in healing of duodenal ulcer (P value less than 0.01) and also in relieving symptoms of duodenal ulcer (P value less than 0.01) and those data were analysed using Z statistic method. (Hunstberger 1968).

Accordingly, it seems that Mastic is effective in relieving symptoms of duodenal ulcer and in promotion of its healing.

The drug was free from side effects because no patients developed untoward clinical effects or deviation from the normal function of vital organs as estimated by laboratory tests done in patients with benign gastric ulcer treated by Mastic in an open trial during the same period (Al-Habbal & Huwez).

This new drug is of a plant origin and Mastic is a resinous exudate from the plant Pistacia Lentiscus (Family; Anacardiaceae) which is cultivated in the Mediterrenean countries particularly in the Greecian Archipelago specially on the island of Scio (Bail 1935). Mastic is extracted from the tree Pistacia Lentiscus by making long incisions on the trunk and larger branches from which the resinous juice exudes and collected on the out side of the tree and it will harden (Claus, E et al 1970). Mastic

pieces are of variable sizes and shapes and hard in consistancy but brittle, pale yellow clear and glassy if fresh but dull and dusty if kept, possessing an aromatic odour with an agreeable taste (British Pharmaceutical Codex 1949). The acid value is not more than 70 and its melting point is ranging between 105-120 degree centigrade, and it is insoluble in water while partially soluble in alcohol and oil of turpentine but it is very soluble in chloroform (2/1) and in ether (2/1) (British Pharmaceutical codes 1949).

The chemical composition of Mastic is not similar to the currently used anti-ulcer drugs because Mastic is composed of more than 90% of resins, 2% volatile oil and a bitter principle (Claus, E et al 1970). The volatile oil is composed of d-alpha - Dipnene and gives the balsamic odour to the drug (British Pharmaceutical Codex 1949). The resins of Mastic are composed of; alpha and beta masticonic acid (38%), alpha and beta masticinic acid (4%), beta masticoresene which is insoluble in alcohol (30%) and masticolic acid (British Pharmaceutical Codex 1949).

The ideal drug for treatment of duodenal ulcer is that drug which relieves symptoms, heals ulcer and keeping them healed, but because of break through recurrences and post treament relapses with cimetidine, an other drug with lower incidence of break through recurrences and post-treatment relapses is actively sought for to replace cimetidine (Wormsley, K.G. 1980). However, in this preliminary report it is not possible to evaluate Mastic effect in prevention of post-treatment relapses because the patients were not followed after they ended the treatment and the trial for long periods of time by post-trial duodenoscopic examinations. Yet, even if relapses occur, Mastic is worthy because the duration of treatment was short (two weeks) and it was given in single daily dose. (in dose of 1 gram).

From the results of this preliminary report, other studies are needed regarding the mode of action, the active ingredients, the pharmacodynamics and pharmakinetics of the drug and other clinical randomized multi-centres double blind control trials versus placebo and/or other known anti-ulcer drugs.

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TABLE 1

(NUMBER OF PATIENTS IN BOTH GROUPS WITH THEIR SEX AND AGE DISTRIBUTION)

GROUP	TOTAL No. OF PATIENTS	MALE	FEMALE	RANGE OF AGE (YEARS)
I: MASTIC	20	18	2	27-62
II: PLACEBO	18	15	3	22-55

TABLE 2

(SYMPTOM RELIEF)

GROUP	TOTAL No. OF PATIENTS	No. OF PATIENTS WITH SYMPTOM RELIEF	PERCENTAGE
I: MASTIC	20	16	80%
II. PLACEBO	18	9	50%

(P value less than 0.01) Using Z STATISTIC METHOD

TABLE 3

(ENDOSCOPIC HEALING)

GROUP	TOTAL No. OF PATIENTS	No. OF PATIENTS WITH ENDOSCOPIC HEALING	PERCENTAGE
I: MASTIC	20	14	70%
II: PLACEBO	18	4	22%

(P value less than 0.01) USING Z STATISTIC METHOD

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HERBAL DRUGS IN TURKEY

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The great difference in the forms of medicines available today, and also the important increase in the number of synthetic drugs lead us to think at first glance that the herbal drugs have been withdrawn from treatment. Therefore, many researches have been made recently in almost every country of the world to determine the real position of herbal drugs in treatment. The studies have shown in consequence that the herbal drugs hold a significant place in treatment as they have been with us for centuries, they have lower side effects or are better known and as they are generally cheaper to obtain.

We also have tried to determine where phytotherapy is in our country [1-5] . Turkey has a very rich flora of great variety. The total number of plant species growing in Turkey today is estimated to be about 10.000[6]. This richness in variety has also influenced the use of the plants as remedies for ailments. It is known that some plants were used in treatment in Anatolia in the days of Hittites during 20th Century (B.C.). It is not a mere coincidence that "Materia Medica", one of the pioneer books on the therapeutic use of medical plants, was written by DIOSCORIDES (1st. Cent. A.C.) who had lived in Anatolia, around Adana.

After the Hittites, the Anatolian Civilizations have followed one another and their works on folkloric medicines, both written and oral, have reached us in consequence.

Books written in the days of the Ottoman Empire, which is a period reflecting the Islamic Civilization, are the most important sources giving us information about our traditional medicines. Some of these medicines have turned to be folkloric or modern medicines today.

I - FOLKLORIC HERBAL MEDICINES

Sources where herbal drugs are available: People either collect the raw materials for their traditional medicines from Nature, or they buy them from the herbalists, sellers at the markets, peddlers or rarely from the pharmacists.

Herbalists: Today in Turkey the main source supplying drugs to the public is the herbalist. The presence of the herbalists is known in Anatolia since 12th and 13th centuries (A.C.). They were the mere source supplying herbal remedies to the customers in the old centuries. The regulations drafted in 19th century gave this duty to the pharmacists and the drugs the herbalists could sell were restricted with regulations.

During the days of the Ottoman Empire, the shops of the herbalists were found mainly in the capital cities like Bursa, Edirne and Istanbul. Today they are again present in the big cities like Bursa and Istanbul though they have diminished in number.

The Herbalists of Istanbul: The herbalists were found in different places in Istanbul up to the foundation of the Egyptian Bazaar in 17th century (1662). The bazaar was restored while the New Mosque was built, and it was devolved to the mosque. Then the tradesmen and merchants selling the same sorts of products were brought together. The bazaar was aranged for the herbalists and cotton-sellers only, and according to some records in 19th century, of the 100 shops present, 49 belonged to the herbalists.

In the days the bazaar was built, the drugs came there from Arabia and India via Egypt; so the bazaar was called "Egyptian Bazaar" "Spice Market".

Today, the two main places where the herbalists are found together are the "Egyptian Bazaar" and "Çemberlitas". The shops of the herbalists may also be found in various districts separately.

The herbal drugs sold by the herbalists: In list I is given some 200 herbal products[177] sold by the herbalists in Istanbul today. About 30 ,of these drugs are foreign-sourced and this makes 17% of the whole. This shows that about 80% of the herbal drugs in sale are obtained from Anatolia.

The Anatolian Herbalists: The herbalists found in the Anatolian cities other than Istanbul and Bursa have lost a great deal of their properties; they are now merely shops selling seeds. One can find local drugs in these shops such as *Flores Helichrysi, Folia Salviae, Herba Sideritis, Radix Ferulae, Tubera Salep,* etc.

As for the small cities and districts, it is observed that the herbal drugs are sold by grocers, seed-sellers, in all sorts of shops and open markets.

District Markets (Outdoor Markets): Almost all of the herbal drugs sold in the outdoor markets set up in every district once in a week are spices such as *Folia Menthae, Herba Origani, Fr. Piperis Nigri, Fr. Capsici* etc.

Peddlers: The local fresh drugs are usually sold by peddlers both in Istanbul and in Anatolian cities. One can easily meet these peddlers in the courtyards of the mosques and markets of the districts. The herbal products they sell vary according to the regions and seasons. Among these drugs, we can mention *Flores Helichrysi, Folia Salviae, Fr. Momordicae, Fr. Ecballii,* etc.

Pharmacies: The number of herbal drugs sold in the pharmacies are extremely small and *Fl. Chamomillae, Fl. Tiliae* and *Fr. Anisi* are the main ones of them. In an inquiry we realized in the Istanbul pharmacies in April 1982, we found out that these drugs were sold either singly or in compositions[7].

II - MODERN HERBAL DRUGS PRODUCED IN TURKEY:

We made a research in 1978 to find out how much the herbal-origined drugs were used in Turkey[2], and saw that the number of herbal drugs used in medicines was about 1000[937]. This value is a very low one when it is compared with those of Belgium, England, France, Germany and Italy which were found to be 1,600, 5,000, 7,500, 12,000 and 7,500 respectively. In the same work, the number of plant species used in medicines was found to be 100[96].

This time, we have examined the plants used in modern herbal medicines in 2 groups, taking the "Drug Index 1978" as our basis[8]. These two groups are A) the plants used in medicines as their active compounds and B) plants used in medicines as they are or in the form of their galenical preparations.

A - **Plants used in medicines as active compounds:** Plants used in medicines as active compounds and their frequency of use in these medicines are shown in list II.

On the other hand, the herbal active compounds taking the first 10 places of the list giving the frequency of use of plants in medicines are as follows:

Opium alkaloids	130
Ascorbic acid	61
Ephedrine	53
Solanaceae alk	52
Xanthine alk	36

Menthol	36
Ergot alk	24
Camphor	18
Rauwolfia alk	14
Chinchona alk	9

7 of the first compounds are the alkaloid groups.

B - **Plants used in medicines as they are or in the form of their galenical preparations:** Plants used in medicines in Turkey as they are or in the form of their galenical preparations and their frequency of use in these medicines are given in list III.

There are 80 plants in this list as it is seen, and their frequency of use in these medicines is 232. Excluding the antibiotics, 70% of the herbal-origined medicines contain herbal active compounds and 30% contain herbal drugs or their galenical preparations. In the list below is given the first 10 mostly used plants present in medicines as drugs or galenical preparations.

Atropa	16
Mentha	15
Thymus (Origanum)	13
Citrus	13
Pinus	13
Uragoga ipecacuanha	9
Cinnamomum cassia	8
Jambosa caryophyllus	8
Pimpinella anisum	8
Eucalyptus	7

Apart from *Atropa* and *Uragoga,* the plants of this list are those containing volatile oils.

In a previous research of ours, we had found out that the frequency of use of plants in medicines in France, Germany and Italy in the form of their galenical preparations were 2.597, 2.213 and 1.128 respectively and it was shown that the value for Turkey was 232 which was a very low one[5].

CONCLUSION

It is observed that the contribution of plants to modern drugs in Turkey is 10 times less than that in France, Germany and Italy.

Anatolian people used to use herbal drugs for 4,000 years and they carry on using the traditional drugs as the modern herbal medicines are limited in number.

200 Anatolian plants which are used in the modern herbal drugs in other countries are not used in Turkey[5].

All these results show that **it is necessary to develop the modern herbal drugs in Turkey.**

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LIST I

THE MAIN HERBAL DRUGS SOLD IN TURKEY

Herbal Drugs	**Turkish Names**
Aetheroleum Menthae	Nane esansı
A. Myristicae	Küçük hindistancevizi yağı
A. Rosae	Gül yağı
A. Salviae	Adaçayı esansı
A. Thymi	Kekik yağı
Aloe	Sarısabır
Amylum	Nişasta
A. Maranthae	Ararot
Aqua Rosae	Gülsuyu
Benzoe	Asilbent
Bulbus Scillae	Adasoğanı
Camphora	Kâfur
Carrageen	Deniz kadayıfı
Catechu	Kadıhindi
Colophonium	Reçine, Kolofan
Cortex Cascarillae	Amber kabuğu
C. Cinchonae	Kınakına kabuğu
C. Cinnamomi	Tarçın kabuğu
C. Pini	Çam soymuğu
C. Quillajae	Panama kabuğu
C. Granati	Nar kabuğu
C. Thymiamatis	Buhur
Crocus	Safran
Flores Althaeae	Hatmi çiçeği
Fl. Caryophylli	Karanfil
Fl. Chamomillae Romanae	Alman papatyası
Fl. Chamomillae ulgaris	Papatya çiçeği
Fl. Eleagni	Iğde çiçeği

Fl. Granati	Nar çiçeği
Fl. Hibisci	Bamya çiçeği
Fl. Lavandulae	Lavanta çiçeği
Fl. Rhoeados	Gelincik çiçeği
Fl. Robiniae	Akasya çiçeği
Fl. Rosae	Gül kurusu
Fl. Sambuci	Mürver çiçeği
Fl. Tiliae	Ihlamur çiçeği
Fl. Verbasci	Sığırkuyruğu çiçeği
Fl. Violae odoratae	Menekşe çiçeği
Folia adianti	Karabaldır yaprağı
F. Aurantii amari	Turunç yaprağı
F. Caricae	Incir yaprağı
F. Cynarae	Enginar yaprağı
F. Eucalypti	Ökaliptüs yaprağı
F. Juglandis	Ceviz yaprağı
F. Lauri	Defne yaprağı
F. Lawsoniae	Kına yaprağı
F. Malvae	Ebegümeci yaprağı
F. Melissae	Melisa yaprağı
F. Menthae piperitae	Nane yaprağı
F. Mori nigrae	Karadut yaprağı
F. Myrti	Mersin yaprağı
F. Rhois coriariae	Sumak yaprağı
F. Rosmarini	Biberiye (Kuşdili) yaprağı
F. Rubi fruticosi	Böğürtlen yaprağı
F. Salviae	Adaçayı yaprağı
F. Sennae	Sinameki yaprağı
F. Stramonii	Boruçiçeği yaprağı
F. Theae	Çay yaprağı
Fructus Anisi vulgaris	Anason
Fr. Apii	Kereviz tohumu
Fr. Arbuti	Kocayemis
Fr. Arecae	Farfelek
Fr. Capsici	Kırmızı biber
Fr. Cardamomi	Kakule
Fr. Cassiae fistulae	Hiyarşembe
Fr. Conii	Baldıran
Fr. Coriandri	Kişniş
Fr. Corni	Kızılcık kurusu
Fr. Cubebae	Kübabe
Fr. Cumini	Kimyon
Fr. Foeniculi	Rezene, Raziyane
Fr. Gundeliae	Kenger tohumu
Fr. Jujubae	Hünnap meyvası
Fr. Juniperi	Ardıç tohumu

Fr. Lauri	Defne tohumu
Fr. Paluiri	Çeşmezan
Fr. Petroselini	Maydanoz tohumu
Fr. Piperis nigri	Karabiber
Fr. Pimentae	Yenibahar
Fr. Rosae Caninae	Kuşburnu
Fr. Silybi Mariani	Devedikeni tohumu
Fr. Terminaliae	Karahalile
Fr. Terminaliae citrinae	Sarıhalile
Fr. Vanillae	Vanilya
Gallae Quercinae	Mazı
Gummi Arabicum	Arap zamkı
G. Olibanum	Akgünlük
G. tragacanthae	Kitre zamkı
Gummi-Resina Ammoniacum	Çadır uşağı
Herba Absinthii	Pelinotu
H. Artemisiae	Ayvadana
H. Equiseti	Kırkkilit otu
H. Fumariae	Şahtere otu
H. Hyperici	Kantaron
H. Origani	Kekik otu
H. Parietariae	Yapışkan otu
H. Plantaginis Majoris	Sinirli yaprak otu
H. Rutae	Sedefotu
H. Sideritis	Dağ nanesi
H. Stachydis	Karabaş otu
Lignum Santoli Rubrum	Kırmızı sandal
L. Quassiae	Acı ağaç
Manna	Kurdret helvası
Macis	Besbase
Mastix	Sakız
Oleum Amygdalae Expressum	Badem yağı
O. Cacao	Kakao yağı
O. Coryli	Fındık yağı
O. Juglandis	Ceviz yağı
O. Lauri Expressum	Defne yağı
O. Momordicae	Kudret narı yağı
O. Ricini	Hint yağı
Pericarpium Aurantii Amari	Turunç kauğu
P. Citri	Limon kabuğu
P. Juglandis	Ceviz kabuğu
Pix Juniperi	Ardiç katranı
Pix Liquida	Çam katranı
Pulpa Tamarindorum	Demirhindi pulpası

Radix Alkannae	Havacıva kökü
R. Althaeae	Hatmi kökü
R. Asphodelini	Çiriş otu kökü
R. Chicorii	Hindiba kökü
R. Gentianae	Defneyezit kökü
R. Liquiritiae	Meyan kökü
R. Pyrethri	Udukahir Nezleotu kökü
R. Rubiae	Boyacı kökü
R. Saponariae	Çöğen kökü
R. Sarsaparillae	Saparna kökü
R. Scirpi	Saz kökü
R. Valerianae	Kedi otu kökü
Resina Pini	Çam sakızı
Rhizoma Calami	Eğir kökü
Rh. Curcumae	Zerdeçöp
Rh. Galangae	Havlican
Rh. Graminis	Ayrık otu kökü
Rh. Iridis	Menekşe kökü
Rh. Rhei	Ravend rizomu
Rh. Zedoariae	Zulumba
Rh. Zingiberis	Zencefil
Semen Amomi	Itrifil
S. Amygdalae Amara	Acıbadem
S. Brassica Napus	Şalgam tohumu
S. Basilici	Reyhan tohumu
S. Cannabis	Kenevir tohumu
S. Coffeae	Kahve çekirdeği
S. Cucurbitae	Kabak çekirdeği
S. Cydoniae	Ayva çekirdeği
S. Dauci	Havuç tohumu
S. Foenugraeci	Çemen tohumu
S. Gossypii	Pamuk tohumu
S. Helianthii	Ayçiçeği
S. Hippocastani	At kestanesi
S. Lini	Keten tohumu
S. Lupini	Acı bakla, Yahudi baklası
S. Mori Nigrae	Karadut tohmu
S. Myristicae	Küçük hindistan cevizi
S. Nigellae	Çöre otu, Çörek otu tohumu
S. Papaveris	Haşhaş tohumu
S. Pegani	Üzerlik tohumu
S. Pruni Persicae	Şeftali çekirdeği
S. Pruni Mahaleb	Mahlep tohumu
S. Psylli	Karnıyarık tohumu
S. Sabadillae	Bitotu tohumu
S. Sesami	Susam

S. Sinapis	Hardal tohumu
S. Staphysagriae	Mezvek, Karaot, Karaca otu, Bitotu
S. Strychni	Kargabüken
S. Urticae	Isırgan tohumu
S. Visci	Çekem tohumu
Stylus Maydis	Mısır püskülü
Styrax Liquidus	Günlük
Succus Elaterii	Yabani hıyar
S. Liquiritiae	Meyan balı
Terebinthina	Terementi, Çam sakızı
Tubera Cyclameni	Topalak
T. Salep	Salep yumrusu
Valonea	Palamut

LIST II

PLANTS USED IN MEDICINES AS ACTIVE COMPOUNDS AND THEIR FREQUENCY OF USE

Acacia senegal	4
Ascorbic acid (Vit. C)	61
Atropa (Atropine, hyocyamine and derivatives)	30
Capsicum	1
Carica papaya	1
Caryophyllus	1
Cascara sagrada	1
Cassia	2
Catharanthus	2
Centella asiatica	1
Chinchona	9
Cinnamomum camphora (Camphre)	18
Claviceps	24
Coffea	67
Cynara	1
Datura	22
Digitalis	7
Ephedra (Ephedrine)	53
Eucalyptus (Eucalyptol)	7
Fraxinus (Mannitol)	2
Leuconostoc (Dextran)	1
Mentha	36
Papaver somniferum	130
Pausinystalia	1
Peumus	1
Pilocarpus (Pilocarpine)	1
Podophyllum	1
Quercus and tannin	5
Rauwolfia	14
Scilla maritima var. alba	1
Sophora (Rutoside)	1
Strophanthus	2
Strychnos	2
Thea	12
Thymus	3
Uragoga	2
Vanilla	2
Veratrum	1

LIST III

PLANTS WHICH GIVE THE HERBAL DRUGS THAT ARE USED IN MEDICINES AS THEY ARE OR IN THE FORM OF THEIR GALENICAL PREPARATIONS AND THEIR FREQUENCY OF USE IN THE MEDICINES

PLANTS GROWING IN TURKEY

Acorus calamus	1	Matricaria chamomilla	3
Adiantum capillus veneris	3	Melissa officinalis	2
Aesculus hippocastanum (c)	1	Mentha piperita (c)	16
Atropa belladonna	16	Olea europea (c)	1
Capsicum annum (c)	10	Origanum	1
Citrus aurantium (c)	12	Papaver rhoeas	2
Citrus bergamiae (c)	1	Papaver somniferum (c)	5
Crataegus oxyacantha	1	Passiflora incarnata (c)	2
Crocus sativus (c)	2	Pimpinella anisum (c)	8
Cynara scolymus (c)	1	Pinus	13
Drosera	1	Prunus amygdalus (c)	1
Eucalyptus	7	Prunus laurocerasus	1
Faex medicinalis	2	Quercus infectoria	1
Foeniculum vulgare	2	Rhamnus frangula	4
Hyoscyamus	3	Ricinus communis (c)	4
Hypericum perforatum	1	Rosa (c)	4
Juniperus communis	4	Rosmarinus officinalis (c)	2
Lactuca	1	Salix alba	1
Laurus nobilis	1	Thymus vulgaris	15
Lavandula spica	6	Valeriana officinalis	1
Linum usitatissimum (c)	1	Viola odorata	1
Liquidamber orientalis	1		

LIST III

PLANTS WHICH GIVE THE HERBAL DRUGS THAT ARE USED IN MEDICINES AS THEY ARE OR IN THE FORM OF THEIR GALENICAL PREPARATIONS AND THEIR FREQUENCY OF USE IN THE MEDICINES

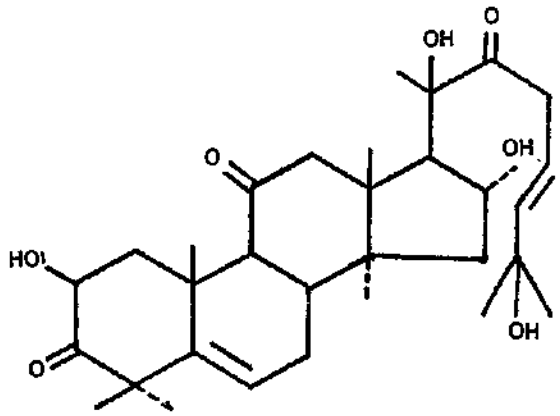
FOREIGN-ORIGINED PLANTS

Acacia senegal	4	Cinnamomum casia	8
Aconitum napellus	1	Cocos nucîferae	2
Aloee ferox	4	Cola nitida	3
Carica papaya	1	Commiphora abyssinia	3
Cassia angustifolia	5	Curcuma aromatica	1
Centella asiatica	1	Erythroxylon coca	1
Chinchona	2	Ferula galbaniflua	1
Cinnamomum camphora	8	Gelidium amansii	1

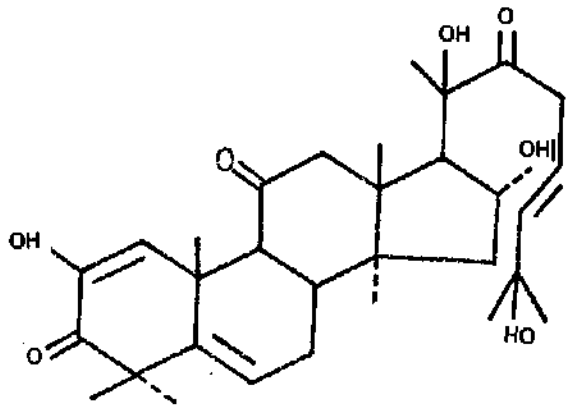
CYTOTOXIC EFFECT OF THE GLYCOSIDES OBTAINED FROM ECBALLIUM ELATERIUM ON THE S-PHASE OF L-STRAIN CELLS

Drs. Ayhan Ulubelen, Dogan Anil, Turkan Erbengi and Ayhan Billir
TURKEY

Ecballium elaterium is a well investigated plant which was tested against sarcoma 37 test system in 1952[1]. Elatericin A and B (1) & (2) were isolated from this plant and their structures were elucidated[2-7]



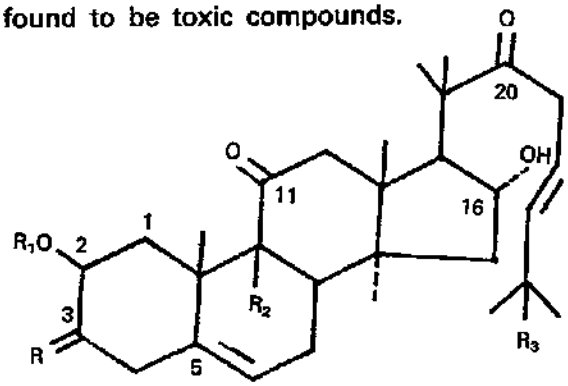
(1)
elatericin A



(2)
elatericin B

Later a group of cucurbitacins (C, D, E, H, G, I, M) (3)[8], a steroidal compound, elasterol (4)[9], a lignan, liqballinol (5)[10] and cucurbitacin A(6)[11] were obtained from the same plant.

Although most of the cucurbitacins showed antitumor activity on KB cells, they showed negative or marginal invivo activity against P 388 leukemia, L1210 leukemia, B16 melanoma and Lewis lung tumor[12]. Cucurbitacins are found to be toxic compounds.

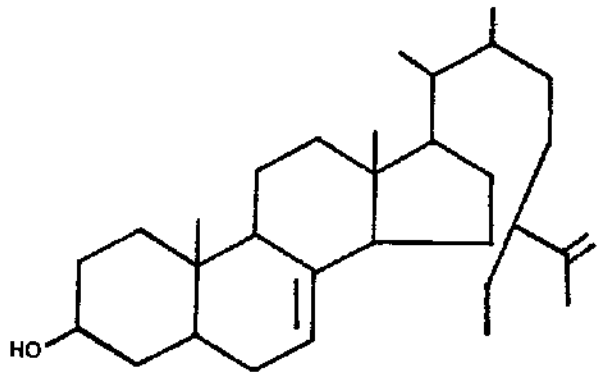


R = OH,H	R_1 = OAc	R_2 = CH_2OH	R_3 = OAc	Cucurbitacin C
R = 0	R_1 = H	R_2 = CH_3	R_3 = H	Cucurbitacin D
R = OH, H	R_1 = H	R_2 = CH_3	R_3 = H	Cucurbitacin F

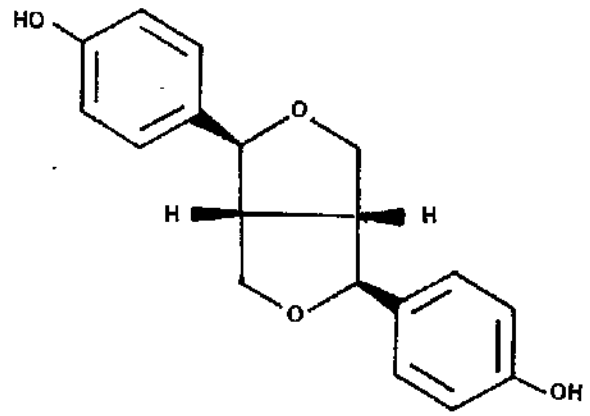
$\Delta^{1,5,22}$, 3,11,22-trion, 2,16,20,25-tetrahydroxy, R_2 = CH_3 , R_3 = OAc Cucurbitacin E

$\Delta^{1,5,22}$, 3,11,22-trion, 2,16,20,25-tetrahydroxy, R_2 = CH_3 , R_3 = H Cucurbitacin I

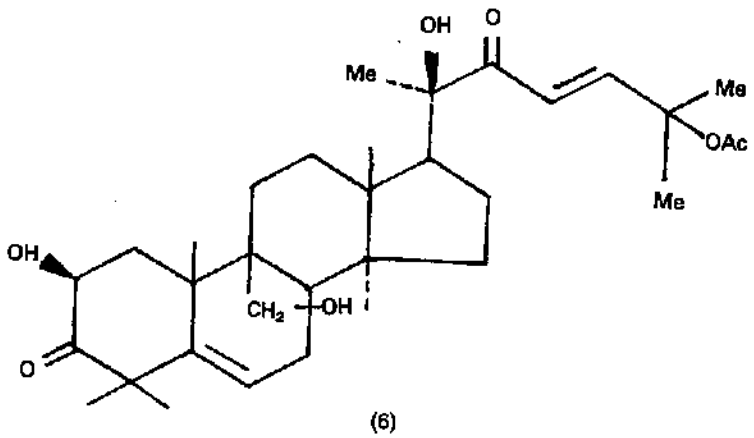
(3)



(4)
elasterol



(5)
ligballinol



(6)
cucurbitacin A

In this country, the aqueous extract of the whole plant is being tested on volunteer patients, promising results were obtained in hemorrhoid, cancer, especially intestinal cancer patients. The extract is taken orally in extended periods. It was also claimed that the extract stops the symptoms of multiple sclerosis, although the nature of this latter sickness needs a long period of observation

before to come to a conclusion. Since the aqueous extract was claimed to show these activities and no toxicity was observed until now, we decided to initiate a study on the aqueous extract of the whole plant. In order to find the active compound(s) the fractions and single compounds first tested on cell cultures, later they will be tested on invivo systems.

The tests are being conducted at the Faculty of Medicine (Çapa) as follows: L-strain cells were seeded on coverslips (4.3×10^4 cell per 20 mm) and put into Petri dishes containing Medium 199, plus inactive calf serum (10%), 100g streptomycin and 100 IU penicillin. The Petri dish was left at 37°, pH 7.2 in an atmosphere composed with 95% air and 5% CO_2 for 24 hrs. Then the incubation media was replaced with the media containing the plant extracts or single compounds. Control groups were worked with incubation media. After another 24 hrs test and control groups containing media were replaced with incubation media which contains 1 Ci/ml ^{3}H-thymidine (TRA-120 Radiochemical Centre Amersham). After 20 minutes the media were removed and washed with Hanks buffered salt solution and fixed with Cornoy fluid. The cover slips fixed on slides using colourless nail polish. The slides then covered with AR.10 stripping film and left in the dark for 4 days. At the end of this period the films are developed and stained with Giemsu. The percentage of labelled and unlabelled cells were calculated.

The crude extract of the plant showed promicing activity in reducing cell devision in the S-phase. Therefore this extract was fractioned on a Si-gel column, similar fractions were combined and each of the 8 fractions thus obtained were tested as given above and the most active fraction was established. By using preparative TLC separation in addition to elatericin A and B we have obtained 7 glycosides. Each of these compounds were tested on L-strain cells, all of them showed some activity the tests are still going on. Both the results and the structures of active compounds will be discussed in detail.

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ISOLATION AND STRUCTURE DETERMINATION OF ACTIVE COMPOUNDS FROM CENTAUREA SPECIES

Dr. Sevil Öksüz and Dr. Hatic Ayyildiz

TURKEY

As a part of our continuing investigations of Turkish plants in order to establish their chemical properties, we have studied some *Centaurea* species.

In a previous study we investigated *Centaurea kotsichyi* which showed a slight activity on 3 PS test system (test were coducted by NIH). From chloroform extract we have isolated four guaianolide type sesquiterpene lactones, one of which was a new compound 4 and their structures were determined by spectral and chemical reactions. All compounds contained α-methylen- γ-lactone function as shown in Fig.1[1].

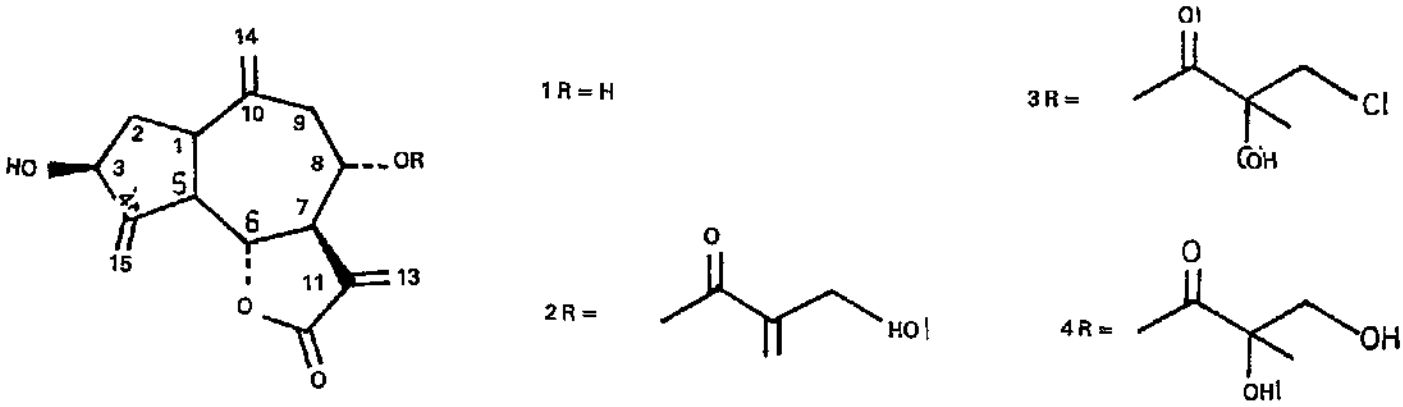

Fig. 1

Since *Centaurea coronopifolia* showed promising activity against 3 PS test system we have decided to study this plant and obtain the active compounds. The aerial parts of *C. coronopifolia* was extracted with chloroform and chromatographed on a silica gel column and eluted with benzene-chloroform by several proportions. The polarity was increased by gradual amounts of chloroform. Fractions, contain the same compounds, were combined and the single compounds were obtained by preparatif plates. Totally seven compounds were isolated. We have structure determined four of these compounds up till now. As shown Fig. 2,3,4,5 all compounds are germacren type sesquiterpene lactones and have α-methylen- γ-lactone function, it is well known that this group is essential for cytotoxicty. In several articles it has been reported that many sesquiterpene lactones possesing this group show cytotoxic activity[2,3,4].

Compound 1: IR spectra exibiting the following peaks cm^{-1} 3450 (OH), 1750 1150 (α, β-unsaturated γ-lactone), 1710, 1275 (ester function), 1645 (C = C) indicated that the compound was a lactone and UV spectrum showed no conjugation by giving the absorbsion max. at 214 nm.

200 MHz ^{1}H NMR spectrum showed the characteristic duplets of α-methylen- γ-lactone group at 6.32 and 5.69 ppm (J = 3, 3.5 Hz), 1.24 ppm a singlet for a methyl adjacent to an oxygen and 1.83 pm a singlet for a tertiary methyl group. A duplet at 2.62 ppm J = 9 Hz is very characteristic for an epoxide proton in germacren type sesquiterpene lactones. In addition to these signals spectrum showed the other major peaks of the skeleton 4.32 dd (J = 6, 9.5 Hz), H – 6), 3.32 multiplet (H – 7) 4.58 (H – 1) and 5.30 m a proton bearing an ester group). In the other hand, 4.35s (br) and 4.48d (J = 6 Hz) indicated

two CH_2 - O- groups and a multiplet at 6.89 ppm for a vinylic proton in side-chain.

These data clearly show the side chain must be a derivative of tiglic acid and MS spectrum; indicating molecular peak at 378 and a fragment at 97 with the intensity of 98% (side chain-H_2O) confirmed the molecular formula as C_{20} O_7 H_{26}.

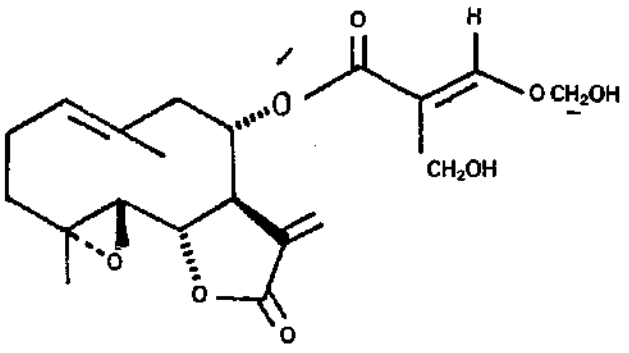

Fig. 2

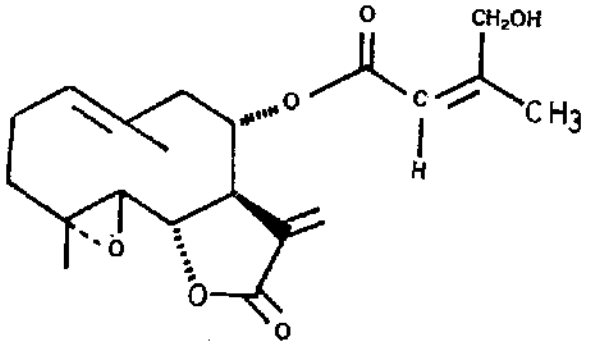

Fig. 3

Compound 2: All spectroscopic data are very similar to compound 1 except ester function as side-chain. In 200 MHz ^1H NMR spectrum; 2.02 ppm a tertiary methyl singlet and at 5.99 ppm a vinylic proton multiplet show that the side chain must be senecioic acid derivative.

Compounds 3 and 4; IR and UV spectrum of these compounds are similar to those of compound 1 and compound 2, 400 MHz ^1H NMR spectrum shows additional hydroxyl group at C-9 position. A duplet at 4.57 ppm J = 4 Hz and a singlet (br) at 4.35 ppm indicate H – 8 (Proton, geminal to the ester function) and H – 9 (proton, adjacent to an hydroxyl group) respectively. The upfield chemical shift of H – 8 and unusual splitting of H – 9 required more investigation, by spin-decoupling experiments, these protons were properly assigned.

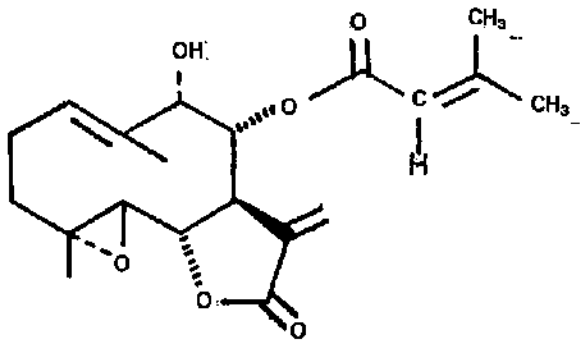

Fig. 4

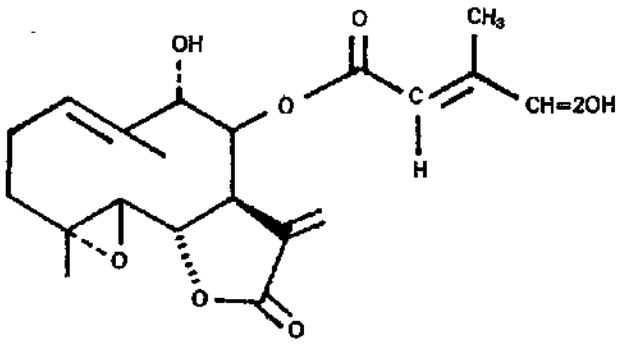

Fig. 5

Structure elucidation of the other compounds are still under investigations and will be discussed.

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PHARMACOGNOSTICAL INVESTIGATIONS ON THE PLANTS USED AS FOLK MEDICINE IN TURKEY — I

Prof. (Dr.) Ekrem Sezik, Nurten Ezer and Gülendam Tümen

TURKEY

In every region of Turkey, many plants are being used as folk medicine or herbal tea. In this paper, our investigations on the plants which are used for different purposes in the surroundings of Antalya-Isparta-Konya are summarized. Taxonomical, morphological and anatomical results of our studies[1,2] excluded from this paper. Active compounds (especially the structures of flavonoids and volatile oils) of the plants were elucidated and still being elucidated. In this first part of the paper, the results of our studies on *Sideritis* and *Ziziphora* will be presented.

There are 38 Sideritis (Labiatae) species in Turkey. 31 of them are endemic and widespread in South Anatolia[3].

Sideritis congesta, arguta, argyrea, perfoliata and libanotica are being used in the form of infusion as herbal tea and folk medicine in the surroundings of Antalya-Alanya against gastro-intestinal disorders, kidney stones, cold and as diuretics.

The results of our chemical studies on S. congesta are given below:

The leaves, flowers and the stems of S. congesta have been used in chemical studies. When it is extracted with petroleum benzene, the extract has one methoxyflavon and diterpenes. The structures of this methoxyflavon and the main diterpene have been identified after separation by column chromatography.

It has been determined that the main diterpene is the same as the authentic sample of linearol (3, 7-dihydroxy-18-acetoxy - (-) - kaurene) with respect to its chromatographic behaviour, melting point, optical rotatory. Its analytical definitions are as follows; its mp is 198-201°C, $(\alpha)_D^{20}$ is-63, 8. IR peaks are at 3500, 3400, 3080, 1710, 1660, 1270, 1070, 1025 and 882 cm^{-1}. NMR findings are 4.85, 3.70 and 1.07 ppm. Its M_w which is determined by mass spectra is 362. For linearol (CHO $C_{22}H_{34}O_4$) the theoretical quantities of carbon, hydrogen and oxygen are 72,93,9.39 and 17.68 percent. The practical values of the name components are 72.89, 9.45 and 17.66 percent respectively.

The structure of linearol is confirmed by comparing the acetyl and deacetyl derivatives of linearol prepared with the authentic standards, acetyl linearol and foliol by chromatography.

The methoxyflavon that the plant contained is determined as salvigenin which is 5-hydroxy-6,7,4' -trimethoxyflavon considering its melting point, UV, IR, NMR and Mass spectra. Its mp is of 190°-193°C, UV peaks in methanol are seen at 330,277 nm. In sodium methoxide, peaks are obtained at (375), 298,270,260 and (245) nm. In aluminium chloride these values are as 362,302 and (266) nm. In aluminium chloride and hydrochloric acid mixture, the peaks are at 353,302,265 nm, in sodium acetate at 332,275 and in sodium acetate, boric acid mixture at 332 and 275 nm respectively. It gives, IR peaks at 3080,1640,830 and 710 cm^{-1}. Where as NMR values are of 12.70; 7.92; 7.84; 7.01; 6.98; 6.57; 6.53; 3.90, 3.96 and 3.92 ppm. Its M_w is found as 328.

After extracting with petroleum benzene the material has been treated with 80% etanol and the ethanolic phase was evaporated. The residue, then dissolved in hot water and it has been extracted with ether, ethyl acetate and n-butanol respectively. The ethyl acetate phase yields two main flavon heterosides, separated by column chromatography and preparative TLC. However, the acid hydrolysis of these heterosides show that their aglycons are the same.

The aglycon is found as chrysoeriol (5,7,4' -trihydroxy-3'- methoxyflavon). Investigating its

chromatographic behaviour, melting point, UV, IR and Mass spectra the following values are obtained; its mp is 330°C, UV spectra in methanol gives peaks at 348, 270, (252), 244nm. Where as in sodium methoxide, peaks are obtained at 405, (330), (277), 269 nm. In aluminium chloride the peaks are at 388, 361, (295), (275), 262 nm, in aluminium chloride hydrochloric acid mixture at 386, 355, (295), (278), 260nm and in sodium acetate at 398,320,272 nm, in sodium acetate boric acid mixture at 353 and 270nm. In infrared spectrophotometry the peaks are obtained at 3340, 1640 and 2900 cm^{-1}. Its molecular weight is found as 300.

The ose moiety of the flavon heterosides has been found as glucose. The acid hydrolysis of the permethylated flavon heteroside indicates that one of the heterosides contains one ose and the other heteroside has two.

It has been determined that the oses of the two heterosides have been attached to the aglycons from the seventh position, comparing the UV spectra of the heterosides and the aglycons.

In accordance with the results mentioned above, the structure of the flavon heterosides has been determined as chrysoeriol-7-glucoside and as chrysoeriol-7-diglucoside.

On the other hand, in our following research, it is shown the other *Sideritis* species are carrying linearol.

In South Anatolia, *Ziziphora taurica* ssp. *taurica (Labiatae)* is another plant which is being used as folk medicine, in the surroundings of Isparta. There are 5 *Ziziphora* species in Turkey. *Z. clinopodioides, persica, capitata, tenuiour, taurica. Z. taurica* has 2 subspecies: ssp. taurica and cleonioides. The only *Ziziphora* species which is being used as herbal tea and folk medicine against gastrointestinal disorders is *Z. taurica* ssp, *taurica.* Our studies on the volatile oil of *Z.taurica* ssp. *taurica* are summarized below.

Chemical investigations were carried out on the volatile oil obtained from the herb of *Ziziphora taurica* subsp. *taurica* gathered while the plant was blossom. The volatile oil, the amount of water and the physicochemical values of the volatile oil the material contained are shown below (Table-1,2).

Material	Essential Oil Content %		Water content %
	Gravimetric Method	Volumetric Method	Volumetric Method (v/w)
Fresh	0.23 g/g	0.41 ml/g	65.23 ml/g
Dried	0.40	0.85	10

TABLE 1
VOLATILE OIL AND WATER CONTENT

It has been determined by using the gravimetric method that 9.6% of the volatile oil was made of MTHC (monoterpene hydrocarbons) and 90.4% OCMT (Oxygen containing monoterpenes) and sesquiterpenes. It has been demonstrated by using the GLC (Gas-liquid Chromatography) that the monoterpene hydrocarbons in the volatile oil were made of α-pinene (1.25%), camphene (0.45%), β-pinene (1.49%), Δ^4-Carene (0.73%) sabinene (0.34%), myrcene (0.46%), limonene (3.91%), β-phellandrene (0.08%), γ-Terpinene (0.05%), cis-β-Ocimene (0.43%), Terpinolene (0.02%), trans-β-Ocimene (0.33%) and oxygen-containing monoterpenes had 1:8 Sineol (1.08%), fenchone (2.35%), Thujone (1.99%) menthone (0.27%), isomenthone (2.89%), linalool (2.17%), menthyl acetate (0.72%),

Determination	Value
Specific gravity, 20°C	0.9475
Optical rotation, 20°C	+ 22°72
Refractive index, 20°C	1.4782
Solubility in ethanol, 70°	Turbid soluble in 2v. and more
80°	Turbid soluble in 2v. and more
90°	Turbid soluble in 2v. and more
96°	Clearly soluble in 1 v. and more
Acid index	2.06
Acids value	3.78
Saponification index	10.64
Ester index	8.58
Acetyl index	156.8
Determination of Ketons	
a) Semicarbazide method	64.18% (w/w)
b) Neutral sulphite method	68% (v/v)

Table-2
PHYSICAL PROPERTIES

isopulegone (4.88%), menthol (0.54%), pulegone (38.4%), α-terpinol (2.17%), borneol (0.90%) piperitone (2.0%), Carvon (0.81%), thymol (0.19%).

The dominant compound, pulegone, was isolated by liquid-solid chromatography. Its physico-chemical properties were determined and its structure is elucidated by using UV, IR spectras.

In other countries also, the herbs of *Sideritis* and *Ziziphora* species are being used as tea and folk medicine.

In Bulgaria, Albania, Yugoslavia and Russia[4], *S. scardica;* In France[5], *S. romana* as herbal tea; and in other European Countries species such as *S. hirsuta, scardioides, hyssopifolia, montana*[5,6,7] are being used as tonic and against cold, In our research, It is estabilished that *S. congesta, arguta, argyrea, perfoliata* and *libanotica* are also used as folk medicine and we have elucidate the structure of the diterpenes and flavonoids of *S. congesta.*

In India[8] *Z. clinopodiodes* is being used against thyphus fever while *Z. tenuior* is used as expectorant, carminative and aphrodiziac. In Russia[9] *Z.turcomanica* is being used against heart-vessel disordors. As a result of our study we have estabilished that *Z. taurica* ssp. *taurica* is a folk medicine and we also elucidated the composition of its volatile oil.

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A PHARMACOGNOSTICAL RESEARCH ON TURKISH TILIA SPECIES*

Drs. M. Tanker, N. Tanker, G. Toker

TURKEY

ABSTRACT

The inflorescens of *Tilia species* grown in Turkey were investigated according to active substances contained and some results were compared with the samples of *Tilia* which grown in France.

The following species grown wild in Turkey:

T. argentea Desf. ex DC (T. tomentosa auct.)

T. rubra DC.

T. platyphyllos Scop.

T. rubra and *T. tomentosa* are wide spread, whereas *T. platyphyllos* is rarely found. These three species are easily distinguished from one another by means of the leaf shapes and hairs. In addition to *T. tomentosa* is separated from the two species by means of staminodium of the flowers.

The flavonoides such as kaempferol, quercetin are found in these species. Total flavonoid assay was determined spectrofotometrically, after the hydrolysis of the flavonoid glycosides in the alcoholic extracts of inflorescences. The following values were calculated:

T. tomentosa	0.66%
T. rubra	
T. platyphyllos	1.13%

Volatile oil content in *Tilia species* varies between 0.044% to 0.050%. Fernesol was found in trace amount. The volatile oil was found that consist mainly of hydrocarbons, phenyl ethyl alcohol and esters.

The mucilage was obtained by extraction with cold and hot water from the inflorescences and then precipitated by ethanol. The following amount of the mucilage are:

T. tomentosa	7.2%
T. rubra	6.2%
T. platyphyllos	6.5%

The yield of mucilage in the sample from France was 6.7%. The structure of the mucilages of the species are all the same. It has been found clear that the mucilage consisted of glycose, galactose, arabinose, xylose, rhamnose and galacturonic acid.

By determining viscosity of mucilage in flowers and bractes, flowers had more mucilage than the bractes. *T. tomentosa* flowers had the maximum mucilage content.

* As the full text could not be made available, we are publishing here the abstract only.

Editors

Part Eight: *Pharmacological and Clinical Evaluation for Some Plants Mentioned by the Muslim Scientists.*

CHAPTER TWO

(Some Selected Papers - Not Presented)

1. ANTISECRETORY PROPERTIES OF ACHYRANTHES ASPERA LINN
   Prof. J.S. Qadry, et al
2. PHARMACOGNOSTICAL INVESTIGATIONS ON THE PLANTS USED AS FOLK MEDICINE IN TURKEY - II
   Dr. Ekrem Sezik, et al
3. OXIDATION MECHANISM OF POTENTIAL ANTITUMOR FURANOSESQUITERPENES FROM SMYRNIUM OLUSATRUM
   Dr. Ayhan Ulubelen, et al
4. PHARMACOGNOSTICAL INVESTIGATIONS ON THE PLANTS OF TURKEY CONTAINING TRITERPENIC SAPONINS
   Dr. Ekrem Sezik, et al
5. THE HYPOGLYCAEMIC ACTIVITY OF FOUR ACTIVE PRINCIPLES OF TRIGONELLA FOENUM-GRAECUM L. (TRIGONELLINE, OREINTIN, VITEXIN AND VETEXIN)
   Dr. Mohammed Mohd. Hashim, et al
6. EFFECT OF BAURENOL, A TRITERPENE ALCOHOL FROM EHRETIAMICROPHYLLA LAM: IN IMMUNOPATHOLOGICAL AND INFLAMMATORY REACTIONS
   Dr. S.K. Nazimuddin, et al
7. SOME RECENT ISOLATION AND SYNTHETIC STUDIES ON THE CONSTITUENTS OF INDIGENOUS MEDICINAL PLANTS
   Prof. Atta-ur-Rehman, et al
8. PHARMACOLOGICAL EVALUATION OF BERBERIS ARISTATA IN EXPERIMENTAL CHOLERA AND OTHER DIARRHOEAS
   Dr. Mohammed Sabir, et al
9. SUPPRESSION OF CHOLESTEROGENESIS AND REDUCTION OF LDL CHOLESTEROL BY NATURAL PRODUCTS IN AVIAN AND MAMMALIAN SYSTEMS
   Dr. Asif A. Qureshi, et al
10. RESEARCH METHODOLOGY FOR CLINICAL STUDY OF BRONCHIAL ASTHMA (ZEEQUN NAFAS)
    Hk. K.M. Siddiqui, et al
11. LEPROSY STIGMA AND ISLAMIC MEDICINE
    Dr. H. Kamal Mahmud

ANTISECRETORY PROPERTIES OF ACHYRANTHES ASPERA Linn.

Prof. J.S. Qadry, Rakesh Kapoor & K.K. Pillai

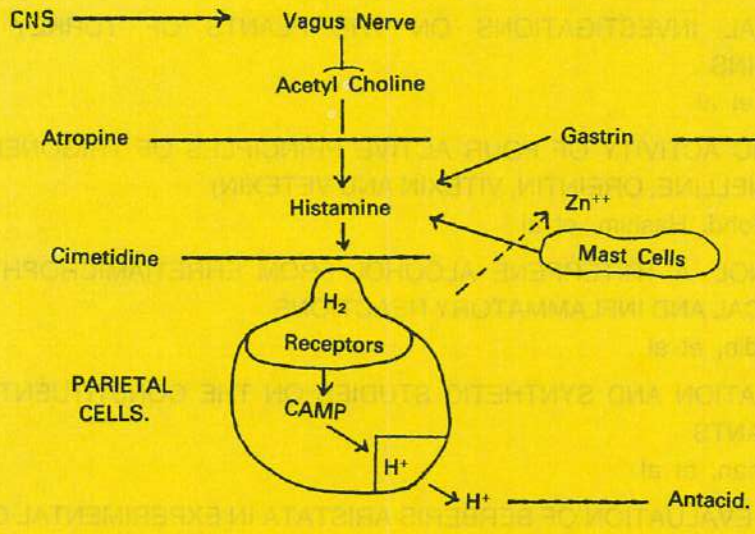
INDIA

The plant *Achyrenthes aspera* (F. Amaranthaceas) is an important medicinal plant used in the indigenous systems of medicine, especially in the Islamic and Unani System of Medicine. The plant is known as *Atkumah* in Arabic, *Prickly Chaff-flower* in English and *Chirchita* in Hindi and in Urdu (Fig./Slide 1).

The whole plant and its parts - leaves, seeds and roots - have been in use in various indigenous systems of medicines in India for treating a large number of diseases, including leprosy, bowel complaints, general anasarea and arthritis[1,2,3]. The plant has been claimed by Wahid and Siddiqui[4] as an antacid and this property has been attribued to it in Unani System of Medicine. Chirchita is being used in many Ayurvedic and Unani formulations, such as Cystone, *Kushta Sam-ul-Far* etc., which are popularly prescribed even by allopathic doctors to cure different ailments.

Since the biological findings supporting this claim were not available, the present work was undertaken to investigate the usefulness of the drug in hyperacidity syndrome.

Acid secretion is a complex process which is mediated through a number of mediators. A schematic representation of mode of acid secretion is given below:



MATERIAL AND METHODS

The plants with fully developed spikes were collected from area around Hamdard College of Pharmacy, Hamdard Nagar, New Delhi-62, during the months of October - December. The collected plants were brushed off the dust and cut into small pieces after removing the insect-eaten leaves by hand. The cut-pieces of plant were dried at 60°C in a hot air oven. The dried plant material was powdered in Hammer mill and then sifted through sieve 40.

The plant constituents studied for antisecretory properties were:-

A - **Crude Agueous Extract:** It was prepared by boiling 100g of the powdered material with

distilled water for three hours. The water extract was filtered and the filterate was evaporated to dryness on a water bath when a dark brownish-black residue (9.5g) was obtained. The dried extract gave positive tests for alkaloids, saponin and reducing sugars. The residue was tested for its effects on gastric acidity at 250mg. and 500mg/kg dose levels given orally to the rabbits. The extract was dissolved in water and then given to rabbits through Ryle's tubes.

B - **Chloroform Soluble Alkaloids:** They were extracted by a method similar to that reported by Basu[5]. 1.5kg dried plant material was extracted with chloroform. The chloroform layer was concentrated and poured into 200ml. 2% v/v sulphuric acid and shaken for 2 hours mechanically. The acid layer was collected by filtration. The residue was again extracted with 2% sulphuric acid successively until all the alkaloids were extracted (till Dragondorff's test was negative). The acid layer was extracted with chloroform repeatedly to remove chloroform soluble non-alkaloidal matter. Then the acid layer was made alkaline by adding sodium carbonate and the resultant alkaline layer was extracted with 50ml. chloroform repeatedly till a negative test with Dragondorff's reagent was obtained. Chloroform layers were collected, dried over anhydrous sodium sulphate and evaporated to dryness over a water bath when a yellowish-brown residue was obtained. This residue was dissolved in 50ml. 2% sulphuric acid and the acid layer extracted with chloroform to remove impurities. Then it was made alkaline and estracted with chloroform to exhaustion. The chloroform layers were combined and dried over anhydrous sodium sulphate. The chloroform was recovered, when a pale yellow resinous mass was obtained. This mass was dissolved in a little ethanol to which excess of solvent ether was added. A pure alkaloidal precipitate (0.185/g) was obtained, which was tested for pharmacological effect.

PHARMACOLOGICAL STUDIES

The method adopted for studying the effect of drugs on gastric acid secretion was similar to that reported by Curwaine & Turner[6].

Male Rabbits weighing between 1-2kg (usually about 1.3kg) were taken. They were deprived of meals for 18 hours prior to anaesthetizing. The fasted rabbits were anaesthetised with Urethane (1.5 g/kg). The anaesthetised rabbits were laid on their back on Brody's table. The body temperature was maintained at 37°C ± 1°C. A midline abdominal incision was given. Through this incision, the duodenum was gently picked up and the pyloric end of stomach was looped around with a cotton thread taking care not to cause any injury to the adjacent mesentery vessels. Finally the thread was tied to its opposite ends. The duodenum was then placed into its original position and the abdominal incision was sutured.

The residual contents of stomach were removed using a Ryle's tube and the stomach was washed with normal saline. A test meal (50ml 5% v/v alcohol) was given through the Ryle's tube and after every 15 minutes samples were withdrawn and analysed for free and total gastric acidity by a method as descried by Tikekar[7].

RESULTS AND DISCUSSION

All the data obtained was subjected to statistical analysis applying Student's 't' test of significance. The results are given in Tables/Slides 2 to 15.

The study of the effect of crude aqueous extract, chloroform soluble alkaloids and Cimetidine on gastric acid secretion in rabbits induced by 5% ethanol indicated that all the samples and standard drugs tested have an inhibitory effect on acid secretion.

It was observed that crude aqueous extract at 250mg/kg oral dose showed a better and statistically significant reduction in free and total gastric acidity compared to control group, whereas at 500mg/kg oral dose the crude aqueous extract had inhibitory effect on gastric acid secretion but the effect was not statistically significant.

The chloroform soluble alkaloid at 10mg/kg dose when given intraperitoneally to rabbits caused a reduction in gastric acidity but the reduction was not statistically significant.

Chloroform soluble alkaloids had been earlier reported by Kapoor & Singh[8] to posses anti-cholinergic properties, which might have contributed to the anti-secretory property. However, further study is needed to confirm the mode of action of chloroform soluble alkaloid.

The inhibitory effect of crude aqueous extract was compared with Cimetidine - a well-known potent H_2-receptor antagonist. It was observed that at 0.5um/kg dose the effect of Cimetidine was comparable with 250mg/kg oral dose of crude aqueous extract.

Zinc element has the property of preventing the acid separations induced by a variety of agents (9 and 10). Since no report on zinc content in the plant was available, the whole plant ash was analysed by Atomic Absorption Spectroscopy for zinc content. It was found to be 0.018% w/w and could in addition be responsible for the anti-secretory property of the drug.

Preliminary studies have also shown that the aqueous extract of the plant inhibited the acetyl choline induced spasm of the rat uterus muscle.

From the above investigation, it is cleat that Chirchita *(Achyranthes aspera)* has been rightly classified and used as an anti-secretory drug in the Islamic System of Medicine[4].

SUMMARY

1. The chloroform soluble alkaloid isolated from whole plant as well as from the leaves was found to interfere with the release of gastric hydrochloric acid at 10mg/kg dose level.
2. The crude aqueous extract of whole plant was tested for chemical constituents and for antisecretory properties. The extract was found to contain alkaloids, saponins reducing sugars and colouring matters.
3. The extract reduced the alcohol induced gastric acidity and the results were statistically significant.
4. Zinc was quantitatively detected in the plant ash.
5. The presence of Zn^{++} element in the plant could also be contributing to the antisecretory property.

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TABLE / SLIDE - 2

CONTROL GROUP

FREE GASTRIC ACIDITY IN MILLI EQUIVALENTS OF HCL/LITRE

Time in Minutes	S.No. of Individual Rabbit						Mean ± S.E.M.
	1	2	3	4	5	6	
15	4.27	4.72	9.38	11.90	4.50	4.60	6.56 ± 1.33
30	7.32	7.08	10.05	13.60	6.00	5.46	8.25 ± 1.25
45	10.98	8.26	9.35	16.15	6.00	5.46	9.37 ± 1.60
60	12.81	8.85	12.06	16.15	6.00	5.46	10.22 ± 1.71
75	14.03	10.03	12.06	17.85	6.00	6.24	11.04 ± 1.88
90	12.20	10.62	9.35	20.40	5.25	7.80	10.94 ± 2.12
105	14.03	11.21	11.39	16.15	5.25	7.80	10.97 ± 1.62
120	12.81	11.21	12.73	16.15	5.25	10.92	11.51 ± 1.42

TABLE / SLIDE - 3

CONTROL GROUP

FREE GASTRIC ACIDITY IN MILLI EQUIVALENTS OF HCL/LITRE

Time in Minutes	S.No. of Individual Rabbit						Mean ± S.E.M.
	1	2	3	4	5	6	
15	6.10	5.90	10.72	14.45	5.25	6.24	8.11 ± 1.50
30	8.54	7.67	12.73	16.15	6.75	7.80	9.94 ± 1.51
45	12.81	9.44	12.73	18.70	7.50	7.02	11.37 ± 1.78
60	14.64	10.03	14.07	18.70	7.50	7.02	11.99 ± 1.87
75	15.25	11.21	14.74	19.55	7.50	7.02	12.55 ± 1.99
90	16.47	11.80	12.73	22.95	7.50	9.36	13.47 ± 2.27
105	15.86	12.39	13.40	18.70	6.75	10.14	12.87 ± 1.72
120	17.08	12.39	14.07	18.70	6.75	14.82	13.97 ± 1.71

TABLE / SLIDE - 4

CRUDE AQUEOUS EXTRACT 250 mg/kg ORALLY
TOTAL GASTRIC ACIDITY IN MILLI EQUIVALENTS OF HCL/ LITRE

Times in Minutes	S.No. of Individual Rabbit				Mean ± S.E.M.	P. Value
	1	2	3	4		
15	2.06	0.93	1.98	1.86	1.70 ± 0.26	P < 0.001
30	4.12	1.86	3.96	3.72	3.41 ± 0.55	P < 0.001
60	6.18	3.72	3.95	4.64	4.62 ± 0.55	P < 0.025
90	9.27	4.64	3.96	5.58	5.86 ± 1.17	N.S.
120	10.30	4.64	4.95	6.50	6.60 ± 1.30	P < 0.05

N.S. NOT SIGNIFICANT.

TABLE / SLIDE - 5

CRUDE AQUEOUS EXTRACT 250 mg/kg ORALLY
TOTAL GASTRIC ACIDITY IN MILLI EQUIVALENTS OF HCL/LITRE

Times in Minutes	S.No. of Individual Rabbit				Mean ± S.E.M.	P. Value
	1	2	3	4		
15	3.09	1.86	2.97	2.79	2.67 ± 0.28	P < 0.001
30	6.18	3.72	4.94	4.64	4.87 ± 0.51	P < 0.025
60	8.24	5.58	5.94	6.51	6.56 ± 0.59	P < 0.025
90	11.33	7.44	5.94	6.50	7.80 ± 1.21	N.S.
120	12.35	6.50	6.92	8.37	8.53 ± 1.33	P < 0.05

N.S. NOT SIGNIFICANT.

TABLE / SLIDE - 6

CRUDE AQUEOUS EXTRACT 500 mg/kg ORALLY
FREE GASTRIC ACIDITY IN MILLI EQUIVALENTS OF HCL/LITRE

Time in Minutes	S.No. of Individual Rabbit				Mean ± S.E.M.	P. Value
	1	2	3	4		
15	3.56	2.43	6.32	3.44	3.94 ± 0.83	N.S.
30	3.56	2.43	6.32	5.16	4.37 ± 0.86	$P < 0.05$
60	3.56	4.05	7.90	7.74	5.81 ± 1.16	N.S.
90	5.34	4.05	7.90	8.60	6.47 ± 1.06	N.S.
120	5.34	4.05	8.69	7.74	6.45 ± 1.06	$P < 0.025$

N.S. NOT SIGNIFICANT.

TABLE / SLIDE / 7

CRUDE AQUEOUS EXTRACT 500 mg/kg ORALLY
TOTAL GASTRIC ACIDITY IN MILLLI EQUIVALENTS OF HCL/LITRE

Time in Minutes	S.NO. of Individual Rabbit				Mean ± S.E.M.	P. Value
	1	2	3	4		
15	4.45	4.05	7.90	5.16	5.39 ± 1.73	N.S.
30	5.34	4.45	7.90	6.88	6.14 ± 1.54	N.S.
60	5.34	5.67	9.48	9.46	7.49 ± 1.15	N.S.
90	6.23	5.67	10.27	10.32	8.12 ± 1.25	N.S.
120	6.23	5.69	11.06	11.18	8.53 ± 1.50	$P < 0.05$

N.S. NOT SIGNIFICANT.

TABLE / SLIDE - 8.

CHLOROFORM SOLUBLE ALKALOID 10mg/kg I.P.
FREE GASTRIC ACIDITY IN MILLI EQUIVALENTS OF HCL/LITRE

Time in Minutes	S.No. of Individual Rabbit					Mean ± S.E.M.	P. Value
	1	2	3	4	5		
15	1.77	6.49	6.70	6.56	2.80	4.86 ± 1.05	N.S.
30	3.54	9.44	9.38	9.84	4.20	7.28 ± 1.56	N.S.
45	5.31	10.25	10.05	10.66	4.20	8.28 ± 1.46	N.S.
60	6.49	12.88	8.71	11.48	4.20	8.75 ± 1.58	N.S.
75	7.67	14.75	9.38	12.30	4.20	9.66 ± 1.83	N.S.
90	7.67	12.98	9.38	11.48	4.20	9.14 ± 1.53	N.S.
105	6.49	14.16	7.37	12.30	4.20	9.98 ± 1.86	N.S.
120	5.31	13.57	5.36	11.48	4.20	7.98 ± 1.89	N.S.

N.S. NOT SIGNIFICANT.

TABLE / SLIDE - 9

CHLOROFORM SOLUBLE ALKALOID 10mg/kg I.P.
TOTAL GASTRIC ACIDITY IN MILLI EQUIVALENTS OF HCL/LITRE

Tine in Minutes	S.No. of Individual Rabbit					Mean ± S.E.M.	P. Value
	1	2	3	4	5		
15	2.95	7.67	9.72	7.38	3.50	6.24 ± 1.30	N.S.
30	4.72	10.62	12.73	11.48	5.60	9.03 ± 1.62	N.S.
45	6.49	12.39	12.73	11.48	4.90	9.60 ± 1.63	N.S.
60	7.67	14.16	11.34	13.12	4.90	10.24 ± 1.73	N.S.
75	8.85	15.93	10.72	13.12	4.90	10.70 ± 1.87	S.N.
90	8.85	14.10	11.34	13.12	5.60	10.60 ± 1.54	N.S.
105	7.67	15.93	9.38	13.12	4.90	10.20 ± 1.96	N.S.
120	6.49	14.75	8.04	13.12	4.90	9.46 ± 1.91	N.S.

N.S. NOT SIGNIFICANT.

TABLE / SLIDE - 10

CIMETIDINE 0.5 uM/kg I.V.
FREE GASTRIC ACIDITY IN MILLI EQUIVALENTS OF HCL/LITRE

Time in Minutes	S.No. of Individual Rabbit				Mean ± S.E.M.			P. Value
	1	2	3	4				
15	2.43	3.36	2.67	4.08	3.13	±	0.37	P < 0.05
30	4.05	3.36	3.56	5.10	4.02	±	0.39	P < 0.025
45	3.24	4.20	4.45	5.10	4.25	±	0.38	P < 0.025
60	8.10	4.20	5.34	5.10	5.68	±	0.84	P < 0.05
75	8.10	4.20	6.23	5.10	5.91	±	0.84	P < 0.025
90	6.48	4.20	6.23	4.08	5.25	±	0.64	P < 0.05
105	5.67	5.04	9.79	5.10	6.40	±	1.74	N.S.
120	7.29	5.88	8.01	5.10	5.57	±	0.66	P < 0.025

N.S. NOT SIGNIFICANT.

TABLE/SLIDE - 11

CIMETIDINE 0.5 uM/kg I.V.
FREE GASTRIC ACIDITY IN MILLI EQUIVALENTS OF HCL/LITRE

Time in Minutes	S.No. of Individual Rabbit				Mean ± S.E.M.			P. Value
	1	2	3	4				
15	4.05	5.04	3.92	6.12	4.78	±	0.51	N.S.
30	5.18	5.88	5.34	6.12	5.63	±	0.22	P < 0.025
45	5.18	5.88	5.34	6.12	5.63	±	0.22	P < 0.025
60	11.34	5.88	7.12	6.53	7.72	±	1.23	N.S.
75	9.72	6.72	8.01	6.12	7.64	±	0.80	N.S.
90	8.91	6.72	8.90	6.12	7.66	±	0.73	P < 0.05
105	7.29	7.56	11.57	7.14	8.39		1.06	N.S.
120	10.53	7.56	10.68	7.14	8.98	±	0.94	P < 0.025

N.S. NOT SIGNIFICANT.

TABLE / SLIDE - 12

CIMETIDINE 1.0 uM/kg I.V.
FREE GASTRIC ACIDITY IN MILLI EQUIVALENTS OF HCL/LITRE

Time in Minutes	S.No. of Individual Rabbit				Mean	±	S.E.M.	P. Value
	1	2	3	4				
15	6.64	2.61	4.00	2.25	3.88	±	0.95	N.S.
30	6.64	5.22	5.60	3.75	5.30	±	0.60	N.S.
45	6.64	4.75	5.60	3.00	4.90	±	0.77	$P < 0.05$
60	6.64	4.35	6.40	3.00	5.10	±	0.87	$P < 0.05$
75	6.64	4.35	7.20	3.00	5.29	±	0.98	$P < 0.05$
90	6.64	3.48	6.40	3.00	4.88	±	0.95	$P < 0.05$
105	6.64	3.48	8.00	3.00	5.28	±	1.21	$P < 0.025$
120	4.15	3.48	7.20	3.00	4.45	±	0.94	$P < 0.005$

N.S. NOT SIGNIFICANT.

TABLE / SLIDE - 13

CIMETIDINE 1.0 uM/I.V.
TOTAL GASTRIC ACIDITY IN MILLI EQUIVALENTS OF HCL/LITRE

Time in Minutes	S.No. of Individual Rabbit				Means	±	S.E.M.	P. Value
	1	2	3	4				
15	7.47	4.35	6.40	4.50	5.68	±	0.76	N.S.
30	7.47	7.83	8.00	6.00	7.32	±	0.45	N.S.
45	8.30	6.09	8.00	6.00	7.10	±	0.61	N.S.
60	7.47	6.09	9.60	5.25	7.10	±	0.95	$P < 0.05$
75	8.30	5.22	8.80	5.25	6.89	±	0.96	$P < 0.05$
90	8.30	5.22	8.80	6.00	7.08	±	0.87	$P < 0.05$
105	7.47	5.22	10.40	5.25	7.08	±	1.22	$P < 0.025$
120	5.81	6.09	10.40	6.00	7.07	±	1.11	$P < 0.001$

N.S. NOT SIGNIFICANT.

TABLE / SLIDE - 14

CIMETIDINE 1.4 uM/kg I.V.

FREE GASTRIC ACIDITY IN MILLI EQUIVALENTS OF HCL/LITRE

Time in Minutes	S.No. of Individual Rabbit				Means	±	S.E.M.	P. Value
	1	2	3	4				
15	5.88	5.10	6.80	4.40	5.54	±	0.51	N.S.
30	5.88	5.95	6.80	6.16	6.20	±	0.21	N.S.
45	8.40	7.65	6.80	7.04	7.47	±	0.36	N.S.
60	10.08	8.50	13.60	6.16	9.58	±	1.56	N.S.
75	9.24	8.50	12.75	5.28	9.94	±	1.53	N.S.
90	11.76	9.35	11.90	5.28	9.57	±	1.55	N.S.
105	10.08	9.35	9.35	4.40	8.30	±	1.31	N.S.
120	10.08	10.20	7.65	4.40	8.08	±	1.36	N.S.

N.S. NOT SIGNIFICANT.

TABLE / SLIDE - 15

CIMETIDINE 1.4 uM/kg I.V.

TOTAL GASTRIC ACIDITY IN MILLI EQUIVALENTS OF HCL/LITRE

Time in Minutes	S.No. of Individual Rabbit				Mean	±	S.E.M.	P. Value
	1	2	3	4				
15	7.06	6.37	8.50	5.28	6.80	±	0.67	N.S.
30	7.90	7.65	8.50	7.92	7.99	±	0.18	N.S.
45	10.08	9.35	8.50	7.92	8.96	±	0.47	N.S.
60	11.25	10.20	17.85	7.92	11.80	±	2.13	N.S.
75	10.92	16.20	16.15	7.04	11.07	±	1.89	N.S.
90	12.60	11.05	13.60	7.04	11.07	±	1.44	N.S.
105	11.76	11.05	13.60	6.16	10.64	±	1.59	N.S.
120	11.16	11.90	10.20	5.28	9.78	±	1.49	N.S.

N.S. NOT SIGNIFICANT.

PHARMACOGNOSTICAL INVESTIGATIONS ON THE PLANTS USED AS FOLK MEDICINE IN TURKEY - II

Prof. (Drs.) Ekrem Sezik, Akın Çubukçu, Ahmet Başaran, Safa Kaya

TURKEY

In our second paper about the same subject, our investigations on *Thymus sipyleus* Boiss. *(Labiatae)* and *Stachys lavandulifolia* Vahl. var. *lavandulifolia (Labiatae),* which are being used as folk medicine and herbal tea, and also our study on *Ecbalium elaterium (Cucurbitaceae),* a widespread folk medicine for sinusitis, will be summerized.

T. sipyleus is being used as a folk medicine for the treatment of gastrointestinal disorders in the surroundings of Beyşehir and Isparta.

Chemical studies were made on the leaves of *Thymus sipyleus Boiss.* The samples were first extracted with petroleum ether (b.p. 40-60°C). The precipitate formed in the extract on standing was purified by column chromatography followed by several crystallizations and identified as oleanolic acid.

Oleanolic acid: m.p 304–307°C, $(\alpha)_D^{20}$ + 78′ (in chloroform), mol wt.: 456 (according to Mass spectrometry). IR: 3440 cm^{-1} 1690 cm^{-1}, 1030 cm^{-1}. Mass: 248, 209, 133.

The remaining residue was extracted with 80° ethanol. Removal of the solvent gave a solid which was partially dissolved in hot water. Following filtration the aqueous phase was extracted succesively with ether and ethylacetate. The solvent was removed from the latter to give a yellow solid mixture composed of approximately nine fractions. The mixture was separated on a cellulose column; the flavonoside containing fractions were combined; the solvents were evaporated to give a yellow residue. This yellow residue is dissolved in ethanol and carried on two dimentional preparative PC, in first development the solvent system was t-butanol/acetic acid/water (3:1:1), and in the second developmdnt, it is 15% acetic acid. The flavonoside mixture was re-purified on silicagel (Kieselgel G60) plates and was obtained pure flavonoside. The pure flavonoside was hydrolysed with hydrochloric acid (5%), then aglycon extracted with ether. The aglycon was purified on silicagel (Kieselgel G60) plate using toluene / ethylacetate / methanol (8:6:1) as solvent system, then was crystalized from methanol/water mixture. The analytical data showed that the aglycone was quercetin.

Quercetin: m.p 317°C, PC R_f values in water O, with water/phenol 0.38, n-buthanol / acetic acid/water 0.77, c. hydrochloric acid/acetic acid/water (4:1:5) 0.77, t-butanol/acetic acid/water (3:1:1) O.53, 15% acetic acid 0.07. C,H,O: for $C_{15}H_{10}O_7$, $2H_2O$ estimated calculations for C 53.26%, for H 4.17%, for O 42,57%. The experimental findings were as follows: C 53.59%, H 5.10%, O 41.30%. UV spectra (maximums innm) in methanol 255, (270). (300), 370; in sodium methylate (dec.); in aluminium chloride 262, (304), (333), 455; in aluminium chloride / chlorhydric acid 262, (300), (360), 428; in sodium acetate 265, 278, 330, 390; in sodium acetate/boric acid 260, 303, 387.

IR: 3360 cm^{-1}, 3030 cm^{-1}, 1660 cm^{-1}, 1005–1010 cm^{-1}, 1085 cm^{-1}, 840 cm^{-1}, 825 cm^{-1}, 810 cm^{-1}, 785 cm^{-1}, 720 cm^{-1}, 705 cm^{-1}.

The aqueous phase of the hydrolisation product is neutralised, filtrated, evaporated and applied to descendent PC by use of the solvent system n-butanol / pyridine / water (9:5:4) and the ose was identified as galactose.

The binding of galactose to aglycone was determined by use of zirchonium oxychloride and UV spectra.

According to the methods mentioned above, the flavonoside was identified as quercetine - 3 - galactoside (hyperoside). Hyperoside: m.p. 324–236°C (dec.), PC R_f values in water 0.10, in t-butanol / water / phenol 0.50, in n-butanol / acetic acid/water (4:1:5) 0.70, in t-butanol / acetic acid/water (3:1:1) 0.43, in c. hydrochloric acid/acetic acid/water (3:10:30) 0.43, in 15% acetic acid 0.42, C,H,O: for $C_{21}H_{20}O_{12}$. 2½ H_2O estimated calculations for C 49.5%, for H 4.95%, for O 45.55%. The experimental findings were as follows: C 48,53%, H 4.48%, O 46.63%.

UV spectra (maximums in mμ): in methanol 258, (272), (300), 363: in sodium methylate 330, (412) (dec.); in aluminium chloride 265, (300), (332), 435; in aluminium chloride/hydrochloric acid 265, 300, 365, 405; in sodium acetate 278, 325, 385; in sodium acetate/boric acid 260, 300, 375.

One of the herbal tea used in the surroundings of Gündoğmuş (province of Antalya, S. Anatolia) is obtained from *Stachys lavandulifolia (Labiatae)* and is named as "tüylü çay" (hairy tea).

The volatile oil of this plant was studied and the composition of the volatile oil elucidated.

Fractionation of the Essential Oil: In order to obtain a better resolution in GLC, the oil was fractionated by column chromatography as succeeded before[1]. In fractionation Kieselgel 60 (Merck 7734), containing 5% w/w water, is used as adsorbent and n-pentane as eluent for MTHC; diethylether for OCMT.

GLC Systems: Being lack of capillary columns, the analysis in GLC were realised at 5 different conditions. The first 3 systems were used in identification of MTHC mixture, while the other 2 were for OCMT. Gas Chromatograph: Packard-Becker 419-Detector: FID, 200°C - Injection Port: 200°C - Column: Copper, 800x0.15 cm ID - Stationary Phases: PEG 20M, 60°C - ββ' ODPN, 36°C - SF 96,80°C - PEG 20M, 140°C

SF 96,120°C. In analysis, each fraction was concentrated to 0.5ml under reduced pressure at ca.0°C and 2 μl was chromatographed.

Results: According to the methods estimated in pharmacopeias; the oil yield of fresh material, which had 49% v/w water, was 0.08 w/w and 0.20 v/w, while the oil content of dried material (6.65% v/w water) was 0.25 w/w and 0.40 v/w.

The results of the volatile oil according to the gas chromatograms are tabulated in Table-1.

The use of the fruit juice of *Ecbalium elaterium* (L.) A. Rich. in the treatment of sinusitis as a folk medicine is very common in Turkey. In our research, the effect of the fruit juice in sinusitis and the convenient doses for the treatment of sinusitis are investigated.

Fruit juice was used by 49 patients, who had sinusitis and nasal obstruction recovery is observed in 71.43% of these patients. Fruit juice has no effect on thickening of mucous membrane and cysts. The cysts can be seen clearly in X-Ray examination after the application of the fruit juice of Ecbalium elaterium.

As a result of our studies summerized above, it is shown that another *Thymus* species *(T. sipyleum)* is used as folk medicine. Also, we have established the usage of a *Stachys* species as a folk medicine for the first time and elucidated the composition of its volatile oil.

On the other hand, by the help of clinical applications on the patients who suffer from sinusitis, we have proved the effect of the *Ecbalium elaterium* fruit juice on sinusitis.

Table - 1
The results of the GLC analysis

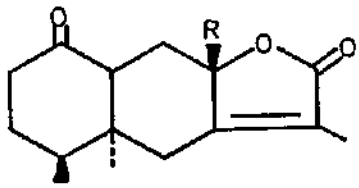
Compound	% in Vol. Oil	Compound	% in Vol. Oil
α - pinene	3.83	Citronellal	0.40
Thujene	0.40	Linalool	2.84
Camphene	0.24	Menthone	3.11
β - pienene	2.98	Menthyl acetate	0.65
△ 3 - carene	2.16	Terpinene - 4 - ol	4.36
Sabinene	1.20	Caryophyllene	11.32
α - phellandrene	0.24	Insopulegone	1.52
Myrcene	3.30	Menthol	2.30
α - terpinene	0.24	α - terpineol	2.84
Limonene	1.24	Borneol	1.35
β - phellandrene	2.20	Cadinene	3.57
γ - terpinene	0.48	Verbenone	1.19
Cis-Ocimene	0.48	Citronellol	1.19
Terpinolene	0.48	Geranyl acetate	0.71
trans-Ocimene	0.16	Geraniol	0.53
p-Cymene	0.40	Methyl eugenol	3.61
1.8 Cineole	8.65	Unknown	25.12
Ethyl amyl ketone	1.92		
Fenkone	0.80		
Thujone	1.99		

OXIDATION MECHANISM OF POTENTIAL ANTITUMOR FURANOSESQUITERPENES FROM SMYRNIUM SPECIES

Drs. Ayhan Ulubelen, Sevil Öksüz and Nezhun Gören

TURKEY

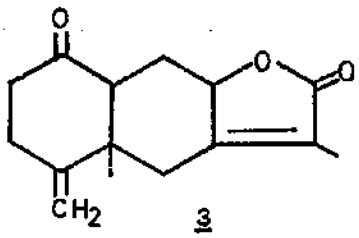
We have been screening Turkish plants for their antitumor activity the last 15 years as a joint project with NIH (Washington D.C.). Until now about 200 plants were screened, some of them showed potential antitumor activity. Among them the root extracts of *Smyrnium olusatrum* showed a promising activity both invivo and invitro systems. From this extract two new sesquiterpene lactones of eremophilane type were isolated and they were named as istanbul in A *(1)* and B *(2)* [1].



1 R = OH istanbulin A

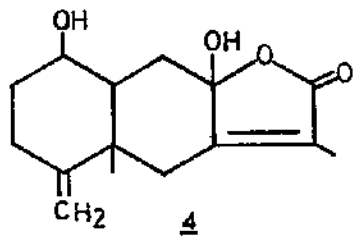
2 R = H istanbulin B

The roots of other *smyrnium* species, namely *S. connatum*[2] and *S. creticum*[3] also yielded eremophilenolides, istanbulin C *(3)*, D *(4)* and E *(5)* respectively.



3

istanbulin C



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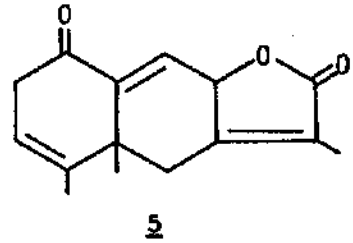
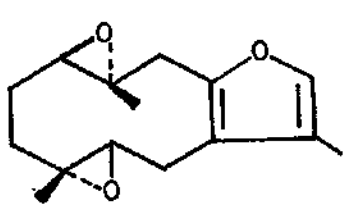
istanbulin D



5

istanbulin E

In another study with the fruits of *S. olusatrum* a known compound glechomafuran *(6)* was obtained[4], this compound was found to be unstable especially in chloroform solution. The air oxidation of compound *6* starts in the first hour by dissolving in $CHCl_3$ and exposing to air and completes withing 22 days. When the gummy residue fractioned on a Si-gel column 3 lactones all germacrane type were obtained *(7,8,9)*[5].



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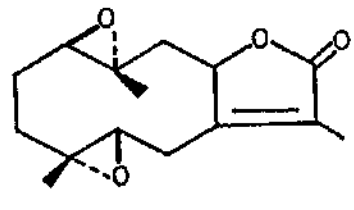

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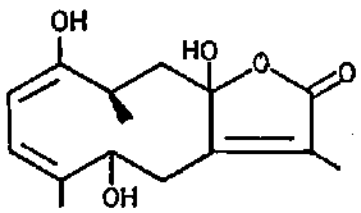

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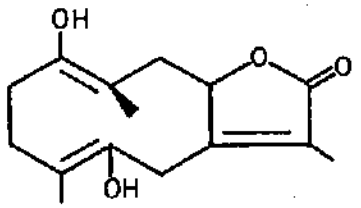

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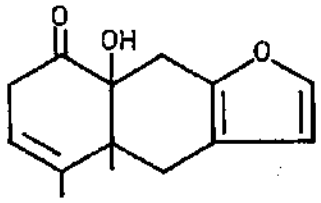
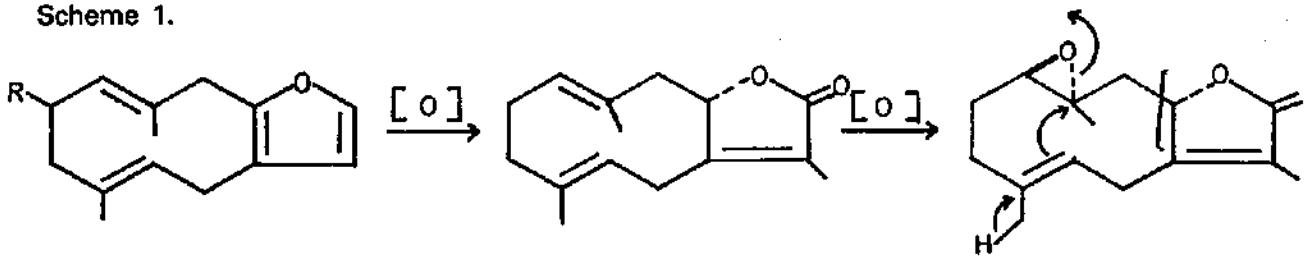
Since none of the above compounds could be the precursor of eremophilenolides a systematic study with the roots and fruits of *smyrnium* species present in Turkey was initiated, in order to prevent possible oxidation the plant materials were extracted with a mixture of light petrol and ether, evaporated under a vacuum at room temparature. The residues were separated in Si-gel columns by fast elution. Using this technique, a furanoeremophilane *(10)* was obtained from the fruits of *S. cordifolium*[6], which probably is the precursor of a number istanbulin type eremophilenolides. The

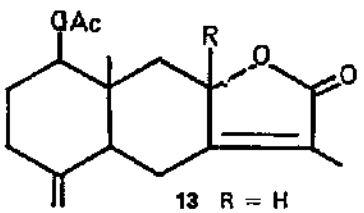


10

same extract yielded furodiene *(11)*, 2-acetylfurodiene *(12)* as well as oxidation products of furodiene, new eudesmanolides *(13, 14)*[7]. The biosynthetic oxidation mechanism is suggested as shown in Scheme 1.



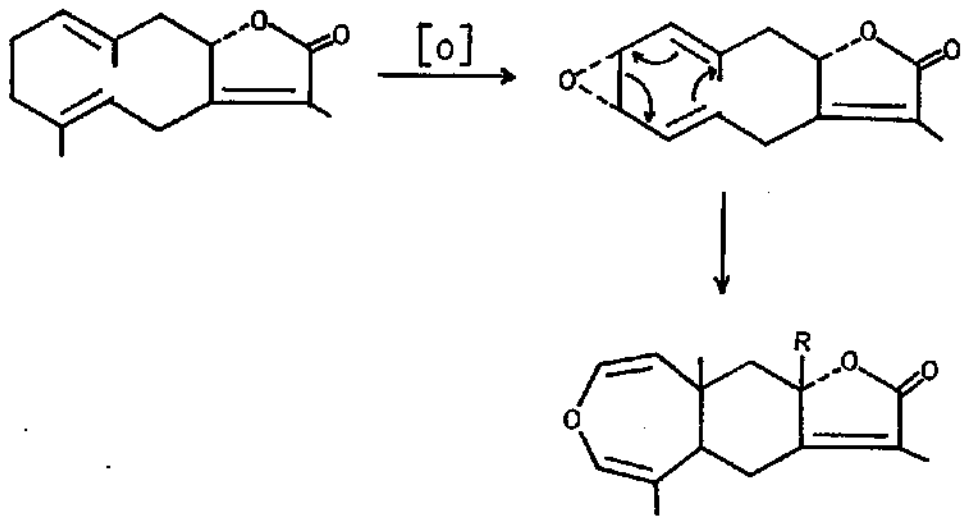
11 R = H
12 R = OAc



13 R = H
14 R = OH

Scheme 1

On the other hand the roots of *S. cordifolium* yielded a different type oxidation products of furodiene, compounds *(15, 16)*, these compounds have a new skeleton and named as smyrnicordiolides *(15, 16)*[7].

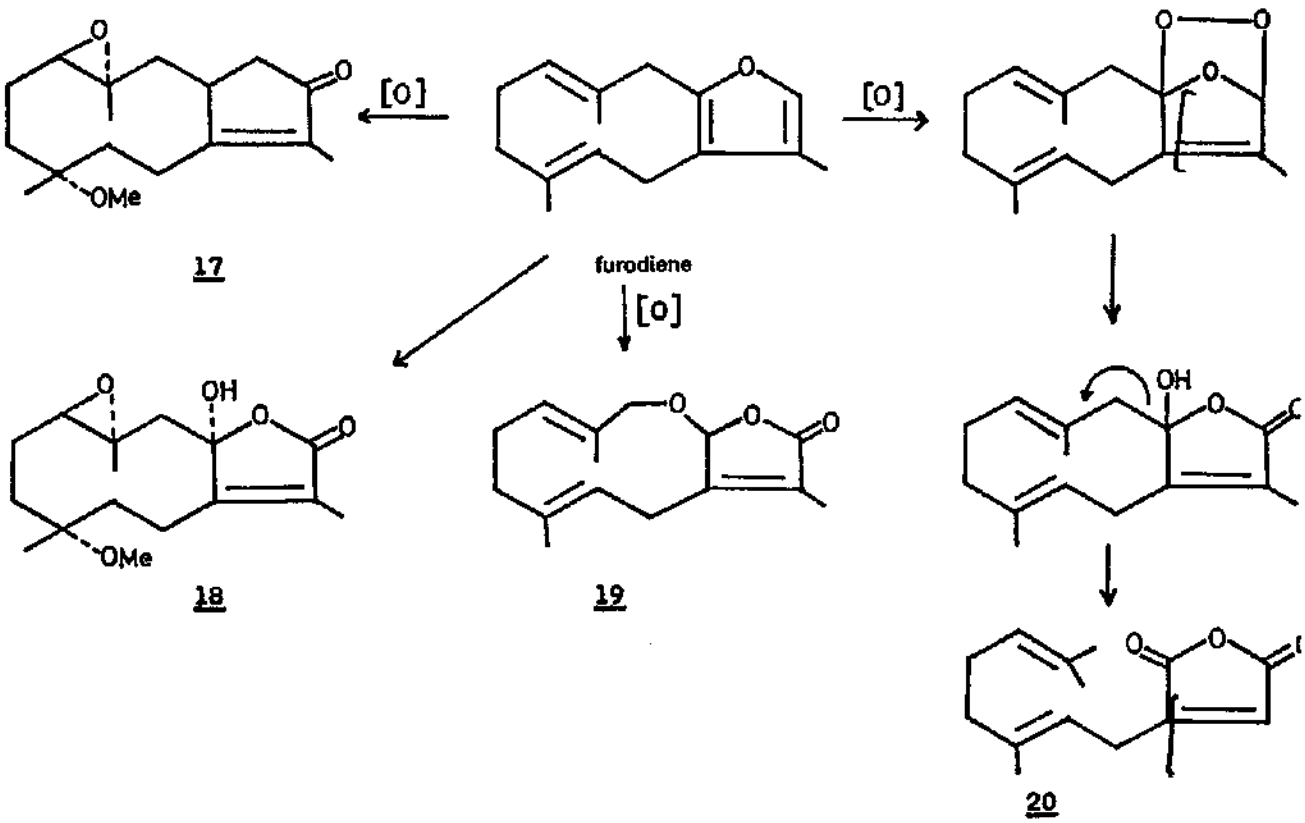


Scheme 2

15 R= H

16 R = OH

While the fruits of *S. rotundifolium*, in addition to several known sesquiterpenes yielded germacrane derivatives (17, 18, 19, 20) with a different oxidation path of furodiene (Sheme 3)[8].



17 furodiene 18 19 20

Scheme 3

Compounds *13* and *14* were also isolated from the fruits of *S. olusatrum* and *S. qallaticum*[9,10]. The investigation is still going on and unstable compounds are being obtained, their structures will be discussed. The structures of all known and new compounds were established by spectral methods, for the new compounds spin-decoupling experiments as well as Dreiding models were used for stereochemical studies.

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PHARMACOGNOSTICAL INVESTIGATIONS ON THE PLANTS OF TURKEY CONTAINING TRITERPENIC SAPONINS

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TURKEY

Since the ancient times, saponin containing plants have been used as folk medicine for various purposes. The expectorant and antifungal antibiotic effects of these plant components are especially significant. In addition, the anti-inflammatory, antiexudative, sitostatic effects and antiviral activity, which is reported recently, are other important effects of saponins[1].

Triterpenic saponin containing plants are widely distributed in Turkey. The plants of Polygalaceae, Caryophyllaceae and Primulaceae are the most important and widespread examples. In this paper, chemical and biological investigations on some saponin-containing plants of Polygalaceae and Caryophyllaceae, carried out in our department, will be presented.

Polygala is the only genus of Polygalaceae family, found in Turkey, *Radix Senegae* is the most important one of the drugs, obtained from this genus. This drug is obtained from *Polygala senega* (a North American species), and appears in the composition of some expectorants.

There are 11 species of *Polygala* in Turkey[2]. *Polygala pruinosa* subsp. *pruinosa* and *P. anatolica* are the most widespread species among these. But *P. pruinosa* subsp. *pruinosa* has greater roots, in comparison with those of *P. anatolica*[3].

With its 32 genus and about 500 species,Caryophyllaceae is one of the most widespread and richest family of the flora in Turkey. There are 46 *Gypsophila,* 18 *Saponaria,* 66 *Dianthus* and 119 *Silene* species in Turkey.

Gypsophila spec. is the most important genus of Caryophyllceae. *Radix Saponaria Albae (R. Gypsophilae),* obtained from this genus has been used as an emulsifier and it is also an important exportation matter, known as Turkish Soaproot (for 479.457 kg 63.834.119 TL. in 1981). But its source was not known exactly. The sources of the 4 kinds of Turkish Soaproot was established with the studies which are carried out in our department[4] (Table-1).

Table 1
Turkish Soaproot Types

Region	Commercial Name	Origin of the Drug
East Anatolia	Soaproot of Van	*G. bicolor* (Freyn. et Sint.) Grossheim
Central-West Anatolia	Soaproot of Konya or Soaproot of Isparta	*G. arrostii* Guss. var. *nebulosa* (Boiss. et Heldr.)
Central Anatolia		
a) Çorum-Yozgat Region	Soaproot of Çorum or Soaproot of Yozgat	*G. eriocalyx* Boiss.
b) Niğde Region	Soaproot of Niğde	*G. perfoliata* L. var. *anatolica* (Boiss. et Heldr.) Bark.

Among these types, both Soaproot of Van and Soaproot of Isparta/Konya hav higher foaming and hemolytic indices (Table-2) and in addition, their crude saponin content are rather high. Both types of Soaproot are accepted as first grade in commerce. As a matter of fact, Soaproot of Van is exported and is used in the obtaining of "Saponinum Purum Album" (Firma Merck).

Soaproot of Niğde, has also higher hemolytic index, but its foaming index and the percentage of crude saponine is rather low. It has also slender roots, so it is accepted as second grade.

Soaproot of Çorum/Yozgat has the lowest values of indices (Table-2) and so it has to be third grade. But its roots are rather big and abundant, so this drug can be provided in larger amounts, and thus is exported to Rumania and Bulgaria, besides being used in food industry.

Table 2
Some Values Concerning The Investigated Plants

	Crude Saponin		
	Hemolytic Index	Foaming Index	(%)
Gypsophila arrostii var. nebulosa	5295- 6667	9600-10034	19-22
Gypsophila bicolor	6667- 6925	9000-10000	20-25
Gypsophila eriocalyx	3385- 3659	1800-2000	10-14
Gypsophila perfoliata var. anatolica	9778-10000	4650- 5000	15-19
Saponaria kotschyi	405	714	5
Polygala pruinosa subsp. pruinosa	1292	2500	6

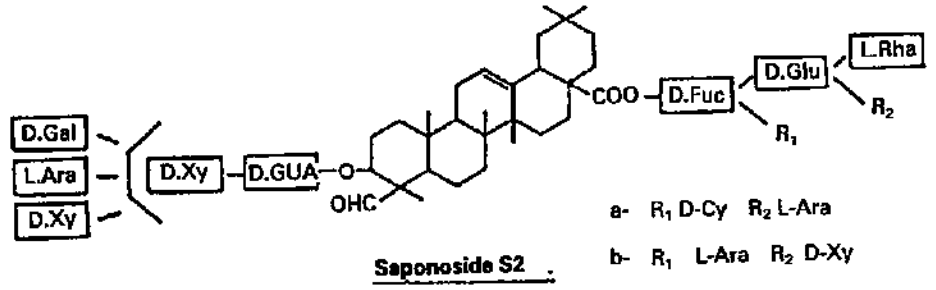
There are 18 species of *Saponaria* in Turkey. The seven of these species are biennial or perennial plants, whose roots can be useful. *Saponaria officinalis* is one of these species and there are sufficient chemical and pharmacognostical investigations on this species. *S. kotschyi* is the other widespread species in Turkey. The results of our investigations on the roots of this plant is summarized in (Table-2) and (Table-3).

Some significant biological effects of these crude saponins, obtained in our department, have also been determined.

Amongst the saponins we investigated, the crude saponin which is found most effective on micellium-producing fungi, is the one obtained from *Polygala pruinosa* subsp. *pruinosa.* The crude saponin from *Saponaria kotschyi* and *Gypsophila eriocalyx,* also have medium antifungal effect. On the other hand, the crude saponins of *G. bicolor* and *G. arrostii* var. *nebulosa,* has been shown to be effective on Candida albicans (Table-4).

In determining antiviral activity of these crude saponins, tissue culture methods and hemagglutination-inhibition method related to the structure of viruses were chosen. According to the results obtained, the crude saponin isolated from *Gypsophila bicolor* showed the highest antiviral

		Main Saponin	
	A	Aglycone	Sugars (molar ratios)
Saponaria Kotschyi	2	Gypsogenol	D-glu., D-gal., D-xy., L-ara., L-rha., D-fuc., D-glu. A. (1:1:2:2:1:1:1)



Saponoside S2

a- R_1 D-Cy R_2 L-Ara

b- R_1 L-Ara R_2 D-Xy

Polygala pruinosa subsp. pruinosa	5	Presenegenin	D-glu., D-gal., D-xy., L-rha., L-ara., D-fuc., (2:1:1:1:1)

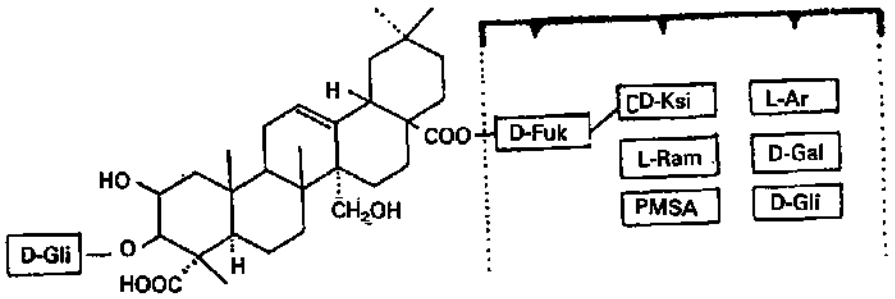


Table-3
Explanations of the Structures of the Main Saponins Elucidated by Sezik, Yeşilada and Çaliş

A: Saponin spots established by TLC; D-glu.: D-glucose; D-gal.: D-galactose; D-xy.: D-xylose; L-rha.: L-rhamnose; L-ara.: L-arabinose; D-fuc.: D-fucose; D-glu. A.: D-glucuronic acid.

activity. Its crude saponin was active to 5/6 of the viruses used. On the other hand, the other *Gypsophila* spec. were found less active. The crude saponins of *G. arrostii* var. *nebulosa*, *G. perfoliata* and *G. eriocalx* was active to 4/6, 3/6, 4/6 of the viruses, respectively. The crude saponin of *P. pruinosa* subsp. *pruinosa* was active to 5/6 of the viruses used. The crude saponin of *S.kotschyi* was active to only 3/6 of the viruses used (Table-5).

In our investigations the sources and qualities of Turkish Soaproot were established. In addition to that, the crude saponins of *Polygala pruinosa* subsp. *pruinosa* and *Saponaria kotschyi* were obtained and the structures of their main saponins were elucidated.

On the other hand, antifungal-antibiotic and antiviral activities of these crude saponins were investigated. Amongst these, the crude saponins of *Polygala pruinosa* subsp. *pruinosa* and *Gypsophila bicolor* showed the highest antifungal antibiotic, and *G. bicolor* showed the highest antiviral activity.

According to these results, we can expect that the crude saponins can be used externally for antifungal and antiviral purposes.

Table — 4
Antifungal Activities of the Crude Saponins Obtained from the Investigated Plants

	Alternaria solani		Aspergillus flavus		Asp. fumigatus		A.niger		A.ochraceus		A.versicolor	
Gypsophila arrostii	+	+	++	+	+++	++	++	+	++	+	0	0
Gypsophila bicolor	+++	+	++++	++	+++	+	0	0	++	+	+++	0
Gypsophila eriocalyx	++	+	++++	+++	++	+	++++	+++	+++	+	++	+
Gypsophila perfoliata	+++	++	++	++	++	+	++	0	++	+	+++	0
Saponaria kotschyi	+++	+++	+++	++	++++	+++	++	+	++++	+++	++	+
Polygala pruinosa subsp. pruinosa	++++	++	++++	++++	++	+	++++	++++	+++	++	++++	++
	Fusarium oxysporum		**Penicillium expensum**		**Candida alsicans**							
Gypsophila arrostii	++	+	++	++	++++	++						
Gypsophila bicolor	++	+	++	+	+++	++						
Gypsophila eriocalyx	++	+	+++	++	−	0						
Gypsophila perfoliata	+	+	++++	++++	0	0						
Saponaria kotschyi	++	+	+++	+	0	0						
Polygala pruinosa subsp. pruinosa	++++	++	++++	+++	0	0						

Table-5
Antiviral Activities of the Crude Saponins
Obtained from the Investigated Plants

	Polio type-1	Herpes type-1	Herpes type-2	Vesicolor stomatitis	Influenza A2	Parainfluenza type
Gypsophilà arrostii	+−	−	+−	++	+−−	−
Gypsophilà bicolor	+	+	+	++	+−−	−
Gypsophilà perfoliata	+−−	−	+	+	+−−	−
Gypsophilà eriocalyx	−	−	+−−	+	+−−	−
Saponaria kotschyi	+−−	−	+−−	++	−	−
Pruinosa subsp. pruinosa	+	+	+−−	++	+−	−

(++) Strong
(+) medium
(+−) partially effective
(+−−) weak
(−) none

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THE HYPOGLYCAEMIC ACTIVITY OF FOUR ACTIVE PRINCIPLES OF *TRIGONELLA FOENUMGRAECUM* L. (TRIGONELLINE, ORIENTIN, VITEXIN & VETEXIN) IN MICE.

Drs. M.M. Hashim, A.B. Pettigrewand and M. Saleem

SAUDI ARABIA

INTRODUCTION

Trigonella foenumgraecum L. is found mainly in the Mediterranean region and is extensively cultivated in Southern Europe, Northern Africa and India (British Pharmaceutical Codex, 1934). Trigonella greek hayseed, fenugreek, semen foenumgraeci get bock shornshamen, *Trigonella foenumgraecum* L. (OSOL & FARRAR. 1960).

Trigonella foenumgraecum L. has been widely used in folk medicine for the treatment of various forms of malnutrition (Huerre, 1928) for the promotion of lactation in nursing mothers (El-Ridi and El-Shahat, 1944). Morcos and El-Baradie (1955) reported its use for gastro-intestinal disturbances, habitual constipation, debility and diabetes mellitus, while Krishnaswamy et al (1971) and Voros and Nagy (1972) reported its use as an anti-microbial agent. Chemical studies have revealed that *Trigonella foenumgraecum* L. contains trigonelline, orientin, vitexin and vetexin. (Wallis, 1962).

These therapeutic applications stimulated us to study and compare the hypoglycaemic activity of trigonelline, orientin, vitexin and vetexin.

MATERIALS AND METHODS

Trigonelline, orientin, vitexin and vetexin were acquired in powder form from the Faculty of Pharmacy at Cairo University. Each substance was tested at two different dose rates, and the whole investigation was carried out according to the method of Krawczynski and Osinski (1967). The potency of the drugs were compared with reference to insulin. Insulin was made up as a 10% solution in distilled water (Insulin manufactured by Merck in 1ml vial containing 20 units insulin).

Two hundred and twenty five mice (mixed male and female) were used at a weight of 20-30 grams. The mice were prepared by with-holding food for 24 hours prior to injection of test substances and insulin. All four active principles and insulin were administered by intraperitoneal injection.

Each substance at each dose was tested on 25 mice. Blood samples were taken from the retro-orbital sinus of each mouse with a micropipette. Samples were taken before injection, and at 15 minutes, 30 minutes, 1, 2, 4, 6, 12, 24 and 48 hours following injection, or until the blood sugar level had returned to its pre-injection level.

RESULTS

The results of the effects of the test substances on blood sugar levels in mice are shown in Table 1. Results for the insulin group are shown in Table 2. A comparison between the two dose levels of each of the four test substances and insulin is shown in Figures 1 to 4.

The administration of insulin at a dose of 1.0mg per mouse produced a very significant decrease

in blood sugar level (b.s.l.) to 102 ± 4.899 mg/dl after 2 hours and a return to pre-test b.s.l. after 6 hours. Trigonelline at a dose of 0.1mg per mouse produced a drop in b.s.l. to 136 ± 9,274 mg/dl after 2 hours, while a dose of 0.2 mg/dl caused the b.s.l. to decrease to 116 ± 9.274 mg/dl after 6 hours, at both dose levels the b.s.l. returned to normal after 24 hours.

Orientin reduced b.s.l., in the 0.1 mg/mouse and the 0.3 mg/mouse groups to 120 ± 8.367 mg/dl and 112 ± 5.31 mg/dl after 4 hours respectively. The b.s.l. returned to pre-test levels after 48 hours.

Following administration of vitexin at dose levels of 0.1 mg and 0.2 mg/mouse, b.s.l. of 130 ± 13.785 mg/dl and 122 ± 9.696 mg/dl were recorded respectively after 2 hours, with a return to pre-injection levels after 6 hours. However, vetexin at dose levels of 0.2 and 0.5 mg/mouse produced a decrease in b.s.o. to 121 ± 8.124 mg/dl and 106 ± 8.124 mg/dl respectively after 2 hours, with a return to normal levels after 6 hours.

All the above quoted blood sugar levels are significant statistically, at $p<0.0002$.

DISCUSSION

In Egypt, fenugreek seeds are used as a popular household remedy for a variety of ailments (Morcos and El-Baradie, 1959). Meanwhile, Wallis (1962) reported that the seeds are used in veterinary medicine and occassionally as a spice in curry powders. Moreover, Dewidar (1967) mentioned that an aqueous decoction is often used as a hot drink in cases of common cold.

T. foenumgraecum L. has received special interest in the field of pharmaceutical research. However, the literature lacks information relating to the properties of trigonelline, orientin, vitexin and vetexin.

The need to discover some inexpensive and harmless drug with anti-diabetic potency suggested further investigation of these active principles of *Trigonella foenumgraecum* L.

The blood sugar levels of mice were determined before and after administration of the substances. It was found that all four substances caused lowering of blood sugar levels to the following: Trigonelline at doses of 0,1mg and 0.2mg produced levels of 136 ± 9.274 mg/dl after 2 hours and 116 ± 9,274 mg/dl after 6 hours respectively. Vitexin produced blood sugar levels, after dosing at 0.1mg and 0.2mg, of 130 ± 13.785 mg/dl after 2 hours and 122 ± 9.696 mg/dl after 2 hours respectively; Vetexin dosed at 0.2 and 0.5mg produced 121 ± 8.124 and 106 ± 8.124 mg/dl after 2 hours respectively; Orientin at doses of 0.1mg e 0.3mg meanwhile, produced blood sugar levels of 120 ± 8.367 and 112 ± 5.831 after 4 hours respectively.

These results may be due to the blocking of the adrenal gland by the drugs, or they may be due to stimulation of the Islet cells to produce insulin. The results obtained are comparable to those obtained by Morcos and El-Baradie (1959).

Lowering of the blood sugar may be due to an increased uptake of sugar by tissues such as muscle and fat. There is evidence indicating a decreased hepatic output of glucose through the action of insulin (Madison et al, 1960). It has been shown by hepatic vein catheterization in humans that the injection of insulin causes decreased hepatic output of glucose (Bearn et al, 1952 and Madison et al, 1960).

Of the four active principles of *T. foenumgraecum* L. tested, vetexin at a dose of 0.5 mg/mouse produced a drop in blood sugar levels similar to that observed after injection of insulin. Although the effects on blood sugar levels by orientin at doses of 0.1mg and 0.3 mg/mouse did not produce a depth of reduction comparable to insulin, the duration of effect was nore prolonged, returning to pre-test

levels after 48 hours. Trigonelline at 0.2 mg/mouse also produced a blood sugar reduction that persisted for 24 hours compared to 6 hours duration for insulin.

More research is required before any of these substances can be properly evaluated as an antidiabetic agent, although some of these results show promise.

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TABLE 1.

The effects of some active principles of Trigonella foenumgraecum L., on blood sugar levels (mg/dl) following intraperitoneal injection in mice.

ACTIVE PRINCIPLE	DOSE IN mg.		BEFORE DOSING	TIME AFTER ADMINISTRATION								
				15 mins	30 mins	1 hour	2 hours	4 hours	6 hours	12 hours	24 hours	48 hours
VITEXIN	0.1	MEAN ± S.E.	171±1.0	140±7.071 P < 0.0002	133±11.136 P < 0.0002	132±2.0 P < 0.0002	130±13.785 P < 0.0002	153±13.379 P < 0.0002	169±1.166			
	0.2	MEAN ± S.E.	171±1.871	150±7.071 P < 0.0002	140±6.325 P < 0.0002	138±6.634 P < 0.0002	122±9.696 P < 0.0002	129±1.0 P < 0.0002	165±2.236			
TRIGONELLINE	0.1	MEAN ± S.E.	172±1.225	138±8.603 P < 0.0002	137±6.634 P < 0.0002	136±2.45 P < 0.0002	136±9.274 P < 0.0002	150±6.325 P < 0.0002	170±3.162	172±1.225	171±1.0	
	0.2	MEAN ± S.E.	170±2.739	144±8.718 P < 0.001	149±6.783 P < 0.001	133±2.0 P < 0.0002	120±6.325 P < 0.0002	132±6.634 P < 0.0002	116±9.274 P < 0.0002	156±5.099 P < 0.001	169±2.45	
ORIENTIN	0.1	MEAN ± S.E.	171±1.0	146±7.484 P < 0.0002	140±7.071 P < 0.0002	156±7.484 P < 0.0002	126±10.296 P < 0.0002	120±8.367 P < 0.0002	152±8.0 P < 0.0002	152±8.0 P < 0.0002	164±4.0 P < 0.01	170±2.739
	0.3	MEAN ± S.E.	171±1.0	142±5.83 P < 0.0002	140±6.325 P < 0.0002	116±6.783 P < 0.0002	122±8.603 P < 0.0002	112±5.831 P < 0.0002	134±2.45 P < 0.0002	134±2.45 P < 0.0002	136±10.296 P < 0.0002	169±2.45
VITEXIN	0.2	MEAN ± S.E.	171±1.0	153±8.0 P < 0.0002	150±9.354 P < 0.0002	134±10.296 P < 0.0002	121±8.124 P < 0.0002	153±15.938 P < 0.0002	169±1.0			
	0.5	MEAN ± S.E.	165±2.236	144±5.099 P < 0.001	124±12.083 P < 0.0002	114±9.274 P < 0.0002	106±8.124 P < 0.0002	146±8.124 P < 0.001	169±1.0			

TABLE 2

The effects of Insulin on blood sugar levels (mg/dl) following intraperitoneal injection in mice.

	DOSE IN mg		BEFORE DOSING	TIME AFTER ADMINISTRATION					
				15 mins	30 mins	1 hour	2 hours	4 hours	6 hours
INSULIN	1.0	MEAN ± S.E.	171±0.979	158±5.831 P < 0.0002	140±4.472 P < 0.0002	112±7.349 P < 0.0002	102±4.899 P < 0.0002	154±8.124 P < 0.0002	169±2.449

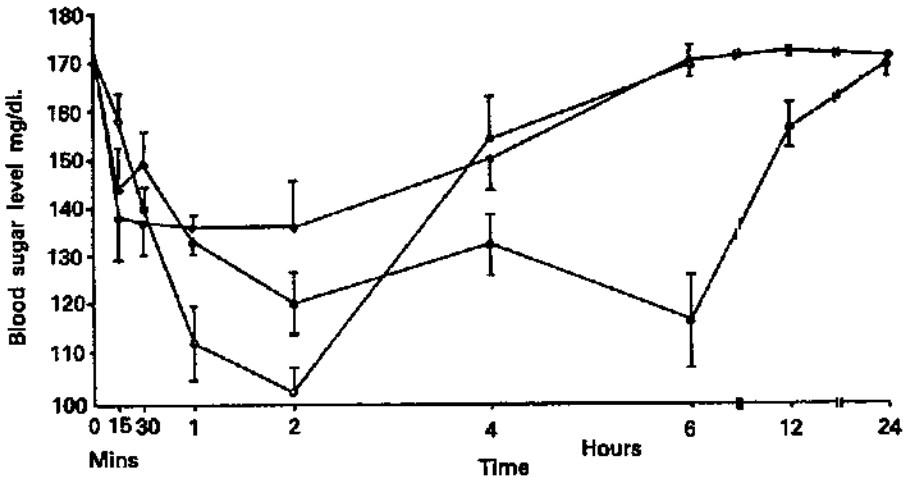


Figure 1. A comparison of the effects of trigonelline and insulin on mouse blood sugar. (● - ●) trigonelline 0.1mg, (▲ - ▲) trigonelline 0.2mg (○ - ○) insulin 1.0mg 1 bar represent ± S.E.M.

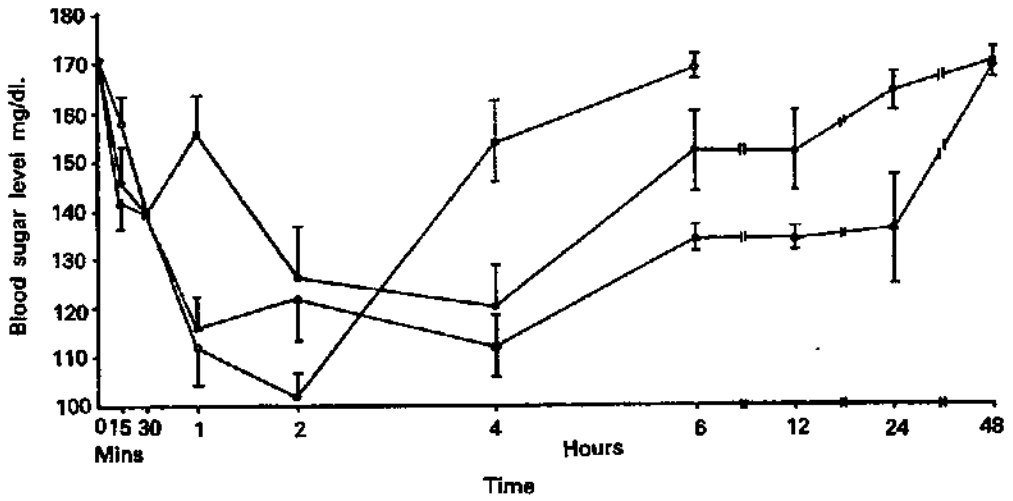


Figure 2. A comparison of the effects of orientin and insulin on mouse blood sugar. (● - ●) orientin 0.1mg, (▲ - ▲) orientin 0.3mg, (○ - ○) insulin 1.0mg. 1 bar represents ± S.E.M.

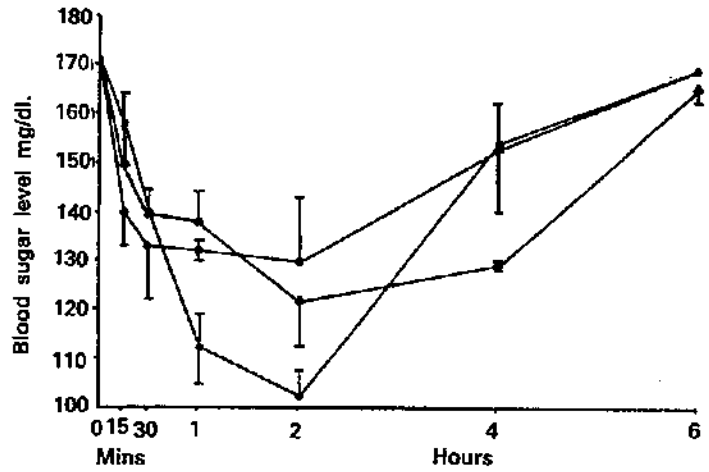
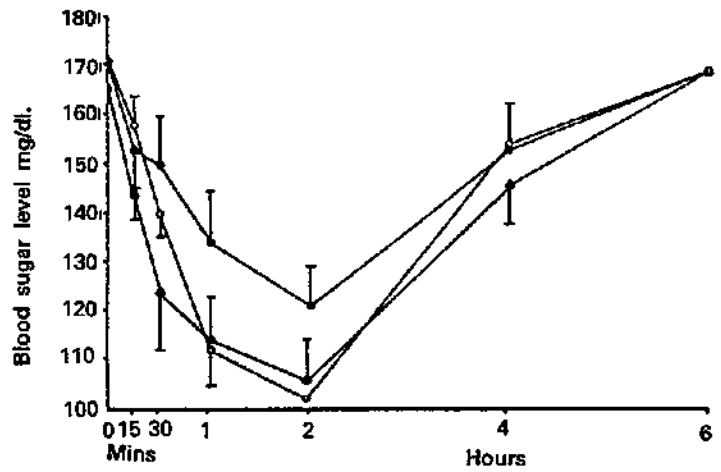


Figure 3. A comparison of the effects of vitexin and insulin on mouse blood sugr. (● - ●) vitexin 0.1mg, (▲ - ▲) vitexin 0.2mg, (o - o) insulin 1.0mg 1 bar represents ± S.E.M.



Time

Figure 4. A comparison of the effects of vetexin and insulin on mouse blood sugar. (● - ●) vetexin 0.2mg, (▲ - ▲) vetesin 0.5mg, (o - o) insulin 1.0mg. 1 bar represents ± S.E.M.

EFFECT OF BAUERENOL, A TRITERPENE ALCOHOL FROM EHRETIA MICROPHYLLA LAM: IN IMMUNOPATHOLOGICAL AND INFLAMMATORY REACTIONS

Drs. S.K. Nazimuddin, C. Gopalakrishnan and Lalitha kameswaran

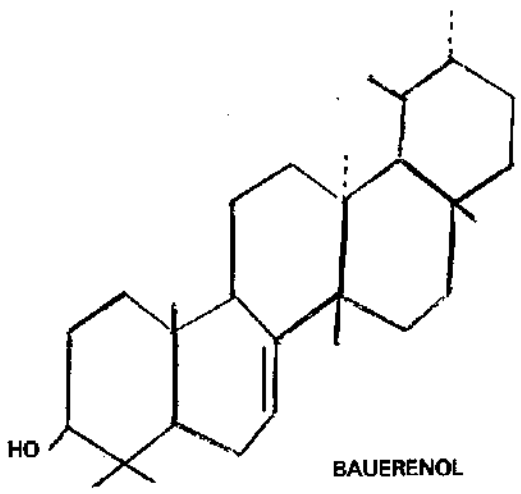
INDIA

INTRODUCTION

Ehretia microphylla (Family: Boraginaceae) is a medicinal small shrub which is used in syphilis, cachexia due to malignancy and as an antidote in vegetable poisoning. In philipines a decoction of the dried leaves is used for cough and stomach disorders and the leaves are used as a substitute for tea[1]. The plants belonging to family Boraginaceae are reputed to contain pyrrolizidine alkaloids which themselves are good anti-tumour agents. But however, there appears to be no report on the isolation of pyrrolizidine alkaloids from this genus hetherto. Nazimuddin et al[2] have reported its anti-inflammatory activity. In view of this finding, it is of interest to elucidate the effect of Bauerenol in various immunopathological and inflammatory reactions, since a number of non-steroids anti-inflammatory agents have been reported to interfere with one or more discrete phases of immunopathological and inflammatory events[3].

ISOLATION AND IDENTIFICATION OF BAUERENOL

Air dried, powdered leaves with stem were extracted with hexane by cold percolation. Removal of the solvent and refrigeration left a crystalline solid in fair yields (0.1%) This solid gave positive Libermann-Burchard reaction. Chromatography over silica gel followed by repeated crystallisation from hexane gave Bauerenol as colourless plates M.P. (206°-207°) (lit: 207°), the acetate melted at 292-94° (lit: 292-93°). All the compounds were characterised with IR and mass spectra. Oxidation of the alcohol gave a ketone, the mass spectrum of which was superimposable with the published spectrum of Bauerenone[4]. Finally it was confirmed by mixed melting point, mixed thin layer chromatography with an authentic sample of Bauerenol. The first isolation of Bauerenol was repoorted in 1958 from barks of Acronychia baueni[5].



BAUERENOL

MATERIALS AND METHODS

Drug Preparation and Administration:

Since triterpene monols are of lipid nature, they are soluable only in organic solvents such as benzene, chloroform etc., a fine suspension of the compound was prepared in 2% gum acacia using a "Remi Homogeniser" at 3000 rpm. The suspension was administered at a volume of 2 ml/kg i.p to guinea pigs and rats at a dose level of 50 mg/kg.

Animals:

Inbred strains of Wister albino rats and guinea pigs were obtained from Madras Veterinary college, Madras.

Immunological Studies:

To evaluate the effect of Bauerenol on humoral and cellular hypersensitivity reactions, the following parameters have been studied:

1. Systemic Anaphylaxis: This was done according to the method of Harnath and Shyamalakumari[6] using guinea pigs of either six (250-300 gm). The animals were sensitized with an i.p. injection of egg albumin in saline 4 g/kg. The animals were divided into 3 groups of 10 each and were administered with gum acacia, Bauerenol (50 mg/kg) and dexamethasone (1 mg/kg) respectively, 2 days before the commencement of the experiment and subsequently for 6 days after the injection of the antigen. A challenging dose of egg albumin (4 g/kg) was administered (i.p) after 10 days. Death of animals upto 24 hrs following the challenging dose was taken as lack of protection.
2. Schultz-Dale's reaction — Two groups of 5 guinea pigs each, were sensitized with egg albumin as described earlier. The control animals were administered with gum acacia and the test group with Bauerenol (50 mg/kg), 2 days before the commencement of the experiment and subsequently continued for 6 days. Ten days later all the animals were sacrified, test and the control groups, mounted in communicating organ bath containing Tyrode solution at 37°C. The tissues were exposed to the antigen-egg albumin and histamine at various concentrations, for a fixed time and the responses were recorded on a rotating smoked drum kymographically.
3. Immunocyto adherence or "Rosette formation" — This method is based on the specific binding of an antigen with the surface of cells containing the corresponding antibody and the experimental procedures have been described by Sriram and Srinivasa Rao[7]. The heterogenous cells adhere strongly in vitro to the lymphoid cells containing the corresponding antibody on their surface and give rise to characteristic "Rosettes", defined as any cell with more than half its circumference covered with red cells. Any decrease in the number of rosettes in comparison to control samples is taken as a positive response indicating possible interference in immune-reaction.

   Sensitization: Freshly collected sheep blood in "Alsever's" solution was centrifuged, processed according to the method of Sriram and Srinivasa Rao[7], the red blood cells were separated, standardised by counting in a haemo-cytometer, so as to give a concentration of 1×10^9 cells/ml and this was used for further studies. Three groups of albino rats (10 in each) were sensitized with sheep red blood cells (SRBC) at a dose level of 0.5 ml/100 g i.p. and the animals were administered with gum acacia, Bauerenol (50 mg/kg) and dexamethasone (1 mg-kg), respectively for 7 days. The animals were sacrificed on the 8th day, the spleen was removed, washed free of clots and cut into small bits. The cells were separated by pressing the fragments with a glass rod in a test tube, washed with cold buffered saline and counted in a haemo-cytometer. The lymphoid cell

suspension thus obtained was then treated with SRBC and the percentage of rosettes was counted using a haemo-cytometer and the results were interpreted according to the method mentioned above[7].

4. Adjuvant-induced arthritis — This was induced in 3 groups of albino rats (10 in each) by injecting killed mycobacterium tuberculosis cells suspended in paraffin oil (10 mg/ml), into the plantar region of the animals at a concentration of 0.1 ml/100 g, according to the method described by Edordo Arrigoni-martelli[3]. The animals were administered with gum-acacia. Bauerenol (50 mg/g) and dexamethasone (1 mg/kg), respectively 24 hrs before the injection of the adjuvant and subsequently continued for 10 days. The primary reaction characterised by pronounced swelling of the injected paw, was observed within 4hrs after the injection of the adjuvant and persisted for several weeks. The oedema volume was measured plythysmographically on the 1st day, 5hrs after the induction of oedema and subsequently on the 15th day. The paw volume of the contralateral limb was also measured on the 1st and 15th days. The delayed systemic response or the secondary response, was characterised by the swelling of the front paws, the contralateral paw and the appearence of arthritic nodules on the ear and tail. The ability of the test drug to inhibit the arthritic — syndrome was assessed and compared with the control and positive — control animals. The course of adjuvant — induced arthritis and the activity of the test compounds were also assessed by the grip strength method in which the ability of the animals to balance on a rotating rod (8 rpm) was tested as per the procedure of Bhide[8].

RESULTS

Systemic Anaphylaxis:

Pretreatment of Bauerenol at 50 mg/kg for 2 days and subsequently for 6 days after sensitizing the animals, afforded 50 percent protection against the mortality rate induced by the challenging dose of egg albumin on the tenth day after sensitization. While this gum acacia treated control animals died within 24 hours, after the administration of the challenging dose of egg albumin, only 5 out of ten animals pretreated with Bauerenol succumbed to the challenging dose, within 24 hrs. Only 3 out of 10 treated with dexamethazone succumbed to the challenging dose of antigen, thereby showing 70% protection.

Schultz-Dale Reaction:

The isolated ileal tissue of guinea pigs pretreated with gum acacia responded by contracting powerfully when the antigen (egg albumin 1:100) was administered into the organ bath. The tissues also responded well to histamine (10 mg/ml). The ileal strips removed from the animals pretreated with Bauerenol responded only very weakly to the administration of antigen, while the response to histamine was not altered to any significant extent.

Immunocytoadherance:

While addition of sheep erythrocyte cell suspension to the lymphoid cell suspension of the unsensitized animals did not produce rosettes, the addition of SRBC to the sensitized lymphoid suspension resulted in the formation of 45.5 ± 9.4% rosettes. Addition of SRBC to the sensitized lymphoid cell suspension obtained from animals treated with Bauerenol resulted in the formation of only 21.6 ± 5.5% rosettes. Similarly in the dexamethazone treated animals there was only 14.5 ± 6.5% rosettes ($p < 0.01$) thereby showing an inhibitory effect on immunocytoadherance.

Adjuvant-Induced Arthritis:

Though there are a number of parameters for assessing the course of adjuvant arthritis such as i) arthritic lesions; ii) joint "score"; iii) hind paw size; iv) grip strength; v) paw temperature; iv) joint histopathology; vii) erythrocyte sedimentation rate; viii) albumin/globulin rates; ix) plasma fibrinogens; x) heat-coagulation protein (inflammation units) and xi) lysosomal enzyme active (Edoardo Arrigoni-Martelli, loc. cit), for the present study only the hind paw size, as measured plethysmographically, and grip strength as tested by the ability of the animals to balance on the rotating rod (8 rpm) were estimated and comparative assessment was made between the animals treated with gum acacia and Bauerenol respectively.

The results of the effects of Bauerenol on adjuvant induced-arthritis in rats as evidenced by the measurement of paw size are given in Table I. Bauerenol was highly active in inhibiting the primary as well as the secondary responses of the adjuvant induced arthritis in rats. The additional parameter (grip strength method) to assess the course of adjuvant-induced arthritis and the activity of Bauerenol in inhibiting the arthritic syndrome also confirms the activity of Bauerenol. The results of the effect of Bauerenol on adjuvant-induced arthritis as tested by grip-strength method are presented in Table 2.

DISCUSSION

Bauerenol, a triterpene alcohol is active in suppressing the "acute" as well as the "chronic" inflammations as evidenced by the ability of the triterpene alcohol to inhibit carrageenin-induced hind paw oedema and cotton pellet granuloma in albino rats[2]. Bauerenol also interferes with one or more discrete phases in the secuenco of events leading to immunopathological and inflammatory responses as evidenced by the ability of the triterpene alcohol to inhibit systemic anaphylaxis, Schultz-Dale's reaction, immuno-cytoadherence and inhibition of the primary and secondary response in adjuvant-induced arthritis in experimental animals. Little evidence exists, in fact, that correlates clinical and experimental anti-inflammatory activity with immunosuppression. Among the several mechanisms of action proposed are I) interference with the synthesis of enzymes necessary for the release of inflammatory mediator; ii) interference with the pharmacological mediators of the inflammatory responses; iii) reduction of complement levels and iv) inhibition of mononuclear cell exudation. Further studies are required to elucidate the activity of Bauerenol with respect to the above in order to understand the precise mechanism by which Bauerenol interferes with various inflammatory and immunological events. Anti-inflammatory as distinct from immuno-supressive activity, has been described in several models of experimental inflammation for many immunosuppressive agents, such as 6-mercaptopurine, methotrexate, cyclophosphamide, chlorambucil and actinomycin-D. These drugs mainly act by preventing the participation of macrophages in delayed hypersensitivity and their infiltration into an inflammatory site. Similarly, a number of anti-inflammatory agents such as steroids, asprin like compounds, gold salts and pharmacological doses of oestrogen etc., have been shown to interfere with the immunopathological and inflammatory reaction such as adjuvant — induced arthritis. In view of the above findings, it would be interesting to extend such studies on Bauerenol as an immunosuppressive agent and elucidate its role in various immunological reaction as well as in experimental tumours in animals models.

ACKNOWLEDGEMENT

The authors are deeply indebted to Dr. P. Kulanthaivel, Department of Chemistry, Florida State University, USA; Dr. D.S. Narayanan, Professor of Chemistry, Dr. V. Rajasekaran, Biometric Scientist and Dr. S. Viswanathan, Pharmacologist of Madras Medical College for the Cooperation extended.

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TABLE-I
Effect of Bauerenol on adjuvant induced arthritis in rats
(Values are Mean ± SD)

	Primary response. Injected paw volume (ml)				
	Initial	5 th hr	% Red	15 th day	% Red
Control	1.26 0.15	3.45 0.22	——	2.45 0.25	
Bauerenol 50 mg/kg	13.50 0.20	2.50 0.25	27.5*	1.80 0.25	
Dexamethazone 1 mg/kg	1.30* 0.10	2.20 0.75	36.2*	1.60 0.05	

*$P < 0.01$

Secondary response. Contralateral paw volume (m1)			
%Red	Initial	15 th day	% Red
——	1.26 0.15	2.05 0.20	——
26.5*	1.35 0.20	1.50 0.10	26.8*
34.7*	1.30 0.10	1.40 0.10	31.7*

TABLE-2

Effect of Bauerenol on adjuvant induced arthritis as tested by the grip strength method

(Method: Rota-rod (8 rpm); animal: Wistar rats. Values are Mean ± S.D.)

Group	Balancing in sec.
Control	130.5 ± 14.8
Sensitized control	52.8 ± 10.5
Sensitized rats treated with Bauerenol	122.6 ± 18.6
Sensitized rats treated with Dexamethazone	125.5 ± 16.4

*$P < 0.001$

SOME RECENT ISOLATION AND SYNTHETIC STUDIES ON THE CONSTITUENTS OF INDIGENOUS MEDICINAL PLANTS

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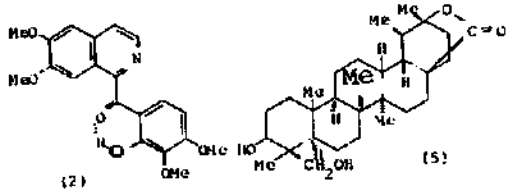
PAKISTAN

The bulk of the populations of the Afro-Asian countries, particularly those living in villages, rely on the indigenous medical system to provide relief from disease. Systematic scientific investigations, particularly during the current century, have resulted in the identification of a growing number of active constituents many of which are now routinely used in modern medicine. These include reserpine for the treatment of cardiac arrhythmias, vincamine as a vasodilator, and vinblastine and vincristine as anti-tumour agents, etc. Isolation, structural and synthetic studies have, accordingly, been directed in many laboratories around the world, including ours, to isolating new natural products which could prove to be valuable chemotherapeutic agents. Some of the recent studies carried out by my group at Karachi are briefly presented here.

ISOLATION AND STRUCTURAL STUDIES ON BERBERIS ARISTATA

Berberis aristata DC (Berberidaceae) is a shrub found in the northern mountainous regions of Pakistan and India as well as in the Nilgiri Hills of Southern India. The extracts, made from the root bark are known as *"rasaut"* and are used in the traditional system of medicine for the treatment of



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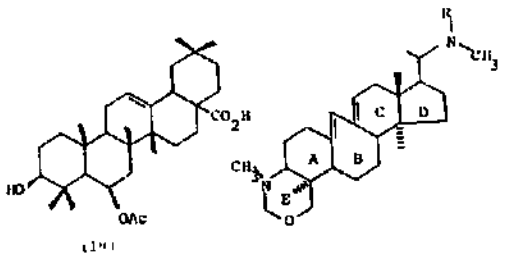
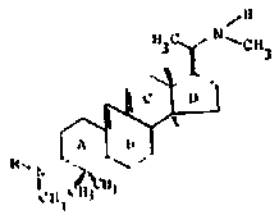




Papilamine (6) R = H
Papilicine (7) R = CH_3

Moenjodaramine (8) R = CH_3
I.R: ν_{max} 1360, 2940 & 1595 cm−1
U.V: λ_{max} 207, 237, 254 nm
Mass: m/e 426.3609 (M+),
58.0650 (100%)
NMR: δ0.71 (s,3H), 0.75 (s,3H), 1.03 (s,3H), 0.88 (d,3H)

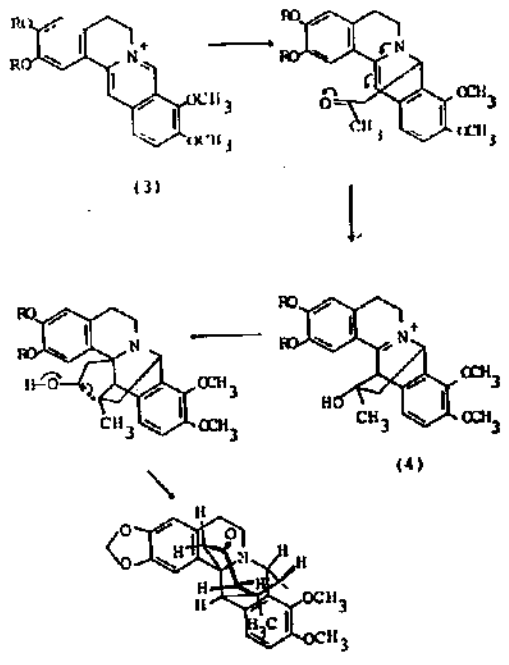
Harappamine (9) R = H
I.R: ν_{max} 3400, 2540, 1650 cm−1
U.V: λ_{max} 238,246
Mass: m/e 412.3454 (M+), 58.0660 (100%).
NMR: δ1.03 (s,3H). 1.06 (s,3H), 1.12 (s,3H), 0.72 (D,3H), 5.98 (s,1H), 5.56 (m, 1H).

jaundice and skin diseases. As a result of careful isolation studies, 2 new alkaloids, "Karachine" (1) and "Texelamine" (2) have recently been isolated (G. Blasko *et al.* 1982a, G. Blasko *et al.* 1982b). Karachine is the first naturally occuring berbinoid of this skeletal system and is the most complex of more than 50 protoberberine alkaloids presently known. Its structure (1) has been elucidated largely on the basis of its high resolution mass and 360 MHz (FT) nmr spectra, and the positioning of groups confirmed by Nuclear Overhauser Effect studies.

The uv spectrum of karachine, λ_{max} EtOH 226 and 285 nm (log ε 3.90 and 3.62), was suggestive of a tetrahydroprotoberberine. The mass spectrum shows the molecular ion at m/e 443, and the base peak at m/e 336. The latter peak fits exactly for the molecular ion of berberine or epiberberine and is formed by loss of 97 mass units from the molecular ion via cleavage alpha to the nitrogen atom (C-14 to C-ε bond), followed by a retro-Diels-Alder process. The m/e 97 fragment corresponds to C_6H_9O, or, more specifically, to 2 moles of acetone minus the elements of water (3). A sharp absorption band at 1710 cm−1 in the ir spectrum ($CHCL_3$) denoted the presence of a non-conjugated carbonyl.

The 360 MHz (FT) nmr spectrum in $CDCl_3$ presented a complex pattern, but allowed for the tentative assignment of expression 1 to karachine.

In order to settle conclusively the nature of the substitution pattern in aromatic-rings A and D, an n.o.e. study was carried out. Irradiation of the C-10 methoxyl singlet at δ3.77 resulted in an overall 11.6% increase in the area of the δ6.52 and δ6.55 ring D aromatic doublet of doublets. Alternatively, irradiation of the H-1 singlet at δ6.73 gave a 2.8% increase of the δ2.70 and 2.72 doublet of doublets assigned to the C-ε protons, as well as to a 5.6% increase of the signal at δ3.07 due to H-13. Significantly, irradiation of either the H-1 or H-4 singlets at δ6.73 and δ6.17 respectively led to no observable n.o.e. for the methoxyl absorptions. Further support for the structure of karachine has come from its borohydride reduction, and analysis of the mass and nmr spectra of the corresponding alcohol.



Scheme-1

Karachine must arise by the condensation of berberine (3) with 2 moles of acetone and accompanying loss of water, as suggested in the Scheme (1). It is the first naturally occurring berbinoid incorporating acetone units (Govindachari *et al.* 1981). It is a true alkaloid and not an artefact of isolation since (a) optically active, as well as inactive, naturally occurring adducts of the related benzo-phenanthridine alkaloids with acetone are known (M. Shamma *et al.* 1972), (b) no acetone was used during the isolation process, and (c) various attempts on our part to obtain karachine by condensation of berberine with acetone at carrying pH's were to no avail.

Taxilamine (2) was isolated by chromatography of the alkaloidal fraction (8 g) using neutral alumina. Besides a consistent u.v. spectrum, the 360 MHz (FT, $CDCl_3$) nmr spectrum of taxilamine shows H-5 and H-8 as singlets at δ7.15 and δ7.40, respectively; H-3 and H-4 as a doublet of doublets at δ8.46 and δ7.66 J_{vic} = 5.5 Hz); and H-5' and H-6' as another doublet of doublets at δ6.44 and δ6.28 (J_{vic} = 9.1 Hz). The 4 methoxyl signals appear as singlets at δ3.92, 3.96, 3.97 and 4.06. This spectrum bears a distinct resemblance to that reported for ugosinone (Wu *et al.* 1980). The mass spectrum of taxilamine confirmed the molecular formulation $C_{20}H_{19}O$ N and the structure (2) assigned.

Taxilamine (2) is the fourth member of its class of pseudobenzyl isoquinoline alkaloids and must probably have been formed in nature through oxidative rearrangement of palmatine to suply initially polycarpine. Hydrolytic N-deformylation followed by further oxidation would then afford taxilamine Murugesan *et al.* 1979).

ISOLATION AND STRUCTURAL STUDIES ON THE CHEMICAL CONSTITUENTS OF FAGONIA INDICA

Fagonia indica Linn. is a small spiny undershrub which is widely distributed in Pakistan. An aqueous decoction of the leaves and young twigs is a popular remedy for cancer in its early stages. A new sapogenin "Nahagenin" (5) (Atta-ur-Rahman *et al.* 1982a) has been isolated from the hydrolysed extracts of the aerial parts of the plant, and its structure has been elucidated on the basis of a 100 MHz NMR spectrum, a 100 MHz CMR spectrum and high resolution mass spectrum.

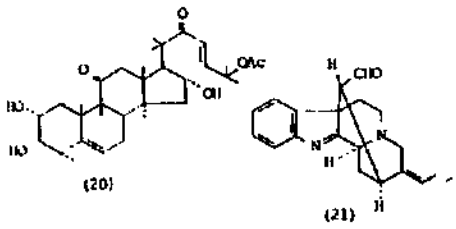
The substance analyzed for $C_{30}H_{48}O_4$ (confirmed by high resolution mass spectrometry, m/z = 472.3740 mass, 472.3552 for $C_{30}H_{48}O_4$). Major peaks in the MS occurred at m/z 454, 436, 424, 409, 395 and 261. The IR spectrum ($CHCl_3$) showed peaks at 1740 cm^{-1} and 3460 cm^{-1} suggesting a δ-lactone and hydroxy groups. The substance readily afforded a diacetate (m/e = 556), but was found to be remarkably inert to attempted hydrolysis of the lactone. The ^1H NMR showed no olefinic protons. The ^{13}C NMR recorded on a 400 MHz instrument confirmed the presence of 30 carbons. The carbon atoms in the A and B rings were readily recognised by comparison with corresponding signals of known pentacyclic triterpenoids (Knight *et al.* 1974). Eight quaternary centres and 6 methyl groups were also identified. The ^{13}C NMR displayed a resonance at δ177.29 for the carbonyl carbon, and 3 resonances at δ84.72 (s), 76.54 (dd) and 71.92 (d) for the oxygen-bearing carbons C (20), C(3) and C(23) respectively. On the basis of these spectral data, structure (5) was assigned to nahagenin which has been confirmed by an unambiguous structure determination by a single crystal X-ray diffraction analysis carried out by Prof. Clardy and co-workers at Cornell University.

ISOLATION AND STRUCTURAL STUDIES ON BUXUS PAPILOSA

Buxus papilosa (Buxaceae) is a shrub which occurs abundantly in the northern regions of Pakistan. Extracts of *Buxus* species have been used since ancient times for the treatment of a wide variety of diseases including malaria and venereal disease. *Buxus papilosa* has found use in the indigenous system of medicine as a febrifuge for relief of rheumatism and for the treatment of a number of other ailments. Four new alkaloids, papilamine (6) (Atta-ur-Rahman *et al.* 1983a), papilicine

(7) (Atta-ur-Rahman *et al.* 1983b), moenjodaramine (8) (Atta-ur-Rahman *et al.* 1983c), and harappamine (9) (Atta-ur-Rahman *et al.* 1983d), have recently been isolated by us from the leaves of this plant and their structures elucidated on the basis of the spectral data of the alkaloids as well as their derivatives. The spectral data obtained for each alkaloid are given against each structure.

The uv spectrum of moenjodaramine showed absorption maxima at 207, 237, 245 and 254 nm, characteristic of the presence of a 9 (10 → 19) *abeo*-diene system (Khuong *et al.* 1966). An identical u.v. spectrum is encountered in buxamine E, buxaminol E and papilamine (Atta-ur-Rahman *et al.* 1983a). The proton NMR spectrum ($CDCL_3$) showed 3 singlets, corresponding to the 3 tertiary methyl groups at δ0.71, δ0.75 and δ1.03. The secondary (C-21) methyl group resonated as a doublet at δ0.88 (J = 6 Hz). A 3-proton singlet resonating at δ2.1, was assigned to the — NCH_3 group, while another peak resonating at δ2.2 and integrating for 6 protons was assinged to the — $N(CH_3)_2$ group attached to C-20. A set of AB doublets resonating at δ3.24 and ϵ3.82 was assigned to C-29 methylene protons α-to the C-3 nitrogen. A singlet at δ5.98 was ascribed to the isolated olefinic proton at C-19 while a multiplet centred at δ5.55 was assigned to the C-11 olefinic proton.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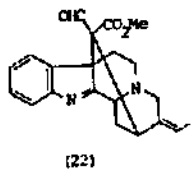
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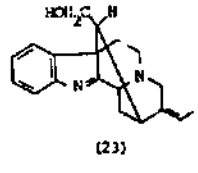
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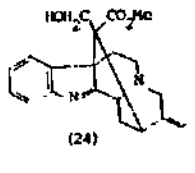
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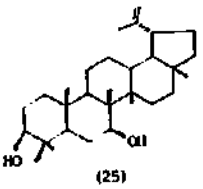

(25)

The mass spectrum of the compound afforded the molecular ion at m/z = 426.3609 which corresponded to the formula $C_{28}H_{46}N_2O$ (calcd. 426.3609). The substance showed a base peak at m/z 58.0650 corresponding to the composition $C_3H_8N^+$ which suggested the loss of CH_2N^+ $(CH_3)_2$ characteristically encountered in alkaloids bearing a — $N(CH_3)_2$ grouping on ring A, and which may be formed in moenjodaramine by intramolecular proton transfer and cleavage. Another peak at m/z 57.0625 corresponded to the fragment $CH_2 = {}^+N\,(CH_2)CH_3$. A peak at m/z 85.0883 was in accordance with the composition $C_5H_{11}N$ (calc. 85.089) which was attributed to $(CH_2)_2CH = N^+(CH_3)_2$ formed by the cleavage of ring A along with the side chain. A peak at m/z 72.0810 having the composition $C_4H_{10}N^+$ corresponded to the loss of $CH_3CH = N^+(CH_3)_2$ commonly encountered in alkaloids bearing a —$CH(CH_3)$ — $N(CH_3)_2$ grouping on ring D (Wallier *et al.* 1980). Another peak at m/z = 71.0734 having formula $C_4H_9N^+$ was assigned to the fragment CH_2 — CH = N^+ $(CH_3)_2$ formed by cleavage of ring A along with the side chain.

In the light of the above studies, structure (8) has been assigned to moenjodaramine. This substance has previously been reported as a synthetic product prepared from desoxy-16-buxidienine C (Khuong *et al.* 1971), but it has not been isolated. A second alkaloid, harappamine was similarly established to have structure (9).

Moenjodaramine (8) and harappamine (9) are the first representative numbers of a new class of pentacyclic natural products bearing both a tetrahydrooxazine ring and a 9 (10 → 19) *abeo*-diene system.

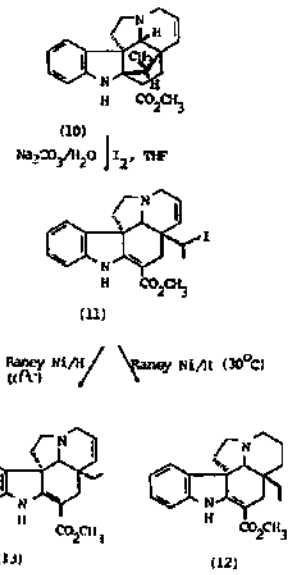
(a) ISOLATION AND STRUCTURAL STUDIES ON THE CHEMICAL CONSTITUENTS OF CATHARANTHUS ROSEUS

Studies on the alkaloids of *Catharanthus roseus* have resulted in the isolation of a new alkaloid, to which structure (10) has been assigned. The substance afforded a u.v. spectrum which was typical of a dihydroindole system, showing absorption maxima at 212, 246 and 303 nm and minima at 276, 226nm. The i.r. spectrum showed the presence of an ester carbonyl absorption at 1730 cm^{-1}. The mass spectrum was very similar to that reported for vindolinine (Djerassi *et al.* 1962) and 19-epi-vindolinine (Mehri *et al.* 1972). A high resolution mass measurement on the molecular ion afforded the exact mass to be m/z 336.1837 in agreement with the formula $C_{21}H_{24}N_2O_2$. The C-13 NMR spectrum of the alkaloid (10) (broad-band and off-resonance) showed interesting similarities to the C-13 NMR spectra reported for 19-R-vindoline (Ahond *et al.* 1974), 19-S-vindoline (Ahond *et al.* 1974), and 16-epi-19-R-vindolinine (Ahond *et al.* 1974). The ester carbonyl carbon resonated at δ173.47, whereas the methyl of the ester group resonated at δ52.6 (quartet). The substance afforded 4 doublets for the tertiary aromatic carbons, and 2 singlets for the 2 quaternary aromatic carbon atoms. A characteristic singlet appeared at δ81.36 corresponding to the quaternary carbon atom α to the indoline nitrogen (Atta-ur-Rahman *et al.* 1983e).

The H-NMR spectrum of (10) recorded on a 200 MHz instrument showed the presence of a doublet at δ0.62 (J = 7.4 Hz) which is assigned to the C-18 methyl protons. The proton adjacent to the carbomethoxyl function resonated as a double doublet at δ3.18 (J_1 = 12.2 Hz, J_2 = 5.8 Hz). A double-doublet at δ6.41 was assigned to the olefinic proton at C-15, showing coupling with the vicinal olefinic proton and an allylic coupling with the C-3 proton (J_1 = 10 Hz, J_2 = 2,8 Hz). The other olefinic proton at C-14 resonated as a doublet of double doublets at δ5.84 (J_1 = 10 Hz, J_2 = 5.2 Hz, J_3 = 1.8 Hz). The chemical shift of δ0.62 for the methyl group is consistnet with a 19-S-configuration as the methyl group of 19-S-vindolinine resonates at δ0.57 while the methyl group in 19-R-vindolinine resonates at δ0.95.

Direct t.l.c. comparison with authentic samples of vindolinine and epivindolinene showed that the substance could be just separated from these 2 materials in 25% ethanol in ethylacetate on a silica gel plate. In order to confirm the structure, the alkaloid (10) was subjected to an oxidative cleavage reaction (Janot *et al.* 1962, Rasoanaivo *et al.* 1974) with iodine/THF/H_2O/Na_2CO_3 when it was found to be smoothly converted to the iodo compound (11). On hydrogenolysis with Raney Ni at 30°C for 2 h, the iodo compound was found to be transformed to (—)-vincadifformine (12). When the same hydrogenolysis experiment was repeated at 0°C for 5 min, quantitative conversion to tabersonine (13) was observed (Scheme 2). The identity of the synthetic hydrogenolysis products was established by direct chromatographic and spectroscopic comparison with authentic samples of tabersonine and vincadifformine.

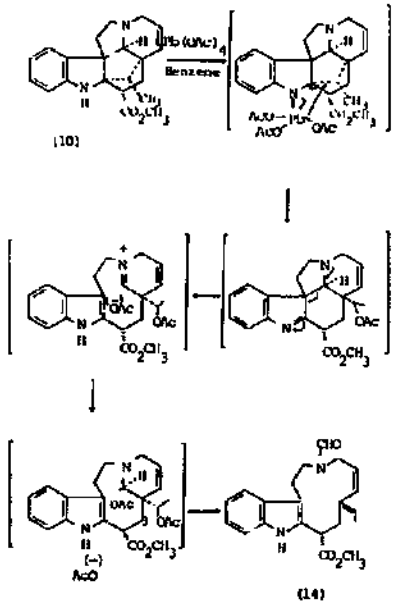
16-Epi-19-S-vindolinine, when refluxed in benzene for 3 h in the presence of an equimolar amount of lead tetraacetate, was found to be smoothly transformed to 2 faster runing products. The



Scheme-2

major product formed in 70% yield afforded a normal indolic u.v. spectrum. The i.r. spectrum (KBr) showed bands at 1655 cm^{-1} and 1730 cm^{-1}, which were assigned to N_b-CHO and $-CO_2CH_3$ groups respectively. The mass spectrum showed M^+ at 352.1783 (calc. for $C_{21}H_{24}N_2O_3$,352.1786), and other major peaks at 320, 293, 214, 169 and 154. The PMR spectrum ($CDCl_3$) showed resonances at δ1.23, (3H, d, J = 5.6 Hz, C = CH-CH_3), δ3.67 (3H, s, OCH_3), δ5.46 (IH, q, J = 5.6 Hz, C = CH-CH_3), δ5.7-6.1 (2H, m, HC = CH), δ7.6-6.9 (4H, m, aromatic), δ8.00 (1H, s, N_b-CHO) and δ8.35 (1H, s, NH). Irradiation at δ5.46 resulted in the collapse of the methyl group at δ1.23 to a singlet.

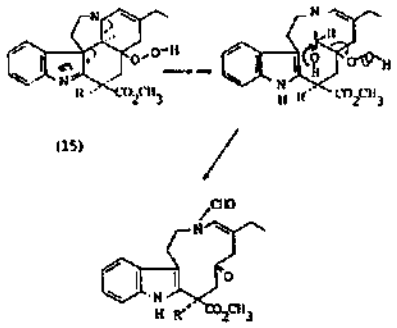
The above spectroscopic data were identical with those for (14), a product previously reported to be formed from 19-iodo-tabersonine on heating with sodium acetate in DMF (Diatta *et al.* 1976). In order to confirm the structure of the oxidation product, 16-epi-19-S-vindolinine (10) was oxidized with iodine under conditions previously described for the oxidation of its diastereo isomer (Rasoanaivo *et al.* 1974b). This afforded the corresponding 19-iodo-tabersonine in quantitative yields. Treatment of the latter with sodium acetate in hot DMF afforded (14). A direct spectroscopic and chromatographic comparison of the product formed by lead tetraacetate oxidation with that prepared from 19-iodotabersonine (Diatta *et al.* 1976) unambiguously established its structure. A plausible mechanism for the formation of (14) is presented in (Scheme 3).



Scheme-3

The second minor product formed in the lead tetraacetate oxidation possessed a u.v. characteristic for the dihydroindole system. Further work on the structure of this material is under progress.

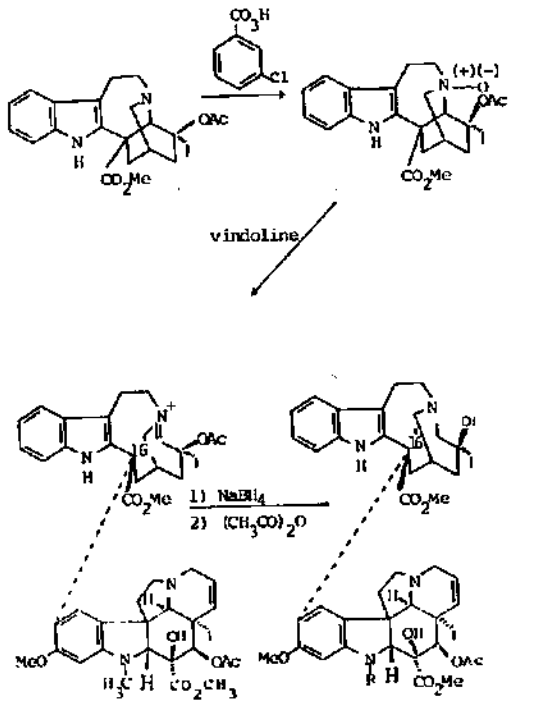
The facile formation of (14) from (10) is biogenetically interesting particularly in view of the occurrence of the binary indole alkaloids such as catharine (16) (Rasoanaivo *et al.* 1974c) in which one of the moieties bears a distinct resemblance to (14) & raises the interesting possibility that the indole moiety of catharine may arise by a parallel process occurring in a binary precursor alkaloid such as (15) (Scheme 4).



Scheme-4

(b) A RAPID PROCEDURE FOR THE ISOLATION OF CATHARANTHINE, VINDOLINE AND VINBLASTINE

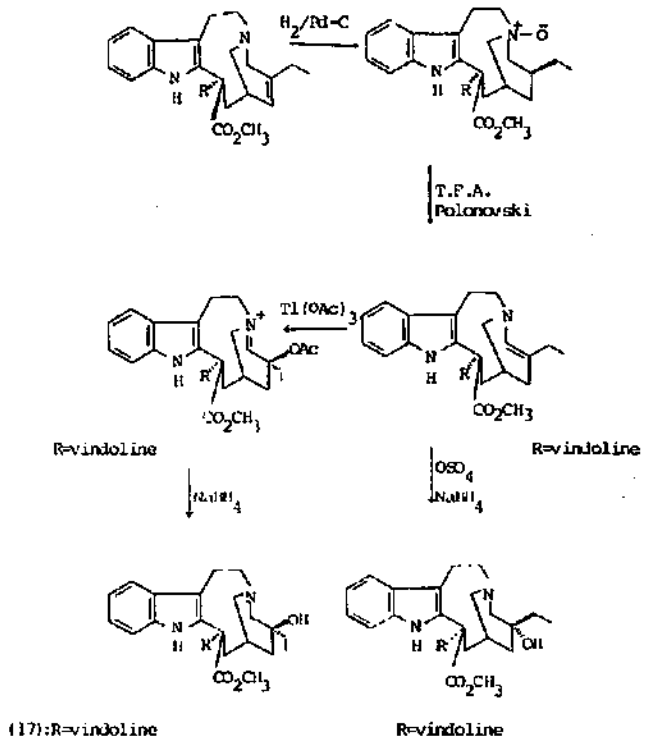
The binary indole alkaloids vinblastine (17) and vincristine (18) are among the most potent chemotherapeutic agents known to man, and are being used for the treatment of several different



Scheme-5

type of cancer including Hodgkins disease, acute leukaemia in children and choriocarcinoma. As both alkaloids occur only in minute traces in the leaves of *Catharanthus roseus,* they cost several thousand dollars per gram. This has attracted the attention of a number of groups towards their synthesis.

Our earlier efforts in this field (Atta-ur-Rahman *et al.* 1980) have led to 2 different syntheses of vinblastine based on functionalisation of the olefinic bond of catharanthine before (Atta-ur-Rahman *et al.* 1976) (Scheme 5), or after (Atta-ur-Rahman *et al.* 1978) (Scheme 6) (Atta-ur-Rahman 1980b, 1981) coupling with vindoline, These syntheses employed a novel modification of the polonovski reaction developed by Potier and co-workers (Potier *et al.* 1975). A similar approach to vinblastine has also been reported by the French group (Managaney *et al.* 1979).



Scheme-6

As the above synthetic routes were all based on catharanthine and vindoline as starting materials, it was important to develop an isolation procedure which could afford these alkaloids in bulk without having to resort to extensive chromatography, We have now developed a rapid isolation procedure for the isolation of catharanthine, vindoline and vinblastine. This procedure has been tested and found to be extremely satisfactory both at laboratory and pilot-plant levels. This should produce catharanthine, vindoline and vinblastine much more readily, as well as stimulating further research on the development of new antitumoural derivatives of these oncolytic alkaloids. The procedure that we have developed (Atta-ur-Rahman *et al.* 1982b, Atta-ur-Rahman *et al.* 1983f), involves extraction of the alkaloids with pH 3 phosphate buffer, selective precipitations by use of appropriate solvents and selective extractions. For vinblastine, a direct and simple isolation procedure has been developed which does not involve any chromatography, but affords pure vinblastine sulphate in yields of 0.02% to 0.025% by weight of the dried leaves (8-10 gm of vinblastine from 40 kg of leaves). Pilot plant investigations have proved very successful and commercialisation of the procedure is under active exploration.

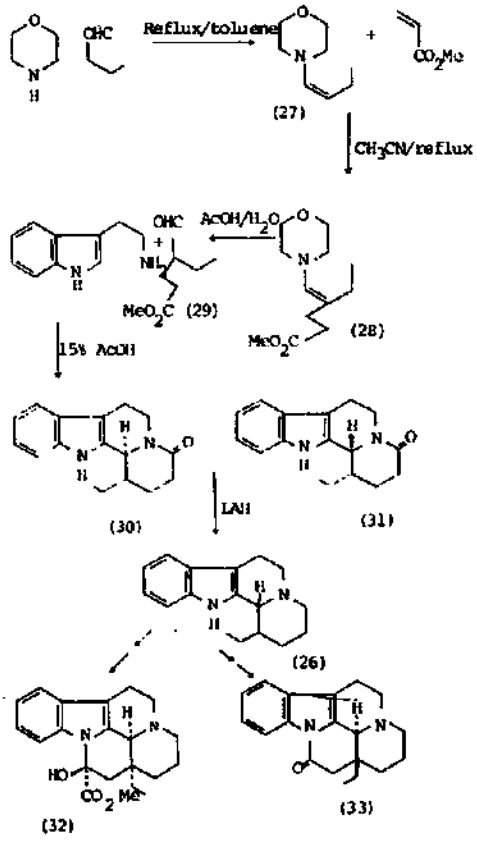
ISOLATION AND STRUCTURAL STUDIES ON THE CHEMICAL CONSTITUENTS OF BETULA UTILIS

Betula utilis is a tree commonly found at high altitudes in the temperate Himalayas extending from Chitral eastwards to Azad Kashmir, and in Sikkim and Bhutan. The infusion of its bark has found wide use in indigenous medicine as an antiseptic, carminative, and for hysteria. Our interest in the systematic investigation of the chemical constituents of Pakistani medicinal plants has led us to a chemical investigation of the bark of *Betula utilis*. This has resulted in the isolation of a new triterpenoid, "Karachic acid" (19), the structure of which has been solved on the basis of chemical and spectroscopic studies (Atta-ur-Rahman & Khan 1975).

ISOLATION AND STRUCTURAL STUDIES ON THE CHEMICAL CONSTITUENTS OF CUCUMIS PROPHETARUM

The isolation of a number of cucurbitacins with cytotoxic properties prompted us to investigate the active principles present in the fruits of *Cucumis prophetarum* (Cucurbitaceae), a plant locally known as "Choti indrayan" or "Khar indrayan". It is a perennial trailing herb with ellipsoidal echinate fruits. The plant grows wild in various regions of Pakistan, Rajputana (India), Saudi Arabia and tropical Africa. The fruits are used in indigenous medicine as an emetic and purgative. It is known to contain cucurbitacins B and D and traces of cucurbitacins G and H.

As a result of isolation studies carried out on the fruits of this plant, we have isolated a new cucurbitacin, cucurbitacin Q-1 (20) which closely resembles cucurbitacins O and P in its structure (Atta-ur-Rahman *et al.* 1972). The cytotoxicity of these cucurbitacins against Eagles KB strain of human carcinoma of the nasopharynx has been demonstrated and it has been shown that the side-chain double bond and tertiary acetate are essential for cytotoxic activity. The activity of cucurbitacin Q-1 would, therefore, be of interest, and it is being studied by the National Institutes of Health, Bethesda, U.S.A.



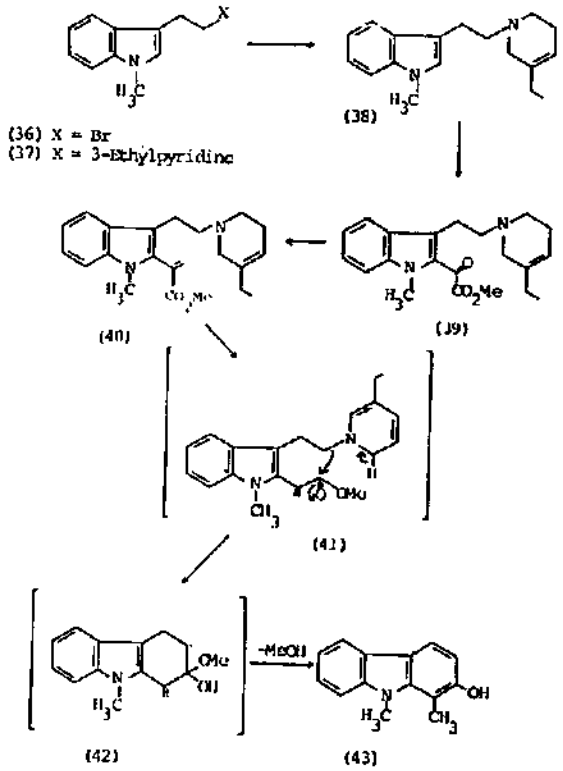
Scheme-7

ISOLATION AND STRUCTURAL STUDIES ON RHAZYA STRICTA

Rhazya stricta Decaisne (Apocynaceae) is a small glabrous erect shrub which grows profusely in the north-western region of the Indo-Pakistan subcontinent. It is used by the traditional practitioners as a bitter tonic for sore throat, in fever, in general debility and as a curative for chronic rheumatism. As a result of isolation and structural studies carried out by us, a number of new alkaloids have been isolated and their structures elucidated. These are strictalamine (21) (Knight 1974), rhazimal (22) (Atta-ur-Rahman *et al.* 1977), rhazinol (23) (Atta-ur-Rahman *et al.* 1979), and rhazimol (24). Space does not permit a detailed discussion. The structures are shown in the Fig. I.

STUDIES ON THE CHEMICAL CONSTITUENTS OF LORANTHUS GREWINKII

Siddiqui and co-workers had previously reported a new triterpenoid, "loranthol" from the berries of *Loranthus grewinkii*, a parasite found widely distributed on pear, apricot and almond trees. The gum from these berries is widely used in the indigenous system of medicine as a general tonic, relaxant and laxative. This triterpenoid has been re-isolated and its structure (25) has been elucidated on the basis of chemical and spectroscopic studies (Atta-ur-Rahman *et al.*1973).



Scheme-8

A FORMAL TOTAL SYNTHESIS OF (±) — VINCAMINE AND (±) — EBURNAMONINE

In veiw of the reported pharmacological properties of vincamine (32) and eburnamonine (Taylor *et al.* 1973), we have developed a new route to these alkaloids involving a novel synthesis of the key intermediate (26) a compound which contains 4 of the requisite 5 rings and 2 of the 3 chiral centers.

Butyraldehyde and morpholine were condensed by the method of Stork (Stork *et al.* 1963) to afford the morpholinoenamine (27). Alkylation of (27) with methyl acrylate gave the dialkylated product (28) which was hydrolysed with aq. acetic acid to give (29) in 45% yield.

Condensation of (29) with tryptamine afforded a gum which on purification through a silica column gave a mixture of 2 diasteroisomeric compounds, which could readily be separated by preparative layer chromatography as (30) and (31) (Scheme 7) each of which crystallised as white needles m.p. 185-186°C and 230°C respectively.

Lithium aluminium hydride reduction of the diastereoisomeric mixture of (30) and (31) afforded the amine (26) in 20% overall yield; (26) is convertible to vincamine and eburnamonine by one of several routes (Kuehne 1964, Wenkert & Wickberg 1965, Hermann *et al.* 1979). This, thus formally, constitutes a total synthesis of these alkaloids (Atta-ur-Rahman & M. Sultana 1982c).

A TOTAL SYNTHESIS OF N-METHYL SECODINE

The currently accepted biosynthetic route to the indole alkaloids envisages the mediation of 14, 21-dehydrosecodine (34) which can undergo intramolecular Diels-Alder reactions in 2 different ways to afford the Iboga alkaloids catharanthine (35), or the Aspidosperma alkaloid tabersonine (Wenkert 1962). Inspite of intensive efforts by several groups, the synthesis of dehydrosecodine has still not been accomplished because of its high susceptibility to oxidation, dimerization and polymerisation; the synthesis of N-benzyldehydrosecodine has recently been reported (Kutney *et al.* 1982). Secodine has, however, been synthesised (Kuehne *et al.* 1978, Kutney 1979, Raucher *et al.* 1981, Marazano *et al.* 1977), and a number of approaches to the indole alkaloids involving the intermediacy of the secodine system have been studied (Kuehne *et al.* 1979, Scott *et al.* 1974). We have recently developed a short and high yield synthesis of N-methyl secodine based on a facile Friedel-Crafts acylation reaction at the indole 2-position (Atta-ur-Rahman *et al.* 1983h) which is shown in Scheme 8.

N-methyl secodine (40) when refluxed in acetonitrile for 8h afforded the 2-hydroxy carbazole (42) as a major product (yield 80%). The facile conversion of the secodine derivative to the carbazole system (43) (Scheme 8) suggests the intermediacy of N-methyl dehydro-secodine (41) in the reaction which may have been formed through aerial oxidation. The generation of carbazole derivatives has previously been reported (Kutney *et al.* 1982b, Scott & Cherry 1969), and it has been proposed that 2-hydroxy carbazole if formed via dehydro-secodine by an intramolecular rearrangement and hydrogen transfer mechanism. A parallel project aimed at synthesising N_a-benzylsecodine has also been carried out. This synthesis represents the shortest route (reported to date) to the secodine system. Attempts are presently underway to generate the corresponding dehydrosecodines for biomimetic transformations to the Aspidosperma and Iboga alkaloids.

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PHARMACOLOGICAL EVALUATION OF *BERBERIS ARISTATA* IN EXPERIMENTAL CHOLERA AND OTHER DIARRHOEAS

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INTRODUCTION

Exhaustive description of the medicinal usefulness of the plant *Berberis aristata* (Arabic - "Ambarbaris"; "Aargis") has been given by Bu-Ali-Seena[1]. This plant has been claimed to be effective in bleeding disorders, haemorrhoids, flatulance, dysentery, indigestion, sprue, anal fissure, diarrhoea and gastroenteritis and as stomachic, choleretic, antispasmodic and constipatory. Utility of this plant has also been appreciated by other Arab Physicians[2]. The value and popularity of this plant has persisted upto twentieth century since several formulations developed for the treatment of acute gastroenteritis, diarrhoea and dysentery contain *Berberis aristata* decoction/extract ("Aargis") or its alkaloid berberine as one of the important ingredients.

Berberine ($C_{20}H_{19}O_5N$) is the chief alkaloid present in *Berberis aristata.* Scientific evidence of its empirical use in gastroenteritides came only in 1967 when its efficacy was demonstrated in clinical trials in patients suffering from cholera or severe nonspecific diarrhoea; it was observed that altogether berberine was more effective than chloramphenicol[3]. The present study was, therefore, planned to study its effect in experimentally-induced cholera and other diarrhoeas and to work out the possible mechanism of antidiarrhoeal effect of berberine.

MATERIAL AND METHODS

Cholera toxin:

Crude cholera toxin powder was manfactured by the Wyeth Laboratories, Marietta, U.S.A. The toxin was received in two lots, namely, Lot 001 prepared from *Vibrio cholerae* strain B1307 and Lot 002 from the strain B569. However, in the following experiments, they did not show difference in their potency. Therefore, they have not been mentioned individually and the crude cholera toxin powder of both the lots is just referred as "cholera toxin". Each gramme of crude powder contained 1.068mg of highly purified cholera toxin (Miller, 1974, Personal communication). This highly purified toxin is also known as "fluid accumulating factor (FAF)" or "choleragen" or "enterotoxin" or "cholera enterotoxin". Aqueous solution of the cholera toxin was prepared freshly every day for our experiments.

Effect of drugs on diarrhoea induced by feeding

Cholera toxin in adult rats:

Albino rats (112-258gm) of either sex were denied food for 6 hours but were allowed water *ad lib.* Thereafter, the drugs were administered through a stomach tube. To different groups of rats, berberine (sulphate), Aargis (the traditional crude dried preparation of *Berberis aristata* decoction), atropine (sulphate), norphine (sulphate), indomethacin (suspended in propylene glycol) or distilled water was administered, orally, 5 minutes before cholera toxin. Individual rats were then placed in separate metallic cages with blotting paper spread at the botton. Water was allowed throughout 24 hours observation period but food was denied for 7 hours after giving cholera toxin. The latent period

of diarrhoea and the number of loose stools passed by individual rats were noted. Purging response of each group was comprehensively assessed by calculating the purging index as per the following formula -

$$\text{Purging Index} = \frac{\text{Per cent rats responding by purging} \times \text{Mean number of loose stools of respondents}}{\text{Mean latent period of respondent in hours}}$$

Effect of drugs on cholera toxin-induced fluid formation in the gastrointestinal tract of adult albino rats:

Animals (105-200gm) were denied food for 6 hours but had water *ad lib.* Groups of rats received the drugs, orally, about 5 minutes before cholera toxin. Individual rats were then placed in separate cages with water but without food and were observed for 4 hours. As soon as an individual passed a loose stool, it was killed by chloroform; those which did not pass loose stools were killed exactly at 4 hours. The abdomen was opened, gastrointestinal tract dissected out and its contents carefully collected, measured and weighed. Water value was calculated from the fresh and constant dry weights of the contents. In many experiments, after ascertaining the constant dry weight, the dried residue was thoroughly mixed with 75ml distilled water and the clear supernatant was used for estimating Na^+ and K^+ (by flame photometer) and chloride[4].

Effect of drugs on the cholera toxin-induced fluid accumulation in the ligated intestinal loop of adult rats:

The method[5] was modified as follows to render it more consistent. Adult albino rats (118–185gm) of either sex were denied food for 27–36 hours but had 5 per cent glucose water *ad lib.* Abdomen was opened under pentobarbitone anaesthesia and, extending from 3cm below the pylorus, a 30cm long intestinal loop was prepared by two ligatures. Berberine, atropine, morphine, indomethacin (suspended in propylene glycol), propylene glycol or distilled water was injected into the loop just before cholera toxin injection. Loop fluid was collected after 5 hours and its Na^+, K^+ and Cl^- concentrations were estimated. In view of the possibility that berberine might act against cholera toxin promptly or after many hours, in some groups, loop fluid was collected at 3, 8 or 12 hours after injecting berberine and cholera toxin.

Effect of berberine on diarrhoea induced by Ipomoea turpethum root powder in dogs:

Healthy mongrel dogs (8–16kg) of either sex were maintained on boiled meat, bread and water *ad libitum,* for atleast 3 days; only those dogs which passed formed stools were used. For inducing diarrhoea[6], 1gm of freshly powdered root of *Ipomoea turpethum* (Arabic - "Turbud") was mixed with 200ml milk and dogs were allowed to drink. In some experiments, berberine was given with Ipomoea powder in the milk. Negative control animals received only milk. To assess severity of diarrhoea, frequency of defaecation and consistency of each stool passed by individual dogs were observed over 24 hour period. Stools were classified into the following categories and assigned grades: solid formed stool -1 grade; soft uniform stool - 2 grades; and frank liquid stool - 4 grades. Grades secured by each dog over a 24 hour period after drugging were recorded.

Effect of berberine on magnesium sulphate-induced diarrhoea in adult rats:

Adult albino rats (100-190gm) of either sex were denied food for 6 hours but were allowed water

ad libitum. Magnesium sulphate ($MgSO_4$. $7H_2O$) was administered orally, by stomach tube, in doses of 1.25, 2.5 and 5gm/kg as 25 per cent w/v aqueous solution. Individual rats were then placed in separate cages which had white blotting paper spread at their bottom. Rats were watched for 8 hours for the latent period of diarrhoea and number of loose stools. Water (without food) was freely available throughout this period. Severity of diarrhoea of each group was comprehensively assessed by calculating the purging index. Effect of berberine on diarrhoea induced by 5gm/kg dose of magnesium sulphate was studied in some rats; in this experiment, berberine was administered about 5 minutes before magnesium sulpate.

Intestinal motility of mice by the charcoal meal method:

Adult mice (15—30gm) of either sex were denied food for 24 hours but offered 5 per cent w/v glucose water *ad libitum*. Charcoal meal[7] was prepared by suspending 1gm finely powdered activated charcoal in 10ml of about 25 per cent gum acacia in water. The mice were given orally 0.2ml of the charcoal meal, 30 minutes after they received the following drugs (intraperitoneally) - berberine, atropine, morphine, carbachol, neostigmine or distilled water. In some groups berberine, atropine or morphine was given by the oral route. Effect of giving berberine orally, thrice, at an interval of 2 hours was also studied in some mice. Twenty minutes after charcoal meal feeding, mice were killed by sharp blow on the head. The abdominal cavity was opened and the entire small intestine from pylorus to ileocaecal junction was then gently freed by cutting the intestinal edge of the mesentery. The freed intestine was gently placed, without stretching, in a straight line on a white filter paper. Length of the entire small intestine as also of the portion traversed by dark-coloured charcoal meal were measured. Percentage of the small intestine length travelled by charcoal was then calculated.

Study of the alluded astringent action of berberine:

Purified bovine serum albunin (0.5 per cent w/v in water) or fresh egg-white (25 per cent v/v in water) was taken in 1-2ml volumes, in a series of clean glass test tubes. To these tubes, different quantities of berberine or tannic acid dissolved in distilled water were added and the degree of precipitate formation was observed. Solubility of precipitates in 0.1 N KOH or alcohol was also studied.

Passage of electrolytes into 5.5 per cent glucose water injected into the rat peritoneum:

Adult albino rats (90-140gm) of either sex were anaesthetized by intraperitoneal injection of sodium pentobarbitone (35mg/kg). The animals were injected[8] intraperitoneally 5ml glucose water (5.5 percent) per 100gm body weight. One ml of the injected fluid was aspirated from the peritoneal cavity every 5 minutes upto 20 minutes and subsequently after 30 minutes and thereafter every 30 minutes upto 120 minutes. The volume of peritoneal fluid drawn on each occasion was replaced by an equal volume of glucose water. The aspirated peritoneal cavity fluid samples were then used for estimation of Na^+, K^+ and Cl^-. In some experiments, different doses of berberine were mixed with 5.5 per cent glucose water before it was injected intraperitoneally.

RESULTS

Effect of berberine on diarrhoea induced by feeding cholera toxin in adult rats:

Results are presented in Table I. For about 3½ hours after oral administration of cholera toxin,

rats passed a few well-formed pellets which were not counted. Subsequently, they passed soft to frank liquid stools which are referred to as "loose stools". Most of the animals recovered completely within 7 hours after feeding cholera toxin; there was no mortality or apparent distress to the animals. On feeding 2gm/kg cholera toxin, rats manifested diarrhoea (average loose stools 4.9) and showed high purging index (127). Three mg/kg dose of berberine extended the latent period of diarrhoea. Ten mg/kg dose was more effective in that it also reduced the average number of loose stools from 4.9 to 3.4 and percentage of respondents from 95 to 50; these factors reduced the purging index to 25. Thirty mg/kg berberine and 1.2gm/kg "Aargis" were also effective. Four gm/kg dose of cholera toxin produced more severe purging but no mortality; it was reduced convincingly by 10 and 30mg/kg dose of berberine. In this method atropine and morphine proved more effective than berberine. Indomethacin was entirely ineffective.

Effect of berberine on the cholera toxin-induced fluid formation in the gastrointestinal tract of adult rats:

Results are presented in Table 2. Cholera toxin promoted passage of water and electrolytes into the gastrointestinal tract while berberine and "Aargis" inhibited this effect. Thus, rats receiving 2gm/kg cholera toxin had about 3 times (11.9ml) more fluid in the gastrointestinal tract than the control animals (3.9ml). At 10 and 30mg/kg doses berberine significantly reduced this action of cholera toxin. "Aargis" 1.2gm/kg also significantly reduced fluid accumulation though its effect was less than that of 10mg/kg berberine. Berberine as also "Aargis" reduced Na^+ and Cl^- (but not K^+) contents of the gastrointestinal fluid augmented by cholera toxin (Table 2). In this, "Aargis" appeared to act better than berberine particularly against chloride loss.

Atropine and morphine did not reduce the fluid accumulating action of cholera toxin though they symptomatically suppressed purging in intact rats. Indomethacin was also totally ineffective in reducing volume and electrolytes.

Effect of berberine on the cholera toxin-induced fluid accumulation in the ligated intestinal loop of adult rats:

Results are presented in Table 3. Cholera toxin induced fluid accumulation in the ligated intestinal loop of adult rats; 100mg produced significantly more fluid than 30mg ($P < 0.02$). Five mg berberine convincingly reduced the fluid accumulating action of both the doses of cholera toxin ($P < 0.001$). Thirty mg berberine appeared about as effective as 5mg. At 5mg dose, indomethacin, unlike berberine, proved much less effective whereas at 30mg dose it was as effective as berberine. Propylene glycol (used for suspending indomethacin) did not inhibit fluid formation. Also, atropine and morphine did not influence the fluid accumulation induced by cholera toxin.

When allowed to act against cholera toxin for different periods, berberine showed clear inhibitory effect during the first 3-5 hours period. After 5-8 hours, there was a general tendency for the fluid to get reabsorbed which was apparently facilitated by berberine.

In this experiment, berberine or other drugs did not influence the electrolyte composition of the fluid accumulated by cholera toxin.

Effect of berberine on diarrhoea induced by Iponoea turpethum ("Turbud") root power in dogs:

Feeding ipomoea powder (1gm/kg) induced prompt purging which usually started within 90 minutes and lasted for 2–3 hours. The stools were profuse, watery and often bile-stained. There was no vomiting or anorexia and the animals remained otherwise normal. Berberine (0.06–20mg/kg)

significantly prolonged the latent period and frequency of purging and, thus, significantly lowered the purging score (Table 4). However, antidiarhoeal effect of berberine was not dose-dependent.

In control dogs, 200ml milk alone or alongwith 6 or 20mg/kg berberine did not produce any purging.

Effect of berberine on magnesium sulphate-induced diarrhoea in adult rats:

Oral administration of magnesium sulphate produced dose-dependent diarrhoea (Table 5). However, its 5mg/kg dose was found to be most effective as it produced purging in all the rats. Purging started after about 4 hours and subsided within 8 hour, after which the rats started passing normal stools. The average number of loose stools was 5.3. Throughout the experiment, the rats appeared normal and there was no mortality. Berberine in doses of 0.3, 3 and 30mg/kg did not significantly reduce diarrhoea induced by magnesium sulphate. It was observed that in these experiments, availability of water is absolutely essential. In preliminary experiments in which water was not kept in the cages rats receiving 5gm/kg magnesium sulphate died in a few hours and often before manifesting diarrhoea.

Effect of drugs on the intestinal motility of mice:

By intraperitoneal route: - As shown in Table 6, in control mice, 60 per cent length of the small intestine was travelled by charcoal. Small doses (1 and 3mg/kg) of berberine had no effect on the motility; 10mg/kg reduced the motility so that charcoal travelled 17 per cent length. Atropine (10mg/kg) and morphine (10mg/kg) had about the same degree of inhibitory effect. Atropine and berberine combination did not manifest a clear additive effect. Neostigmine (100ug/kg) and carbochol (50ug/kg) somewhat increased the motility, the charcoal travelling 74 and 76 per cent length respectively. Berberine, like atropine and morphine clearly antagonised the stimulant effect of neostigmine and charbachol.

By oral route: - In 10 control mice, 65 per cent length of the small intestine was travelled by charcoal. On oral administration or 10mg/kg of berberine, the mean length of charcoal travel was 64 per cent of small intestine (12 mice). Larger dose of berberine (40mg/kg; 10 mice) given orally 2 hours before charcoal feeding, reduced the charcoal travel distance from 65 to 45 per cent. Three administrations of 40mg/kg dose of berberine did not produce any better effect (45 per cent length travelled in 10 mice). When given orally, atropine (10mg/kg; 10 mice) had no effect on the intestinal motility. Morphine (10mg/kg; 10 mice) was more effective by oral route and reduced charcoal travel distance to 38 per cent.

Study of alluded astringent action of berberine:

Tannic acid (0.15 - 6mg/ml) precipitated purified bovine serum albumin and fresh egg-white. Density of precipitate was proportional to the amount of tannic acid; 0.1 N KOH but not alcohol immediately and completely dissolved the precipitate. However, berberine (0.15-6mg/kg) did not form a precipitate with bovine serum albumin or egg-white.

Passage of electrolytes into the 5.5 per cent glucose water injected into the rat peritoneum:

Results are presented in Table 7. In control animals, considerable Na^+, K^+ and Cl^- appeared into the peritoneal glucose fluid within 5 minutes of its injection and, over 2 hours the values steadily rose. Addition of 0.3, 3 or 30mg/kg berberine did not influence the temporal course or degree of these electrolyte shifts.

DISCUSSION

Berberine convincingly reduced the severity of diarrhoea induced by cholera toxin. It manifested antidiarrhoea effect in 3 ways; (a) it reduced the percentage of rats that manifested purging (b) it prolonged the latent period of diarrhoea and (c) it reduced the number of loose stools. These factors, together, decreased the purging index of berberine treated groups.

Berberine also significantly reduced the volume of water and electrolytes that accumulated in the gastrointestinal tract after feeding cholera toxin.

Berberine decisively reduced the fluid accumulation induced by cholera toxin in the rats ligated intestinal loop. These findings in rats agree with the earlier report on adult rabbit ligated ileal loop[9].

Berberine inhibited fluid accumulation by cholera toxin during the first 5 hours. This suggested that the process of late reabsorption of the fluid in the ligated loop is also facilitated by berberine. These findings indicate that berberine may help in clinical cholera by a dual mechanism, namely (a) by inhibiting initial fluid formation and (b) by promoting later reabsorption.

Fluid that accumulates in the ligated rat intestinal loop after cholera toxin instillation shows remarkably constant electrolyte composition in different experimental conditions. Berberine which certainly reduced its volume (Table 3) did not influence electrolyte concentrations. These data suggest that this method is suitable for studying volume but not electrolytes unlike method 2 which allows study of both fluid and electrolytes.

In the above mentioned 3 methods as also in the previous work[10] involving adult rats, berberine produced its beneficial effects when administered just 5 minutes before or with cholera toxin. In the infant rabbits, on the other hand, berberine had to be given 18—24 hours earlier to elicit action against cholera toxin which prompted earlier workers[9] to propose a role of host tissues. This difference between the two studies could be due to differences in age and species of the animals. Our findings suggest that in adult rats, berberine acts against cholera toxin immediately, directly and perhaps without the role of host tissues.

Over the hundreds of years, "Aargis" - a dark-brown solid has been the common form in which *Berberis aristata* plant has been prescribed and used. It forms a deep yellow suspension when mixed with water. The actual concentration of berberine may vary[11] greatly in different samples of "Aargis" (0-3.5 per cent, average 0.79 per cent). It reduced the severity of diarrhoea and also the fluid volume and electrolytes. Indeed, compared to berberine, "Aargis" appears to inhibit transport of electrolytes more effectively than that of water. It would be interesting to study the contribution of ingredients of "Aargis" other than berberine. The dose of "Aargis" in this work was calculated on its expected berberine content.

Atropine reduces gastrointestinal motility by parasympatholytic action and morphine by a direct potent motor inhibition. Though useful in moderate gastroenteritides, these drugs are considered to be ineffective and even dangerous in severe cholera. The present work supports this clinical opinion. Thus, atropine and morphine apparently manifested anticholera action in that they convincingly reduced the incidence of diarrhoea (Table I). However, unlike berberine, they did not inhibit fluid accumulation in the gastrointestinal tract (Table 2) or ligated loop (Table 3). Therefore, it is reasonable to suggest that their diarrhoea-masking effect was entirely due to inhibition of gastrointestinal motility and not due to true anticholera action. This finding also indicates that, during drug screening, anticholera effect obtained in method I should be confirmed by methods 2 and 3. It is interesting to note that atropine, morphine and berberine were used here in doses that are respectively about 150,15 and three times higher than the daily human dose.

Indomethacin is a clinically used potent non-steroidal anti-inflammatory drug. In subacute

inflammation induced by subcutaneous injection of cholera toxin (which takes 27 hours to develop and lasts for 3 days), berberine and indomethacin were found equally potent inhibitore[10]. Therefore, it was tried against cholera toxin here in the 3 gastrointestinal methods in adult rats. In these methods where the toxin has to act swiftly and for a shorter time, indomethacin was found to be entirely ineffective (Tables 1 and 2) or much less potent (Table 3) than berberine. Further unlike berberine, the dose of indomethacin used in these methods exceeded (10 times) the safe human dose. It is not clear why indomethacin should convincingly inhibit cholera toxin in subcutaneous tissue but not in the gastrointestinal tract.

Ipomoea turpethum (dark variety of "Turbud" plant) root has been used for many centuries as a purgative in the Unani and Ayurvedic systems of medicine. It contains a resin purgative which resembles that of Jalap[12]. These purgative resins are broadly classified as 'irritants'. They act directly on the small intestine where they produce, like cholera toxin, copious outpouring of fluids, which provokes peristalsis leading to quick, profuse, watery motions. In dogs, the severity of Ipomoea-induced diarrhoea is dose-dependant and can be expressed semi-quantitatively[13]. Its frequency and severity are very significantly reduced by berberine. It is interesting to mention here that castor oil induced diarrhoea in dogs was not at all inhibited by berberine (Sabir and Bhide, unpublished data).

Magnesium sulphate is a classic osmotic saline type of purgative. Its purgative effect in rats was not impressively or consistently reduced by berberine. In this connection, it is of interest to note that, in rats, 2gm/kg cholera toxin and 5mg/kg magnesium sulphate produced about the same degree of diarrhoea; and yet, berberine remarkably reduced the former but hardly influenced the latter.

Altogether, experiments in dogs with Ipomoea and castor oil and in rats with magnesium sulphate and cholera toxin indicate that berberine inhibits some but not all types of diarrhoea. Therefore, its antidiarrhoea action is probably specific and not general.

Does berberine help in diarrhoea by inhibiting gastrointestinal motility? The evidence is certainly conflicting for the following reasons: (i) berberine is a weak cholinesterase inhibitor[14] and cholinesterase inhibitors generally increase the gastrointestinal motility. Indeed, in dogs (Sabir and Bhide - umpublished data) and man[13], large doses of berberine or Aargis are known to exert laxative action; (ii) on the other hand, the present study shows that berberine definitely reduces intestinal motility in mice. This could be due to the direct inhibition of intestinal smooth muscles by berberine which is known to inhibit several types of smooth muscles and their stimulants[14,15]. On the whole, the available data are inadequate to draw valid inference.

Berberine reduces passage of water and Na^+ from blood into the renal tubules[15]. This finding raises the question whether berberine helps in diarrhoea because it inhibits passage of electrolytes across all the cell membranes? However, the present study in rats using the model of Darrow and Yannet[8] clearly shows that berberine does not inhibit passage of electrolytes from the blood into the glucose solution in the peritoneal cavity.

Earlier studies[16] have suggested that berberine might be helping cholera patients due to probable protein precipitating astringent action. Tannins and other astringents are well-known age old antidiarrhoeal agents. However, the present study clearly shows that, unlike tannins, berberine is not an astringent.

Besides the mechanisms described above, there are others by which berberine is likely to inhibit infective diarrhoeas. These are metabolic inhibition of infective micro-organisms[17,18,19], bactericidal action[18,20,21], inhibition of toxin formation by micro-organisms[21], direct antagonism of the formed toxin at the site of target organs[10], and central antiemetic action; this mechanism is, however,

excluded because, in dog, berberine had no chlorpromazine-like antiemetic action against apomorphine-induced vomiting[15].

Altogether, these experiments strongly support the clinical efficacy of *Berberis aristata* in acute gastroenteritis, including cholera, as claimed by Bu-Ali-Seena[1] and other Arab Physicians[2].

SUMMARY AND CONCLUSION

At 10mg/kg dose, berberine sulphate significantly reduced the incidence and severity of diarrhoea induced by 2 or 4gm-kg of cholera toxin in rats; each gm of cholera toxin contained 1.068mg of highly purified cholera toxin. Berberine also reduced the levels of water and electrolytes (Na^+, K^+ and Cl^-) in the gastrointestinal luminal fluid in rats fed with cholera toxin; further, it (5mg) also reduced the cholera toxin (30 or 100mg) - provoked fluid accumulation in the ligated loop (30cm) of the rat intestine. Indeed, crude dried decoction of *Berberis aristata* (Arabic - Aargis; Ambarbaris). 1.2gm/kg, was almost equally effective in reducing cholera toxin-induced diarrhoea and fluid formation in the gastrointestinal tract.

Berberine (0.06-20mg/kg) significantly prolonged the latent period and reduced severity and frequency of *Ipomoea turpethum* (Arabic - Turbud; 1mg/kg) - induced purging in dogs. However, it (0.3, 3 and 30mg/kg) did not affect the diarrhoea induced by magnesium sulphate (5gm/kg). Berberine (10mg/kg) markedly inhibited the intestinal motility in intact mice; intraperitoneal route was more efficacious than the oral one.

Berberine did not precipitate, *in vitro*, bovine serum albumin or egg-white nor altered the shift of Na^+, K^+ and Cl^- from the blood into the peritoneal cavity. Therefore, its anticholera toxin or antidiarrhoea effect cannot be due to any astringent action or due to generalised inhibitory effect on electrolyte movement. These findings, suggest the selective nature of antidiarrhoea action of berberine in gastroenteritis or cholera.

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TABLE I.

EFFECT OF BERBERINE AND OTHER DRUGS ON DIARRHOEA INDUCED BY CHOLERA TOXIN IN ADULT RATS

Dose (gm/kg) of cholera toxin	Dose-kg of a drug fed orally before cholera toxin	Number of rats used	Number of rats responded by purging	Average latent period of respondents hr-min	Average number of loose stools of respondents	Purging index
2	Nil or distilled water 6 ml	21	20	3 40	4.9	127
2	Berberine 3 mg	7	7	5 19	4.3	81
2	Berberine 10 mg	18	9	6 46	3.4	25
2	Beberine 30 mg	10	5	4 52	3.2	33
2	Aargis 1200 mg	7	3	4 50	3.6	32
2	Atropine 10 mg	6	2	9 00	3.0	11
2	Morphine 10 mg	6	1	8 30	1.0	2
2	Indomethacin 10 mg	10	10	4 10	5.2	125
4	Nil or distilled water 6ml	8	8	2 05	6.9	345
4	Berberine 10 mg	9	6	4 27	3.6	54
4	Berberine 30 mg	10	6	7 19	3.3	27

TABLE 2.

EFFECT OF BERBERINE AND OTHER DRUGS ON WATER AND ELECTROLYTES IN THE GASTROINTESTINAL TRACT IN ADULT RATS FED 2GM/KG CHOLERA TOXIN

Dose/kg of a drug fed orally before cholera toxin	Number of rats	Gastrointestinal Contents				
		Volume in ml average ±S.E. (P values)	Water Content average gm	Na^+ mEq./lit. average ±S.E. (P values)	K^+ mEq./lit. average ±S.E.	Cl^- mEq./lit. average ±S.E. (P values)
Distilled water + 10-20 ml	14	3.9±0.53	2.96	15"	5"	3"
Nil or distilled water 10 ml	17	11.9±0.82	10.10""	"28±1.14	"5±0.90	"20±2.84
Berberine 10 mg	12	8.05±0.43 (< 0.001)	5.81"	"22±5.79 (> 0.1)	"5±1.55	"15±3.96 (> 0.1)
Berberine 30 mg	14	7.0±0.32 (< 0.001)	6.15"	"19±3.64 (< 0.5)	"4.5±1.19	"15±4.21 (> 0.1)
Aargis 1200 mg	11	9.08±0.55 (< 0.01)	8.00	18±1.31 (< 0.001)	4±0.33	4±0.48 (< 0.001)
Atropine 10 mg	6	10.92±0.82 (> 0.1)	—	—	—	—
Morphine 10 mg	8	11.32±2.00 (> 0.1)	—	—	—	—
Indomethacin 10 mg	7	11.5±1.57 (> 0.1)	11.15	25±2.66 (> 0.1)	4±0.53	21±2.07 (> 0.1)

" Data from 5-7 animals of the respective groups
"" Data from 11 animals of the group
\+ This group was not given cholera toxin
K^+ Values did not differ significantly

TABLE 3.

EFFECT OF BERBERINE AND OTHER DRUGS ON FLUID AND ELECTOLYTE ACCUMULATION BY CHOLERA TOXIN IN THE LIGATED INTESTINAL LOOP

Dose of cholera toxin loop	Dose of drug/loop	Number of rats	Fluid in the intestinal loop			
			Volume ml average ±S.E. (P values)	Na^+ mEq./lit. average	K^+ mEq-lit. average	Cl^- mEq./lit. average
Nil	Distilled water 1.0ml	6	0	—	—	—
30 mg	Nil or distilled water 1.0ml	22	5.44±0.17	159	1.3	120
30 mg	Berberine 5mg	17	2.83±0.42 (< 0.001)	149	15.1	114
30 mg	Bererine 30mg	8	3.10±0.54 (< 0.001)	—	—	119
30 mg	Indomethacin 5mg	11	4.30±0.44 (< 0.02)	—	—	117
30 mg	Indomethacin 30mg	6	3.10±0.48 (< 0.001)	—	—	116
30 mg	Propyleneglycol 0.3ml	6	4.90±0.66 (> 0.1)	—	—	128
30 mg	Atropine 5mg	6	5.23±0.46 (> 0.1)	153	27.5	—
30 mg	Morphine 5mg	6	5.07±0.57 (> 0.1)	155	24.9	—
100 mg	Nil or distilled water 1.0ml	6	6.42±0.35	158	11.4	127
100 Mg	Berberine 5mg	6	3.95±0.24 (< 0.001)	156	13.9	—

TABLE 4

EFFECT OF BERBERINE ON DIARRHOEA INDUCED IN DOGS BY FEEDING IPOMAEO TURPETHUM ROOT POWDER

Drugs fed with 200ml milk	Dose-kg	Number of Dogs	Latent period of purging in minutes Mean ± S.E. (P values)	Score of purging over 24 hours Mean ±S.E. (P values)
Control (milk alone)	200ml per dog	18	No diarrhoea	1
Berberine	6 mg	6	No diarrhoea	3
Berberine	20 mg	6	Nodiarrhoea	2.8
Ipomoea	1 gm	26	"88±9	"20±1.4
Berberine + Ipomoea	0.06 mg + 1 gm	6	130±15 (< 0.05)	13±1.7 (< 0.01)
Berberine + Impomoea	0.2 mg + 1 gm	6	155±14 (< 0.001)	10±3.7 (< 0.05)
Berberine + Ipomoea	2 mg + 1 gm	6	210±34 (< 0.01)	13±2.4 (< 0.05)
Berberine + Ipomoea	6 mg + 1 gm	3	230±95	7±1.0
Berberine + Ipomoea	20 mg + 1 gm	16	165±17 (< 0.001)	12±1.8 (< 0.001)

"These values were used as standard for calculating P values by the 't' test.

TABLE 5

EFFECT OF BERBERINE ON DIARRHOEA INDUCED IN RATS BY MAGNESIUM SULPHATE

Drugs given orally	Dose/kg	Number of rats used	Number of rats responded by purging	Mean latent period of respondents in min ± S.E.	Mean number of loose stools for the whole group ± S.E. (P values)	Purging Index
Distilled water	20 ml	17	Nil	—	0	0
	1.25 gm	8	1	330	0.25	4.5
$MgSO_4$	2.50 gm	8	7	257±25	4.0±0.66	95
	5.0 gm	21	21	"240±20	"5.3±0.31	133
Berberine	0.3 mg					
+	+	10	10	195±29 (>0.1)	5.2±0.29 (>0.05)	160
$MgSO_4$	5 gm					
Berberine	3 mg					
+	+	10	10	185±33 (>0.1)	4.8±0.51 (>0.05)	156
$MgSO_4$	5 gm					
Berberine	10 mg					
+	+	18	18	216±19 (>0.1))	4.1±0.34 (=0.01)	114
$MgSO_4$	5 gm					
Berberine	30 mg					
+	+	11	10	274±28 (>0.1)	4.7±0.65 (>0.05)	103
$MgSO_4$	5 gm					

"Values used as standard for calculating P values by 't' test.

TABLE 6.

EFFECT OF BERBERINE AND DRUGS ON THE INTESTINAL MOTILITTY OF MICE AS ASSESSED BY THE CHARCOAL MEAL METHOD

Drugs injected intraperitoneally	Dose/kg	Number of mice	Mean of the per cent 1 length of small intestine travelled by charcoal meal (range)
Distilled water	10 ml	16	60 (43 - 81)
Berberine	1 mg	11	63 (50 - 74)
Berberine	3 mg	8	64 (47 - 88)
Berberine	10 mg	10	17 (0 - 42)
Atropine	10 mg	10	14 (4 - 34)
Morphine	10 mg	10	15 (5 - 31)
Berberine + Atropine	10 mg + 10 mg	8	12 (0 - 26)
Neostigmine	100 ug	9	74 (58 - 90)
Neostigmine + Berberine	100 ug + 10 mg	10	16 (0 - 42)
Neostigmine + Atropine	100 ug + 10 mg	8	37 (7 - 73)
Neostigmine + Morphine	100 ug + 10 mg	5	28 (24 - 33)
Carbachol	50 mg	8	76 (48 - 100)
Carbachol + Berberine	50 ug + 10 mg	10	38 (18 - 54)
Carbachol + Atropine	50 ug 10 mg	10	26 (5 - 41)
Carbachol + Morphine	50 ug + 10 mg	6	13 (0 - 33)

TABLE 7.

TEMPORAL CHANGES IN THE ELECTROLYTE COMPOSITION OF 5.5 PERCENT GLUCOSE SOLUTION INJECTED INTO THE PERITONEUM OF ANAESTHETIZED ADULT RATS

Group of rat	Electro-lytes (mEq./	Time of collection of peritoneal fluid in minutes							
		5	10	15	20	30	60	90	120
Control, only 5ml glucose water/ 100mg rat weight	Na^+	43	50	53	64	75	92	90	119
	K^+	2.2	2.5	2.3	2.9	2.2	5.0	5.6	5.6
	Cl^-	28	38	43	50	59	76	89	84
0.3mg/kg berberberine in glucose water	Na^+	39	55	67	65	73	—	—	—
	K^+	1.7	2.1	2.5	2.4	2.6	—	—	—
	Cl^-	32	43	53	50	59	—	—	—
3mg/kg berberine in glucose water	Na^+	54	47	74	84	82	80	87	—
	K^+	2.4	1.6	2.5	2.4	3.7	5.3	6.7	—
	Cl^-	27	41	57	52	64	73	84	—
30mg-kg berberine in glucose water	Na^+	41	55	50	59	64	115	87	121
	K^+	2.6	2.9	2.7	3.3	4.3	5.0	6.7	5.6
	Cl^-	38	52	52	48	69	89	84	89

5 - 14 animals were used for each value; -, Not done.

SUPPRESSION OF CHOLESTEROGENESIS AND REDUCTION OF LDL CHOLESTEROL BY NATURAL PRODUCTS IN AVIAN AND MAMMALIAN SYSTEMS[1]

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INTRODUCTION

Coronary heart disease is a major cause of death in the United States. Diets high in saturated fat and cholesterol raise the serum cholesterol level which is responsible for the elevation of serum lipoproteins, especially the beta or low density lipoproteins (Chol-LDL), which induce atherosclerosis. The effects of diet on plasma and liver cholesterol have been a subject of great interest in biomedical research. Several reports have suggested that the consumption of certain cereals has a cholesterol lowering effect on laboratory animals and humans[1]. Evidence implicating specific dietary components in this effect is contradictory, but plant protein[2], fiber and lipids[3] have been suggested in various studies. Recently, it has been reported that a coarse oat fraction in conjunction with a high carbohydrate diet lowered serum total cholesterol and Chol-LDL and elevated high density lipoprotein (Chol-HDL) levels in several hypercholesterolemic humans[4]. **In all these studies, the importance of essential microcomponents of plant origin in producing the hypocholesterolemic responses in humans had not been considered.**

Our studies indicate that secondary products of plant metabolism arising from the mevalonate pathway have roles in the multivalent suppression of cholesterol biosynthesis. Mevalonate, the product of β-hydroxy-β-methylglutaryl coenzyme A (HMG-CoA) reductase is a key intermediate in pathways yielding steroids, isopentenyl tRNA and a variety of isoprenoid compounds, all of which are essential for the cell's growth and survival. A number of the latter play key roles in regulating plant germination, growth, maturation and senescence. These secondary products of plant metabolism are not degraded but instead remain in a storage form in seeds, bulbs and roots. Barley is a major dietary component of humans in the Mideastern part of the world where cardiovascular disease is quite rare. With this in mind, we examined chickens which had been fed diets supplemented with small grain (Seeds), bulbs (garlic) or roots (ginseng) for alterations in lipid and cholesterol metabolism. Barley, oats, wheat, and rye diets produced inhibition of cholesterogenesis compared to a control diet[5].

The cholesterol inhibitor(s) appears to be distributed throughout the barley kernel as well as in the nonpolar and polar fractions of garlic and ginseng. The highest concentrations of cholesterol inhibitors in barley were found in the aleurone and subaleurone layers of endosperm (high-protein barley fraction, HPBF). Inclusions of 20% HPBF in the corn-based chicken diets caused a 16% increase in weight gain, an effect which has not been seen with barley or with HPBF when used as the main source (70-80%) of dietary protein[6]. This was accompanied by significant decreases in serum total cholesterol and Chol-LDL levels, without affecting the Chol-HDL[6].

This article is a summary of our research in which we have identified factors from three plant materials which suppress cholesterol biosynthesis. The isolation and the structural identification of the **cholesterol inhibitors (I)** and **(II)** and other components from the nonpolar fraction of HPBF will be described in detail with reference to **in vivo** and **in vitro** studies. These safe active agents present in

barley and, possibly, garlic, ginseng, and oats suggest the potential of using these plant materials as dietary supplements to lower Chol-LDL in humans suffering from hypercholesterolemia. The various effects of these components on lipid metabolism presented here have several implications for human nutrition and for possible control of cardiovascular disease in which Chol-LDL plays a key role.

MATERIALS AND METHODS

The protocols of our studies (5-13) examined the influence of barley and other grains (5-10), of barley milling fractions[10], of high-protein barley flour (HPBF) and its serial solvent extracts[6], of garlic and its serial solvent extracts[11,12] and of ginseng root and its serial solvent extracts[13] on avian hepatic cholesterol and lipid metabolism. Male and female chicks 1 day to 9 weeks of age and of broiler or layer strains were fed standard corn-soy diets or diets modified with the addition of test material for periods in excess of 19 days. The birds were housed in batteries under continuous illumination and were given free access to feed and water.

Procedures for the solvent fractionation of HPBF, garlic bulbs and ginseng root have been described (6,11-13). Briefly, the procedures involved successive extraction (repeated three times) with petroleum ether, ethyl acetate, methanol and water. The dried solvent fractions and the residue were added to the diet in proportion to the equivalent amount of 20% of the starting product.

The preparation of tissues for assays of 3-hydroxy-3-methylglutaryl CoA (HMG-CoA) reductase, cholesterol 7α-hydroxylase and fatty acid synthetase (FAS), the enzymic procedures and sources of chemicals as well as procedures for the estimations of plasma lipids and lipoproteins are given in reference 14.

A second protocol examined the influence of the solvent extracts on cholesterol and lipid metabolism by avian hepatocytes. The preparation of the hepatocytes and the conditions of the incubation are described in reference 14.

RESULTS

Cereal grains in the diets of human populations are believed to be responsible for lowering serum total cholesterol levels by unknown mechanisms[15-18]. Our original dietary comparisons were of the effects of wheat, rye, oats and barley on cholesterol metabolism in chickens[7-10]. The stimuli for further studies described herein were the observations that isonitrogenous diets containing these cereals (Table I) effectively lowered both plasma cholesterol levels and hepatic cholesterol synthesis. Hepatic lipogenesis, on the other hand, was enhanced by each of the cereals[8]. Barley has the greatest influence on these activities, reducing HMG-CoA reductase by 79% and plasma cholesterol by 45% and increasing FAS 5-fold as shown in Table 2. This observation prompted us to determine whether or not the active agents were confined to a specific portion of the barley kernel.

Commercial pearling of barley produces three fractions which are not sharply defined in terms of composition: (i) barley pearlings consisting of hull and bran; (ii) a high-protein barley flour (HPBF), consisting of aleurone and subaleurone layers of endosperm, and separable from the pearlings by sieving, and (iii) pearled barley consisting of starchy endosperm. Each fraction was fed in place of corn. The results indicated (Table 3) that the HPBF fraction most effectively lowered cholesterol synthesis to a level of 40% of that observed in controls. Lipogenesis and serum triglyceride levels were increased. Feed performance by chickens fed barley pearlings or HPBF was markedly depressed in these 3-week-old chickens.

The characterization of the constituents responsible for these effects began with the serial

extraction of HPBF with solvents of increasing polarity[6]. The dried solvent fractions accounted for 18.8% of the HPBF (petroleum ether — 3.5%, ethyl acetate — 2.5%, methanol — 4.2% and water — 8.6%) and the residue, 81.2%. These fractions were fed at levels equivalent to 20% HPBF. Chicks fed the petroleum ether solubles showed a 21% increase in weight gain which appeared to be related to a 40% decrease in FAS activity (Table 4). The constituents responsible for the suppression of HMG-CoA reductase and cholesterol 7α-hydroxylase activities and the lowering of serum cholesterol levels were not segregated into a single solvent fraction (Table 4). An important finding was that the lowering of serum cholesterol was limited to that portion transported in the low density lipoprotein (LDL) fraction.

These results led us to examine other plant materials which are widely reported to have cholesterol-suppressive actions. Garlic paste (3.8 g) prepared from 5g garlic bulbs and its equivalent serial solvent fractions were fed at the levels shown on Table 5. All treatments, with the exception of the residue, suppressed HMG-CoA reductase, cholesterol 7α-hydroxylase and FAS and other lipogenic enzyme[12] activities in dose-dependent fashion[11]. The lowering of serum cholesterol was restricted to that in the LDL fraction (Table 5).

A brief report of the effects of Wisconsin ginseng root on human cholesterol metabolism[19] prompted us to feed chicks diets containing 0.25% ginseng root or its equivalent in serial solvent extracts[13]. Wisconsin or Chinese red ginseng root (0.25%) was aded to the corn-based diet. Serum total cholesterol and Chol-LDL fell by at least 20% and 24% respectively and the Chol-HDL fell by 15%. Suppression of HMG-CoA reductase and cholesterol-7α-hydroxylase fell in the ranges recorded with 20% HPBF and 3.8% garlic paste as shown in Table 6. Serial solvent extraction revealed again that the effects were not clearly defined in terms of polarity. The petroleum ether soluble fraction of HPBF, garlic and ginseng suppressed FAS and other lipogenic enzymes. However, the residue of ginseng, like that of garlic, elicited little response[13].

The polar serial solvent extracts of garlic also inhibited HMG-CoA reductase and FAS activities in avian isolated hepatocytes. The inhibitory action was dependent both on concentration (up to 3000 μg/ml) and duration of exposure (to 60 min) of either the methanol solubles or the water solubles (Tables 7 and 8). The time dependence was linear to 20 min, and the concentration dependence, to 100 μg/ml. HMG-CoA reductase and FAS activities under these assay conditions were 50% and 70% respectively of the control activities[11]. Similar results have been obtained using the methanol or water solubles of ginseng root (Table 9).

As mentioned above, when nonpolar (petroleum ether) and polar (methanol) soluble fractions of HPBF were fed to chickens, there was suppression of the hepatic activities of HMG-CoA reductase and cholesterol 7α-hydroxylase. The FAS was suppressed with nonpolar but stimulated by the polar soluble fraction[6]. The similar results for HMG-CoA reductase and FAS were duplicated with these fractions using isolated hepatocytes of rat and chicken (Tables 9, 10). This *in vitro* assay served as an inexpensive and rapid means of following the various active components as they were purified by high pressure liquid chromatography (HPLC) procedure (Fig. 1).

Different components of the nonpolar soluble fraction of HPBF were separated by semipreparative HPLC using an Ultrasphere C18 IP column (25 cm × 4.6 mm I.D., 5μ particle size), 50 μl of the sample was eluted with methanol at a flow rate of 1 ml per minute at 700 psi, using 200 nm as detecting wavelength. Each peak was scanned between 200-400 nm (Fig. 1) and tested in isolated hepatocytes of chicken using 200 μg/ml incubation and assayed for HMG-CoA reductase and FAS activities. Components of fractions 5 and 9 showed 68% and 59% inhibition of HMG-CoA reductase, respectively. There was 38% induction with fraction 5 and 33% decrease with fraction 9 in the activity

of FAS (Table 12A). These results were further confirmed by feeding these 10 components to chicks at levels reflecting their quantities in a 20% HPBF diet. HPLC fractions 5 and 9 (cholesterol inhibitors I and II, respectively) suppressed HMG-CoA reductase activity by 32% and 25% respectively. FAS activity in chicks fed fraction 5 was increased by 28% whereas fraction 9 decreased the activity by 26% (Table 12B).

The structure of **cholesterol inhibitor I** (fraction 5) isolated from nonpolar soluble fraction of HPBF was established as d-α-tocotrienol by high resolution mass spectrometry (Figure 2a). The mass measurement of the molecular ion peak (424^+) corresponded to a molecular formula of $C_{29}H_{44}O_2$. The fragmentation pattern and mass measurements of the different peaks indicated the presence of 6-chromanol nucleus with a methyl group ($C_{13}H_{17}O_2$) peak at 205^+ mass unit and 16-carbon unsaturated isoprenoid side chain at ring position 2. From the molecular ion peak there was a stepwise loss of 3 isoprenoid moieties of 69 mass units each time. First major loss from the molecular ion peak was 55 mass units of a C_4H_7 moiety, giving rise to an intense peak at 359^+. Further confirmation of the structure was obtained by the UV spectrum (Fig. 2b), consistent with the reported value of others which showed λmax at 292 nm, and closely related compunds such as Vitamin E and tocopherol series. The isolated cholesterol inhibitor I is very effective in inhibiting cholesterol biosynthesis both **in vivo** and **in vitro** using chicken hepatocytes at the level of 5-20 ppm in a number of repeated experiments (Table 13).

The structure of **cholesterol inhibitor II** (Fraction 9) was found to be **1, 3, dilinoleoyl, 2-linolenioylglycerol** isolated from the nonpolar fraction of HPBF. The structure of this inhibitor was also established by its mass spectrum (Fig. 3) which sowed a characteristic fragmentation pattern of triglyceride with a molecular ion peak at 876^+, Corresponding to the molecular formula of $C_{57}H_{96}O_6$. The structure was confirmed by making p-bromophenacyl ester derivatives of the fatty acids obtained after saponification of the inhibitor II. The resulting p-bromo derivatives were identified by high pressure and recycling liquid chromatographic method using acetonitrile: water (90:10) as eluting solvent system on a C_{18} RP column against authentic compound derivatives of linoleic acid, α- and γ-linolenic acids using 254 nm as a detecting wavelength (Figs 4a and 4b). The mass spectra of these p-bromo derivatives showed, as expected, the double molecular ion peaks of bromine 79 and 81.

Cholesterol inhibitor II was found to be very effective **in vivo** and **in vitro** studies (Table 14). Linoleic acid accounts for 55% of barley's total fatty acids. The presence of the **gamma** form of linolenic acid in this triglyceride appears to be one of the rare plant sources of this acid (cf. **Evening Primrose oil**), which is mainly found in animal systems. Apart from this triglyceride we were able to isolate a number of other isomers and its homologous series, but only this isomer was found to be effective in lowering cholesterol biosynthesis in chickens. A number of diglycerides have also been isolated from this fraction and identified as having different combinations of linoleic and α-or γ-linolenic acids.

Feeding trails with 21-day-old female rats showed a better growth rate with barley as compared to corn and a 50% reduction in HMG-CoA reductase activity. When compared to commercial chow diet, barley produced 20% less wight gain, but HMG-CoA reductase was reduced by 80%. Trials with 5-month-old Yorkshire and Hampshire gilts (82% corn or barley diets) produced about equal weight gains, but 19 to 25% reduction in HMG-CoA reductase in liver, adipose, intestine, lung and muscle tissues, and 17 to 18% less cholesterol in the plasma and muscle in the barley-fed animals (Tables 15, 16).

DISCUSSION

When the importance of cholesterol was first appreciated, a number of studies were carried out on the effects of various diets on blood cholesterol levels. Therefore, with all its limitations, plasma total cholesterol remains the best predictor of coronary heart disease risk in a human population. The predictive value of the total cholesterol may be improved slightly by consideration of the ratio between low density lipoproteins (Chol-LDL) and high density lipoproteins (Chol-HDL) cholesterol levels. Several reports covering the studies on human populations indicate that vegetarians and other individuals who consume diets principally of plant origin have lower risk factors for coronary heart disease, specifically, lower plasma cholesterol levels and lower ratios of plasma total cholesterol to high density lipoprotein (Chol-HDL) cholesterol (15-18).

A number of attempts to identify hypercholesterolemic factors in the Westernized diet and hypocholesterolemic factors in the vegetarian diet have been successful to varying degrees. Yet there continues to be considerable debate as to the specific factor. The most popular dietary practices recommended for the control of plasma cholesterol levels involve the selection of foods which decrease the quantity of cholesterol ingested and of dietary components which increase the excretion of cholesterol and its metabolites[20]. Both approaches increase endogenous cholesterol synthesis. This synthesis can be repressed by increasing cholesterol intake[21], an approach which maintains[22,23] or elevates plasma cholesterol levels[24,25].

Recently, it was reported that the factors which elevate cholesterol are more potent when added to a purified diet[26,27]. This observation implies that crude diets contain factors which either 'detoxity' hypercholesterolemic factors or factors which act apart from cholesterol in suppressing cholesterol biosynthesis.

The results of the studies described here indicate that barley, garlic, ginseng and their nonpolar and polar soluble fractions contain minor components which suppress hepatic HMG-CoA reductase and lower plasma cholesterol levels in chickens. HMG-CoA reductase is the ratelimiting step in cholesterol synthesis under most physiological conditions. The regulation of this enzyme is predominantly through changes in its mass via modulation of its synthesis and degradation[28,29], by hormones[30], steroids, oxygenated sterols[30], or by feedback[31]. Other control may be exerted via its reversible phosphorylation[32], by cytosolic, noncatalytic proteins (y- and z-proteins; 33) or by changes in membrane fluidity[34]. The suppression of HMG-CoA reductase by these plant constituents might be due to the increased cellular levels of products arising from the mevalonate pathway. According to Edwards **et al.**[29] these endogenous products destabilize HMG-CoA reductase resulting in an enhanced rate of its degradation. The plant materials examined here appear also to provide similar effectors of HMG-CoA reductase. Clegg **et al.**[35] have described the concentration dependent inhibition of HMG-CoA reductase activity following the **in vivo** administration of menthold to fed animals. Their studies ruled out all of the aforementioned modulations of HMG-CoA reductase activity except that imposed by reduction in enzyme mass.

The pure cholesterol **inhibitors** I and II from HPBF were found to be more potent than the crude extract. More significantly, these inhibitors were found to lower the serum total cholesterol levels and levels of Chol-LDL, without affecting the level of Chol-HDL. The suppression of lipogenesis and cholesterogenesis by the **cholesterol** inhibitor II may be due to the presence of γ-linolenic acid. A number of studies have strongly suggested that the cholesterol associated with LDL is preferentially taken up by intimal cells and is thus a positive risk factor in cardiovascular disease. Cholesterol associated with HDL is inversely related to cardiovascular disease because HDL is involved in the removal of cholesterol from cells[36]. Although specific mechanism remain unknown, it is clear that

dietary modifications influence HDL levels. The substitution of polyunsaturated for saturated dietary fat, for example, increases HDL cholesterol[37,38].

Another prevailing concept is that components of plant materials interfere with the reabsorption of bile acids therein causing a reduction in serum cholesterol levels[39-43]. Recent publications suggest that oat-bran[42] and whole grain[43] components exert hypocholesterolemic effect on the LDL fraction. Our data obtained by feeding solvent-extracted solids of HPBF, garlic and ginseng supplemented cornbased diets, on the other hand, point to a direct action of the plant material on cholesterol biosynthesis with a concomitant lowering of LDL-cholesterol.

The results presented herein are compatible with the observations of O'Brien and Reiser[26,27] namely that crude diets contain materials apart from cholesterol which suppress cholesterol biosynthesis. Therefore the present studies have demonstrated various dietary agents in food or natural products which can lower Chol-LDL levels in hypercholesterolemic subjects and thus prevent the onset of atherosclerosis in humans.

CONCLUSIONS

In the present studies we have shown that minor components of plant materials influence lipid and cholesterol metabolism. Chickens fed a diet containing barley or its milling products and other cereals or corn diet supplemented with garlic paste or ginseng root or their petroleum ether and methanol soluble fractions for 3 to 4 weeks, when compared to a corn-based diet (control) caused decreases between 40-60% in the serum total cholesterol level. This reduction was primarily in the cholesterol level of low density lipoprotein (Chol-LDL) fraction without affecting the cholesterol concentrations in the high density lipoprotein (Chol-HDL). The hepatic β-hydroxy-β-methylglutaryl coenzyme A (HMG-CoA) reductase and cholesterol 7α-hydroxylase (Chol-7α-hyd.) activities responded in paralel to these treatments.

Two hypocholesterolemic agents (cholesterol inhibitors I and II) have been isolated from the nonpolar fraction of high-protein barley flour. The structures of these cholesterol inhibitors were established as **d-α-tocotrienol** and **1,3-dilinoleoyl-2-linolenioylglycerol** with the help of high resolution mass and UV absorption spectra. The purification of these inhibitors and other confirmatory characteristics were carried out by high pressure liquid chromatographic methods. These cholesterol inhibitors were found to be 400-700 times more effective than their respective crude fractions.

Despite the longstanding and widespread use of cereal grains, garlic and ginseng for food and feed, knowledge of their effects at the cellular level is limited. Current interests in lipid metabolism, especially cholesterol, may serve as a stimulus for more definitive work on some of the minor constituents of the cereals, garlic and ginseng and their effects in humans. The present work with the isolation of pure cholesterol inhibitors I and II from barley demonstrates that there are many factors which come into play. Some of these may have therapeutic potential for those individuals who for genetic or purely dietary reasons are inclined toward abnormally high blood cholesterol concentrations.

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FOOTNOTE

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TABLE I: COMPOSITION OF ISONITROGENOUS CHICKEN DIETS

Ingredients	Diets[1]				
	A	B	C	D	E
A Corn (9.1% protein)	61.5	—	—	—	—
B Wheat (14.0% protein)	—	75.0	—	—	—
C Barley (12.0% protein)	—	—	73.5	—	—
D Oats (11.6% protein)	—	—	—	74.5	—
E Rye (11.8% protein)	—	—	—	—	73.5
Soybean Meal (44% protein)	30.0	16.5	18.0	17.0	18.0
Meat Scrap	5.0	5.0	5.0	5.0	5.0
Alfalfa Meal (17% protein)	1.0	1.0	1.0	1.0	1.0

[1]All constituents used on an 'as is' basis. Grit (5%) was used at the expense of each diet. Also: dicalcium phosphate 1%; calcium carbonate 0.5%; mineral misture 0.5% consisting of (per kg) sodium chloride 2 mg, zinc sulfate 50 mg and manganese dioxide 50 mg, and vitamin mixture 0.5% consisting of (per kg) vitamin A 2,000 IU, vitamin D3, 200 ICU, vitamin E 10 IU, vitamin KI 5 mg, choline 1.3 g, thiamin 1.8 mg, niacin 27 mg, riboflavin 3.6 mg, pyridoxine 3 mg, calcium pantothenate 10 mg, vitamin B12 10 μg, and L-lysine-HCl 1 g, L-methionine 0.72 g.

TABLE 2. EFFECT OF CEREAL DIETS ON CHICK GROWTH AND LIPID METABOLISM[1]

Diet	Body Wt. g	Liver Wt. g	HMG-CoA Reductase[2]	Plasma Cholesterol mg/100 ml	FAS[3]
A Corn	272 ± 7 (100)[4]	12.0 ± 0.8 (100)[4]	2.9 ± 0.6 (100)[4]	139 ± 7 (100)[4]	5.0 ± 0.5 (100)[4]
B Wheat	221 ± 9 (81)	11.0 ± 1.2 (92)	2.2 ± 0.4 (76)	106 ± 4 (76)	11.2 ± 1.7 (224)
C Barley	188 ± 6 (69)	8.2 ± 1.0 (68)	0.6 ± 0.1 (21)	76 ± 4 (55)	26.2 ± 2.4 (524)
D Oats	195 ± 7 (72)	8.7 ± 1.4 (73)	1.2 ± 0.3 (41)	95 ± 4 (68)	7.7 ± 1.4 (154)
E Rye	166 ± 9 (61)	6.8 ± 1.8 (57)	1.1 ± 0.2 (38)	105 ± 5 (76)	6.7 ± 0.4 (134)

[1]Twenty-one day old chicks fed 18 days; N = 4 chickens/group; means ± SD; values in parentheses indicate percent of respective controls.

[2]n moles of mevalonic acid synthesized per min per g of liver.

[3]μ moles of NADPH oxidized per min per g of liver.

[4]Percentage of respective control activity data are in parentheses.

[a-d]Means within a column and without a common superscript letter are significantly different $P < 0.01$.

TABLE 3. EFFECT OF DIFFERENT FRACTIONS OF BARLEY KERNEL ON GROWTH AND LIPID METABOLISM IN FEMALE CHICKENS[1]

Diet	Body Wt. g	HMG-CoA Reductase[2]	Plasma Cholesterol mg/100 ml	Plasma Triglycerides mg/100 ml	FAS[3]
Corn	263 ± 3.0[a] (100)[4]	6.0 ± 1.0[a] (100)[4]	165 ± 17[a] (100)[4]	117 ± 7.0[a] (100)[4]	4.8 ± 0.4[a] (100)[4]
Barley	258 ± 4.0[a] (98)	2.6 ± 0.8[b] (43)	120 ± 14[b] (73)	236 ± 15.0[b,c] (202)	18.0 ± 0.3[b] (375)
Barley Pearlings	116 ± 14.0[b] (44)	3.5 ± 0.8[b] (58)	126 ± 12[b] (76)	229 ± 12.0[b] (195)	17.6 ± 0.4[b] (367)
HPBF	86 ± 4.0[c] (33)	2.4 ± 0.6[b] (40)	120 ± 11[b] (73)	256 ± 11.0[c] (219)	17.5 ± 0.2[b] (364)
Pearled Barley	217 ± 6.0[d] (83)	3.4 ± 0.4[b] (51)	124 ± 15[b] (75)	230 ± 19.0[b] (197)	16.2 ± 0.3[c] (338)

[1]Forty-one-day old chickens were fed for 4 weeks; N = 8 chickens per group. Means ± SD; values in parentheses indicate percent of respective controls.[a-d]

[2]n moles mevalonic acid synthesized per min per g liver.

[3]μ moles NADPH oxidized per min per g liver.

[4]Percentage of respective control activity data are in parentheses.

[a-d]Means within a column and without a common superscript letter are significantly different $P < 0.01$.

TABLE 4. EFFECT OF HPBF FRACTIONS ON HEPATIC ENZYME ACTIVITIES AND SERUM LIPIDS IN 12-WEEK-OLD CHICKENS

Nutritional State	HMG-CoA Reductase[2]	Cholesterol 7α-Hydroxylase[3]	Fatty Acid Synthetase[4]	Concentration in Serum			
				Total Cholesterol	Triglycerides	Chol-HDL	Chol-LDL
Corn	690 ± 44[a] (100)[5]	6.7 ± 0.2[a] (100)[5]	62 ± 8[a] (100)[5]	208 ± 8[a] (100)[5]	242 ± 18[a] (100)[5]	68 ± 6[a] (100)[5]	96 ± 9[a] (100)[5]
Corn + 20% HPBF	460 ± 42[a,b] (67)	3.7 ± 0.2[b] (55)	72 ± 7[a] (116)	178 ± 9[b] (86)	308 ± 6[b] (127)	66 ± 6[a] (97)	76 ± 7[b] (79)
Corn + Pet. Ether SF[6]	440 ± 37[b] (64)	5.0 ± 0.4[c] (75)	37 ± 3[b] (60)	164 ± 7[b] (79)	219 ± 4[c] (91)	65 ± 4[a] (96)	66 ± 7[b] (69)
Corn + Ethyl Acetate SF[6]	460 ± 38[a,b] (67)	5.5 ± 0.4[c] (82)	113 ± 16[c] (182)	204 ± 10[a] (98)	231 ± 7[a,c] (95)	67 ± 7[a] (99)	88 ± 8[a] (92)
Corn + Methanol SF[6]	350 ± 37[c] (51)	3.4 ± 0.5[b,d] (51)	121 ± 14[c] (195)	159 ± 12[b] (76)	314 ± 6[b] (130)	62 ± 5[a] (91)	42 ± 6[c] (44)
Corn + Water SF[6]	370 ± 32[c] (52)	4.1 ± 0.4[d,e] (61)	151 ± 12[d] (244)	202 ± 5[a] (97)	262 ± 6[a] (108)	64 ± 6[a] (94)	94 ± 9[a] (98)
Corn + Residue[6]	630 ± 43[a] (92)	4.6 ± 0.5[c,e] (69)	141 ± 11[c,d] (227)	201 ± 6[a] (97)	247 ± 7[a] (102)	66 ± 4[a] (97)	91 ± 7[a] (95)

[1]Feeding period was three weeks; Time of killing was 0800; Data expressed as mean ± SD ; N = 6 chickens per group.

[2]β-hydroxy-β-methylglutaryl-CoA reductase; pmoles of mevalonic acid synthesized per minute per mg of microsomal protein.

[3]pmoles of [^{14}C] cholesterol into [^{14}C] 7α-hydroxycholesterol per minute per mg of microsomal protein.

[4]ηmoles of NADPH oxidized per minute per mg of cytosolic protein.

[5]Percentage of respective control activity data are in parentheses.

[6]SF = Soluble fraction equivalent to 20% HPBF in corn-based diet.

[a-e]Means within a column and without a common superscript letter are significantly different $P < 0.05$.

TABLE 5. EFFECT OF GARLIC AND ITS FRACTIONS ON HEPATIC ENZYME ACTIVITIES AND ON SERUM LIPIDS IN 12-WEEK-OLD WLH FEMALE CHICKENS[1]

Nutritional State	HMG-CoA Reductase[2]	Cholesterol 7α-Hydroxylase[3]	Fatty Acid Synthetase[4]	Concentration in Serum mg/100 ml			
				Total Cholesterol	Triglycerides	Chol-HDL	Chol-LDL
Corn (Control)	909 ± 70[a] (100)[5]	1.14 ± 0.08[a] (100)[5]	175 ± 14.0[a] (100)[5]	168.0 ± 2.0[a] (100)[5]	125.1 ± 12.0[a] (100)[5]	57.0 ± 4.0[a] (100)[5]	86.0 ± 7.0[a] (100)[5]
Corn + Garlic Paste	253 ± 40[b] (28)	0.72 ± 0.04[b] (63)	158 ± 12.0[a,c] (90)	132.8 ± 10.0[b] (79)	98.1 ± 10.0[b] (78)	55.5 ± 8.0[a] (97)	57.7 ± 5.0[b] (67)
Corn + Garlic PESF	193 ± 30[c] (21)	0.61 ± 0.03[c] (54)	124 ± 11.0[b] (71)	128.6 ± 8.0[b] (76)	113.1 ± 10.0[a] (90)	56.2 ± 8.0[a] (99)	59.4 ± 4.0[b] (69)
Corn + Garlic MESF	159 ± 30[c] (17)	0.56 ± 0.04[c] (49)	141 ± 11.0[c] (81)	126.5 ± 4.0[b] (75)	92.6 ± 11.0[b] (74)	57.0 ± 5.0[a] (100)	51.0 ± 4.0[b] (59)
Corn + Garlic WASF	192 ± 28[c] (21)	0.65 ± 0.05[b,c] (57)	145 ± 8.0[c] (83)	134.7 ± 11.0[b] (80)	96.3 ± 10.0[b] (77)	54.7 ± 6.0[a] (96)	60.7 ± 5.0[b] (71)
Corn + Garlic Residue	781 ± 62[a] (86)	0.93 ± 0.06[d] (82)	172 ± 13.0[a] (98)	152.2 ± 14.0[a] (91)	121.7 ± 10.0[a] (97)	53.5 ± 4.0[a] (94)	74.4 ± 7.0[a] (87)
Corn + Garlic oil (commercial)	230 ± 30[b] (26)	0.67 ± 0.05[c] (59)	160 ± 4.0[a] (91)	128.9 ± 7.0[b] (77)	115.1 ± 7.0[a] (92)	54.5 ± 3.0[a] (96)	61.2 ± 6.0[b] (71)

[1]Feeding period was four weeks; Time of killing was 0800; Data expressed as mean ± SD; 11 = 8 chickens per group; IMG-CoA reductase = β-hydroxy-β-methylglutaryl-CoA reductase. PESF, MESF, WASF, = petroleum ether, methanol and water soluble fractions of garlic, respectively.

[2]ρmoles of mevalonic acid synthesized per minute per mg. of microsomal fraction.

[3]ρmoles of [^{14}C] cholesterol into [^{14}C] 7α-hydroxycholesterol per minute per mg. of microsomal fraction.

[4]ηmoles of NADPH oxidized per minute per mg. of cytosolic fraction.

[5]Percentage of respective control activity data are in parentheses.

[a-c]Values not sharing a common superscript letter are different at $P < 0.01$.

TABLE 6. EFFECT OF GINSENG AND ITS FRACTIONS ON HEPATIC ENZYME ACTIVITIES AND SERUM LIPIDS IN 12-WEEK-OLD FEMALE (WLH) CHICKENS[1]

Nutritional State	HMG-CoA Reductase[2]	Cholesterol 7α-Hydroxylase[3]	Fatty Acid Synthetase[4]	Concentration in Serum mg/100 ml		
				Total Cholesterol	Chol-HDL	Chol-LDL
Corn (control)	909 ± 72^{a} (100)[5]	1.14 ± 0.04^{a} (100)[5]	145 ± 4^{a} (100)[5]	167.9 ± 10^{a} (100)[5]	61.4 ± 5^{a} (100)[5]	86.0 ± 10^{a} (100)[5]
Corn + Ginseng Powder	295 ± 27^{b} (32)	0.71 ± 0.02^{b} (62)	141 ± 7^{a} (97)	134.9 ± 6^{b} (80)	51.6 ± 7^{a} (84)	65.4 ± 6^{b} (76)
Corn + Ginseng PESF	284 ± 17^{b} (31)	0.53 ± 0.01^{c} (46)	107 ± 7^{b} (74)	112.4 ± 6^{c} (67)	52.2 ± 7^{a} (85)	46.2 ± 6^{c} (54)
Corn ± Ginseng MESF	332 ± 30^{b} (37)	0.64 ± 0.02^{d} (56)	141 ± 9^{a} (97)	140.4 ± 8^{b} (84)	52.0 ± 5^{a} (85)	69.5 ± 5^{b} (81)
Corn + Ginseng WASF	307 ± 26^{b} (34)	0.56 ± 0.02^{d} (50)	125 ± 6^{c} (86)	128.9 ± 10^{b,c} (77)	56.9 ± 4^{a} (93)	47.6 ± 6^{c} (55)
Corn + Ginseng Residue	820 ± 42^{a} (90)	1.13 ± 0.02^{a} (99)	144 ± 5^{a} (99)	163.4 ± 7^{a} (98)	59.7 ± 5^{a} (97)	83.9 ± 7^{a} (98)

[1]Feeding period was four weeks; Time of killing was 0800; Data expressed as mean ± SD; N = 8 chickens per group; HMG-CoA reductase = β-hydroxy-β-methylglutaryl-CoA reductase. PESF, MESF, and WASF = petroleum ether, methanol and water soluble fractions of ginseng, respectively.

[2]pmoles of mevalonic acid synthesized per minute per mg. of microsomal protein.

[3]pmoles of [^{14}C] cholesterol into [^{14}C] 7α-hydroxycholesterol per minute per mg. of microsomal protein.

[4]ηmoles of NADPH oxidized per minute per mg. of cytosolic protein.

[5]Percentage of respective control activity data are in parentheses.

[a-d]Values not sharing a common superscript letter are different at $P < 0.01$.

TABLE 7: EFFECT OF DIFFERENT CONCENTRATIONS OF METHANOL AND WATER SOLUBLE FRACTIONS OF GARLIC ON THE ENZYMIC ACTIVITIES OF β-HYDROXY-β-METHYLGLUTARYL-CoA REDUCTASE AND FATTY ACID SYNTHETASE IN ISOLATED HEPATOCYTES OF FEMALE CHICKENS[1]

Methonol or water soluble fractions of garlic	β-Hydroxyı-B-methylglutaryl-CoA reductase[2]		Fatty acid synthetase[3]	
Concentration in μg/ml	Methanol Soluble fraction	Water soluble fraction	Methanol soluble fraction	Water soluble fraction
0.0	22.5 (100)[4]	24.3 (100)[4]	69.9 (100)[4]	77.8 (100)[4]
25.0	15.3 (68)	14.5 (60)	68.8 (98)	75.2 (97)
50.0	14.7 (65)	14.0 (58)	65.2 (93)	71.3 (92)
75.0	11.2 (50)	10.2 (42)	59.7 (85)	65.4 (84)
100.0	10.4 (46)	9.5 (39)	53.8 (77)	61.2 (79)
200.0	9.7 (43)	9.0 (37)	46.7 (67)	54.3 (70)
300.0	8.6 (38)	9.1 (37)	44.4 (64)	52.2 (67)

[1]Eight-week-old female chickens were fed standard corn-soybean diets. They were fasted for 48 hr and refed 72 hr prior to the preparation of liver perfusion. Incubation period was 15 minutes. Values represent means of replicate within incubation set.

[2]ρmoles of mevalonic acid synthesized-minute-mg of microsomal fraction.

[3]ηmoles of NADPH oxidized/minute/mg of cytosolic fraction.

[4]Percentage of respective control activity data are in parentheses.

TABLE 8: EFFECT OF LENGTH OF INCUBATION WITH METHANOL AND WATER SOLUBLE FRACTIONS OF GARLIC ON THE ENZYME ACTIVITIES OF β-HYDROXY-β-METHYLGLUTARYL-CoA REDUCTASE AND FATTY ACID SYNTHETASE IN ISOLATED HEPATOCYTES OF MALE CHICKENS[1]

Incubation Time min	β-Hydroxy-B-methylglutaryl-CoA reductase[2]		Fatty acid synthetase[3]	
	Methanol soluble fraction	Water soluble fraction	Methanol soluble fraction	Water soluble fraction
0	15.5 (100)[4]	18.5 (100)[4]	52.0 (100)[4]	58.5 (100)[4]
5	13.0 (84)	14.5 (78)	46.0 (88)	52.5 (90)
10	11.5 (74)	11.0 (59)	44.0 (85)	46.0 (79)
15	9.5 (61)	10.0 (54)	40.5 (78)	43.5 (74)
20	8.5 (55)	9.5 (51)	38.4 (73)	41.0 (70)
40	8.0 (52)	9.0 (49)	37.0 (71)	41.0 (70)
60	8.0 (52)	9.0 (49)	35.5 (68)	37.0 (63)

[1]Eight-week-old male chickens were fed standard corn-soybean diets. They were fasted for 48 hrs and refed 72 hrs prior to the preparation of liver perfusion. Each incubation contains 100 μg of methanol or water soluble fractions of garlic; value represents means of replicate within incubation set.

[2]$_p$moles of mevalonic acid synthesized/minute/mg of microsomal fraction.

[3]$_e$moles of NADPH oxidized/minute/mg of cytosolic fraction.

[4]Percentage of respective control activity data are in parentheses.

TABLE 9: EFFECT OF DIFFERENT CONCENTRATIONS OF METHANOL AND WATER SOLUBLE FRACTIONS OF GINSENG ON THE ENZYMIC ACTIVITIES OF β-HYDROXY-β-METHYLGLUTARYL-CoA REDUCTASE AND FATTY ACID SYNTHETASE IN ISOLATED HEPATOCYTES OF FEMALE CHICKENS[1]

Methanol or Water soluble fractions of Ginseng	β-Hydroxy-B-methylglutaryl-CoA reductase[2]		Fatty acid synthetase[3]	
Concentration in μg/ml	Methanol soluble fraction	Water soluble fraction	Methanol soluble fraction	Water soluble fraction
0.0	24.3 (100)[4]	21.7 (100)[4]	48.8 (100)[4]	56.2 (100)[4]
25.0	18.9 (78)	20.8 (96)	44.2 (91)	53.4 (95)
50.0	17.4 (72)	18.6 (86)	40.6 (83)	47.3 (84)
75.0	16.1 (66)	17.5 (81)	37.6 (77)	45.2 (80)
100.0	15.2 (63)	17.1 (79)	35.2 (72)	40.7 (72)
200.0	14.8 (61)	16.8 (77)	34.6 (72)	39.2 (70)
300.0	14.6 (60)	16.7 (77)	34.8 (71)	39.0 (69)

[1]Seven-week-old female chickens were fed standard corn-soybean diets. They were fasted for 48 hrs and refed 72 hrs prior to the preparation of liver perfusion. Incubation period was 15 minutes. Values represent means of replicate within incubation set.

[2]$_{\rho}$moles of mevalonic acid synthesized/minute/mg of microsomal fraction.

[3]$_{\eta}$moles of NADPH oxidized/minute/mg of cytosolic fraction.

[4]Percentage of respective control activity data are in parentheses.

TABLE 10

EFFECT OF DIFFERENT CONCENTRATIONS OF PETROLEUM-ETHER SOLUBLE FRACTION (PESF) OF HPBF ON THE ENZYME ACTIVITIES OF β-HYDROXY-β-METHYLGLUTARYL-CoA REDUCTASE AND FATTY ACID SYNTHETASE IN ISOLATED HEPATOCYTES OF CHICKEN AND RAT[1]

PESF of HPBF Concentration (mg/ml)	β-Hydroxy-β-Methylglutaryl-CoA Reductase[2]		Fatty Acid Synthetase[3]	
	Chicken	Rat	Chicken	Rat
0	19.5 (100)[4]	17.5 (100)[4]	17.6 (100)[4]	17.2 (100)[4]
1	18.0 (92)	16.1 (92)	15.8 (90)	16.2 (98)
2	15.9 (82)	14.7 (84)	14.8 (84)	15.3 (89)
4	15.0 (77)	14.2 (81)	12.8 (73)	14.2 (83)
6	14.1 (72)	13.7 (78)	12.6 (72)	13.3 (77)
8	13.2 (68)	13.5 (77)	11.2 (64)	12.2 (71)
10	12.9 (66)	13.0 (74)	10.3 (59)	11.5 (67)

[1]Eight-week-old female chickens and six-week-old male Sprague-Dawley rats were fed standard corn-soy and Purina chow diets. They were fasted for 48 hrs and refed 72 hrs prior to the preparation of liver perfusion. Incubation period was 15 minutes. HPBF = high protein barley flour.

[2]$_{p}$moles of mevalonic acid synthesized per minute per mg of microsomal fraction.

[3]$_{\eta}$moles of NADPH oxidized per minute per mg of cytosolic fraction.

[4]Percentage of respective control activity data are in parentheses.

TABLE 11

EFFECT OF DIFFERENT CONCENTRATIONS OF METHANOL SOLUBLE FRACTION (MESF) OF HPBF ON THE ENZYMIC ACTIVITIES OF β-HYDROXY-β-METHYLGLUTARYL-CoA REDUCTASE AND FATTY ACID SYNTHETASE IN ISOLATED HEPATOCYTES OF CHICKEN AND RAT[1]

MESF of HPBF Concentration (mg/ml)	β-Hydroxy-β-Methylglutaryl-CoA Reductase[2]		Fatty Acid Synthetase[3]	
	Chicken	Rat	Chicken	Rat
0	20.0 (100)[4]	19.5 (100)[4]	21.7 (100)[4]	19.8 (100)[4]
1	17.5 (88)	18.4 (94)	23.9 (110)	20.8 (105)
2	15.5 (78)	17.6 (90)	25.4 (117)	21.9 (111)
4	12.5 (63)	17.2 (88)	26.6 (123)	22.8 (115)
6	10.0 (50)	15.0 (77)	27.7 (128)	23.9 (121)
8	8.5 (43)	14.8 (76)	28.2 (130)	26.8 (135)
10	8.0 (40)	14.5 (74)	29.9 (138)	28.6 (144)

[1]Eight-week-old female chickens and six-week-old male Sprague-Dawley rats were fed standard corn-soy and Purina chow diets. They were fasted for 48 hrs and refed 72 hrs prior to the preparation of liver perfusion. Incubation period was 15 minutes. HPBF = high protein barley flour.

[2]ρmoles of mevalonic acid synthesized per minute per mg of microsomal fraction.

[3]ηmoles of NADPH oxidized per minute per mg of cytosolic fraction.

[4]Percentage of respective control activity data are in parentheses.

TABLE 12. EFFECT OF DIFFERENT HPLC PURIFIED COMPOUNDS FROM PETROLEUM-ETHER SOLUBLE FRACTION OF HPBF ON THE ENZYMIC ACTIVITIES OF β-HYDROXY-β-METHYLGLUTARYL-COA REDUCTASE AND FATTY ACID SYNTHETASE

(A) In Isolated Hepatocytes of chicken[1] (*In vitro*).

HPLC Purified Components from PESF of HPBF	Concentration (μg/ml)	β-Hydroxy-B-Methylglutaryl -Co A Reductase[2]	Fatty Acid Synthetase[3]
Control	(0)	75.9 (100)[4]	63 (100)[4]
1	200	74.2	69
2	200	78.4	67
3	200	86.8	71
4	200	64.9 (86)	72
5•	200	**24.6 (32)**	**87 (138)**
6	200	74.0	61
7	200	68.9	57
8	200	70.8	62
9•	200	**31.3 (41)**	**42 (67)**
10	200	73.7	65

(B) Three-week-old Broiler Male Chickens[5] (*In vivo*).

Nutritional State	B-Hydroxy-β-Methylglutaryl-CoA Reductase[2]	Fatty Acid Synthetase[3]
Corn (Control)	198 ± 15[5,a]	168 ± 20[5,a]
Corn + PESF of HPBF	142 ± 8[b]	146 ± 14[b]
Corn + HPLC Peak #1	193 ± 16[b]	178 ± 29[a]
Corn + HPLC Peak #2	188 ± 11[a]	166 ± 28[a]
Corn + HPLC Peak #3	194 ± 12[a]	188 ± 35[a]
Corn + HPLC Peak #4	186 ± 10[a]	177 ± 41[a]
Corn + HPLC Peak #5 •	**134 ± 6[c]**	**215 ± 18[c]**
Corn + HPLC Peak #6	184 ± 17[a]	171 ± 27[a]
Corn + HPLC Peak #7	182 ± 9[a]	177 ± 29[a]
Corn ± HPLC Peak #8	189 ± 13[a]	164 ± 27[a]
Corn + HPLC Peak #9 •	**149 ± 8[b]**	**124 ± 19[d]**
Corn + HPLC Peak #10	179 ± 12[a]	177 ± 28[a]

[1]Twelve-week-old female chickens were fed standard corn-soy diet. They were fasted for 48 hrs and refed 72 hrs prior to the preparation of liver perfusion. Incubation period was 15 minutes. HPLC = high pressure liquid chromatography; PESF = petroleum-ether soluble fraction; HPBF = high protein barley flour.

[2]$_p$moles of mevalonic acid synthesized per minute per mg of microsomal fraction.

[3]$_\eta$moles of NADPH oxidized per minute per mg of cytosolic fraction.

[4]Percentage of respective control activity data are in parentheses.

[5]Feeding period was three weeks; Time of killing was 0800 hrs; Data expressed as mean ± SD; N = 9 3-week-old broiler male chickens per group.

[a-d]Means within a line and without a common superscript are different at $p < 0.01$.

TABLE 13: EFFECT OF CHOLESTEROL INHIBITOR I ISOLATED FROM PETROLEUM-ETHER SOLUBLE FRACTION OF HPBF ON THE ENZYMIC ACTIVITIES OF β-HYDROXY-β-METHYGLUTARYL-COA REDUCTASE AND FATTY ACID SYNTHETASE.

Three-Week-Old Broiler Male Chickens[1] *(in vivo).*

Nutritional State (Concentration in ppm)	β-Hydroxy-β-Methylglutaryl-CoA Reductase[2]	Fatty Acid Synthetase[3]
Corn (control	198 ± 15[a] (100)[4]	168 ± 14[a] (100)[4]
Corn + Chol. Inhib. I 2.5	172 ± 12[a,b] (87)	190 ± 12[a] (118)
Corn + Chol. Inhib. I 5.0	161 ± 12[b] (81)	202 ± 10[b] (120)
Corn ± Chol. Inhib. I 10.0	144 ± 9[b] (73)	210 ± 15[b,c] (125)
Corn + Chol. Inhib. I 15.0	135 ± 8[c,b] (68)	218 ± 17[b,c] (130)
Corn + Chol. Inhib. I 20.0	130 ± 6[c,b] (66)	235 ± 18[c] (140)

In Isolated Hepatocytes of Chicken[5] *(in vitro).*

Chol Inhib. I Concentration (μg/ml)[6]	β-Hydroxy-β-Methylglutaryl-CoA Reductase[2]	Fatty Acid Synthetase[3]
0	52 (100)[7]	72 (100)[7]
5	45 (87)	88 (122)
10	40 (77)	97 (135)
15	31 (60)	112 (156)
20	30 (57)	126 (175)
25	28 (54)	135 (188)
50	22 (42)	148 (188)
100	23 (44)	154 (214)

[1]Feeding period was three weeks; Time of killing was 0800; Data expressed as mean ± SD; N = 9 chickens per group.

[2]$_p$-moles of mevalonic acid synthesized per minute per mg of microsomal protein.

[3]$_\eta$moles of NADPH oxidized per minute per mg of cytosolic protein.

[4]Percentage of respective control activity data are in parentheses.

[a-c]Values not sharing a common superscript letter are different at $P < 0.01$.

[5]Ten-week-old female chickens were fed standard corn-soy diet. They were fasted for 48 hrs and refed 72 hrs prior to the preparation of liver perfusion.

[6]Incubation period was 15 minutes. Values represent means of two replicates within incubation set.

[7]Percentage of respective control activity data are in parentheses. The results presented above were carried out by using the cells from one liver.

TABLE 14: EFFECT OF CHOLESTEROL INHIBITOR II FROM PETROLEUM-ETHER SOLUBLE FRACTION OF HPBF ON HTE ENZYMIC ACTIVITIES OF β-HYDROXY-β-METHYLGLUTARYL-COA REDUCTASE AND FATTY ACID SYNTHETASE.

Thirteen-week-old WLH Male Chickens[1] *(in vivo)*

Nutritional State (Concentration in ppm)	β-Hydroxy-β-Methylglutaryl -CoA Reductase[2]	Fatty Acid Synthetase[3]
Corn (control)	484 ± 35[a] (100)[4]	262 ± 7[a] (100)[4]
Corn + Chol. Inhib. II 2.5	309 ± 24[b] (64)	255 ± 8[a,b] (97)
Corn + Chol. Inhib. II 5.0	295 ± 21[b,c] (61)	240 ± 7[b] (92)
Corn + Chol. Inhib. II 10.0	281 ± 20[b,c] (58)	235 ± 8[b,c] (90)
Corn + Chol. Inhib. II 15.0	278 ± 18[b,c] (57)	231 ± 6[b,c] (88)
Corn + Chol. Inhib. II 20.0	265 ± 16[c] (55)	225 ± 4[c] (86)

In Isolated Hepatocytes of chicken[5] *(in vitro)*

Chol. Inhib. II Concentration (μg/ml)[6]	β-Hydroxy-β-Methylglutaryl-CoA Reductase[2]	Fatty Acid Synthetase[3]
0	42 (100)[7]	46 (100)[7]
5	39 (93)	36 (78)
10	35 (83)	32 (70)
15	30 (71)	30 (65)
20	26 (62)	30 (65)
25	25 (60)	28 (61)
50	24 (57)	26 (57)
100	22 (52)	29 (63)

[1]Feeding period was three weeks; Time of killing was 0800; Data expressed as mean ± SD ; N = 9 chickens per group.

[2]ρ-moles of mevalonic acid synthesized per minute per mg of microsomal protein.

[3]η moles of NADPH oxidized per minute per mg of cytosolic protein.

[4]Percentage of respective control activity data are in parentheses.

[a-c]Values not sharing a common superscript letter are different at $P < 0.01$.

[5]Ten-week-old female chickens were fed standard corn-soy diet. They were fasted for 48 hrs and refed 72 hrs prior to the preparation of liver perfusion.

[6]Incubation period was 15 minutes. Values represent means of two replicates within incubation set.

[7]Percentage of respective control activity data are in parentheses. The results presented above were carried out by using the cells from one liver.

TABLE 15: EFFECT OF CEREALS ON THE ACTIVITIES OF β-HYDROXY-β-METHYLGLUTARYL-CoA REDUCTASE AND CHOLESTEROL 7α-HYDROXYLASE IN CERTAIN SWINE TISSUES[1]

Nutritional State	Tissue					
	Liver	Adipose (Inside)	Adipose (Outside)	Intestine	Lung	Muscle[4]
Corn	HMG[2] 163.0 ± 9.0[a] (100)[3]	485.0 ± 10[a] (100)[3]	478.2 ± 15.0[a] (100)[3]	212.3 ± 9.0[a] (100)[3]	78.3 ± 5.0[a] (100)[3]	55.2 ± 2.0[a] (100)[3]
	7α-OH[2] 4.6 ± 0.2[a] (100)[3]	19.7 ± 1.0[a] (100)[3]	11.8 ± 1.5[a] (100)[3]	5.4 ± 0.5[a] (100)[3]	1.8 ± 0.6[a] (100)[3]	1.1 ± 0.1[a] (100)[3]
Barley	HMG 142.0 ± 3.0[b] (87)	395.0 ± 10[b] (81)	381.2 ± 9.0[b] (80)	158.2 ± 8.0[b] (75)	62.1 ± 5.0[b] (79)	42.3 ± 2.0[b] (77)
	7α-OH 3.3 ± 0.2[b] (72)	16.8 ± 1.0[b] (85)	8.4 ± 0.4[b] (71)	4.1 ± 0.3[b] (76)	1.4 ± 0.2[b] (78)	0.8 ± 0.1[b] (73)

[1]Feeding period was three weeks. Time of killing was 0800 hours. Data expressed as means ± SD; N = 5 swine per group.

[2]HMG = β-hydroxy-β-methylglutaryl-CoA reductase and 7αOH = cholesterol 7α-hydroxylase as p-moles of mevalonic acid synthesized per min per mg microsomal protein (HMG) or p-moles of [^{14}C] cholesterol into [^{14}C] 7α-hydroxycholesterol per min per mg of microsomal protein (7αOH).

[3]Percentage of respective control (corn-diet) activity data are in parentheses.

[a-b]Means for a given enzyme within a column and without a common superscript letter are significantly different $p < 0.01$.

[4]Enzyme activities recorded for the muscle tissue may actually represent contribution of the intramuscular fat cells which account for about 5% of the weight of the semimembranous muscle.

TABLE 16: EFFECT OF CEREALS SUPPLEMENTED DIETS ON THE LEVEL OF CHOLESTEROL IN PLASMA AND MUSCLE OF SWINE[1]

	Days of feed					(Muscle[3])
	(Plasma[2])					
Nutritional State	**0[1]**	**5**	**10**	**15**	**21**	**21**
Corn	92.5 ± 2.0	98.3 ± 3.0[a] (100)[4]	96.7 ± 3.0[a] (100)[4]	97.3 ± 4.0[a] (100)[4]	95.3 ± 3.0[a] (100)[4]	83.0 ± 4.6[a]
Barley	98.6 ± 2.0	94.2 ± 3.0[b] (96)	87.6 ± 3.0[b] (89)	81.7 ± 2.0[c] (84)	78.6 ± 2.0[c] (82)	69.2 ± 2.0[b] (83)

[1]Feeding period was three weeks. Time of killing was 0800 hours. Data expressed as means ± SD N = 5 swine per groups.

[2]The cholesterol concentration is expressed as mg/100 g of muscle

[4]Percentage of respective control (corn-diet) concentration data are in parentheses.

[a-b]Means within a column and without a common small superscript letter are significantly different $p < 0.01$.

RESEARCH METHODOLOGY FOR CLINICAL STUDY OF BRONCHIAL ASTHMA (ZEEQUN NAFAS)

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INTRODUCTION

Bronchial Asthma is one of the commonest intractable disease which not only incapacitates the patients but also leads to considerable loss of mandays. It is a condition for which the modern system of medicine does not have a very satisfactory line of management in terms of efficacy as well as safety. The Unani system of medicine (Islamic medicine), on the other hand, claims useful remedies which are said to not only efficacious but devoid of serious side effects. These drugs are simple to prepare and inexpensive.

Breathing in air is included in six essential causes of life *(Asbab-e-Sitta Zarooriya)* and is an involuntary and unconcious phenomenon[1,6,7]. According to Galen[2] fresh air is essential to cool the firey furnace of heart (which keeps the body warm) and to instil vital spirit into the blood. Exhaled breath warmed by its encounter with the heart's heat carries away impurities. Any disease disturbing the phenomenon of breathing is of much attention and requires immediate necessary treatment, and bronchial asthma is among one of these diseases. Scholars of Islamic medicine [3,4,5,6] were well known about the etiology and pathogenesis of bronchial asthma since long. They called bronchial asthma as *Zeequn Nafas* or *Buhar,* prescribed a number of drugs and treated so many cases. Avicenna[3] described *Zeequn Nafas* as difficulty in breathing due to narrowing in the air passages caused by inflammation *(waram)* of mucous membrane *(Ghisha-e-mukhati)* of trachea *(Qasbat-ur-Riya),* bronchi *(Shobaha-e-Qasba),* bronchioles *(Jirm-e-Riya)* and alveoli *(Khalkhala-e-Riya)* leading to secretion and accumulation of tenacious humour *(Khilt-e-Lazij)* or thick humour *(Khilt-e-Ghaliz)* or watery humour *(Khilt-e-Mayee).* Patients feel much difficulty in supine position than in sitting or standing positions.[8] Avicenna[3] was also of the view that *Zeequn Nafas* hardly cures in old age. Describing the pathogensis of disease Majoosi[4] states that the cause of narrowing is cold humour *(Khilt-e-Lazij)* or thick humour *(Khilt-e-Ghaliz)* which sticks to the walls of air passages and the physique *(Tabiyat)* wants to expel it by repeated laboured expiration and thus the expiratory process is prolonged. Increased rate of respiration is due to inadequate supply of oxygen *(Naseem)* to lungs and Tabiyat tries to fulfil it.[3,4,5,6,8]. He[4] wrote that *Zeequn Nafas* is a heridatory disease and generally occurs in middle age.

ETIOLOGY

Describing the etiology of *Zeequn Nafas* Islamic Physicians[3,4,5,6] listed following causes.

2.1. Predisposing causes:

(a) Heridity
(b) Middle age
(c) Male are more prone
(d) Emotion, Excitement, anger, fear, exercise, fatigue etc.
(e) Cold climate
(d) Non-ventillated residence

2.2. Exciting causes:

(a) Thick and tenacious phlegm *(Balgham-e-ghaliz or Lazij)* produced in the lungs or in other parts of the body infiltrating in air passages.
(b) Spasm *(Tashanuj)* of mucles of trechea and bronchi.
(c) Inflammation of mucous lining of air passages.
(d) Disorders of Heart.
(e) Chest effusion
(f) Dryness and coldness of lungs.
(g) Abnormal function of centres of nervous system responsible for rythmic respiratory movements.
(h) Inflammation of related organs of lungs e.g. liver, stomach, spleen, diaphragm etc.
(i) Excess of carbon dioxide *(Bukharat-e-Dukhaniya)* in the lungs.
(j) Congenital narrowing of chest.

PATHOGENESIS

(a) Spasm in bronchial musculature narrowing the calibre of bronchi[3,4].
(b) Inflammation of mucous membrane *(ghisha-e-mukhati)* of air passages lessening its lumen[3,4,5].
(c) Collection of secretions in the bronchi blocks the air passages.[3,4,5].

SYMPTOMATOLOGY

Signs and symptoms of *Zeequn Nafas* are recurrent attacks of wheezing, dyspnoea, cough and expectoration of mucoid sputum.[2,3,4,5,6,9].

DIAGNOSIS

Diagnosis of the patients will be performed on the basis of History of the patient, thorough clinical examination and laboratory findings. Detailed history of the patients will be recorded on the proforma at Annexure-I. Besides general examination of the patients, all systems will be examined with particular emphasis on respiratory and cardiovascular systems on the proforma at Annexure-II. Investigations will be performed as per Annexure-III.

SELECTION OF DRUG

Keeping in view the pathogenesis of the disease, selection of the drug to be trialled will be made by experienced research scholar who is capable of selecting the drug by considering the following points as described by Islamic physicians.[4,5,10,11].

(A) The drug should be least toxic, most suitable and easily available.

(B) The drug should be of high quality and free from any extrinsic or intrinsic alteration.

(C) Pharmacological action of the drug should be performed on such a mammal whose temperament resembles most with that of human being e.g. Monkey.

(D) The source of the drug, form, therapeutic dose, mode of administration, temperament, fate and excretion must be known before starting clinical trial.

(E) The drug should be collected according to method and time mentioned in Unani literature and the preservation of the drug be made accordingly.

(F) Pharmaceutical processing must be done according to scientific methods.

(G) The drug should be selected according to temperament of patients and it should be quantitatively and qualitatively approximate to the intensity of the disease.

The drugs mentioned by Islamic medicine scholars for the treatment of *Zeequn Nafas* are noted on Annexure-IV.

METHODS OF CLINICAL TRIAL

Evaluation of a new drug in human being should be carried out by clinical pharmacologists who has adequate background in animal studies, necessary facilities and uses drugs continuously and critically with continuing analyses of results. The clinical trial of new durg completes in four stages,[11].

1. Preliminary study (Phase I)
2. Controlled study (Phase II)
3. Double Blind Study (Phase III)
4. Final study (Phase IV)

1. Preliminary Study: The initial study should be planned to evaluate the effect of the drug on the patients suffering from bronchial asthma and to find out:

(i) Whether the drug in any way modifies the course of the disease.
(ii) Safety and toxicity of the drug.
(iii) Other pharmacological effects that it produces other than therapeutic action.

Such studies are carried out by competent investigators at limited centres. The aim of this study is to obtain precise informations from smallest sample in minimum time. The drug should be prescribed for sufficiently long time in uniform cases in respect of age, sex and severity of disease. Both subjective and objective evaluation will be done along with laboratory studies.

2. Controlled study: To avoid psychological indulgence of doctor and patient and to assess the subjective relief of symptoms such as chest pain, sleeplessness, dyspnoea etc. controlled clinical trial are absolutely necessary. This type of study is defined as one where a new drug therapy is compared with the previously established therapy or placebo. In this study patients are randomly divided into two groups, out of which one group gets new drug while the other receives control drug with either a previously established drug or placebo. In this study patient is unknown whether he is getting drug or placebo.

3. Double Blind Study: In this study both, evaluating investigator and patient are unaware of the drug. The specimen for laboratory investigation are submitted under a code number. Day to day report is recorded by investigator. The drug is decoded only after the trial is completed.

4. Final Study: The results of double blind controlled trials at few centres will be confirmed by trials at many more centres before the drug is released for general use.

DURATION OF TREATMENT & FOLLOW UP

The period of treatment will be 4 months and observation for one year. The patients will be followed up every fortnight during the period of treatment and information will be ascertained on the proforma at Annexure-V. During the period observation three monthly follow up will be carried out and informations will be collected on the proforma at Annexure-VI.

RESPONSE

Response of the drug will be assessed in terms of:

(i) Relief in acute attacks of bronchial asthma.
(ii) Increased interval between attacks.
(iii) Decrease in severity of an acute attack of asthma.

INTERPRETATION

After completioin of clinical trial the results will be subjected to statistical analysis. If the difference between the two groups is so large that the possibility of its occurance simply by chance is less than three times in 100 ($P < 0.03$) then the new drug is said to have significant effect. However, before acceptance it is necessary to rule out all possible explanations for such difference.

CONCLUSION

Following the above principles one can get accurate results of drugs and thus a lot of therapeutically worthless, costly and even toxic compounds can be prevented from reaching the hands of clinicians.

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ANNEXURE — I

PROFORMA FOR TRIAL OF BRONCHIAL ASTHMA

Name: Age Sex

Parentage

Religion Hindu Muslim Christian Other

O.P.D. No. Allergy Clinic No.

Date of First Consultation

Hospital No. Bed No.

Date of admission Date of discharge

Occupation: Present Nature of work:

Past Physical, mental, sedentary

Education

Marital status Married / Unmarried

Monthly income (per capita)

Address for correspondence: Rural Urban

Local Village P.O.

Deh. Distt.

Pradesh Pin

Permanent Address:

Village P.O.

Deh. Distt.

Pradesh Pin

Referred by:

Chief Complaints with duration.

1.
2.
3.
4.
5.
6.

Treatment if already taken

Present History / Illness

(a) Time place relationship of attacks

(b) Progress of sign and symptoms

Breathlessness	Duration	Time
Seasonal / Perennial	Paroxysmal / Continuous	

Frequency and duration of attacks

Wheeze	Bilateral	
Chest pain	Yes/No	
Cough	Yes/No	Dry/Productive
Past similar illness	Yes/No	

Respiratory Disease

Asthma, Bronchitis		Pneumonia
Pulmonary Kock's		Others

Any cardiovascular symptoms

Any gastro-intestinal symptoms

Any associated allergic disease

Urticaria	)		Yes/No
Eczema	)		Yes/No
Burning	)	skin	Yes/No
Itching	)		Yes/No
Allergic conjunctivitis			Yes/No
Rhinitis			Yes/No
Sinusitis			Yes/No
Angioneurotic oedema			Yes/No

PAST HISTORY

What illness he had in past

Respiratory disease:

T.B.		Bronchitis	Asthma	Others
Skin allergies	Urticaria	Burning	Itching	Others
Renal diseases				
G.I.T. diseases				
Childhood diseases	Measles			
	Mumps			
	Chicken Pox			
	Smallpox			
	Whooping cough			

(b) When he had them with their duration

(c) History of recurrent respiratory tract infections: Yes/No

FAMILY HISTORY

(a)	Grand parents	
	Parents	
	Children	
	Brothers and sisters	
	Their status of health	
	Cause of their death	
	At what age	
(b)	Similar illness	Yes/No
	C.V.S. disease	Yes/No
	G.I.T. disease	Yes/No
	C.N.S. disease	Yes/No
	Diabetes	

Resp. diseases
Tuberculosis
Asthma
Bronchitis
Others
Skin diseases
Urticaria
Burning itching
Others
Rhinitis Yes/No
Sinusitis Yes/No
Allergic conjunctivitis Yes/No

PERSONAL HISTORY:

(a) A brief account of a typical day of patient

(b) Patient's Home

(c) Patient's family relations

(d) Patients's Daily habits

(e) Diet: Vegetarian Non-vegetarian Occasional non-veg.
Balanced Rich Deficient
Rest after meals Physical work after meals Mental work after meals
Number of meals

(f) Exact nature of patient occupation

(g) Whether patient is exposed to certain allergens

(h) Patient's business affairs

(i) Patient's ambitions

(j) Patient's anxieties (Anxiety Scale)

(k) Patient's quarrel (if any)

(l) His attitude towards his work (occupational adjustment scale)

(m) Home surrounding

(n) Sanitary condition

(o) Any overcrowding (home)

(p) Any pet patient keeps

(q) Patient's domestic relations (home adjustment scale)

(r) Patient's marital relation (Mental adjustment scale)

(t) Hopes

(u) Fears

(v) Amount of exercise patient takes

(w_1) Games he plays

(w_2) Mental Fatiue

Habits / Addiction Alcohol
Tobacco Chewing-Smoking
Others

Whether patient has lived in other part of country or world

Whether patient ever got the parent illness or some associated there

ALLERIC HISTORY (PERSONAL)

I. Inhalants -

Symptoms induced (1)
(2)
(3)
(4)

(a) Dust-

House dust	Road dust
Rural dust	Bed-room
Pillow type	Cotton U-Foam
Mattress type	Dari
Gadda	Kambal
U-Foam	Others

(b) Moulds -

Symptoms induced
(1)
(2)
(3)

Around the cattle, Hay, old leaves, alcohol, Lake side.

(c) Danders -

Symptoms induced
(1)
(2)
(3)
(4)

Cat Cow Goat Dog Bull
Bird

(d) Miscellaneous

Symptoms induced
(1)
(2)
(3)
(4)

Cosmetics,	Chemicals,	Perfumes	Paints
Newspaper	Wool		

Bacteria and their product (attack after infection).

Parasites	Hook work	Roundworm	Pin worm
Tapworm	Others		
Silk			

II. Foods

Symptoms induced
(1)
(2)
(3)
(4)

Wheat	Banana	Potato	Groundnut	Rice
Tomato	Corn	Coffee	Tea	Milk
Beans	Peas	Oranges	Apples	Fish
Egg	Goatmeal	Chicken	Others	

Drugs
Symptoms induced
(1)
(2)
(3)
(4)

Asprin	- Quinine Any other	Sulpha	B. Complex group	Penicillin
Injectants		Diphteria	Antitoxin	Other

Immunization Status

Smallpox	Yes/No
Polio	Yes/No
BCC	Yes/No
Cholera	Yes/No
TAB	Yes/No
Diphtheria	Yes/No

Physical agent and habits-
Symptoms induced -
(1)
(2)
(3)
(4)

Smoking	Hukka	Bidi	Cigarettes
Heat and cold		Yes/No	
Alcoholic		Yes/No	
Cloudy weather		Yes/No	
Tobacco chewing		Yes/No	
Smoke kitchen exhausts			

Emotional stresses	Nervous	Emotional
	Fatigue	Worry
Endocrinal factors	Puberty onset	
	Menstruation	
	Menopause	
	Pregnancy	

Photosensitivity / Watering eyes / Burning / Skin rashes

SYMPTOMATOLOGY

G.I.	Disturbances	
	Nausea/loss of appetite/	Pain abdomen
	Diarrhoea / vomitting	Heart Burn

Respiratory system:

Cough	Yes/No
Seasonal	Summer Rainy Spring/Winter Autumn
Expectoration	Yes/No
Dyspnoea	Yes/No
Chest Pain	Yes/No
Wheeze	Yes/No
Fever	Yes/No
Haemoptysis	Yes/No

C.V.S. palpitation — Dyspnoea — Chest — Pain — Cyanosis — Oedema
C.N.S. Headache — Abnormal — Movements — Convulsions — Sensory — loss
Eyes - Burning — Watering — Redness
Nose — Running nose-Sneezing — Blocking
Throat — Post-nasal drip — Snearing — Itching in throat — Persistent cough
Sunusitis Headache — Local tenderness

Annexure II

PHYSICAL EXAMINATION

General	Appearance	Intelligent	Cooperative
Body build-	Moderate	Undernourished	Well nourished

Ectomorphic endomorphic mesomorphic

1. Anaemia	Yes/No
2. Cyanosis	Yes/No
3. Clubbing	Yes/No
4. Koilonychia	Yes/No
5. Urticaria	Yes/No
6. Lymphad nopathy	Yes/No
7. Jaundice	Yes/No
8. Skin pigmentation	Yes/No
9. Skin eruption	Yes/No
10. Obesity	Yes/No
11. Wasting	Yes/No
12. Any deformation	Yes/No
13. Swelling	Yes/No
14. Resp. rate	min. regular/irregular
15. Pulse	
16. B.P.	
17. Weight of Pt.	

Head and neck:

Nose	Watering	Swelling	Redness
Eyes	Watering	Swelling	Redness

Throat	Congestion	Enlarged tonsils	
Teeth	Healthy	Unhealthy	
Mouth	Healthy	Unhealthy	
Ears	Healthy	Unhealthy	

Respiratory systems:

C.V.S.	Normal		
	Abnormal findings		
Abdomen	Spleen	Palpable	Not palpable
	Liver	Palpable	Not palpable
	Colon	Normal palpable	Tender
	Any abnormalities		
Skin	Rash	Yes/No	
	Urticaria	Yes/No	
	Itching marks	Yes/No	

Remarks:

Diagnosis:

Annexure III
INVESTIGATIONS

1.	Blood			
		TLC	/cu.mm.	
		DLC	P L E M B	
		Hb	gm%	
		Absolute eosinophil	count	
		ESR		
2.	Stool			
		Cyst	Positive	Negative
		OVA	Positive	Negative
3.	Sputum			
		Eosinophils	Positive	Negative
		Polymorphs	Positive	Negative
		A.F.B.	Positive	Negative
		Sec. organisms	Positive	Negative
		Charcoal laden crystals	Positive	Negative
		Chushmann's spirals	Positive	Negative
4.	Urine			
5.	X-ray	Chest	Positive	Negative
		Sinuses	Positive	Negative
6.	E.C.G.			
7.	Breath holding time			
8.	Spirometry			

Annexure IV

List of drugs mentioned effective by Islamic physicians in cases of Bronchial asthma (3,4,5,6).

S.No.	Vernacular Names	Botanical Names
1.	Yabrooj	**Atropa belladona**
2.	Kharbaq	**Veratum album. L.**
3.	Shahm Hanzal	**Citrullus colocynthus**
4.	Zoofa	**Nepeta ciliars**
5.	Irsa	**Iris ensata**
6.	Mustard	**Brassica juncea**
7.	Bhang	**Cannabis sativa**
8.	Hulba	**Trigonella foenum**
9.	Alsi	**Linum usitatissinum**
10.	Karanjwa	**Caesalpinia bonducella**
11.	Pilas	**Butea frondosa**
12.	Sosan	**Iris florentina**
13.	Aneesoon	**Pimpinella anisum**
14.	Satar farsi	**Zataria multiflora**
15.	Afiyun	**Papaver somniferum**

Annexure V
Follow-up (During Treatment)

	15 days	30 days	45 days	60 days	75 days	90 days.
Exanination						
Blood						
Stool						
Sputum						
Urine						
X-ray						
Breathing Time						
Spirometry						
History and Symptoms						
1. Did you have any attack	Yes		No			
2. Severity of attack.						
3. Frequency of attack						
4. Regularity of taking medicine						
5. Duration of attack						

Follow-up (Observation Period)

	3 Monhs	6 Months	9 Months	12 Months
Examination				
Blood				
Stool				
Sputum				
Urine				
X-ray				
E.C.G.				
Breathing Time				
Spirometry				
History and Symptoms				
Attacks				
Frequency				
Severity				

LEPROSY STIGMA AND ISLAMIC MEDICINE

Dr. H. Kamal Mahmud

INDONESIA

Irrational fear of leprosy is a universal phenomenon which is based on the ideas of the great world religions concerning the disease. It is a fact that some kind of leprophobia also exists amongst certain groups of Moslims. Leprophobia itself is an obstacle in every leprosy control programme. Is it reasonable for us, Moslims, to follow the ideas of other religious adherents regarding this leprosy stigma? A comparative study on the conceptions of the great religions concerning leprosy gives us a conclusion that there is no reason for the Moslims to regard leprosy as a disease in religious ritual sense but as a disease in true scientific medical sense. So, we Moslims have to abolish the leprosy stigma from the medical field through the Islamic Medicine for the benifit of all leprosy patients in the world.

INTRODUCTION

Leprosy is widely regarded as one of the oldest diseases known to man, since it is the only disease which is always mentioned in the Holy scriptures of all the great religions in the world. Due to the influence of every religious ideas, leprosy in the past may have appeared as a confused and confusing mixture of superstition and clinical observation that had little to do with general medicine[1].

To-day according to the modern medical science leprosy in an infectious disease due to a specific micro-organism, Mycobacterium leprae "HANSEN", of low invasive power and pathogenicity.

At an early stage, the only convincingly demonstrable abnormality may be localized skin areas of slight, transient and self-limiting changes in pigmentation, tactile sensitivity and sweating.

The very advanced cases show gross deformities and mutilations, which are actually the secondary result of damage to peripheral nerves and other organs due to the spread of infection and tissue hypersensitivity.

It is these disfigurements, generally regarded as essential features of leprosy, are stigmatizing and constitute an obstacle to the patient's acceptance in the community.

Since 1943 when FAGET and POGGE[2] had begun the experimental treatment of leprosy with Promin, leprosy could be cured in the individual and controlled in the community. If the treatment is started at the early stage of the disease less than one year, and continued regularly, a leprosy patient can be recovered completely without leaving sequelae or deformities[3].

LEPROSY CONTROL PROGRAMME FACING LEPROSY STIGMA

The basic objectives of leprosy control are case finding, effective treatment and the protection of contacts, by careful medical and health planning, as indeed in the control of other communicable diseases. The medical and health programme can only function if the people will accept it and co-operate in it.

Leprosy is, however, unique in the importance of sociological factors in its control. It is this sociological factors which cause leprosy control programme to founder through failure, because leprosy is dreaded due to the stigma that goes with it. So, instead of co-operation in its control, the society induces to conceal the disease within the family as long as possible. Concealment of early and

treatable leprosy lesions not only allows the disease to progress to irreversible deformity but also perpetuates the endemic.

This stigma takes the form of irrational fear of leprosy or leprophobia, which cannot be explained from the symptoms of the disease, because what has brought the feeling of fear here is the very name or word "leprosy", which is mentioned and described in the Holy scriptures of every religion. Hence, leprophobia is rooted in the religious idea based on the respective Holy scriptures.

HINDU RELIGIOUS IDEA CONCERNING LEPROSY

Leprosy was mentioned and described in the Hindu religious books, Smritis and the Vedic writings of India. The disease was called kushta, a Sanskrit word, that meant skin diseases in general, prominent among which was possibly or probably leprosy[4].

To the old Ayurvedic physician of old days leprosy was a baffling and mysterious disease, and the results of such treatment as was then available were unsatisfactory. Hence came the idea that the disease was incurable, virulent, and due to some sin committed in this life or in the past one. The victim of leprosy is regarded as a sinful or an immoral person. Therefore the diagnosis of leprosy does not evoke any sympathy for him as it does in the case of other diseases. Even now the world "leper" which carries a sense of abhorrence, is widely used in literature; and to describe something horrible a person with leprosy is introduced. People used the words "leper" and "leprosy" to curse others.

On these ideas, which had their origin about 200 B.C., laws, acts and rules were made in India to deprive the victims of leprosy in all possible way. According to the Hindu law the leprosy patient was disinherited, affected by judicial separation and divorce, debarred from traveling in the same compartment with other persons, disqualified from obtaining license to drive a public service vehicle, although the sufferer did not show any sign of deformity at all.

These customs that result in ostracizing the leprosy patient in India are almost the same today as in the past[5].

CHRISTIAN RELIGIOUS IDEA CONCERNING LEPROSY

Leprosy is mentioned and clearly described in some chapters of the Old and New Testament.

In the Old Testament, Leviticus 13: 1-3 and 45-46[6], leprosy, a translation of the Hebrew word tsara'ath, is described as scaly blemishes on skin and cloth. These skin blemishes are associated with ritual defilement and not regarded as a disease in medical sense. Leprosy figures as something vile and degrading, whose victims has to be banished outside the camp.

According to the New Testament, Matthew 8: 1-3[7], Jesus did not cure the leper, but he only made him clean from the ritual defilement.

It is not surprising that the word leprosy provokes an immediate and uncontrollable rejection; it is described as horrifying by itself.

Some Christian leprologists considered the term "lepra" a common cause for suicide and crime, a trauma that disintegrates the patients, a nightmare, a terrible shock[8].

Leprosy is a vague name associated with medieval darkness and millenary malediction and superstition. PEPIN (France) isued in 757 a decree making marriage of those with leprosy illegal and the disease a reason for divorce. PHILIP IV (1285-1312), King of France, even suggested that all

persons with leprosy be gathered together and burned and that the practice continue until the disease was eradicated[9].

GRAMBERG[10], a Dutch missionary physician, serving leprosy for 25 years on Java, Indonesia, stated in an article in Geloof en Wetenschap (Faith and Science), that the Bible is responsible for the immense heavy lot of the lepers in many countries of the world. With the penetration of Christianity into the Javanese community came along the leprophobia, which originally did not exist. The Mohammedan Javanese do not recognize abhorence of leprosy, but the Christian Javanese know such horror.

Considering the symptoms which are mentioned in the mosaic book of Leviticus, chapter 13 and 14, GRAMBERG concluded that the combinations which are typical of leprosy of to-day are not well recognizable, and pleads for dissociating the leprosy caused by Mycobacterium leprae "HANSEN" from the Biblical words and conceptions, which are not identical at all. The purpose is to break down the curtain of terror and fear which still surrounds the patients with leprosy.

The observation and experience of the author during his 28 years' service in leprosy control and treatment confirmed the statement of GRAMBERG concerning the influence of the evangelization in Indonesia. Leprophobia indeed is very conspicuous among the Christian Indonesians, while the Muslim lepers can be treated anywhere in the same way as the sufferers from other diseases.

In Brazil, one of the Christian countries, where leprosy is still endemic, leprosy is an anti-educative and stigmatizing label of primary force that ostracizes and causes immense suffering to patients and contacts, blocks any attempts to enlighten the public at any level and hinders seriously the development of prophylactic and social programmes, which are based on early diagnosis and treatment, leading to integration and acceptance by society[8].

Therefore the Seminar on Prophylaxis of Leprosy of the 18th Brazillian Congress of Hygiene (S. Paulo, 1970) proposed to change the term "leprosy" and its derivatives into hanseniasis, aiming at the gradual absolescence of the ancient term.

This proposal of changing the ancient term "leprosy" is also accepted by the Church and in GOOD NEWS BIBLE, published in 1976 in England, the words leprosy and leper are eliminated.

In Leviticus 13[11] as well in Matthew 8[12] in the above mentioned bible the words leprosy and leper become respectively, a dreaded skin-disease and a person who had a dreaded skin-disease.

As a consequence of the association of the visible blemishes in the clinical observation with the ritual defilement according to the religious idea concerning leprosy in the christian world, the stigma of leprosy depends less on personal encounters with the condition than on hearsay and folklore. Amongst the educated strata of society, not excepting medical men, a curious dichotomy of thought is frequently to be observed: there may be a conscious and intelectual acceptance of the scientific facts about leprosy, and at the same time a subconscious rejection of these facts in the favour of traditional beliefs[13].

From the above explanation it is obvious that in the Hindu religion as well in the Christianity, leprosy is regarded as a disease in clinical sense as well as punishment for some sin, committed by the sufferer in conformity with the ritual religious conception. The religious conception is actually stigmatizing for the leprosy patient, psychologically as well as socially. It is really one of the oldest conceptions of the cosmos that illness is considered a direct result of sin, the inevitable consequence of some irregular conduct which has violated the indissoluble system binding men and gods in universal harmony[14].

ISLAMIC RELIGIOUS IDEA CONCERNING LEPROSY

First of all we have to consider the next Qur'anic verse[15]:

> *AND WHATEVER MISFORTUNE BEFALLS YOU, IT IS ON ACCOUNT WHAT YOUR HANDS HAVE WROUGHT AND HE PARDONS MUCH*
>
> (S 42: V 30)

And the genuine *hadith (hadith sahih)* from the canonical collections of Bukhari[16]:

Narrated abu sa'id al-Khudri and Abu Huraira: The Prophet, ﷺ , said:

> *"No fatigue, nor disease, nor sorrow, nor sadness, nor hurt, nor distress befalls a Muslim, even if it were the prick he receives from a thorn, but that Allah expiates some of his sins for that".*

From the above Qur'anic verse and *hadith* we can draw a simple conclusion, that according to the conception of *Islam* disease is not considered a result of sin, but on the contrary sickness, included leprosy, is expiation of sins.

The word leprous, a derivative of lepra, is mentioned in the *Holy Qur'an* as well in the *Hadith*, especially the six canonical collections (Al-Kutub al-Sittah).

a. The Holy Qur'an Concerning Leprosy

The word leprous is mentioned in two verses of the *Holy Qur'an* as follows[17]:

> *AND (MAKE HIM) A MESSENGER TO THE CHILDREN OF ISRAEL (SAYING): I HAVE COME TO YOU WITH A SIGN FROM YOUR LORD, THAT I DETERMINE FOR YOU OUT OF DUST THE FORM OF A BIRD, THEN I BREATHE INTO IT AND IT BECOMES A BIRD WITH ALLAH'S PERMISSION, AND I HEAL THE BLIND AND THE LEPROUS, AND BRING THE DEAD TO LIFE WITH ALLAH'S PERMISSION; AND I INFORM YOU OF WHAT YOU SHOULD EAT AND WHAT YOU SHOULD STORE IN YOUR HOUSES. SURELY THERE IS A SIGN IN THIS FOR YOU, IF YOU ARE BELIEVERS*
>
> (S3: V49)
>
> *WHEN ALLAH WILL SAY; O JESUS, SON OF MARY, REMEMBER MY FAVOUR TO THEE AND TO THY MOTHER, WHEN I STRENGTHENED THEE WITH THE HOLY SPIRIT; THOU SPOKEST TO PEOPLE IN THE CRADDLE AND IN OLD AGE AND WHEN I TAUGHT THEE THE BOOK AND THE WISDOM AND THE TORAH AND THE GOSPEL, AND WHEN THOU DIDST DETERMINE OUT OF CLAY A THING LIKE THE FORM OF A BIRD BY MY PERMISSION, THEN THOU DIDST BREATHE INTO IT AND IT BECAME A BIRD BY MY PERMISSION; AND THOU DIDST HEAL THE BLIND AND THE LEPROUS BY MY PERMISSION; AND WHEN THOU DIDST RAISE THE DEAD BY MY PERMISSION; AND WHEN I WITHHELD THE CHILDREN OF ISRAEL FROM THEE WHEN THOU CAMEST TO THEM WITH CLEAR ARGUMENTS-BUT THOSE OF THEM WHO DISBELIEVED SAID: THIS IS NOTHING BUT CLEAR ENCHANTMENT*
>
> (S 5: V 113)

In his commentary on this verse, Maragi[18] stated, that 'Isa, peace on him, exceeded the learned

physicians in his period by his miraculous power to heal the leprous.

Hence according to the Islamic conception leprosy can be cured in medical sense, in conformity with the next genuine *hadith* also from the canonical collection of BUKHARI[19]:

Narrated Abu Huraira, Allah is well pleased with him, The Prophet (ﷺ), said:

"No disease Allah created, but that He created its treatment".

Until 1943, in the pre-sulphonic period, there was indeed no effective cure for leprosy. The disease ended in selfhealing with or without deformities depending on the degree of the cell-mediated immunity of the patient.

Today there are many effective anti-leprosy drugs, from the cheepest dapsone, which is essentialy bacteriostatic up to the most expensive rifampicin with extremely powerful bactericidal activity[20].

So, it took nearly 14 centuries before the statement of the Apostle of *Allah,* in the above mentioned *hadith* came to light.

b. The Hadith Concerning Leprosy

The word leper is mentioned in the six canonical collections as follows:

1. Bukhari[21]:

Narrated Sa'id ibn Mina and Abu Huraira: The Apostle of *Allah,* (ﷺ) , said:

"(there is) no 'Adwa (no contagious disease is conveyed without Allah's permission), nor is there any bad omen (from birds), nor is there any Hamah, nor is there any bad omen in the month of safar, and one should run away from the leper as one runs away from a lion".

2. Muslim[22]:

Narrated 'Amr ibn Sharid and his father: There was among the Thaqif delegation a man, a leper; then the Prophet (ﷺ), sent to him (a message):

"We have just received your fealty, and go back".

3. Abu Daud[23]:

Narrated Muhammad ibn al-Munkadir and Jabir: The Apostle of *Allah,* (ﷺ) took hold of the hand of a leper, then he put it into the trencher and said:

"Eat on account of the confidence to Allah and the reliance upon Him".

4. Al Tirmidhi[24]:

Narrated Muhammad ibn al-Munkadir and Jabir ibn 'Abd Ullah: The Apostle of *Allah,* (ﷺ) took hold of the hand of a leper, then he brought it into the trencher, then he said: "Eat, in the name of Allah, on account of the confidence to Allah and the reliance upon Him".

5. Al Nasai[25]:

Narrated a man of the Sharid relatives, 'Amr and his father: There was among the Thaqif delegation a man, a leper; then the Prophet, (ﷺ) sent to him (a message): *"Go back, then I have just received your fealth".*

6. Ibn Majah[26]:

Narrated Habib ibn al-Shahid, Muhammad ibn al-Munkadir and Jabir ibn 'Abd Ullah: The Apostle of *Allah,* (ﷺ) took hold of the hand of a man, a leper, then he brought it into the trencher, then he said:

> *"Eat on account of the confidence to Allah and the reliance upon Allah".*

If we look closely at the six canonical collections three statements of the Prophet of *Allah,* ﷺ related by ABU Daud, Al Tirmidhi and Ibn Majah, are favourable for the lepers. The other three statements, related by Bukhari, Muslim and Nasai, are relatively unfavourable for those sufferers, but the conception of the last ones do not evoke pejorative sense, such as filth, abhorrence defilement in religious sense. Anyhow, leprosy has nothing to do with some sins or ritual conception.

The seemingly controversy of the two statements can be explained by the modern scientific facts about leprosy of today.

The first statement which denotes, that there will be no harm to have social intercourse with the leper, is adaptable for those, who belong to the capable responders among the population, have a very high degree of cell-mediated immunity and are capable of eliminating Mycobacterium leprae from the body. On the other hand the second statement, which proposes to run away from or not to come across the leper, must be applied to those, who belong to the poor responders among the population with complete absence of cell-mediated immunity and are unable to prevent the attack of Mycobacterium leprae and to stop the enormous multiplication of the bacilli in the body[27;28].

The concordance between the *Hadith* of the Apostle of *Allah,* (ﷺ) and the modern scientific facts about leprosy of to-day, from our viewpoint as Muslims, belongs under the many miracles, which *Allah,* glory be to Him and highly exalted is He, sent to His Apostle Muhammad, ﷺ .

THE ISLAMIC HISTORICAL EVENTS IN RELATION TO LEPROSY

The history of medicine has showed, that *Islam* with the Islamic medicine played a significant role as a link between the Graeco-Roman modern medicine and the scientific modern medicine of to-day[29].

Islamic medicine as a modern medicine in contradistinction to the primitive or traditional medicine regarded leprosy as a disease in clinical sense as showed by the next historical facts.

a. Khalife El Walid's Benevolent Acts For Sake Of Lepers

During his rule from 705 A.D. - 715 A.D., Khalife El Walid, the son of Abdul Malik, established numerous hospitals for ordidnary diseases, mental diseases and contagious diseases. He also ordered that lepers be prevented from begging, providing for them and for patients suffering from chronic diseases, special hospitals in which they live at the expense of the Government's Treasury.

Among the numerous activities of El Walid is his special attempt to improve the status of lepers, thus imitating the Prophet of *Allah,* (ﷺ) , in affording them benevolent treatment and protecting them from any corporal or psychical harm. He assigned for them doctors and servants and alloted the funds sufficient to cover their various requirements, appointing a special servant to look after every leper whose disease shows any malignancy.

For the proper treatment of leprosy El Walid founded in Damascus the Leper Home, which was prominent in that it did not resemble to similar Homes then in existence and which were merely

prisons. On the contrary, the said Leper Home was a vast palace surrounded by charming gardens where the patients tried to forget his disease, and where he was afforded the best treatment[30].

b. Leprosy According To The Opinion Of The Islamic Physicians In The Middle Ages

The comprehension of leprosy as a disease in medical sense in the Islamic religion can be traced from the descriptions of some Islamic physicians concerning leprosy in the Middle Ages.

1. Abu-al-Qasim Khalaf ibn-Abbas al-Zahrawi (936-1013)

This physician, a native of Cordova and author of an "al-Tasrif", describes four varieties of leprosy, namely: the leontina, elephantia, serpentina, and vulpina. The disease may be contracted: by an hereditary taint, by the use of corrupted food, such as the flesh of buck-goats, cows, etcetera, by contagion through the medium of the respiration. He describes all the gradations of the disease with greater minuteness than any other ancient author. In the last stage, he says, the nose falls in, the hairs drop off, the voice is lost, ulcers break on the skin, the extremities mortify and fall away, and the breath is fetid.

2. Ali ibn-al-Abbas al-Majusi (died 994)

This Islamic physician from Persia,who was one of the leading figures of his period,considered that leprosy is contagious. He said that it may contracted by the respiration and that it produces loss of eyebrows and collapse of the nose.

3. Abu-'Ali al-Husayn ibn-Sina (980-1037)

This physician, who was born at Bukhara, the author of an important medical "Canon", in his writings spoke of dysuria and penile sore as a sign of leprosy, contracted during intercourse[31].

LEPROSY STIGMA IN THE MUSLIM SOCIETY

In spite of the clear Islamic idea concerning leprosy, which is free from prejudice, superstition and social as well psychological stigma, the author, as a leprosy worker, observed that there is some kind of leprophobia amongst certain groups of Indonesian Muslims. Some of them could not understand, why the author was able to persist in the leprosy service for so many years. Many times he was belittled and scoffed as a doctor for the scum, and was not appreciated in the same way as his other colleagues.

There are two sources of some fear of leprosy among certain Muslims i.e. the method of the Holy *Qur'an* commentary and the western education.

a. The Method Of The Holy Qur'an Commentary

Maragi[32] gave a commentary on the leprous as follows:

A leper is one who suffers from leprosy or whiteness on the skin, from which he is augured an evil omen.

Muhammad 'Ali[33] in his commentary on healing of the leprous concluded that in this case the healing cannot refer but to healing of the spiritual disease. In this case he cited the verses of Matthew 11:5 in the New Testament.

If the commentary of Maragi had nearly the same conception of the Old Testament, that of Muhammad 'Ali the same conception of the New Testament.

The first we call Israelite commentary and the second the Christian commentary or both we call commentary following the conception of the People of the Book.

In connection to the above commentaries on "I heal the blind and the leprous" with reference to the Bible, we Muslims are reminded to the saying reported by Abu Huraira (Bukhari): The People of the Book used to read the Tora in Hebrew and expound it in Arabic to the people of *Islam*. The Apostle of *Allah*, (ﷺ) , said:

> *"Do not believe the People of the Book and do not disbelieve them, but say, "We believe in Allah and what He has revealed to us"*[34].

b. The Western Education

It is a fact that there exists leprophobia among the Westerners bases on their religious conception concerning leprosy.

The Indonesian Muslims, who had the opportunity to obtain western education from the Dutch, during their study and their social life with the Westerners also adopted the fear of leprosy, which did not exist previously. In relation to this event, Lodder[35], a Dutch doctor, who had been working in the leprosy service in Indonesia stated, that there was some kind of fear of leprosy among the Indonesian intelectuals, while the Indonesian villagers, who never had social intercourse with the Westerners did not recognize leprophobia at all.

But anyhow the author never experienced any obstacle from the Muslim society during his field survey of leprosy and the mass treatment of the lepers. The examination and treatment of these patients could be carried out in the General Health Centre or even at the office of the village-head without any objection from the patient's relatives or the villagers.

Such event was also experienced by the former Indonesian leprologists, among others: Kodijat and Sitanala[36], Kapitan[37] and Boenjamin and Soedarsono[38].

Hence the persistence of the author in the service of the lepers since 1955 up to nowadays was due to the confidence, that leprosy is a disease in medical sense, based on Islamic doctrine as a source of the Islamic medicine.

CONCLUSION

Considering the Qur'anic verses concerning leprosy and the explanation of the *Hadith* on diseases and treatment, we can draw a conclusion, that in *Islam* leprosy is a disease in modern medical sense and can be cured by any available anti-leprosy drug and there is no stigma going with the disease. In this case *Islam* corrects and verifies the wrong idea concerning leprosy prevailing in the world, especially the Judo-Christian world, in conformity with the next verse of the Holy *Qur'an*[39]:

> *O YOU WHO HAVE BEEN GIVEN THE BOOK, BELIEVE IN WHAT WE HAVE REVEALED, VERIFYING THAT WHICH YOU HAVE, BEFORE WE DESTROY THE LEADERS AND TURN THEM ON THEIR BACKS*
>
> (S 4: V 47)

Hence *Islam* releases all the lepers from the horrifying leprosy stigma and regards them as human beings with the same dignity as others with *Allah*. In this connection we Muslims are reminded to the truth of the next two verses of the Holy *Qur'an*[40;41]:

> *"A.L.R. A BOOK WHICH WE HAVE REVEALED TO THEE THAT THOU MAYEST BRING FORTH MEN, BY THEIR LORD'S PERMISSION, FROM DARKNESS INTO LIGHT, TO THE WAY OF THE MIGHTY, THE PRAISED ONE*
>
> (S 14: V1)

AND WE HAVE NOT SENT THEE BUT AS A MERCY TO THE NATIONS

(S 21: V 107)

In this case the Prophet Muhammad (ﷺ), was sent as a mercy to all the lepers, as a part of the nations.

This Islamic modern conception regarding leprosy must be applied by the Islamic Medicine as to sav e all leprosy patients of the world from common prujudice and inhuman social rejection.

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PART NINE

PSYCHIATRY AND ITS TREATMENT IN ISLAM

Part Nine: *Psychiatry and its Treatment in Islam*

CHAPTER ONE

(Papers Presented)

1. REPORT ON THE SESSION
   The Editors
2. THE CONCEPT OF MENTAL HEALTH IN THE HOLY QURAN AND THE HADEETH
   Prof. Osman Najaty
3. THE ISLAMIC MODEL IN THE FIELD OF MENTAL HEALTH
   Dr. Jamal Mady Abul Azayem
4. ISLAM'S PSYCHOLOGICAL THERAPEUTICS
   Dr. Salim Ammar
5. DEPRESSION - PSYCHO-SOCIO BIOLOGICAL FACTORS. ROLE OF MUSLIM PHYSICIAN
   Dr. Basheer Ahmed
6. SOCIO-PSYCHIATRIC INSTITUTIONS IN OLD TURKS UNDER ISLAMIC TRADITION
   Prof. Dr. Ayhan Songar
7. ISLAM AND MENTAL HEALTH
   Dr. Taha Baashar
8. DISCUSSION

REPORT ON THE SESSION

This session was held in evening hours under the chairmanship of Prof. Dr. Mehdi Ben Aboud and co-chairmanship of Prof. Dr. Abdullah Ba-Salama. Five professors and psychiatrists presented their papers on "PSYCHIATRY AND ITS TREATMENT IN ISLAM" in the light of Quran and Hadith. At the end very interesting discussion was held.

Editors

THE CONCEPT OF MENTAL HEALTH IN THE HOLY QURAN AND THE HADEETH*

Prof. Mohammed Osman Najaty

KUWAIT

ABSTRACT

Man is made up of body and soul. Each of these two components of man has its inmate needs. The body has its inmate needs that must be satisfied in order that the individual can live and the human species can survive. The soul also has its inmate needs that express themselves in man's spiritual longing for knowing God, belief in Him and worshiping Him. Satisfaction of these spiritual needs determines man's feeling of security and happiness.

Conflict arises between these two components of man. This conflict is, in fact, the basic psychological conflict that man suffers in his life. Perhaps, it is God's will that the way that man adopts in solving this conflict becomes the real test of man in this world. Those who really succeed in this test are those who can reconcile the material and the spiritual components of their personalities, and can establish the greatest amount of equilibrium between them. Therefore, they deserve the reward of being happy in this world and also in the later eternal life.

Islam follows in educating people a purposeful method that can establish equilibrium between the material and the spiritual components of their personalities in order to be normal persons who can enjoy mental health and happiness. *Islam's* method of education has two approaches. One is to strengthen the spiritual component in man by inviting him to believe in the only one God and to worship Him. The other approach is to ask man to dominate his material component by controlling his drives, emotions and sensual desires. By these two approaches of education, *Islam* teaches people to attain equilibrium between the material and spiritual components of their personalities, and thus enjoy security, happiness and mental health.

* As the full text could not be made available, we are publishing here the abstract only.

Editors

THE ISLAMIC MODEL IN THE FIELD OF MENTAL HEALTH

Dr. Gamal Mady Abdul Azayem
EGYPT

The Islamic message is abundant with preventive principles in the field of mental health, besides it has its effect in the field of psychiatric therapy. It is a well established fact that prevention and treatment are the two wings of health.

Islam gives great care to prevention. The Islamic daily programme is rich with many pieces of advice provided to lay the foundation of a programme which protects Muslims from disease whether physical psychological or social[1]. *Islam* faced, from the very beginning many psychological problems resulting from incessant wars between the different tribes. It also faced many psychosocial diseases. Children were deprived of their rights. Some girls were buried for fear of shame (Sura 81, verse 8). The youth were deprived of their rights and did not get the appropriate psychological up bringing.

Women were deprived of their rights and were enslaved. Some men also suffered from serfdom and were humeliated. The Second Caliph enquires saying "why have you enslaved people while they are born free?".

Alcoholism was wide spread and resulted in wide spread damage to the health.[2]

All this was properly confronted by *Islam* which set the required physical social and psychological approaches which were applied step by step until the behaviour of the people settled down after 23 years of continuous effort.

The youth, women and the aged all acquired their rights and enjoyed physical, psychological and social therapy guided by the principles of Islamic prevention.

By the end of the prophet's life while he was addressing the Muslims on the last pilgrimage the following verse was revealed to him

> *BY THIS TIME THE ISLAMIC PRINCIPLES HAVE FINALLY BEEN MADE CLEAR. THEY ARE FOR YOUR EVER LASTING BENEFIT AND I HAVE ENDOWED YOU WITH ISLAM AS A MODEL OF LIFE.*
>
> (S5: V4).

Psychological health was thus a way to all the classes of the society and for the first time a nation was constructed after it immerged from division and ignorance in the Arab-peninsula, and it spread all over the world a new civilization one of the corner stones of which was the appropriate psychological approach. I shall try here to show the different Islamic preventive and therapeutic trends and state the *Quranic* verses and the prophets, sayings which exemplify these trends. I shall do this in different phases of life, before marriage during pregnancy, and during the different stages of life.

Islamic preventive rules during the different stages of life before marriage

1- *Islam* urges the individual to choose the suitable consort for man and women, and in this respect the prophet (ﷺ) says,

> *"Choose carefully your partner for marriage and be aware that diseases are transmitted with related families"*

and this has proved correct in genetics.

2- *Islam* discourages the marriage of relatives and the prophet (ﷺ) says

> *"Marry outside your relatives to avoid weakness"*

and the progress of the studies of heriditary has proved the validity of this principle[10].

3- *Islam* recommends early marriage, and if it constitutes a difficulty, fasting is recommended as well as forbearance. In this respect the Prophet (ﷺ) says addressing the youth

> *"If you can afford early marriage, it is highly recommended, and if you cannot, stick to fasting which is a protective measure".*

4- *Islam* gives great care to sublimation in order to absorb the surplus energy during the period of puberty. The Prophet (ﷺ) lays stress on the upbringing of the youth when he (ﷺ) says

> *"Train your youth on shooting, swimming and horse riding".*

5- *Islam* forbids sin and adultry and *Quran* says

> *'DON'T APPROACH ADULTERY IT IS A GRAVE SIN LEADING TO GREAT EVIL.* (S17: V32)

Psychologists have hailed sublimation of motives and much research has been conducted and proved that this sublimation through the different activities have their effect of increasing the potentialities of psychological balance among the youth[3].

6- *Islam* recommends marriage after the youth has realised psychological maturation. The *Quran* says:

> *...APPROACH THE ORPHANS AND IF THEY COME TO SEXUAL MATURITY AND PROVE TO BE SOUND MINDED HAND OVER THEIR MONEY TO THEM...*
>
> (S4: V5)

This reveals the importance of psychological examination to make sure of the ability to shoulder responsibility.

7- *Islam* pays great attention to pregnant women to secure to them enough nutrition, good treatment and to spare them any hard work if they are liable to suffer from it and it even licenced them to break fasting in *Ramadan* so that the foetus may develop under favourable conditions, and the *Quran* states:

> *...THOSE WHO FIND IT DIFFICULT TO FAST CAN FEED A POOR PERSON IN RETURN FOR BREAK FASTING...* (S4: V6)
>
> (S2: V184)

The psychological up-bringing of children

Islam gives great care to the relationship between married couples and the Prophet ﷺ recommended this in his last speech so that women may carry out their important role in the healthy upbringing of children *Islam* sets the following rules.

1- Feeding the child should be directly from the mother's breast and if she is incapable of doing so, the child should be fed from another women's breast. In this respect the *Quran* says:

> *...IF YOU ARE INCAPABLE OF BREAST FEEDING ANOTHER WOMAN SHOULD DO SO...*
>
> (S65: V6)

This proved to be responsible for physical stability away from non breast feeding.

2- *Islam* cares for the breast feeding that gives satisfaction to the child, the *Quran* says:

...MOTHERS SHOULD BREAST FEED THEIR CHILDREN FOR A COUPLE OF YEARS...

(S2: V233)

3- *Islam* states that unrelated children who suckle from the same breast are considered as brothers or sisters in suckling and prohibits their inter marriage and the *Quran* says addressing men:

...IT IS A TABOO TO COPULATE WITH YOUR MOTHERS, YOUR DAUGHTERS, YOUR SISTERS, YOUR AUNTS, YOUR NIECES AND YOUR MOTHERS WHO GAVE YOU SUCKLE AND YOUR SISTERS IN SUCKLING...

(S4: V23)

Sister-ship in suckling creates in the human personality what is created by brother and sister relationship, which endangers marriage.

4- *Islam* insures to the suckling child its right to be breast fed by its mother even if she is divorced.

In this respect, the *Quran* says referring to divorced women,

...IF THEY GIVE SUCKLE TO YOUR CHILDREN, YOU SHOULD GIVE THEM THEIR PAY...

(S65: V6).

All these are obligations intended to preserve the rights of children.

In this respect reference is made to the story of Ibraham after he dreams that he would slaughter his son Ismail. When he met his son in the morning he briefed him of the dream asking if he could permit him. The *Quran* says:

...MY SON, I HAVE DREAMT THAT I SHALL SLAUGHTER YOU, TELL ME WHAT IS YOUR OPINION...

This shows how far the father should bare consideration for the rights of his children.

Islam cares for the stable well integrated family and discourages divorce and thus *Islam* protects the child from the evil results of separating him from his or her mother which is so destructive to his or her psychological health.

It has been proved that breast feeding is the healthiest. The international bodies have recently issued their recommendations to this effect.

5- *Islam* urges the parents to treat their children on the same footing so that the children may not feel unwanted or jealous, a feeling which is detrimental to health. In this respect reference is made to the story of Josef and his brothers after he told his father about his dreams, his father advised him not to relate it to his brothers lest they should envy him and conspire against him[9]. (S12: V4 & 5)

6- *Islam* praises play with one's children as it has its important role in psychological upbringing especially at the early years of a child's life.

The Prophet (ﷺ) says:

"...Play with your child for seven years, guide his up-bringing for another seven years and then keep his company for a similar period, then leave him free to fashion his own life...[10]"

The Prophet (ﷺ) always gave the model in this respect and he (ﷺ) used to play with his two grand children Al-Hasan and Al-Husain who used to mount on his back when he (ﷺ) knelt to pray and he (ﷺ) never stopped them.

Again the Prophet (ﷺ) said,

"...Divorce is the most hateful licence to God..."

Many remedies have recently been prescribed to help the family and these remedies have their role in the psychological therapy, by providing treatment to the family. In case of misunderstanding between the married couple the *Quran* recommends the elderly people of the family to interfere to make a reconciliation between the couple so that the unity of the family and its psychological stability may be preserved. In this context the *Quran* says,

...IF YOU FEAR THAT THE MARRIED COUPLE MAY BREAK APART, SUMMON WISE RELATIVE OF HERS AND A WISE RELATIVE OF HIS TO STAGE A RECONCILIATION AND GOD WILL GUIDE THEIR STEPS...

(S4: V35)[5]

And this is one of the objectives of the scientific and psychological researches carried out at present in this respect[5].

Islam has assigned certain responsibilities to each member of the family, and the prophet ﷺ said,

"...You are all supervisors and everyone is responsible for those he supervises..."

So the children should respect their parents and treat them kindly to the extent that God joined his worship with kindness to the parents and here the *Quran* says:

...GOD COMMANDS THAT YOU MUST WORSHIP NONE BUT HIM AND THAT YOU MUST BE KIND TO YOUR PARENTS...

This extent of kindness to the parents reaches its peak when the Almighty says referring to the parents,

...IF THEY (THE PARENTS) ARGUE WITH YOU TO CONVINCE YOU TO CONFESS THE PRESENCE OF ANOTHER GOD DO NOT YIELD TO THEM BUT KEEP THEIR COMPANY IN THIS LIFE GRANTING THEM ALL THE KINDNESS YOU CAN...

This is really the highest degree of consideration for preserving family relations as they have an important role in maintaining psychological health.

Concept of work in Islam

Islam urges people to work and set special rules and ethics to be observed and gave preference to those who work over those who do not, and the *Quran* says:

...ORDER YOUR PEOPLE TO WORK AS GOD, HIS PROPHET, AND THE GOOD BELIEVERS WILL ALL WITNESS YOUR DEEDS...

and again says,

...THE GOOD BELIEVER WHO DO GOOD, WILL ALWAYS GET THEIR DESERTS FROM THE ALMIGHTY...

(S99: V7)

and again says,

...HE WHO DOES AN ATOMS WEIGHT OF EVIL WILL BE PUNISHED IN RETURN FOR IT...

(S99: V8)

Islam also urges the good believers to have patience and perseverance and shows that this

attitude is sure to realise success and to increase production.

...IT IS ONLY THOSE WHO ARE PATIENT THAT ARE REWARDED WITH PARADISE AS WELL AS THOSE WHO DESERVE IT...

and again says:

...TWENTY PATIENT INDIVIDUALS CAN OVERCOME TWO HUNDRED...

(S8: V65)

It is an established fact that patience is one of the constituents of psychological health and that it develops one's energies and causes the secretion of endorphins to increase, and it has been ascertained that these endorphines help to relieve pain and lead to a stable psychological health[6].

Islam's concept of group energy

Islam gives a great weight to group work and warns against individual and selfish work.

A good proof of this is its urge for group prayers in the mosque or even with the members of the family at home if necessary. This group prayer is highly rewarded and is blessed and the Prophet (ﷺ) says,

"...God Supports the group..."

The *Quran* always addresses the believers in the plural form when it says,

...YOU BELIEVERS...

Modern scientific research has proved that the group has a relieving power which does not exist in the case of individual treatment[7].

Islam and recreation

Recreation has its effective role in the field of psychological health, *Islam* encourages this type of activity and recommends travelling and sports and games all in a group after choosing the suitable company.

Middling in Islam

One of the principles of *Islam* is middling and the *Quran* says about the Islamic nation,

...YOU HAVE BEEN CREATED A MIDDLE NATION...

Islam forbids exaggeration and underestimation and in this respect the prophet (ﷺ) says,

"...Avoid going to extremes..."

And the *Quran* says,

...EAT AND DRINK WITHOUT EXCESS AS GOD DOES NOT LOVE THE EXTREMISTS...

And again it says,

...DON'T BE MISERLY AND DON'T BE EXTRAVAGANT SO THAT YOU NAY NOT BE THE SUBJECT OF BLAME AND SORROW...

(S17: V29).

Thus the Islamic nations lived free of anxiety and tension which accompany extravagance and was protected from submissiveness and weakness which accompany miserliness and its production was plentiful as a result of this middling. And again the Prophet (ﷺ) says,

"...The Hasty neither covers a distance nor prevents his beast..."

The daily five prayers are a very important factor to keep this middling and guarantee plentiful production and relieve fatigue and tension, and in this respect the prophet (ﷺ) addresses Bilal the announcer of prayer by saying

"...Relieve us with prayer, bilal..."

Middling in carrying out the individual's daily work is the best proof of a veritable psychological health.

Psychological care for the aged

Islam gives great care to the aged and sets certain obligations to be observed by the children towards their parents. In this context the *Quran* says,

...WHETHER ONE OF YOUR PARENTS OR BOTH OF THEM DURING THEIR LIFE WITH YOU BECOMES OLD DON'T SHOW THEM ANY SIGN OF DISCONTENT OR SHOUT AT THEM BUT TREAT THEM KINDLY, PUT YOURSELF AT THEIR DISPOSAL AND PRAY TO GOD TO FORGIVE THEM FOR TAKING CHARGE OF YOU...

(S17: V23 & 24).

Thus *Islam* asks us to give enough care to the aged and gives them lodging with their children. It has been proved that if the aged live away from the family and the children, their psychological condition gets worse quickly. This is why *Islam* lays much stress on the family as a stable unit from the very beginning till the end of the life of the oldest of its members, living all together in one place sheltered by love and care between all its members.

How Islam succeeded in realising the adequate psychological up-bringing of all the members of the family:

All the foregoing principles were the constituents of the sound Islamic individual and *Islam* has succeeded in implanting them by the following methods:

1- Giving the good example, as the Prophet (ﷺ) himself always gave the good example to be followed and his close followers always adopted his behaviour and in this context the *Quran* says addressing the Muslims

...YOU HAVE IN THE PROPHET A GOOD EXAMPLE TO BE ADOPTED...

(S33: V21)

and the prophet (ﷺ) himself says,

"...Imitate me in exercising your rites...".

and again says,

"...Pray as you saw me pray..."

Besides, all the leading personalities and the fathers always gave the good model to be adopted.

2- Teaching and learning the *Quran* so that the models and examples may stem out from the individual himself after learning it and here the *Quran* says,

...THE MERCIFUL GOD TAUGHT THE QURAN, CREATED THE HUMAN BEING AND TAUGHT HIM HOW TO INTERPRET IT...

(S55: V1, 2 ,3 and 4)

3- Reward and punishment:
The *Quran* lavishes reward for the individual when he follows the right course and says,

...GOD REWARDED THEM FOR THEIR FORBEARANCE BY PARADISE AND FINE LIFE...

(S76 :V12)

and again it says,

...EVERY INDIVIDUAL IS RESPONSIBLE FOR HIS DEEDS...

So, this reward and punishment had their effect in the right upbringing of the individual[8].

4- Readiness to correct one's fault by sincere repentance. The *Quran* opens the gate of repentence wide for everybody and it abounds with phrases which mention repentence to encourage individuals to repent and thus it leads to the correct Islamic principles and it says,

...WHOEVER REPENTS AND DOES GOOD, IS FORGIVEN BY GOD...

(S25: V71)

5- Patience and perseverence in the course of up-bringing, step by step, until the individual gets used to follow the correct behaviour and the *Quran* says,

...PERSEVERE AND KEEP THE COMPANY OF THOSE WHO PRAY GOD DAY AND NIGHT AIMING AT HIS MERCY...

(S18: V28).

The psychological value of the preventive Islamic way

1- Early rising encourages the individual to start his work early and to end it early, thus he ends his work in the most appropriate hours of the day.

2- The daily programme is carried out in a group, a position which eliminates depression and at the same time curbs looseness, besides, man's position within a group promotes in him the opportunities of respecting the group ethics and values. Thus associating the individual with the group breeds in him a feeling of affiliation, integration and cooperation which makes it easy for him to carry out whatever work assigned to him, a position which relieves anxiety and tension.

3- This daily programme causes the individual to indulge himself in a number of coordinated physical and psychological activities. Praying for example requires the following steps: ablution, the movement of the body in praying, concentrating on the faith and hope which accompany praying. All this leads to a kind of coordination which helps decrease anxiety and tension and alleviates depression if it exists. Thus we see that praying requires certain activities which secure physical and psychological comfort and these activities recur five times a day when fatigue reaches its climax. In this respect the *Quran* says, addressing the believers:

...WHEN THE PRAYER IS CONCLUDED, CONTEMPLATE OVER THE GREATNESS OF GOD AND WHEN YOU ARE PACIFIED BEGIN THE PRAYER SINCE PRAYING IS IMPOSED ON THE BLIEVERS AT CERTAIN TIMES.

(S4: V103)

4- The regular meetings in the mosque constitute a good opportunity for the Muslims to find solutions to their social problems when they find the good counsel and the good model since the chapters of the *Quran* do not deal with religious issues only but include legislations to control the life of the individual and the community from the economical, judicial and personal points of view within the frame of the community and in this respect the Prophet (ﷺ) says,

"...The Muslims in their relationship with each other are like a building the components of which support each other....

5- This daily programme facilitates the process of confessing one's sins in an atmosphere of security as the Muslim feels that he is under the care of his creator and that God is merciful to him and is willing to forgive his sins. This faith in God's justice overcomes any feeling of distress or sense of guilt which the individual may face in his everyday life. Here the *Quran* says,

> *...OTHERS CONFESSED THEIR SINS AS THEY HAVE MIXED BETWEEN WHAT IS GOOD AND WHAT IS EVIL, BUT GOD IS MERCIFUL AND COMPASSIONATE..*

6- The Muslim conducts this daily programme out of his own free will and this helps him to overcome the problems of life as long as he is sure of God's care. And here the *Quran* says,

> *...WHY DON'T WE BELIEVE IN GOD AND IN THE TRUTH HE REVEALED TO US AND GET HOPE THAT HE WILL ADMIT US TO JOIN THE PIOUS...*

(S5: V87)

7- The programme is considered a multiple sided training programme which enables the Muslims to satisfy their wishes and practise different activities according to their tendencies.

8- This programme helps to develop the potentialities of the Moslim and allows him to use the gifts awarded him by God. It allows him to know the stored energies and to shoulder responsibility. Here the *Quran* says addressing the good believers,

> *...TWENTY FORBEARING BELIEVERS CAN OVERCOME TWO HUNDRED...*

(S8: V65)

and again it says,

> *...ABRAHAM WAS A WHOLE NATION...*

9- The group religious meetings conducted in the mosque are well used for cultural and educational purposes which helps the widespread of scientific facts amongst the muslims who came to know themselves and what goes around them.

10- The annual meeting of the pilgrims who have one aim help to strengthen the emotional feelings between them and increases their feeling of hope and optimisim. Thus a spontaneous treatment of a psychological nature is conducted for all those who need it.

11- The group meetings in the mosque provide a favourable opportunity for the Muslim to seek advice and counsel.

12- This programme does not overlook the refreshing side of life but it encourages the individuals to participate in different sports and games like hunting, horse riding and travelling.

The Islamic preventive approach and its protective effect against psychological illness

Introversion:

It is one of the symptoms leading to psychological illness. Such an illness cannot exist in a community which gives such a great care to the mosque where group prayers are conducted five times a day, besides it provides a place for many other religious activities conducted within the group and this helps to foster social relationships and to provide help for the individuals and families who need it.

Depression:

This is one of the commonest symptoms of our modern age. It occurs when the individual

becomes unable to face real life. Islam gives enough consideration for real life and it makes the Muslim aware of this in all his rites. It insures the Muslim that he can overcome the feeling of depression if he sticks to forbearance, perseverance and forgiveness. This helps to alleviate the symptoms of depression, strengthens the will power and supports the feeling of hope and optimism. Besides, ablusion helps medically to lessen the symptoms of depression, hence its importance before every prayer. Moreover the prayer itself leeds to the peace and quietness of the psyche. There is no doubt that group prayer in the mosque and the co-operative spirit which prevails among the Muslims, both help to overcome the feeling of loneliness which leads usually to disappointment and depression. In this respect the *Quran* says,

> *...THE FORBEARER ARE REWARDED LAVISHLY FOR THEIR FORBEARANCE...*
>
> (S39: V10)

Suicide:

Statistical data show that suicide does not almost exist in the Islamic society, as the Islamic faith immunises the Muslim against this felony. The Islamic faith considers such a person a criminal and will pay for his crime on doomsday. This belief is deeply rooted within every Muslim and the mosque fosters it more and more and the *Quran* says addressing good believers,

> *"...DON'T COMMIT SUICIDE AS GOD IS MERCIFUL TO YOU..."*
>
> (S4: V29)[13].

Sexual perversions:

These are a taboo in *Islam* which encourages early marriage and the legal intercourse and prohibits any form of perversion and those who commit adultry are publicly punished.

Statistics show that venerial diseases are very rare in the Islamic society and the *Quran* says addressing Muslims,

> *...DON'T APPROACH ADULTRY WHICH IS A TABOO AND HAS EVIL REPERCUSSIONS...*
>
> (S17: V32)

Foundlings:

The occurrence of foundlings in a society is an indication of illegitimate sexual ralationships indicating a lack of the feeling of responsibility. *Islam* prohibits this. Thus *Islam* preserves the children's rights to have acknowleged parents and the woman's right to enjoy a decent family life characterised by love and co-operation between its members. Consequently the members of the Islamic family enjoy the feeling of security and unity which spares them anxiety and tension and ill behaviour. In this respect the *Quran* says,

> *...THOSE WHO FEAR TO LEAVE A WEAK POSTERITY AFTER THEIR DEATH, SHOULD ABSTAIN FROM ANY BAD BEHAVIOUR AND FEAR GOD...*
>
> (S4: V9)

Addiction to alcohol and drugs

Alcoholism is a taboo in *Islam*. At the beginning of *Islam*, Muslims were not encouraged to drink spirits which was widespread before *Islam*. Then prohibition was staged step by step until it was totally prohibited. This prohibition includes drinking, producing or dealing in spirits. Besides, all

similar drugs which have an effect on one's feeling and balance are prohibited. This is why we find that drunkenness does not constitute a phenomenon in the Islamic world. Regarding drugs, although they are analogously prohibited, yet some people try to allow their use under the claim that their prohibition was not directly stated. The mosque is trying at present to shed more light on this subject. The *Quran* states,

> *...SPIRITS, GAMBLING, AND IDOLS ARE EVILS WHICH YOU SHOULD AVOID SO THAT YOU MAY PROSPER...*
>
> (S5: V93)

Divorce:

Although divorce is licensed under certain conditions, yet it is statistically limited and it is the family that is always the victim and the Prophet (ﷺ) says,

> *..."Divorce is the most hateful licence to God"*

Crime:

The mosque always preaches in favour of forgiveness and mercy and recommends friendly relations even with enemies. The *Quran* prohibits murder and imposes strict punishment for the crime and even if murder is by mistake, *Islam* imposes a ransom to be paid by the doer and the *Quran* says,

> *...NEVER KILL A SOUL UNLESS IT IS RIGHTFUL, AND THE NEAREST RELATION TO THE PERSON WHO IS KILLED BY MISTAKE IS AUTHORISED EITHER TO ASK FOR EXECUTION OR TO ACCEPT RANSOM..."*
>
> (S17: V33)

Racial discrimination:

Islam calls for equality and forbids discrimination based on colour, race or sex and; in this respect the Prophet (ﷺ) says,

> *"...People are as equal as a comb's teeth..."*

Islam accepts all the heavenly religions preceeding it and the *Quran* says,

> *"...WE DO NOT MAKE ANY DISCRIMINATION BETWEEN ONE PROPHET AND ANOTHER AND THEY STATED THAT THEY HAD LISTENED AND OBEYED AND ASKED FOR FORGIVENESS BELIEVING IN THE LAST DAY..."*
>
> (S2: V285)

These above stated principles in addition to other social principles have contributed to the outspread of *Islam.*

The mosque had its fundamental role to spread out these principles through the continuous reading, recitation and interpretation of the *Quran.* These principles had their effect on the different aspects of the Islamic life including family life, the upbringing of children, suckling, the relationship between man and woman and the care of the aged.

Islam encourages learning and understanding of the phenomena of nature

The first *Sura* revealed to the Prophet (ﷺ) calls for the acquisition of learning through reading. There are many other *suras* or verses which call for the acquisition of learning and the contemplation of the manifestations of nature that surround man. In this context the *Quran* says,

THE CREATION OF THE EARTH AND THE SKY, THE ROTATION OF DAY AND NIGHT CONSTITULE SOURCES OF CONTEMPLATION FOR THE WISE.

Again it says in verse 51 of the same *sura*

THE GLOBE CONTAINS MANY MANIFESTATIONS OF GOD'S GREATNESS WHICH CAUSE THE TRUE BELIEVERS TO MEDITATE OVER THEM, AND EVEN WITHIN YOURSELVES THERE ARE MANIFESTATIONS FOR CONTEMPLATION.

This call for the acquisition of learning through different means opens the way for the study of different fields especially concerning human behaviour including neality and the unconscious. We are quoting hereunder some examples.

1- Verse 30 of *Sura* 47 says,

IF WE WISH WE CAN UNCOVER THEM TO YOU AND YOU WILL IDENTIFY THEM FROM THEIR APPEARANCE AND FROM THE SLIPS OF THE TONGUE, GOD KNOWS ALL YOUR DEEDS.

This *sura* raised many activities in this field and the mosque was the centre for these psychological studies which enriched scientific psychological research all over the world.

2- The following *sura* refers to the Prophet Jackob who felt great grief when he heard of the death of his son to the extent that he lost his eye sight. The verse says

HIS EYES TURNED WHITE AFTER HE SUPPRESSED HIS GRIEF

As we realise, this verse refers to the hysterical blindness and it stresses the importance of emotions and the deep effect they create on the functions of the senses. In another *sura* it says,

WHEN THE MESSENGER CAME TO HIM, HE THREW HIS (JOSEPH'S) SHIRT ON JACKOB'S FACE AND HE IMMEDIATELY REGAINED HIS EYE SIGHT.

(S12: V96)

This shows that when the psychological trauma is removed, the individual recovers himself. These examples show the effect of the mosque on the intellectual life after *Islam* spread out and so Muslims began to acquire more and more learning and Muslims translated many works and they excelled in the field of mathematics, algebra, discoveries, history, geography, literature, chemistry, psychology and medicine. This progress was manifest in the works of their great learned men like Ibn Sina, Ibn Batota, Ibn Khaldoon, Alghazali and many others.

The personality of individuals working in the field of psychological health:

Islam lays great stress on the psychological upbringing of society as a whole and of individuals particularly those who will shoulder responsibilities in this society and here the *Quran* says,

"THERE SHOULD BE AMONG YOU PEOPLE WHO PERSUADE OTHERS TO DO BENEVOLENT DEEDS AND DISUADE THEM FROM DOING EVIL DEEDS AND THOSE ARE THE SUCCESSFUL".

(S3: V104)

This is why all those who work in the field of mental health should have certain qualities like deep insight, giving a good model, possessing the ability to shoulder the responsibility of understanding

the psyche with a particular specialisation in the health of the body, the society and the faith.

They should have the ability to diagnose and treat the psychological illness and to interview the patients and to estimate the intensity of their illness. They should also be endowed with the gift of persuading their patients and influence them by the effect of suggestion.

Islam enumerates many principles to be adopted carefully in every field of specialisation such as:

The prophet (ﷺ) praises the *use of white clothes* which have a soothing psychological effect.

It is reported by Ibn Abbas that the Prophet ﷺ said,

> *"Wear the white clothes because they are the best to wear".*

So when the members of the medical profession wear the white clothes, it is a tradition recommended by the Prophet ﷺ .

The *Quran* recommends the believers to be *pious* as piety is the best quality of those who take charge of the people's affairs and the *Quran* says in this respect,

> *PIOUS BEHAVIOUR IS ALL GOOD*
>
> (S7: V26)

This pious behaviour is reflected in one's treatment with his fellow men, manifested in a kind word or a gentle smile and the prophet (ﷺ) says,

> *"Every kind act is a charity and it is a very kind act to meet your fellow men with a cheerful face".*

Mercy is another characteristic of this piety and the Prophet ﷺ says,

> *"If you are not merciful to others nobody will be merciful to you. He who is not merciful to the young and is not respectful to the elderly is a stranger to us".*

God forgives and likes forgiveness. *Content* is another quality of piety and prophet ﷺ says,

> *"Adhere to contentedness, it is a resourceful treasure".*

Wisdom is another quality and the *Quran* says,

> *HE WHO IS ENDOWED WITH WISDOM IS ENDOWED WITH A GREAT BLESSING.*
>
> (S2: V269)

And again it says,

> *PREACH FOR RITEOUSNESS WISELY AND BY DECENT PREACHING AND ARGUE WITH OTHERS REASONINGLY*
>
> (S16: V125)

Patience is another good quality of piety, and the *Quran* says,

> *THOSE WHO ARE PATIENT FOR THE SAKE OF GOD'S MERCY AND KEEP PRAYERS.*
>
> (S13: V22)

It should be remembered that patience and careful listening to others are a must for any person who works in the field of psychological medicine and here the *Quran* says,

> *THIS CONSTITUTES EXAMPLES FOR THOSE WHO LISTEN.*

Other qualities are *meditation friendly talk* and *peace of mind* and the *Quran* says,

THOSE WHO BELIEVE AND ENJOY PEACE OF MIND, THE MIND IS PACIFIED WHEN ONE MEDITATES

(S13: V28)

VOLUNTEERING to work in the medical field and giving this medical help even to the enemy is a noble job shouldered by those working in this field. The *Quran* says,

AND SO HE WHO IS YOUR ENEMY, BECOMES AN ENTIMATE FRIEND, AND ONLY THOSE WHO ARE PATIENT GET THE REWARD.

OPTIMISM is another recommended quality as it pacifies the psyche and lessens tension and introversion and the *Quran* says,

HE WHO DESPAIRS OF GOD'S MERCY HAS LOST THE RIGHT COURSE

A doctor is always *a bearer of good news* not repulsive news, and the Prophet ﷺ says in this respect,

MAKE THINGS EASY NOT DIFFICULT AND PROPAGATE HOPEFUL NEWS NOT DESPERATE ONES.

The successful doctor explains to his patients the cause of their illness and prescribes the course of treatment and follows them until they acquire confidence in his treatment. The *Quran* says addressing good believers,

THE BELIEVERS MUST FEAR GOD AND SHOULD ALWAYS BE TRUTHFUL

and it says again,

GOD SUPPORTS THE BELIEVERS WHO BELIEVE IN THE TRUTHFUL SAYING IN THIS LIFE AND IN THE LIFE HERE-AFTER

(S14: V27)

The doctor should keep his word and is steady and stable and the *Quran* says,

KEEP YOUR WORD, THIS IS SOMETHING FOR WHICH YOU ARE RESPONSIBLE

The doctor should keep on his research work and follow up all the up to date trends in his field and he is always ready to learn something new. And the Prophet (ﷺ) says,

"Seek learning all your life until death"

and he says again,

HE WHO TRAVELS AFTER LEARNING IS RECOGNIZED AS A FIGHTER WHO FIGHTS FOR GOD, UNTIL HE IS BACK AGAIN.

And the *Quran* says

THERE IS NO EQUALITY BETWEEN THOSE WHO ARE LEARNED AND THOSE WHO ARE NOT.

(S39: V9)

And it says,

CONTEMPLATE OVER WHAT IS IN THE SKY AND WHAT IS ON THE EARTH

(S10: V101)

These are the traits of those who treat the psyche, a job which requires constant effort and the deep understanding and continuous follow up of the changes of the psyche, until its depth is explored and the complaint disappears through the application of direct and indirect treatment programmes.

Islamic therapeutic methods:

1- The first of these methods is the Islamic upbringing of the people who work in the field of psychic medicine. Memorising the *Quran* is the first corner of this upbringing followed by application of *sunna* or the behaviour of the Prophet (ﷺ) . We have noticed the effect of the *Quran* and *sunna* in the field of protection and in the traits of those working in this field. An Islamic oath should be adopted which stipulates that the persons working in the medical profession should stick to the teachings of the *Quran* and *sunna*. Besides the Islamic ethics of the medical profession should be inculcated to them all with special stress on those working in the field of medical psychology.

2- The adoption of the daily Islamic programme:

When the daily Islamic programme is examined it is found to be unique in its power of treating tension, anxiety and introversion as it recommends early sleep and early rising accompanied by ablusion and group praying which prepares the individual to begin his day with an optimistic outlook in the company of the group. It has been proved that the acme of depression occurs at the early hours of the day and this suggested programme is enough as a guard against it as it releases creative energy for further cheerfulness and it is an approach to one's work with an optimistic spirit. The Islamic daily programme includes the noon prayer at a time when fatigue has reached its climax at which time comes ablution followed by the group prayer which relieves fatigue and overwork and the Prophet (ﷺ) was reported to have said to Bilal who used to call for prayer,

"Comfort us with prayer, Bilal,"

The prayer timing was a psychological and treating programme because whenever fatigue appoached, a prayer came and so on until the daily programme comes to an end realising good psychic health for the individual as this prayer recurs five times a day during which the individual sticks to the principles of piety in all his behaviour.

3- There is a very important group of people who should participate in the field of mental health. This group constitutes the religious preachers who should be given Islamic medical training so that they may be well acquainted with the causes of mental diseases and the modes of protection against them as well as the methods of treating them. These religious preachers draw great attention from all the nation and when their religious and medical back grounds get better, they will definitely give a better service to the people especially when they participate with the working team for the sake of protection and with the treating team in the clinics where they propagate the values previously mentioned and do their best to maintain these values and participate positively in the group therapy with religious orientation and good model.

Annexing the psychological clinics to mosques:

A praise worthy movement has started to develop the function of the mosque and to annex to it different social activities, various medical activities as well as taking care of the elderly people, the youth and children; This movement yielded very good results especially in the field of protection and treatment of the problem of drug abuse. A detailed research has been conducted in this field and proved that the mosque is the best place to carry out psychological therapy and to treat drug abuse. If this movement spreads out where the mosque is assigned, besides its religious mission, to propagate the call for protection, which is one of the corner stones of religion and which was highly

recommended by the Prophet (ﷺ), it will have important repercussions in the Islamic world.

The role of faith in therapy:

The WHO defines health as the integration of the physical, psychological and social health, whereas the Holy *Quran* defines it as the physical, psychological and social integration within a frame of ethics and ideals. This spiritual side is a very important therapeutic and preventive side and it is quite essential to foster this side and state its course and effect and to write about it, to teach it, to judge its development so that the people working in the field of mental health may stick to these values and principles, the effect of which will improve the health of the body the psyche and the society.

Encouraging repentance confession and good company:

The equilibrium between man's psychological powers has its effect on psychological health. Man spurred by his instinctive powers likes to indulge in his worldly pleasures, yet he is spurred by his super ego to proceed towards sublimation and abstaining from bodily pleasures seeking spiritual ecstacy. As this struggle is a perpetual struggle, it is the duty of those who work in the field of mental health to create a balance between these powers until man acquires the power of repentance and the power of staging reconciliation between all his powers until these powers are unified in one stable personality aware of sublimation, good work, repentance realising that bodily pleasures can be reasonably satisfied. This balance is the symptom of stability, the avoidance of anxiety, tension and intro-version which constitute the symptoms which man feels when his bodily pleasures dominate his behaviour and the discrepancy appears between his insticts and his superego.

Thus repentance, confession, good company and the good model are all land marks along the course of health upbringing and they take man away from depression tension and disease.

Within the frame of knowing the real Islamic guidance, the number of those suffering from psychological diseases will always decrease.

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ISLAM'S PSYCHOLOGICAL THERAPEUTICS*

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TUNIS

ABSTRACT

Psychic conflicts often result form fightings between instincts and censorship and at least guilt's feeling. That means anxiety, agressivity and behavior disorders. In Islamic countries the basic personnality structure is often made off civilization's Islamic values. In fact they are a strong psychotherapeutic lever to present ——— and to reduce psychological disorders. Much well known Islamic scientists have emphasized the Islam's impact about the psychic equilibrium and welfare. Social adaptation and psychic equilibrium may to Muslims to get in the *"Mektoub"*, responsibility, smoothness, reminiscence and span of the self denial, span of the built dynamism, sweetness, helpness, solidarity perseverance especially span of sufficiency, at least ego strength and welfare. Indeed all these behavior units compelled Muslims to get deep and deeper in themselves and to be mature. It shows us that some traditional therapeutic ways are still nowadays efficiency and the necessity for Islamic countries actual physicians to have an articulation with these practices.

Several *Quran's verses*, Prophet's ﷺ *Hadith*, famous Muslim men's works are given to illustrate this paper.

* As the full text could not be made available, we are publishing here the abstract only.

Editors

DEPRESSION - PSYCHOSOCIO BIOLOGICAL FACTORS ROLE OF MUSLIM PHYSICIAN

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U.S.A.

Depression is a normal human emotion, however this can be a serious illness which affects both body and the mind. It is estimated that 10% of the population of the United States suffer from depression[1]. The figures may vary in different parts of the world but as we gain more knowledge about the prevalence of depression in various countries of the world we find that depression is the most common mental illness throughout the world. Depression is frequently used to describe a wide variety of behaviors, anything from the mild mood swing to psychosis. Depression can be defined as an emotional state of dejection and sadness randing from mild discouragement and downheartedness to a feeling of utter hopelessness and despair. Unfortunately, depression goes unrecognized in a large number of people. It is also mistaken frequently for other conditions such as anemia, low blood sugar, exhaustion, fatigue, vitamin deficiency or simple nervousness. The most obvious and typical sign of depression is a sad mood-gloomy, miserable, lonely, and apathetic. In addition to that, a depressed patient experiences poor appetite, loss of weight, insomnia, agitation, loss of interest or pleasure in usual activities, a decrease in sexual drive, loss of energy, fatigue, feelings of worthlessness, self-reproach, diminished ability to think or concentrate and suicidal ideations.

God has created us with the capacity to feel and to have emotions. Depression is a normal response to something that is disturbing in our internal or enternal system. It is a message making us aware that something is wrong and needs our attention. Studying the *Quran* and the *Hadith* reveals that no human being was immune to the feeling of depression. Many great prophets, for example, Noha, Jacob, and Moses, experienced depression, which was clearly described in The Holy *Quran*. Our beloved Prophet, Mohammed, (ﷺ) experienced depression on many occasions. He spent hours and days in crying and praying for forgiveness for forgiveness for his followers. However, the Prophet ﷺ continued his mission and accomplished his goals functioning normally.

Primary depression can be classified as mild, moderate or severe. Frustrations and disappointment of any kind can undoubtedly result in our being gloomy or mildly depressed. Moderate depression is almost always a reaction to a loss or upsetting event. A severe depression may be characterized by a diminished interest in the outside world, insomnia, agitation, and inability to function adequately.

Etiological Factors:

Depression has been recognized as a problem for several thousand years but most recently has received more widespread attention. What causes depression? There has been several theories put forward as a cause of depression. Depression may be caused by biological or psychosocial factors. Recent studies have demonstrated that severe or major depression is caused by deficiency of one or more neurotransmitters. Recent evidence shows that biogenic amines, Dopanine, Norepinephrine, and Serotonin, are deficient in severly depressed patients. This research has led to development of recent diagnostic tests, such as Dexamethasone Suppression Test and Thyroid Releasing Hormone Stimulating Test. Sixty percent of patients suffering from major depression show positive results to one of the above mentioned tests, e.g., non-suppresion of cortisol following administration of Dexamethasone or blunted TSH level following administration of TRH. We do not know why these neurotransmitters become deficient. In certain individuals this may be an inherited deficiency where

as in others this may be an acquired deficiency.

Epidemiological studies reveal that up to 15% of depressed patients may suffer from major depression (severe or endogenous depression) which may by biological factors. However, the remaining depressed patients suffer from mild or moderate depression (reactive or neurotic depression). Psychosocial factors may be primarily responsible for this kind of depression.

Psychosocial factors for depression may be related to coping with loss or interpretation of many situations negatively. Another factor may be conditioning. Somehow a depressed person learns to feel hopeless and helpless under Minor stressful conditions and as a result of these feelings becomes depressed. Sometimes parents do not allow children to have successful experiences, no matter what they do, it is not good enough. They just feel helpless and very insecure in such an environment. A successful experience can often eliminate depression that is caused through a conditioning. The depressed person feels sad and lonely because of erroneously thinking that he is inadequate and rejected. Beck has pointed out three major thought patterns as critical in predisposing an individual to depression. First he sees the world as bad, views life in terms of defeat and deprevation. Secondly, such a person tends to dislike himself for perceived inadequacies and failings. Thirdly, he sees the future as hopeless and that his bad situation will not get better. Some sorrows, frustrations, and sufferings affect all human beings. The depression-prone tend to perceive these stresses as bigger and blacker than they are. The negative orientation sensitizes depressed individuals to notice and then to magnify every real or imagined trouble. People are not affected as much by what happens to them as by perception of what happens. Thus, an individuals self evaluation or interpretation of experiences is what determines whether a situation is perceived as a blessing or a curse.

The family is the primary but not the only source from which individuals fulfill their need for self-respect. Fathers often tease a child to the point that the child's self-respect is destroyed. It may be fun to the father but to the child it may be cruel and devastating. By the time children become adults they have ceased being totally dependent on others and should have learned from the example of parents and by words of teachers that if they do certain things then others will praise, honor, look toward them with respect. Growth of self-respect is a slow process involving suffering and pain. Self-respect should not be confused with conceit. People with high self-respect had parents who disciplined them. One important factor found was that boys who possessed high self-esteem had parents who disciplined them but not in cruel ways.

Management of Depressed Patients:

The first step in the medical treatment of depression is the establishment of the diagnosis. A thorough history, physical examination and laboratory studies may reveal other diseases which can cause or contribute to the depressive illness. These conditions include thyroid and other harmonal disorders, viral illnesses such as hepatitis or mononucleosis, toxic chemical exposures, chronic Vitamin D overdoses, hidden malignancies, other psychiatric disorders such as neurosis or psychosis, and alcoholism. The second step is the risk assessment. The risk of suicide is the most urgent indication for hospitalization. In addition, inability or unwillingness of the patient to follow a program of treatment may necessitate hospital care. If the risk of the suicide increases during the course of outpatient treatment, hospitalization may be necessary. The third step is the use of antidepressant medication and psychological treatment. Tricyclic antidepressants, the most commonly used drugs, are highly effective in alleviating about[2] 80% of the patients suffering from major (severe) depression. Lithium Carbonate is most often used in bipolar illness because it moderates the extreme highs and lows. Antipsychotic medications may be used along with antidepressants in the presents of significant anxiety or agitation. For the person who fails to respond to medication E.C.T. can produce marked improvement and may even be life-saving.

Psychological treatment is based upon the premise that every individual can bring about the changes in attitudes and feelings. There are two basic approches, insight oriented treatment, and behavior centered treatment. Insight oriented treatment attempts to uncover the roots of the person's emotional problems and to increase his understanding of his own behavior. The goal of behavior centered treatment is to get rid of the old and bad habits which contribute to depression and to acquire new, more appropriate responses to stress[3].

Cognitive therapy is based on behavior centered treatment. Depressed patient is encouraged to help himself by recognizing the negative thoughts and correcting them by substituting more realistic thoughts. Negative thoughts are characterized by self-criticism and negative expectations. In order to correct this, one needs to replace each negative though with a more positive statement and understanding the difficult situation and resolving it by dealing with one difficulty at a time[4].

The Most Effective Treatment Modality:

Despite current enthusiasm in diagnosis and treatment of depression, some important questions remain unanswered about these treatment modalities. No single strategy is proved to be totally effective. There is no doubt that tricyclic drugs are highly effective in reducing depression symptomatology, however drugs alone are not proved to be sufficient for treatment of depression. Combination of medication and psychotherapy proved to be superior than single modality pharmacotherapy or psychotherapy[5].

Recent studies have demonstrated that a great majority of patients suffering from depression showed interpersonal skill deficit. The sense of guilt, hopelessness and poor self confidence contribute to interpersonal skill deficits. Social skills training which is psychoeducational approach has been used to remedy interpersonal skill deficits and this techniques proves to be more effective than simple supportive psychotherapy of reassurance or psychodynamic psychotherapy[6] Based on these studies one can draw the conclusion that Muslim physician should be incorporate the Islamic values and principles in strengthening the faith and social and interpersonal skills in patients suffering from depression. This modality must be used along with medication in patients suffering from major depression.

Role of Muslim Physician in treatment of depression:

A Muslim physician must always consider the Islamic principles and application of the spiritual guidance in treatment of depression.

A Muslim physician treating a Muslim patient with depression must have strong faith in God and strong beliefs in Islamic values and principles. He should do a comprehensive physical and mental status examination. Identify patient suffering from major depression and treat with tricyclic antidepressant medication and spirtual therapy. Patients suffering from minor depression (reactive) must be treated primarily with psychotherapy, insight oriented or cognitive therapy along with spirtual guidance and therapy. The following guidelines are helpful in:

1. Trust in God is essential as God helps us in every situation to cope and to overcome.
2. All human beings are made in the image of God and God has given human beings a capability to think. This enables us to act on will and make a change in thinking and behavior as necessary.
3. Encourage the patient to admit the depression and seek the religious solution.
4. Advise to get mind off self and put it on God and develop a lifestyle which shows strong faith and trust in God so that confidence can be established in the promise of "I can do all things through God which strengthens me".
5. Apply the teachings of *Quran* and *Hadith* in daily lives does much to remove depression as the

mood of despair and replaces ti with hope.

6. Sorrow is a natural reaction in experiencing the loss of loved ones, but the teaching of *Quran* and *Hadith* prevents this sorrow from developing to despair as the bereaved one thinks of eternity.

No person in the world can remain safe and unaffective by sorrow, grief, calamith, hardship, afflication, failure, or loss. The response of the believers and unbelievers is, however, different in this respect. The non-belivers lose their senses in the burden of pain and sorrows and are completely immobilized by feelings of helplessness and dismay. Sometimes non-belivers come to grief and commit suicide in contrast to the believer who remains undaunted in the face of the greatest calamity and never leaves command over his patience. He takes the view that whatever has occured was decreed by God and no command of God is devoid of wisdom or purpose. This reasoning can produce a state fo spiritual calm and satisfaction. One of the merits of putting faith in divinty appointed destiny is that the believers find solance even admist the greatest suffering. The Holy Prophet, ﷺ has observed

"how excellent is the state of the true believers, he wins grace under all conditions".

On hearing a tragic or painful news or if one suffers a loss of sustained grief or injury, one should say:

LO, WE ARE ALLAH'S AND LO UNTO HIM ARE WE TO RETURN.

The implication is that all our positions belong to God. God has given us everything and he is the one who will take everything. We are his creatures and we must return to him. We submit to the will of God in all matters and are Content with his dispension. All acts of God contain certain purposes, wisdom, and justice. His faithful servant never to resent the actions of God[7].

Quran is the guidance for all Muslims. A Muslim physician must inform patients about the prayers he can offer in moments of intense grief and sorrow.

THERE IS NO DEITY EXCEPT THEE. BE THOU GLORIFIED. LO, I HAVE BEEN A WRONG-DOER.

(S21: V87)

It should be advised that the depressed person should repeat these verses frequently and show faith in God. God says on *Quran*

"O, YE WHO BELIEVE! SEEK HELP THROUGH PERSERVERENCE AND PRAYER".

Muslim physicians must use the above mentioned quidelines based on *Quran* and *Hadith* for supporting psychotherapy and strengthening the faith and social skills. Where ever possible family members and friends should be involved during psychotherapy sessions so that they can continue supportive therapeutic work at home. Scientifically designed research work is needed to identify the therapeutic values of using Islamic principles in treatment of depression.

Role of Muslim Community:

Physicians must take a leadership role in community and through public education make Umma aware of the problem of depression, the ways to identify it, and the role of the community in helping the individual in distress. The *Umma* should share the sorrows of each other and support in grief and pain. The Holy Prophet, ﷺ observe

"All Muslims are like one human body. If the eye becomes sore, the entire body feels distress. If there is a pain in the head all organs of the body suffer the agony" (Muslim)

The help and support of community members will alleviate the suffering of individuals in distress. It should be advised that one should not be impatient with people who are sad and troubled especially after they have been tried to be comforted. The awareness of depression as an illness will help in early recognition and referral to the apprropriate professional for further evaluation and treatment.

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SOCIO-PSYCHIATRIC INSTITUTIONS IN OLD TURKS UNDER ISLAMIC TRADITION

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We may say that, psychiatry is one of the oldest medical arts and the newest of medical sciences. In fact, it will be convenient to consider that history of human interest in his own soul, psychology and psychiatric maladjustments is as old as his firs creating of thoughts. Psychiatric medicine has shown a very intimate relationship and parallelism with and to ways of thought, philosophical and political tendencies, traditions and norms, religions and modes of living within the overall historical development. For-example, whilst psychoanalysis of Sigmund Freud led to long-lasting researches and discussions in the western world, it was rejected with no argue, in a book of Psychiatry published in the Soviet Russia in 1969 (Referring only 5 lines) saying that "as the argument originates from wrong theoretical principles, it is very natural not to obtain any concrete result therefrom". Besides this, we observe the paramount progress of neurophysiology and psychopharmacology in spite of the traditional psychoanalysts who reject any organic view and medical treatment of any kind. As seen, psychiatry has been a field wherein empirical and mental fanaticism have easily rooted up and grown.

In the similar way as thousands of heads were cut off during the French revolution, many people were tried before the religious courts (Enquisition) of the Medieval Age Europe for the sake of "spiritual welfare" or "spiritual treatment", and their lives were ended before the public by burning.

It will be useful to review briefly the western world at that time for the purpose of giving a clearer idea of how Muslim Turks treated the insane, with full affection, humanistic thoughts and medical care.

First, we observe that, Aesclepiades from the Ancient Rome, in the first century B.C., described and defined the errors in perception and reasoning of the insane emphasized the point that they should be treated under favorable environmental conditions. Hippocrates (460-337 B.C.) argued that psychological disorders originated from natural reasons as other diseases, and defined such clinical pictures as mania and melancholia. He further pointed out the relationship between the human brain and epilepsias and mentioned of dementia. Thus, it is evident that, in the starting period from Hippocrates until Galenus who lived in around 200A.D., the insane were subject to humanistic treatment in the Western World to a certain extend.

However, we also observe the fact that as from the time of Hippocrates, the attitudes towards the insane started to get tougher. As a matter of fact, Celcus from the Ancient Rome, who lived at the time of Jesus Christ defended the idea that "a sort of force" had to be applied during treatment of insane. To him, the insane had to be punished with famins, fetters and beating when they made something wrong or eat something not usual. He argued that a sudden sense of fear could cause the insane to recover. This horrible and inhuman consideration, as treatment of insane by applying torture has prolonged for long centuries in the Western World. Even until a few centuries ago, the insane were put into water-wheels and turned; hung over the rocks; sunk into deep waters until they are almost drowned; beaten terribly; chained up with fetters; as we see in the books defining the treatment of the insane. It is a sort of defence mechanism developed as a result of fear and anxiety by the community felt for the insane.

In the second century A.D., Caelius Aurelianus, from the Ancient Rome, announced that devils were existing in the appearance of male or female human beings, whose primary task was to deceive

the opposite sex". Therefore, thousands of the insane were being murdered for the purpose of getting rid of the evil-souls and devils.

The Pope, Innocent XIII, commissioned two priests to prepare a book concerning how to get rid of the devils and demons from the Christian World, by getting acquianted with them. These priest then prepared a book describing the devil, the ways to know it, and how to kill it, as well as the method of torturing the insane, with full details of various torturing methods and techniques.

The insane were prosecuted before the religious courts (Equisition) and burned alive to get rid of the devil located in their souls. Thus, more than hundred thousand mentally ill people were killed during the reign of François the First (1515-1547) in France. In the 16th. century, in Geneva of Switzerland, more than five hundred insane people insane people were burned in the squares of the city before the public, by fastening them to poles, within three months. Even in the 16th. century, Johann Wayer was thinking that seven million of devils were existed in the universe and advicing to torture the insane who carried the devils in their body.

We had to wait until the 18th. Century AD, when humanistic tendencies started to emerge, for the admittance of the insane by the community to a certain extend, in the West. For the first time, in France, a physician named Pinel, employed in the Bicêtre Hospital, was nominated as the very first man who dared to untie the fetters of the insane.

The first patient, whose fetters were untied by Dr. Pinel, a woman, felt the taste of freedom by madly running in the yard of the hospital until her heart is stopped.

However, the definition of the insanity in Germany, even that period, as "a punishment and anthema by God announced for his slaves due to their sins" shows that the reaction towards the insane still continued.

While this was the case in the western world, in Europe, the insane were treated in a completely different manner by Turks under the impact of Islamic faith. We may say that the honour of regarding the insane as an ordinary "ill person" and applying them a treatment in the real meaning of the sense belongs to the Muslims and Turks. The great physician, Avicenna (Ibn Sina), who lived between 980-1037 A.D. was advicing that the insane should be treated with mercy and under humanistic rules. To him, soul contained a moral-ore, running all mechanisms of the body and vitality would be lost when the soul is apparted from the body. According to Avicenna, the relationship between the brain and sentiments and movements is provided by means of nerves. Thus, Avicenna who prescribed the fundamentals of neuroanatomy is the character who first applied a sort of analytical treatment and used free association method for the insane.

The Holy Quran commands as follows:

> *DO NOT GIVE YOUR PROPERTY WHICH GOD ASSIGNED YOU TO MANAGE, TO THE INSANE; BUT, FEED AND CLOTHE THE INSANE WITH THIS PROPERTY AND TELL SPLENDID WORDS TO THEM".*
>
> (S4: V5)

In the holy order of the sentence, the fundamentals of Islamic principles in treating the insane are clearly summarized: "The insane are not competent and eligible to manage on their own property. The legal trustees, to be appointed on their behalf, shall manage their property and all results obtained therefrom shall be used for the benefit of the insane. The insane shall be treated under humanistic rules; shall be clothed and fed, and pleasant words shall be told". This rule is the main principle covering up-to-date psychiatric understanding and legal applications. Under the impact of this religious order and mystical thoughts which developed in time, "the insane" were regarded as a group of people by Muslim Turks, who must be given full assistance and be protected more than the

others. Even from time to time, the insane, who wandered around and harmed nobody were named *"veli"* (saint, or friend of God) and they were remembered even after their death. Such persons were subject to a sort of respect by inhabitants of neighbors and fed up and clothed.

We know the existence of so-called *"hospital-villages"*,, dealing with the treatment of the mentally ill people, during the reign of Seldjuk Empire, in the medieval age in Anatolia. Even at that time, the insane were not regarded as a character who were feared from or tortured; but, the insane were treated as the ill-persons who were admitted to the community and protected and treated. In such hospital-villages, the insane were treated free of any charge, and against this, the inhabitants of these villages were exempted from income tax, for their incomes obtained from agricultural and commercial activities.

The Dervish Convents, which emerged as a social institution, have had great services in this respect. The Sheikhs of such Convents were treating the insane. Even more that, there were some families, who adopted the treatment of the insane as a business, a profession for generations. Among these, Karacaahmed Family has a unique place. The religious-poem written on their memory starts with the following lines:

Karacaahmed ulu veli
Akillanir gelen deli

(Karacaahmed, the great seint
All the insane recover when met...)

The Karacaahmed Convents prolonged for about seven centuries. The insane brought were subject to various psychological treatments, and specially prepared plant-origin medicines were used, there.

The great mosques of istanbul, constructed during the reigns of the Ottoman Sultans are the typical samples of the social organization of that time. Beside the mosque, usually kitchens were established to feed the poor free of charge. Also, there were small rooms for the accomodation of the fellows and assistant to the Hodjas. Some of such mosques incorporated hospitals, dispensaries and lunatic asylums, completely allocated for treatment of physical and mental diseases.

They were a sort of "mental-health dispanseries" complying with today's technology and understanding. They were mostly built up by the foundations established by the rich. These foundations were so much complete and well-thought that we have met a parsley field, allocated for supplying parsley for the soup which was served to the insane at Toptaşi Asylum, served as the Government Mental Hospital of Istanbul for a long time, among deeds of trusts of such foundations. Mongéri Père, who once worked at that asylum, wrote at Annales Médico-Psychologiques as follows:

"If the civilization of a nation is to be assessed using such criteria as the interest of the government in the problems of the public and abundance of public charity institutions, we may well say that Istanbul pioneered such a civilization three centuries ahead of Europe".

Ottomans taught the nations which were conquered, how to get cleaned at baths, and imposed medical science by introduced hospitals and asylums, and introduced humanity by social institutions and foundations. At the period when we built public baths all over the cities and each individual house had bath-rooms, the streets of Paris were flooded by sewerage. And in the medical books published in the west at that time, it was noted that applying plenty of water on body would kill us.

During the Ottoman Empire, the first asylum in Edirne was opened in the Mosque of Sultan Bayazıt II. Before that, a small asylum was existing there. Sultan Bayazıt Asylum was kept until 1915, with 40 patients recently.

After the conquer of Istanbul (1453 A.D.) Mehmed the Conquerer established an asylum named

"Bîmarhâne-i Ebulfeth Sultan Mehmed" in 875 (hegira - Islamic year). As the great voyager Evliya Çelebi told, that asylum contained 70 rooms, 80 domes, 200 nurses and one chief physician. The patients were used excellent bed-sheets and silkh-shirts. Singers and players performed to enjoy them. The patients were fed with pheasant and quail meat. Esquirol, one of the outstanding characters of European psychiatry, who visited that asylum writes that it could only be imagined as a remote ideal and goal.

We should note that, treatment of the insane by music could only be attained by the natural and enriched tones of Turkish music. The "tampered" western music, based on a rigid mathematical system, countrary to human nature, provides no assistance in treating the insane.

The second asylum erected in Istanbul is Haseki Sultan Asylum, built in 936 (hegira). After the second declaration of the Parliamentary Regime, it became Haseki Medical Observation Centre. Thus, for the first time in the world, application of forensic psychiatry emerged in Turkey. This centre had 250 beds.

The third asylum is "Bîmarchane-i Sultan Süleyman" built in 963 (Hegira). It served as an asylum for a long time, a state mental hospital, and then, upon an epidemy of cholera, the mental patients were transferred to Üsküdar.

The fourth asylum is the Mental Hospital of Toptaşı, at Üsküdar, known as "Bîmarhâne-i Valide-i Atik" (Mental Hospital of M.M. the Qeen-Mother) built in 991 (Hegira). That hospital was constructed by Nurbânû Sultan, Mother-Queen of Murad III, wife of Sultan Süleyman II. Until the Parliamentary Regime, its kitchen was active to serve soup and food to the poor, rice and "zerde" (a kind of dessert made from rice) were served once a week, on thursdays. In the holy month of Muharrem, *"Aşure"* was made to serve to the poor. The asylum, which was also a medical-scientific institution, a university within the standards of the time, contained sections as *Dârülhadis* (a kind of religious school) and *Meva-i Muhaddisîn* (Home for teachers). A lot of today's prominent turkish psychiatrists worked at that hospital or were trained there. Among them, we may cite three great characters. Namely, Mazhar Osman Uzman, Ihsan Şükrü Aksel and Fahrettin Kerim Gökay.

During the presidency of Atatürk, when Dr. Tevfik Rustu Aras was the Minister of Health and Social Welfare, a decree of Council of Ministers was issued, upon recommendation of Mazhar Osman and the Reşadiye Barraccks at Bakırköy became Bakırköy Hospital for Mental and Nervous Diseases on June 15, 1927. This institution, which is one of the well-known mental hospitals of the world, is still active and has been recently modernized to suit to conditions of today's modern psychiatrical science.

As a çonclusion, we may say that, Turkey has a tradition in psychiatry, by joining her own culture and belief with the scientific standards of the modern world.

ISLAM AND MENTAL HEALTH

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In the Law of God and his judgement, it has graciously been stated by Him that:

> *SURELY WE CREATED MAN OF THE BEST STATUTE THEN WE REDUCED HIM TO THE LOWEST OF THE LOW*
> *SAVE THOSE WHO BELIEVE AND DO GOOD WORKS, AND THEIRS IS A REWARD UNFAILING.*
>
> (S95: V3-5)[1]

The state of reduction to "the lowest of the low" raises a fundamental and basic issue in the way how human beings feel, think and behaves. The Holy Quranic verse as explained by Wagdy[2] clearly describes the sharp contrast between the magnificent external physical appearance of man and his inner emotional turmoil and his inherent tendency for cruelty, passionate reactions, greediness and aggressive behaviour. As part of his destiny in life, man has to face these human weaknesses and make consistent efforts to overcome them.

The clear understanding of man's inner emotional mechanisms, the development of ways and means to ensure an optimal state of psychological well-being and the enhancement of his potentialities for creative and effective existence have been raising challenging issues in the field of mental health[3]. Not surprisingly, increasing attention has been given to the promotion of mental health care in developed as well as developing countries. In 1970, for example, in response to a mandate by the United States Congress, the Joint Commission on Mental Health of Children reported that the mental health of childhood should be the nation's highest priority[4].

The influence of religious teachings on the promotion of human behaviour and the role of religious institutions in the mental health field have been generally neglected by the medical professionals, and it therefore seems appropriate to address this issue.

An attempt will be made in this paper to highlight the main Islamic principles and approaches to lift up man's inner self and ensure for him a state of psychological well-being and healthy human relationship. Reference will also be made to practical implications of Islamic influence on mental health problems and possibilities for their primary prevention.

Islamic principles and precepts

The basic sources of Islamic principles and precepts are the *Quran*, the *Sunna* (the Prophet's sayings and practices), the *Ijmaa* (consensus) and *Qias* (analogy).

Over a period of twenty-three years, and through systematic revelations, the Prophet Mohammed (ﷺ) communicated the Islamic message to his followers. These revelations constituted

> *...A SCRIPTURE WHICH WE HAVE REVEALED UNTO THEE THAT THEREBY THOU MAYEST BRING FORTH MANKIND FROM DARKNESS UNTO LIGHT, BY THE PERMISSION OF THEIR LORD, UNTO THE PATH OF THE MIGHTY, THE OWNER OF PRAISE...*[5]

The emphasis in the Islamic doctrine as clearly stated in this verse is to bring about a significant change, from dark pagan life to the shining light of *Islam*. Indeed, the *Quran* has been represented as the discernment *(furgan)* between truth and error[6]. In brief, besides being a religious doctrine, the *Quran* constitutes a code of civil and criminal law as well as social and behavioural codes[7]. Essentially, it forms the most basic reference book in the Islamic world.

Along with the basic principles and approaches embodied in the *Quran* and the Prophet's (ﷺ) tradition, the Muslim communities derived their code of behaviour from Islamic jurisprudence *(Sharia and Figh)* which provides a framework and a system of social and political life.

Systematically and rationally, the accumulated principles and approaches have become the established guidelines for a way of life and for restructuring the personality of the believer. The attention in the *Quran* given to man and mankind does not need further emphasis here. As a matter of fact, references to man and mankind have been given in about forty-five and 240 verses respectively. However, special reference has been given to the creation, growth, development and formation of man. Furthermore, there are two *surahs*, one named *Man*[8] and the other Mankind[9].

It may be relevant in this respect to quote a few examples of the Islamic principles dealing with the human rights, free thinking, personality, formation and unity in the purpose of life.

In general there is the respect for the human integrity, the rights of others, the appeal to wisdom and reason. It has been clearly revealed to the Prophet (ﷺ) to

> *CALL UNTO THE WAY OF THY LORD WITH WISDOM AND FAIR EXHORTATIONS, AND REASON WITH THEM IN THE BETTER WAY. LO! THY LORD IS BEST AWARE OF HIM WHO STRAYETH FROM HIS WAY, AND HE IS BEST AWARE OF THOSE WHO GO ARIGHT*[10]

It is significant to note that the first religious commandment to the Prophet (ﷺ) was a direct instruction for learning:

> 1. *READ: IN THE NAME OF THE LORD WHO CREATETH,*
> 2. *CREATETH MAN FROM A CLOT.*
> 3. *READ: AND THY LORD IS THE MOST BOUNTEOUS,*
> 4. *WHO TEACHETH BY THE PEN,*
> 5. *TEACHETH MAN THAT WHICH HE KNEW NOT,*
> 6. *NAY, BUT VERILY MAN IS REBELLIOUS*
> 7. *THAT HE THINKETH HIMSELF INDEPENDENT!*
> 8. *LO! UNTO THY LORD IS THE RETURN.*

Though man has been endowed with great potentialities, the responsibility for righteousnessand wrongfulness lies particularly within his domain.

> *WHOSO DOETH RIGHT IT IS FOR HIS SOUL AND WHOSE DOETH WRONG IT IS AGAINST IT. AND THY LORD IS NOT AT ALL A TYRANT TO HIS SLAVES*[13].

While a true Muslim is the one who firmly believes in God and surrenders himself to the powers of the Mighty, still he is entrusted with the will to chose and decide. This is indeed his supreme advantage on earth. For he has been exceptionally entrusted with the powers to abide by the good or opt for the evil. This is a fundmental issue in man's destiny and is specifically explained in the Holy Scripture in the following Quranic verse:

> *LO! WE OFFERED THE TRUST UNTO THE HEAVENS AND THE EARTH AND THE HILLS, BUT THEY SHRUNK FROM BEARING IT AND WERE AFRAID OF IT. AND MAN ASSUMED IT. LO! HE HATH PROVED A TYRANT AND A FOOL*[13]

Islamic strategy and mental health

1. The straight path

Man's inherent tyrany, foolishness and the wide range of deviant behaviour naturally call for a

clear line to be followed in life and for proper action to be taken. The Islamic strategy in this respect is based on the recognition of these human defects and the systematic enactments to overcome them.

In the five-time daily prayers, the Muslim believer recites the Opening of the Holy Quran and appeals to the Lord of the Worlds:

> *OWNER OF THE DAY OF JUDGEMENT, THEE (ALONE) WE WORSHIP, THEE (ALONE) WE ASK FOR HELP. SHOW US THE STRAIGHT PATH, THE PATH OF THOSE WHOM THOU HAS FAVOURED, NOT THE (PATH) OF THOSE WHO EARN THINE ANGER NOR OF THOSE WHO GO ASTRAY.*

As experience shows the recitation of these verses brings about a sense of relief and provides a consistent way for following up the straight path in life and for reminding him not to go astray. As a line of action, it constitutes a healthy approach for maintaining the psychological well-being and enforcing the believer's state of mental health.

2. Piety and human relationship

In mental health work due consideration is given to inner peaceful balance of the mind as well as to the external harmonious social relationship. Within the context of the Islamic strategy, a number of holy commandments with major social implications have been prescribed and applied. Under the verse of piety, for example, it has been basically indicated that:

> *IT IS NOT RIGHTEOUSNESS THAT YE TURN YOUR FACES TO THE EAST AND THE WEST; BUT RIGHTEOUSNESS IS HE WHO BELIEVETH IN ALLAH AND THE LAST DAY AND THE ANGELS AND THE SCRIPTURES AND THE PROPHETS; AND GIVETH WEALTH, FOR LOVE OF HIM, TO KINSFOLK AND TO ORPHANS AND TO THE POOR AND THE WAYFEARER AND TO THOSE WHO ASK, AND TO SET SLAVES FREE AND OBSERVETH PROPER WORSHIP AND PAYETH THE POOR-DUE*[14].

In addition to these basic five corner-stones of *Islam*, the essential principles underlying piety extends further into the realm of human relationship and coping with stressful situations:

> *AND THOSE WHO KEEP THEIR TREATY WHEN THEY MAKE ONE, AND THE PATIENT IN TRIBULATION AND ADVERSITY AND TIME OF STRESS. SUCH ARE THEY WHO ARE SINCERE. SUCH ARE THE GOD-FEARING.*

3. Unity of mind and heart

The mind and the heart occupy a central place in the holy Scripture. This is clearly reflected in the series of references made to both of them in the Quranic verses. Significantly, reference to the mind has been made in forty-nine Quaranic verse and as many as 122 in the case of the heart[6]. Briefly, though the concept of the mind is basically centered in the cognitive and thinking aspects of the human faculties, the heart enjoys the capacity of wider insight and comprehension as well as the sense of feeling and well-being. Both of them have to work in unison and harmony to fulfil man's mission on earth and ensure a healthy and balanced state of all his senses. This can be readily construed from the following Quranic verse:

> *HAVE THEY NOT TRAVELLED IN THE LAND, AND HAVE THEY HEARTS WHEREWITH TO FEEL AND EARS WHEREWITH TO HEAR? FOR*

INDEED IT IS NOT THE EYES THAT GROW BLIND, BUT IT IS THE HEARTS, WHICH ARE WITHIN THE BOSSOMS, THAT GROW BLIND[16].

With such a searching look for an Islamic-oriented life, the close adherence to the "straight path" and the observance of the principles of piety, man's way of life for a meaningful well-being can be optimally realized.

In essence the above concepts and basic principles defy the wrong assumptions and ill-founded conclusions made by eminent and world famous psychologists, such as Freud, on the role of religion in mental well-being. In this respect one tends to agree with Philp, "that Freud's case against religion in general was unsound, and reflected his own opinions rather than the findings of psychoanalysis[17].

4. Basis for social integration and stability

Based on pagan beliefs, the pre-Islamic social life was riddled with a variety of serious psychosocial problems and harmful practices. Under the influence of Islamic teaching and within the newly established religious setting, it was possible to identify and eradicate such harmful practices. A glaring example is the killing of male children because of poverty or female children for fear of shame. These problems were effectively dealt with, when the Muslim believers appropriately responded to the sacred warning.

AND WHEN THE GIRL-CHILD THAT WAS BURIED ALIVE IS ASKED: FOR WHAT SIN SHE WAS SLAIN?[18]

There are quite a number of other topics and issues related to mental health which will be mentioned rather briefly. Several statements in the *Quran* refer to psycho-social subjects, such as marriage, divorce, family care, adoption, orphanage, women, adultry, prostitution, good manners, virtue, cooperation, love, mercy, truthfulness, justice, fraternity, modesty, personal responsibilities, as well as topics that include well-defined principles on moral and civic duties governing human relationship. These have far-reaching effects upon the establishment of a strong basis for a more integrate, a more stable and healthier society.

The role of Islam in primary mental health prevention

The main principles of the Islamic approach for primary prevention of mental health problems are based on the provision of information, education, the identification of the psychosocial problems, community involvement, demonstration by example and a systematic step-by-step approach with particular appeal to human intelligence, rational thinking, pursuation and logical conviction. To facilitate the discussion and simplify the underlying complex issues, selected examples will be described.

1. Lessons from events and human experiences

The *Quran* as a "guide" and source of "enlightenment" includes a variety of historical events and stories of ancestral figures and prophets. The aim was to encourage people to lead a healthier life by drawing lessons from past events and other human experiences.

The eloquent and resourceful dialogue between the Prophet Lut and his people is an example of exacting endeavours to combat indulgence in homosexuality. It was a serious reminder for the Muslim communities to beware of the gloomy fate of such sexual disorders, and a practical demonstration of a deterrent against deviant behaviour.

2. The prohibition of Khamr (wine)

The model which has been set by *Islam* in control and prevention of alcohol provides an excellent

example for a systematic, step-by-step approach with due emphasis on reciprocal inhibition, demonstration by example, community involvement, pursuation and effective intervention[19]. Further details are given in the paper entitled "The Use of Drugs in the Islamic World"[20].

3. Prevention of suicide

The *Quran* is a religious code and not a medical text. Nonetheless, specific psychiatric problems such as suicide are clearly precise and with firm directives. It states emphatically:

DO NOT KILL YOURSELF, FOR GOD WAS MERCIFUL TO YOU

This has been found of great practical importance in the prevention of suicide among Muslim communities. Some of the Muslim patients seen by the author had entertained suicidal ideas, but had stopped short of taking away their own lives for fear of acting against the will of God.

4. Medicine of the Prophet

The teachings in the revelation and compiled in the holy book were supplemented by the traditions *(sunna)* and sayings *(hadith)* of the Prophet (ﷺ) . From the medical point of view, a number of these traditions and sayings, as well as being religious regulations, constituted guidelines for preventive measures and remedies. Later on the saying pertaining to medical problems were collected separately and came to be known as "the medicine of the Prophet (ﷺ)[21].

Of particular importance was the emphasis laid by the Prophet (ﷺ) on the relationship between psychological factors and somatic diseases: this was demonstrated clearly in his saying that *He who is overcome by worries, will have a sick body.*

Such teaching had great influence and helped in the promotion of mental health and in the prevention of disease-related behaviour.

5. Religious practices

The daily or seasonal religious practices, as already explained, seem to be most helpful for personality adjustment and mental well-being.

The fasting month of *Ramadan,* the pilgrimage to *Makkah,* in particular, provide optimal opportunites for the promotion of psychological well-being, the breaking away from health-damaging behaviour, such as drug abuse, the restructuring of the personality and the development of a healthy way of life.

6. The role of religious institutions

The mosque as a social and religious institution, as experience has proved[22], can play a most effective and useful role in the promotion of mental health and the prevention of psychologically-damaging behaviour. This is particularly so at a time when, nationally and internationally, there is the great movement for a Global Health Strategy and the attainment of the cherishable goal of "health for all by the year 2000". In this respect, and as a fundamental principle, increasing emphasis has been given to community involvement.

In Islamic countries the potentialities of religious communities and religious institutions have not yet been adequately mobilized and consequently utilized. However, the initial activities and the results which have been obtained thus far from the association and involvement of religious leaders augur promisingly well for future planning and programming in the mental health field.

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DISCUSSION

Chairman

The chair will be given to you if you say lot of things in few words.

Dr. Chaudhry

I am Dr. Chaudhry, Professor of Psychiatry in Lahore Pakistan but I am also now the Advisor to the Government of Punjab for mental health and Institution of Disabled Children.

Mr. Chairman, I am very grateful for reminding me to say a lot of things in few words. After this talk, this morning and afternoon, I think at least I feel myself that I have become slightly wiser after listening the views, presented here now, I am going to make one or two observations. One is on the last point which Dr. Taha Baashar has nicely said and you have commented on it about the relationship of the mind and the heart. Last year, in December, I talked about psychiatric aspect of cardiology. At that time, I raised this issue that the word "Heart" has been mentioned 132 times in *Quran*. This is not on imaginary bases and I said it and one of my friends from Saudi Arabia wrote me a letter that some research should be done on it. And I have talked to the President of Pakistan also recently, that this is a subject to be taught to the students of Medical schools and I say that today we think that mind is a controlling station, but I think if looking at all the *Quranic Verses*, I would say that a time will come and we will prove that the mind or the heart or the head is just a computer in the hands of God. There is a control somewhere in the heart linked some where which will be revealed at a later date. Now another point which Dr. Taha Baashar has rightly said, is that there should be a contribution of all the Muslim physicians right from the basic subject in the Medical graduate education and medical subject. That is what he has told. Another point which came to my mind is that we have been, always talking about the Hippocratic oath. Why we should not make an Oath that we Muslims may take specially in Muslim countries. When we go to Medical colleges and Medical schools, we should take an oath that first of all we have to be a good muslim. To my mind, for a psychiatrist, for a physician, he has to be a good muslim if he has to be a good psychiatrist and I would say that old Muslim physicians were basically psychiatrists and their approach was psychological and that was the reason that they had good results. Further I would comment on this that here is a time for us to see that we should become good Muslims and I think we should have full confidence in our own convictions then only we can instil the confidence in the minds of our patients. The last point, which I usually ask from my patients when they come to me is, how you come to me? You may ask some one who is a good physician, who is a good psychiatrist, or who is a good surgeon, like that, but you have never thought of it, that who has given us knowledge or who has given us experiences? God is there above us. If you would just pray to God five times a day, not only you just pray, but ask for help and He helps. To your God, you may ask for help repeatedly, you will not be charged any fee, but if you go to doctor, you will be charged a fee. I he will not charge you a fee you will take his obligations. Here is God above us, who will just not say that you have asked for help before or you have made this appeal before. I would say there are lot of things to be said, but since you rightly said that I should be concise, but I think the more you learn, I always say, the more you realize that you know very little knowledge, specially on *Islam*. I wish I may know more about *Quran* and Arabic language, because every time I hear it, I realize that this is the real way of life and complete in every respect, but first of all we have to convince ourselves. Thank you.

A speaker

I would like to add the basic principal here, that we should always remember that every person is responsible for his deeds. If he will do wrong God will punish him.

Part Nine: *Psychiatry and its Treatment in Islam*

CHAPTER TWO

(Selected Paper - Not Presented)

1. PRIMARY PREVENTION OF PSYCHIATRIC DISORDERS ACCORDING TO ISLAM
   Dr. S.A. Hosseini

PRIMARY PREVENTION OF PSYCHIATRIC DISORDERS ACCORDING TO ISLAM

Dr. S.A. Husseini

ISLAMIC REPUBLIC OF IRAN

Primary prevention is the prevention of a specific undesirable state, whether it is a state of disturbed feelings, a state of disturbed thoughts, a reaction pattern that is undesirable, a stress reaction, a formal illness or a disease state (Freedman, 2860).

Robert (1970) has suggested that "Prevention" is the removal of the noxious agent, strengthening host resistance and preventing contact between the agent and the host.

Elaine Cummings (1968), in this respect, suggested two approaches: to find out the causes of the phenomenon and to remove the cause and to discover the characteristics of immune populations, through epidemiological research and find methods to get other at-risk populatiions to resemble immune population (Freedman 2890).

Although the basis of the above suggestions are acceptable, but in the field of mental health, i.e. prevention, of psychiatric diseases and especially the reactive manifestations, we confront with a great deal of problems. First of all, the removal of noxious agents depends of many factors.

Let us begin with anxiety state or neurotic depressions, the most popular symptoms in the world.

These two mutual symtoms are fundamental modes of response in the normal adaptation to environmental circumstances. The stresses that help producing Anxiety and reactive depression may be many and various. The stresses may be external or internal, but usually both are combined. The symptoms, indeed, may arise much from the personality and special meaning of stresses for individual, than from the actual situation. (Curran 246).

Then, how should we remove the stressful life events, and how can we prevent contact between stressful life events and the individual?

According to *Islam*, man is responsible for his voluntary behaviour, so he can and should prevent voluntary stressful life events.

According to *Islam* principles, preventing and eradicating the main source and cause of involvements should be considered in primary prevention strategies. I will mention some of these preventive strategies personality disorders, Alcoholism and drug dependence.

By very extensive and repetitive teachings, *Islam* has clarified the duties and rights of everybody. Every human being is responsible to God for considering and observing these instructions and, behaves accordingly. *Islam* has very special instructive plans for every basic circle of human life, i.e. family circle; educational circle; occupational circle; the circle of friendly and group relationships; the relations between the human being and nature; political circle, and relationship between man and his Creator.

According to the principle of unity of God, one is responsible for arranging and programming his activities according to Divine laws.

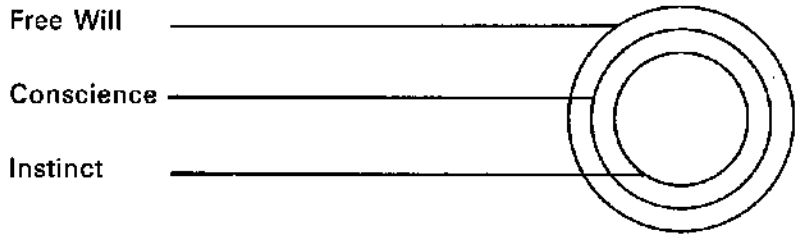
Islam's prophet (ﷺ) teaches that:

"O, slaves of Allah, you are as patients and, Lord of the world as a physician. The well being of patient is due to the knowledge of physician and his policy, not due to the desires of the patient and what he does like. So, do surrender to the commands of God, in order to gain prosperity"[1].

Islam, consequently, teaches us to control our instincts and desires and not to relax them; and it considers this control of instincts as a criterion of mental health. According to saint Ali, the Imam:

> "The authority) of passions (instincts) is like fatal calamities and the best remedy is to resist against them. When the wisdom is developing the passion will diminish. One who overcomes his passions, his wisdom will appear"[2]

So, instincts should be under the supervision of conscience and free will as well. Conscience, which has been defined as a natural and non-acquisition power and called in Arabic *"Fetrat=* فطرت, is responsible to prevent human being from lapsing in conduct.



The whole teachings and instructions in *Islam,* either the fundamentals of ideology and laws, or moral and ethics of this redeemable school, can and should be considered as the effective instruments and measures to fortify the conscience and free will, in order to control the instincts and human desires. The whole teachings and educations by this strategy, facilitate the development of human beings and prevent him from lapsing in conduct. These teachings which are quitely popular, adjust personal and social life process. So, one is responsible for considering and using the developed rules which have been suggested by his Creator to get safety in his self and social aspects of the life. Of course, we can compare the life of true Muslims with the others by some research, but it is conceivable that these rules will have their automatic preventive results if the people consider their rights and duties according to *Islam,* and they act accordingly. With respect to these approaches, *Islam's* Prophet (ﷺ) defines a Muslim as follows:

"Muslim is one that Muslims are secure from his actions and speech (thoughts)"[3]

Consider, if one's deeds and thoughts are safe, can not it prevent voluntary stressful life events, and remove the cause of many reactive psychitric disorders, which their causes are voluntary stresses in inter-individual relationships?

In order to prevent extravagant reactions to unvoluntary life events, such as natural calamities and catastrophe, war, etc., we can also use Islamic instructions as an instrument to increase psychic capacity, and change the meaning of the accidents.

All the accidents and unvoluntary stressful life events have a special meaning in *Islam.* According to *Islam,* all the accidents are trials to discover and present man's initiatives. So, he is responsible for enduring them, and he considers that his situation of development will be arranged according to his approaches to the events. Thus, no accident should be considered as an occasional event.

According to *Quran:*

> *NO AFFLICTION BEFALLS, EXCEPT IT BE BY THE LEAVE OF GOD. WHOSOEVER BELIEVES IN GOD, "HE" WILL GUIDE HIS HEART. AND GOD HAS KNOWLEDGE OF EVERYTHING*[4]
>
> (S64:V11)

Or:

... AND WE TRY YOU WITH EVIL AND WITH GOOD, FOR A TESTING[5]

(S21:V35)

Or:

YOUR WEALTH AND YOUR CHILDREN ARE ONLY A TRIAL. WHEREAS ALLAH! WITH HIM IS AN IMMENSE REWARD[6]

(S64:V15)

Or:

BLESSED IS HE IN WHOSE HAND IS THE SOVEREIGNTY, AND HE IS POWERFUL OVER ALL THINGS WHO HATH CREATED LIFE AND DEATH, THAT HE MIGHT TRY YOU, WHICH OF YOU IS BEST IN CONDUCT; AND HE IS THE ALL-MIGHTY, THE ALL FORGIVING[7]

(S67:V1–2)

Or:

DO MEN RECHON THAT THEY WILL BE LEFT (AT EASE) BECAUSE THEY SAY, WE BELIEVE, AND WILL NOT BE TRIED WITH AFFLICTION? - LO! WE CERTAINLY TRIED THOSE WHO WERE BEFORE THEM (YOU)[8]

(S29:V2–3)

Or:

AND SURELY WE SHALL TRY YOU WITH SOMETHING OF FEAR AND HUNGER, AND LOSS OF WEALTH AND LIVES AND CROPS; YET GIVE GLAD TIDINGS UNTO THE STEADFAST, WHO, WHEN THEY ARE VISITED BY A MISFURTUNE, SAY: LO! SURELY WE BELONG TO ALLAH, AND LO! UNTO HIM WE ARE RETURNING[9]

(S2:V155–156)

Sometimes, these trials and ordeals are instruments for punishment in order that the individual might compensate himself according to *Quran:*

... AND WE SEIZED THEM WITH DISTRESS AND ADVERSITY, IN ORDER THAT THEY MIGHT GROW HUMBLE[10]

(S6:V42)

So, a true Muslim will never be pessimistic due to stressful life events, and considers himself as a completely dependent upon God, in whom he believes as his guide, director and his supporter. According to *Quran:*

SAY: NOTHING WILL BEFALL US SAVE THAT WHICH ALLAH HAS DECREAD FOR US. HE IS OUR PATRON; AND IN ALLAH LET BELIEVERS RELY AND PUT THEIR TRUST![11]

(S9:V51)

Or:

ALLAH IS THE PROTECTOR OF THE BELIEVERS[12]

(S2:V257)

Or:

O, MEN! YOU ARE THE ONES THAT HAVE NEED OF GOD; AND ALLAH! HE IS THE ALL-SUFFICIENT, THE OWNER OF PRAISE[13]

(S35:V15)

Islam considers the world as a place, in which the difficulties and calamities are natural one of its components. According to *Quran:*

CERTAINLY, WE HAVE CREATED AN IN DISTRESS[14]

(S90:V4)

By this very realistic teaching, men should expect the difficulties and sufferings and should be ready to solve and endure them. This principle will increase the rate of individual resistence against the stressful life events, by assuming the difficulties to be world-wide, and not to be his exclusive and allocated problems.

As we mentioned before, according to Islamic laws, a muslim is not allowed to harm himself and others, so any drug which would harm any aspect of man is forbidden. According to *Quran*

WHO SO SLAYS A SOUL NOT TO RETALIATE FOR A SOUL SLAIN, NOR FOR CURRUPTION DONE IN THE LAND, SHALL BE AS IF HE HAD SLAIN MANKIND ALTOGETHER, AND WHOSO GIVES LIFE TO A SOUL, SHALL BE AS IF HE HAD GIVEN LIFE TO MANKIND[15]

(S5:V32)

Or:

AND WHO SO SLAYS A BELIEVER WILFULLY, HIS RECOMPENSE IS GEHENNA, THEREIN DWELLING FOR EVER, AND GOD WILL BE WROTH WITH HIM A MIGHTY CHSTISEMENT[16]

(S4:V93)

The subject of "retaliation" has been produced as an instrument for continuing human life. So, it prevents homicide and to harm the others.

To prevent sexual deviation, *Islam* suggests, stimulates and facilitates the marriage procedure. It has forbidden the other sexual experiences. This approach has been supported by moral instructions and the legal punishments as well.

Islamic laws have forbidden the drugs which cause to disappear the inhibition of brain's cortex and make the user unrealistic. Alcoholic beverages have been forbidden too, because of the above reason. In accordance with these legal regulations, there are many moral teachings which increase the disgust against these drugs and alcoholic beverages. One of these teachings considers Alcoholic beverages unclean.

Thus, as in the case of any other uncleanness, one is supposed to keep himself away from it in order to be able to fulfil his religious duties.

However, alcoholism has never been a great problem in our country although there have always been bands at work to tempt our people to drink.

After the Islamic Revolution, all factories which produced alcoholic beverages changed into medical-alcohol or non-alcoholic beverages producers. All of the bars and those shops which sold alcoholic beverages were closed. Islamic laws suggesting to whip the wine-bibbers were put to practice; and hard punishment were having approved for the pedlars of drugs and/or the users.

In order to compare the prevalence of drug dependence and alcoholism among the students of the Islamic Republic of Iran, we chose 311 students of Mash-had University as a random sample and we used "World Health Organization Questionaire to survey the use of drugs and alcoholism in youth".

13% of the students were chosen at random for urine test of opium derivations. The results were compared with the prevalence of alcoholism and drug dependence in the students of several western and Asian countries. The data which we collected showed that the prevalence of alcoholism and drug dependence among Iranian students is near to zero. Although it may be necessary to survey the same study in different parts of the country, since the results is very much striking, and there is not much difference in different cities of our country, the result may roughly generalized and one can assume that this is the trend of alcoholism and drug dependence in the whole universities.

The results show a significant and meaningful difference between our culture and the other places, mentioned above.

The main reason for this clear difference is the Islamic teachings and laws which have gained more authority after the Islamic Revolution in Iran.

DISCUSSION AND CONCLUSIONS

Now that we have reached the end of our debate, what lessons and results can be drawn from it?

Although we should consider research activities in neurobiochemistry field, now, in practical stage of clinical psychiatry and applied mental health, we are supposed to consider the ecologic factors mutually, and sometimes intervene in psychiatric disorders by changing the environment or the patient's approach to the stressful life events.

The life style of individual and population is quite important in this aspect. So, Islamic instructions, which cover the style of life of about 1000,000,000 of the world population, should be evaluated.

Islam confirms the scientific activities and researches in this respect; and considers these methods as the very essential and indispensable procedures, that every muslim is responsible to respect them. In addition to this approach it has a special theoritical and practical methods for prevention of diseases generally, and for psychiatric diseases especially. These methods, more or less, are using by Islamic population, but more instructions is necessary in this field. In an educated Islamic population and well-trained muslim, we can see the results more clearly.

It may be assumed that this approach which makes everyone responsible to take part in preventive methods of diseases is the more striking policy of *Islam* in this field. If we consider the extention of these teachings among the population and more supportive ways in the fields of ethics and legacy, the applicability of this strategy would be more clear.

In Summary, when the reality testing has not been disturbed, and the individual is responsible for his behaviour, preventive methods have severely been supported by sanctions. In this case, these methods are not summarised only in suggestion, and one would be responsible to follow them up. In the case of neglecting, he will receive severe punishments either by legal authorities or by the punishments have been fixed by God. For example, as we mentioned before, according to *Quran:* suicide in all cases and homicide without God permission are synonimous to kill all human beings, and they shall dwell forever in Gehenna.

These instructions have great effects even in lay men muslims, We are repeatedly told by our patients that "if God had not forbidden suicide, I would have already commited it".

We can see many Islamic laws protecting the above strategy in the realm of Alcoholism, drug addiction, homosexuality in both sexes, masturbation, violation of the rights of others, homicide cruelty to the family or others and even to animals, etc.

All these laws which have been put on intellectual basis, have been confirmed by Islamic laws "to prevent any probable harm is observable and unavoidable, and no one is allowed to harm himself or others".

Lastly and in conclusion we can say, according to *Islam*, considering preventive methods is a duty, which the whole population is responsible to do it. Of course, repeated teachings and instructions can help to give more insight and warning to the population, and it is our duty.

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PART TEN

ALCOHOL INDUCED DISEASES

Part Ten: *Alcohol Induced Diseases*

CHAPTER ONE

(Papers Presented)

1. REPORT ON THE SESSION
   The Editors
2. ALCOHOL FREE PHARMACEUTICALS AND MEDICINES
   Dr. Ahmed Abu Wafa, et al
3. THE ROLE OF ISLAM IN THE PREVENTION OF USE OF ALCOHOL AND NARCOTICS IN DRUGS
   Dr. Yahya Naser Khawaji, et al
4. EFFECT OF ETHANOL ON PROTEIN SYNSTHESIS AND LYSOSSOMAL ENZYMES IN HEPATOCYTES
   Dr. Suleiman Ahmed Suleiman

REPORT ON THE SESSION

This session was conducted from 9.30 to 11.30 by H.E. Dr. Hussain Al-Jazairy and Dr. Jamal Mazy Abu El-Azaim as chairman and co-chairman respectively. Dr. Ali Al-Saif was the moderator. The title of the session was "ALCOHOL INDUCED DISEASES" on which five papers were presented.

Editors

ALCOHOL FREE PHARMACEUTICALS AND MEDICINES*

Dr. Ahmed Abul Wafa, Dr. Yaha N. Khwaji and Dr. Hussein Dardas
SAUDI ARABIA

The study was designed to clarify whether the Ethyl alcohol is necessary for preparing Pharmaceuticals and Medicines. This paper will demonstrate that the use of Ethyl Alcohol as a solvent, preservative or excipient is of less value. The paper also will demonstrate means of stopping the use of Ethyl Alcohol in Pharmacy and Drug Manufactures. We are going to concentrate on the following main points:

A. The Islamic view point.

B. Harms and disadvantages resulting from using Ethanol in medicinals and drug manufacturing.

C. Evaluation of Ethanol uses in Medicine and Pharmacy.

D. Means of stopping the use of Alcohol in Pharmacy and Medicine.

E. Examples.

A. The Islamic view point:

Ethyl alcohol (Ethanol) being the spirit of intoxicants i.e. the active constituent of alcoholic beverages is a non-toxic alcohol differentiated from the toxic Methyl Alcohol. Ethanol is used internally to produce the bad effects on the central nervous system. Its effect is particualrly on the cerebral cortex and on its inhibitory functions which are the most noble functions of the human being. El-Khmr, and Ethyl alcohol which is its active constituent, are prohibited by Almighty *Allah*. It is clear to us being Muslims, that Almighty *Allah* will not put his cure in a thing which is prohibited by Him.

Islam had warned, fourteen centuries ago against the use of Alcohol as medicine and in medicines, by saying "EL KHMR is a disease and not a remedy".

The Prophet Mohamed (ﷺ) also says *"Allah has created diseases as well as remedy, and made a remedy for each disease."* Hence you have to seek remedy, but not through anything prohibited. Narrated by Abu Hurayrha (May Allah be pleased with him): The Prophet (ﷺ) said *"Allah does not cause your cure through anything prohibited by him"*. Hence, according to the Islamic teaching, the use of Alcohol spirit without an Islamic necessity, whether as intoxicant, nocuous drugs or as dissolvent is prohibited in accordance with any one or more of the following cases:

1. Any negligible amount of intoxicant, even one drop is prohibited.
2. Eschewing.
3. Prohibited drug.
4. Nocous drug.
5. Having the quality of causing filth on its own.
6. Close the door of *(Zara'e)* i.e. any behaviour or action that might lead to any matter prohibited by *Islam*.

The necessity of using Medicines containing Alcohol, which is also the window through which all destructive thoughts and idiologies opposing *Islam*, penetrate, can be considered as a result of the lack of attention of Muslim scientists in their scientific work.

From the Islamic view point, Islamic medicinals free from any intoxicant and from any prohibited substance have become an Islamic call claimed by scholars of Islamic Jurisprudence, and recommendations were issued by several Islamic conferences.

B. Harms and disadvantages resulting from using Ethanol in medicinals and drug manufacturing:

Ridding drugs and drug industry of Ethanol, besides being an Islamic demand, it is also medicinal and pharmaceutical demand. I completely adhered to the truth when I say that the use of Alcohol in extraction is considered a great obstacle hindering the progress of the art of Pharmacy and when I say that avoiding it will achieve advance in Pharmacy, the science which is still looked upon as backward because of its depending on extraction and galenical that have been in practice since many centuries. Though chemical sciences and drug manufacturing have achieved great progress, the art of extraction has stopped and been limited to those old traditional methods which depend on Ethanol as a solvent.

1st: Harms resulting from the treatment by Medicinals containing Alcohol are multitude, and some of the damages are very serious. We mention in brief the following:

1. Drug - Drug Interactions:

   Unusual side effects may occur when a medicine containing Alcohol and some other drugs is taken. Ethanol drug interaction is well known and most prominent of the interactions is Disulfiram Reaction and Disulfiram like Reaction, which happen when Ethanol is taken in association with Disulfiram or with some drugs such as: Furazolidine (an antiamaebic), oral hypoglycemic agents of sulfonyl group, some antibiotics such as cephamendole.

   These interactions lead to unpleasant symptoms characterized by: Flushing, palpitation, dyspnea, increased pulse rate, nausea, vomiting, cyanosis, unusual fall in blood pressure, many other alarming reactions, and some times death. Ethanol is a strange material to the human body and the primary step of metabolism is the oxidation of Ethanol to the very poisonous material (Acetaldehyde). If the following steps of Ethanol Metabolism stop due to any cause such as Disulfiram, and Disulfirma like interactions, Blood Acetaldehyde concentration rises, and the marked signs which are called "Acetaldehyde Symptoms" will occur.

   No one can tell the drugs that cause these appelling interactions. Moreover, these damages. Ethanol-Drug Interactions may take place by taking the least amount of Alcohol through medicines, and may even take place on the instant. Alcohol touches one's body from the outside. Patients on such drugs should avoid Alcohol in disguised forms such as cough mixtures, and must learn to avoid other disguised forms of Alcohol such as fermented vinegar, and even after shave lotions containing ethanol.

2. Rapid Dependance of Drug-Ethanol combination in medicines, such as: Barbiturate-Ethanol, Codeine-Ethanol, Antihistamine-Ethanol, which may occur in susceptible persons. Also Drug-Abuse may be associating medicines containing high percentage of Ethanol, even with safe drugs such as vitamins and stomachics, and it is Ethanol abuse.

3. Ethanol, which is present in a medicine, may increase the adverse effects of some drugs, such as: the drowsiness effects of antihistamines, the depressant effect of narcotics on central nervous system. In general Ethanol may enhance the acute effect of drugs which depress the CNS, such as: Hypnotics, antihistamines, muscle relaxants, tranquilizers.

4. The systems of the body are affected in susceptible persons, and the use of Medicines containing Ethanol may cause for example harm to the stomach such as hyperacidity and gastritis. On other side the presence of Ethanol is unsuitable in medicines which are used to treat certain diseases.

   a. Alcohol depresses respiration, sedatives are contraindicated during an asthmatic attack; sedatives and narcotics should be avoided in patients with CO_2 retention because they may further depress ventilation and for these reasons "Alcohol Free Medicines", must be indicated for the treatment of bronchial asthma, chronic bronchitis, and emphysema.

   b. Alcohol pshychically stimulates gastric secretion, especially if the individual likes it, and the

gastric juice produced in this way is rich in acid and normal in pepsin content; alcohol is high concentration is irritant to the gastric mucosa, and for these reasons, "Alcohol-Free Medicines" must be indicated for the treatment of hyperacidity, gastritis, and peptic ulcer.

2nd: There are multitude of harms and disadvantages as a result of using alcohol in drug industries, amongst which are:

a) Alcohol is higly inflammable with appelling dangers.

b) Alcohol is volatile, and vaporised alcohol is absorbed through the lungs and fatal intoxication occurs.

On other side pharmaceuticals and medicinals are exposed to concentration of the active ingredients owing to alcohol volatility when the containers are not tightly closed.

c) Hardening of the tissues of plants by Alcohol, hinders its penetration through the tissues.

d) More work and effort are needed for making the plant suitable for extraction by Alcohol. For example: More work in "communication" to prepare fine powder which is needed for extraction by Alcohol. More effort in packing percolators with fine plant powder and for clarification of liquid extractions.

CONCLUSION

From all above mentioned under A and B about Alcohol and medicinals containing it, we find it necessary to state that we should prepare Pharmaceuticals and Medicinals free from Ethanol.

C. Evaluation of Ethanol Uses in Medicine and Pharmacy:

1. The therapeutic value of Alcohol is much limited, and alcohol as: Antipyretic, analgesic, hypnotic, stomachic etc. is used only by lay persons. It is less important than the potent, selective and safest drugs available all over the ages.

   Most therapeutic uses of Alcohol as apparent stimulant, and for increasing the work done, depend on its depressant action on the CNS, particularly on the cerebral cortex and on its inhibitory functions. Any benefits that may be noted from the ingestion of Alcoholic beverages in patients suffering from coronary artery diseases are probably due to a central depression.

2. For preparing medicinals, Alcohol is of less value, because in suitable amount which is needed, it causes undersired actions and adverse reactions. Alcoholic extracts which are containing ingredients insoluble in water when mixed with aqueous vehicle - the ingredients will precipitate, overdosage may happen, and the patient may suffer from toxicity by the high potent active ingredients.

3. Alcohol as a preservative in medicinals is less potent than other well known preservatives, whether they are classic such as benzoic acid, or modern such as parabens.

4. Alcohol as extracting solvent i.e. Menstruum is also of less value for two main reasons:

   a. It is not selective, as it dissolves beside the desired active constituents, many unwanted constituents such as: resins, colouring matters organic acids, volatile oils, certain sugars (dextrose) etc. Some of these constituents are not inert.

   b. Alcoholic extract is not used as it is but it is mixed with water to prepare medicines, and when it is diluted with aqueous vehicle precipitation of water insoluble ingredients happens, and the amount of Alcohol in the extract is of no value as a solvent.

D. Means of stopping the use of Alcohol in Pharmacy and Medicine:

We re-say that stopping the use of Alcohol in Pharmacy will lead to "Modern Transfer of the Art of Pharmacy."

We offer briefly some means in the following:

1. The use of water as the best solvent under suitable conditions by:
   a. Adjustment of water PH to dissovle the desired active constituents as salts.
   b. Water dissolving through chemical combination, and more studies must be done to make application of these chemical reactions.
   c. The use of suitable preservatives during and after extraction by water.
   d. The use of stabilizers and the elimination of the causes of hydrolysis, during and after extraction by water, to keep the active ingredients in stable case.
2. The use of non aqueous solvents and vehicles, which are suitable for ingredients undergoing hydrolysis in water or which are water insoluble as examples: Propylene glycol, fixed oils, or isopropyl alcohol for external use.

   More research must be done to obtain a vast number of suitable solvents.
3. Modification and improvement of the nowadays available machines and equipments to be suitable for the use of water as a solvent in extraction, for example: Centrifuge in maceration, continuous hot percolation and distillation under reduced pressure.
4. Advanced Extraction Processes such as: Spray drying and freeze drying to obtain aqueous extracts in powder forms which are water soluble. Such powders are formulated and are available as medicines. In the Japanese market much of these medicines are now available for the treatment of different diseases, and find extensive use among the Japanese people, and are called "Genuine Medicines".
5. The use of plant powders in improved forms:

   Nowdays there is a good tend to the use of natural drugs. The most similar to the useful crude drugs is its powder form. In the Pharmacopeas, many official standardized powders are present.
6. The use of new chemicals in place of traditional alcoholic extracts of the same therapeutic indications, such as:
   a. Modern bronchodilator "Salbutamol", in place of Alcoholic extracts of the same therapeutic uses.
   b. Modern antispasmodics or anticholinergics to replace Alcoholic extracts of the same therapeutic uses.
   c. Modern mucolytics to replace Alcoholic extracts of the same therepeutic uses.
7. The use of Modern Technology of Suspensions, to prepare liquid medicinals containing water insoluble active ingredients. Nowadays all antibiotics are available in "powder form for suspension".
8. The use of suitable preservatives and stabilizers, to keep ingredients stable in the aqueous vehicle.
9. Make use of the Physical and chemical modification and reactions to transfer water insoluble materials to water soluble ones. For example: Iodine and Potass Iodide to give water soluble complex, Aspirin and Sodium citrate to give water soluble complex, very fine amorphous form of a material to be in a colloidal solution etc.

   More researches and attention must be taken to the branches of science dealing with water

solubility of materials.

10. Dosage forms suitable for patients to replace liquid forms such as chewable tablets, cream rubbed externally to produce systemic effect, suppositories, powders for oral use, etc.

E. Examples:

As a compared study, we classify some examples of medicines into two main groups.

I. Alcohol free medicines.

II. Medicines containing Alcohol.

The 1st group is divided into four sub-groups:

1. Medicines of non Alcoholic vehicle, or non-Alcoholic base, or non-Alcoholic solvent (N.A.V., N.A.B. - NAS)
2. Alcohol free medicines which are prepared as suitable dosage forms such as: suspensions (NADs) or chewable tablets (NADch).
3. Alcohol free medicines which are preserved by non Alcoholic preservatives (NAP) and non-Alcoholic stabilizers (NAS).
4. Miscellaneous Alcohol free medicines (MNA).

The 2nd Group is divided into 4 subgroups:

1. Medicines containing alcohol in very small amounts, even traces, and it does not exceed 1% (AT).
2. Medicines containing Alcohol from 1-5% (A+).
3. Medicines containing Alcohol above 5% to 15% (A++)
4. Medicines containing Alcohol above 15% (A+++).

THE PAPER CONCLUDES:

1. Alcohol has less value in preparing medicines.
2. Water and other middle than Alcohol are sufficient in preparing Pharmaceuticals and Medicines.
3. Avoidance of adverse reactions and drug interaction which happen through the presence of Alcohol in medicines.
4. The aims of exclusion of the use of Alcohol in the frame work of Islamic Medicine and Pharmacy are noble and beneficial aims; they are not limited or tactical, and they are multitude: Religious aims, scientific aims and economic, industrial aims.

CHAPTER III

After I had finished the study dealing with "Ridding Drugs and Drug Manufacturrs of Ethanil", I saw that it has been useful to add a new chapter, concerned with a number of medicines already available in the market - for example to: ALCOHOL-FREE MEDICINES, and MEDICINES containing ALCOHOL. I selected examples (144 examples) from among that present in PDR35-1981 (2500 formulations, prepared from about 1000 ingredients and produced by about 250 Drug companies).

Before setting forth these examples I submit the following important points:

I mean by ALCOHOL: Ethyl Alcohol, and its Synonems: Ethanol, Spiritus, Spirit of wine Alcohol Spiritus Vini Rectificatus ...etc. It is an Aliphatic Alcohol, of the formula C_2H_5OH. It is the Spirit of Intoxicants, or rather those called Alcoholic Beverages (Beer 10 gm Alcohol/500 ml, Champagne 18

gr/100 ml, Red and White Wine 18 gr/100 ml, Whisky Brandy ...etc), and due to it all what happens to the C.N.S.; mainly to the Higher Centers, and the Inhibitory Control Mechanisms. In Goodman and Gilmaris, The Pharmacological Basis of Therapeutics, 6th edition, Section III - under drugs acting on central nervous system, only two Aliphatic Alcohols are mentioned, namely: Ethyl Alcohol and Methyl Alcohol.

Methyl Alcohol is very toxic, and permanent blindness had been caused by as little al 10 ml[1] It is used internally[2] because of its toxicity. There is no methyl alcohol drinks, and it does not cause a problem of drug abuse. It is purely of toxicological interest.

Alcoholic Beverages have been used since the dawn of history, and Alcohol remains the major drug of abuse.

Like general anesthetics, Alcohol is primary and continuous depressant of the C.N.S. It increases neither mental, nor physical abilities. Its common use is due to its particular effect on the cerebral cortex and on its inhibitory functions, which are the most noble functions of the human being. Through[1] depression of inhibitory control mechanisms, and by[2] masking circumspection and self-criticism, Alcohol in small doses may appear as stimulant. The apparent stimulation - Laymen view - is false, and it results from the unrestrained activity of various parts of the brain, as a result of the depression of inhibitory control mechanisms.

From all the above mentioned, we see the significance of Islamic warning against the use of EL-KHAMAR, which contains Alcohol — the only active principle — which produces the bad effects on the higher centers and inhibitory functions. Moreover, *Islam* had warned fourteen centuries ago, against the use of Alcohol in medicines, by saying "EL-KHAMAR" is a disease and not a remedy. Harms and adverse reactions, as a result of the presence of Alcohol in medicines, have been revealed continually.

SYMBOLS AND ABBREVIATIONS (S & A)

Beside symbols and abbreviations mentioned before, I offer the following:

1. (Ab) Alcohol present in medicines may cause alone or with other drugs in medicines abuse, tolerance or/and dependance.
2. (X) Alcohol present in a medicine is contraindicated with therapeutic purposes if the medicine or it is of adverse reactions.

GROUP I ALCOHOL FREE MEDICINES

Sub-Group A: Medicines of Non-Alcoholic Vehicle, or Non-Alcoholic Base, or Non-Alcoholic Solvent.
(N.A.V. - N.A.B. - N.A.S.)

Serial No.	Name & Reference	S & A	Description and Explanation
1	TUSSAR DM Cough Syrup PDR 589	NAV	Alcohol-Free. It contains: Dextromethorphan HBr, Chlorpheniramine Maleate, Phenylephrine HCL, Methylparaben 0.1%
2	KOMED Acne Lotion PDR 644	NAB	It contains: sodium thiosulfate, Salycylic acid 2%, Isopropyl Alcohol 25%, menthol, camphor, colloidal aluminia, cdetate disodium, and purified water.
3	DECONAMINE Syrup PDR 655	NAV	No Alcohol, No Dye. It contains chlorpheniramine maleate, de.pseudoephedrine HCl in a grape flavoured aromatic vehicle.
4	SORBUTUSS PDR 822	NAV	No sugar, Alcohol, Sodium. It contains d-methorphan HBr, glycerolguiacolate - etc in a palatable mintflavoured glycerin-sorbetol vehicle. Effective antitussive and expectorant.

GROUP 2 MEDICINES CONTAINING ALCOHOL

Sub Group A: Medicines Containing Alcohol in very small amounts, even traces, and it does not exceed 1 per cent (AT)

Serian No.	Name and Reference	S. & A.	Description and Explanation
1	IBERET Liquid Abbot. PDR 508	AT	It contains Ferrous Sulfate, Vitamin, C, B. Complex, Alcohol 1% All ingredients are water soluble. Alcohol - as a trace - is of no value, and the active ingredients can be dispensed in an Alcoholic-Free-Vehicle.
2	LARYLGAN Throat Spray PDR 589	AT	An aguous solution containing: Antipyrin, Pyrilamine maleate sodium caprylate, also contain Menthol, Gentian violet, Methyl paraben, Propylparaben, Methyl salicylate. Alcohol is of no value, as a trace, and the active ingredients can be dispensed in an Alcoholic-Free-Base.
3	KLORVESS 10% Liquid PDR 852	AT	It contains Potassium chloride in a palatable cherry flavoured vehicle, Alcohol 1%. The ingredient is water soluble, and Alcohol as a trace - is of no value.
4	VI-DAYLIN ADC Drops PDR 1562	AT	It contains vit. A, D, C, and the following ingredients: benzoic acid (preservative), methyl-paraben (preservative) in a glycerin-water vehicle. Contains only a trace (less than ½%) of Alcohol, which is of no value.
5	VI-DAYLIN Drops Multivitamin Supp PDR 1562	AT	It contains beside the multivitamins, the following ingredients benzoic acid (preservative), Iron ammonium citrate (stabilizer) Methyl parahen (preservative), disodium edetate (stabilizer) in a glycerin-water vehicle. Contains only a trace (less than ½%) of Alcohol, which is of no value.
6	VI-DAYLIN Liquid PDR 1564	AT	It contains beside the multivitamins: glucose, sucroses benzoic acid (preservative), methyl-parahen (preservative) cysleinc hydrochloride (stabilizer) in an aqueous vehicle. Contains only a trace (not more than ½%) of Alcohol, which is of no value

THE ROLE OF ISLAM IN CONTROLLING THE USE OF ALCOHOL AND NARCOTICS IN MEDICAL DRUGS*

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ABSTRACT

This research is dealing with drugs and medicines that contains alcohol and some of the substitute until the present time. As well it takes the use of narcotics in the medical field as anesthesia in surgical operations or as sedatives for pains and how to escape the use of that.

The research is also discussing the correct and perfect scientific means and methods that support the escape from the use of alcohol and narcotics in drugs. We hope this research will be a hint or an indicator for the Muslims world in particular and the world in general for the importance of treatment and medication of the licit drugs (Islamically permitted), as *Allah* has not made the cure and recovery in what He has prohibited, as being stated by Ibn Masoud through al Iman Al Bukhari that Prophet Mohammed (ﷺ) said,' *"Allah has not made your cure and recovery in what he has prohibited".*

* As the full text could not be made available, we are publishing here the abstract only.

Editors.

EFFECT OF ETHANOL ON PROTEIN SYNTHESIS AND LYSOSOMAL ENZYMES IN HEPATOCYTES

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INTRODUCTION

Techniques for the study of liver metabolism *in vitro* include isolated liver perfusion and the use of organ slices, homogenates, and suspensions of monolayers of intact prenchymal cells (isolated or cultured hepatocytes). There is convincing evidence that suspensions of surviving hepatocytes will continue for 10 to 20h to perform in a normal way a number of metabolic processes including glycogenesis[1], gluconeogenesis [2,3,4] lipogenesis[5,6] and protein synthesis[7,8].

Several studies in recent years have indicated that ethanol impairs protein metabolism in the liver. It has been reported that the content of total protein[9,10] as well as the levels of the microsomal proteins[11,12] are increased in the of liver chronically intoxicated animals. Several investigators[13,14,15] have also demonstrated that ethanol depresses the synthesis of whole liver proteins.

Previous work[16,17] have shown that chronic adimistration of ethanol to rats causes decrease in the membrane bound enzymes such as mitochondrial Mg ATPase and acyl-COA: Carnitine acyltransferase activity in rat livers No data are available for the effect of alcohol on lysosomal enzymes in the liver. In order to measure this effect and to avoid the inclusion of ethanol in the diet, a simpler system of rat hepatocytes suspended in a synthetic medium was used.

The purpose of the studies described in this paper was to examine the effect of ehtanol on lysosomal enzymes in hepatocytes. These studies are in relation to protein synthesis and protein degradation in the liver.

MATERIALS AND METHODS

Materials

Sprauge Dawly rats were used as liver donors to prepare hepatocytes. The following substrates of various enzymes were obtained from Sigma chemical company: deoxyribonucleic acid (DNA) type VII, ribonucleic acid (RNA) type III and p-nitrophenyl phosphate disodium. All other chemicals were of reagent grade quality.

Preparation of hepatocytes

Sprague Dawly male or female rats 60 to 70 days old have been used as liver donors. Hepatocytes were prepared by a slight modification of the collagenase perfusion methods of Berry and Friend[18] and Seglen[8]. The perfusion equipment was similar to that described by Wagle and Ingebretsen[4]. The initial washout perfusion through the hepatic portal vein was done in the animal with Ca^{2+}- Free Hanks balanced salt solution in 25mM Hepes buffer, supplemented with 1.5% bovine serum albumin and 0.1% glucose. The perfusing solution was continuously oxygenated in a 95% O_2, 5% CO_2 atmosphere, and the pH was controlled at 7.4 with additions of 0.5M sodium bicarbonate. After the transfer of the liver to the temperature controled cabinet the perfusion fluid was changed to include 0.4% of type I collagenase and 0.008% of soybean trypsin inhibitor at pH 7.6 and the process continued for 10 to 15 min until the liver began to dinsintegrate visibly. Then the cells were collected and the suspension

was passed through nylon mesh and recovered by centrifugation at 50 X g for 2 min. The loose pellet was resuspended in fresh Hanks-Hepes medium at 4°C and washed once in this solution and once in Swim's culture medium[19] supplemented with 10 per cent fetal calf serum, 25 Hepes, 100 units/ml of penicilin, 7mM glucose, and 50mM Tricine. The cells were suspended in modified Swim's medium for incubation at population of 2 X 10^6 cells/ml. To minimize microbial contamination the perfusion glassware and instruments were sterilized in an autoclave at 100°C for 25 min, and the media and collagenase solution were filtered through millipore mdmbrane (0.25 μ).

Incubation Conditions

For the purpose of lysosomal enzymes assays, multiwell culture plates (24 wells-plate, $2cm^2$ growth area) were used. To each well a total volume of 1ml of cell suspension (2×10^6 cells/ml) and the desired dose of alcohol was added. The culture plates were incubated at 37°C in an atmosphere of 95% air 5% CO_2, and the pH of the medium was maintained at 7.3 to 7.4. For taking samples, the whole contents of the well were pipetted out and frozen until the time of assay when they were thawed and sonicated.

For the purpose of measuring amino acid incorporation into total protein, a volume of 4ml of cell suspension (2X 10^6 cells/ml) was placed in a sterile petri dish 60mm in diameter and treated with (^{3}H) leucine with a specific activity of 100 Ci-mmol to yield a cell suspension with 10 μ Ci/ml. Samples were removed for analysis at selected time intervals

Methods of Assay

Activity of DNAase, RNAase and acid phosphatase in the supernatant or the sonicated cell suspension was measured. RNAase II and DNAase II were assayed by a modification of the procedure described by de Duve *et al.*,[22] and Vaes and Jacques[23,24]. One unit activity causes the hydrolysis of one μmol of RNA or DNA successively per 60 minutes of incubation at 37°C. Acid phosphatase (ACP) was assayed by a minor modification of the method described by Neil and Horner[25]. One unit activity catalyzed the hydrolysis of one °25mol of p-nitrophenyl phosphate per 30 min of incubation at room temperature. Protein was determined by the method of Lowry *et al.*,[26], with bovine serum albumin as a standard. Amino acid incorporation into total protein was measured as described before[21].

RESULTS

Amino Acid Incorporation into protein in Hepatocytes

In Fig.1 data are presented in which (^{3}H) leucine incorporation into total protein was measured for 10h. From this figure it is clear that hepatocytes incorporated labelled leucine into cell protein at an almost constant rate. When labelled leucine was added to control hepatocytes which were preincubated for 2h, the same rate of incorporation was found as when added to freshly prepared hepatocytes (data not shown), indicating an unchanged ability of the hepatocytes to synthesise protein during the incubation period. Addition of ethanol to the hepatocyte suspension reduced the incorporation of leucine. This reduction was proportional to the concentration of ethanol. 50mM ethanol caused approximately 30 per cent reduction while 10mM caused 20 per cent reduction. Fig 2 shows that after incubation of hepatocytes for 1h, rodioactivity began to appear in proteins released in the medium. After incubation for 10h the rodioactivity of medium proteins constituted approximately 50 percent of the total radioactivity incorporated during this period. The presence of ethanol reduced the incorporation of labelled precursor into this protein appearing in the medium. The reduction was also dependent on the concentration of ethanol. 50mM ethanol caused 40 percent reduction in the radioactivity of medium proteins while 10mM ethnol caused 25 percent reduction.

The effect of ethanol on incorporation of (^{3}H) leucine into proteins seems to be mediated by its metabolite, acetaldehyde. As shown in Table I, addition of acetaldehyde to the suspension of hepatocytes resulted in a similar effect to that of ethanol. The concentration of 1.0mM acetaldehyde resulted in 40 percent reduction of labelled leucine incorporation.

Effect of Different Ethanol concentrations on lysosomal Enzymes

The effect of three different ethanol concentrations on lysosomal enzymes activity is illustrated in Table 2. All concentrations caused significant release of lysosomal enzymes in the culture medium of hepatocytes. The higher concentration (50mM) caused significantly greater release of the lysosomal enzymes. About 30 percent of the total activity of the three lysosomal enzymes investigated was released in the culture medium after 10h of incubation. The release of lysosomal enzymes was gradual but mostly after 2h of incubation. About 20 percent of the activity was present in the culture medium when 50mM ethanol was used (data not shown). Total activity of lysosomal enzymes in hepatocytes was not changed during incubation with ethanol.

Acetaldehyde did not affect the activity of the lysosomal enzymes. There was no significant increase in the activity of any of the three lysosomal enzymes tested in the incubation medium even after the addition of 1.0mM acetaldehyde.

DISCUSSION

The present results show that ethanol at concentrations which are easily obtainable *in vivo* inhibit protein synthesis in hepatocytes. Major effect of ethanol on precursor entry and specific radioactivity, as well as on protein leakage and degradation can be excluded in this system. The present results also indicate that ethanol may directly influence hepatic protein synthesis rather than through hormones or other extrahepatic agents or changes in the composition of diet. These results are in accord with those of Perin *et al.*[26,27] obtained in liver slices. In the perfused liver and *in vivo*, ethanol reduces the incorporation of labelled amino acids in circulating proteins, while the effect on stationary proteins is less pronounced[15]. The observations in the present study (Fig.1) also suggest that ethanol did not modify the uptake of labelled leucine. The reseults indicate that ethanol depress the rate of (^{3}H) leucine incorporation into cell proteins. This inhibition which ranged form 20 to 40 percent for ethanol concentration between 10 and 50 mM appeared soon after the addition of ethanol. The effect of ethanol on protein synthesis is a consequence of its metobolism and the formation of acetaldehyde. These results are in accord with previous results in the literature[27]. The mechanism by which acetaldehyde, like many other aliphatic aldehydes[28], depresses protein synthesis in the liver is still unclear. Aliphatic aldehydes have been reported to react with amino acids that have an active group adjacent to the primary amino group, such as serine, threonine, and cysteine[29]. Moreover, acetaldehyde condenses with glycine to form threonine or allo-threonine in the presence of threonine aldolase[30].

The present results also indicate that ethanol cause the leakage of lysosomal enzymes in the culture medium. Obviously, these enzymes are released in the cytosol before they find their way to the extracellular medium. The leakage of lysosomal enzymes is a direct effect of alcohol on lysosomal membranes. This is not surprising since it could dissolve some of the lipids in the membrane. Also, addition of acetaldehyde (ethanol metabolite) did not affect lysosomal enzymes in hepatocytes. Although the synthesis of DNA and RNA was not monitored in hepatocytes, but the release of lysosomal DNAase and RNAase in the cytoplasm (in the presence of ethanol) would cause hydrolysis of DNA and RNA respectively. Hydrolysis of RNA will indirectly lead to a reduction in protein.

In conclusion, the results presented here suggest that the inhibition of protein synthesis by

ethanol may be one of the factors that impairs the cellular homeostasis in the liver and, consequently, it may play a role in the hepatic damage by alcohol. Also. ethanol produces its effect directly and through its metabolite acetaldehyde.

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TABLE I

Effect of Acetaldehyde on (^{3}H) leucine Incorporation Into protein in Rat Hepatocytes

Acetaldehyde Concentration (mM)	DPM/mg protein (% of control)
0.1	78 ± 3.6
0.5	71 ± 3.8
1.0	60 ± 3.4

Acetaldehyde was added to the suspension of hepatocytes and the radioactivity in protein of hepatocytes was determined as described in the methods. These are results of incubation for 10 hours. Values are means ± standard deviations of four experiments.

TABLE 2

Effect of Ethanol on the Release of Lysosomal Enzymes in the Culture Medium of Hepatocytes

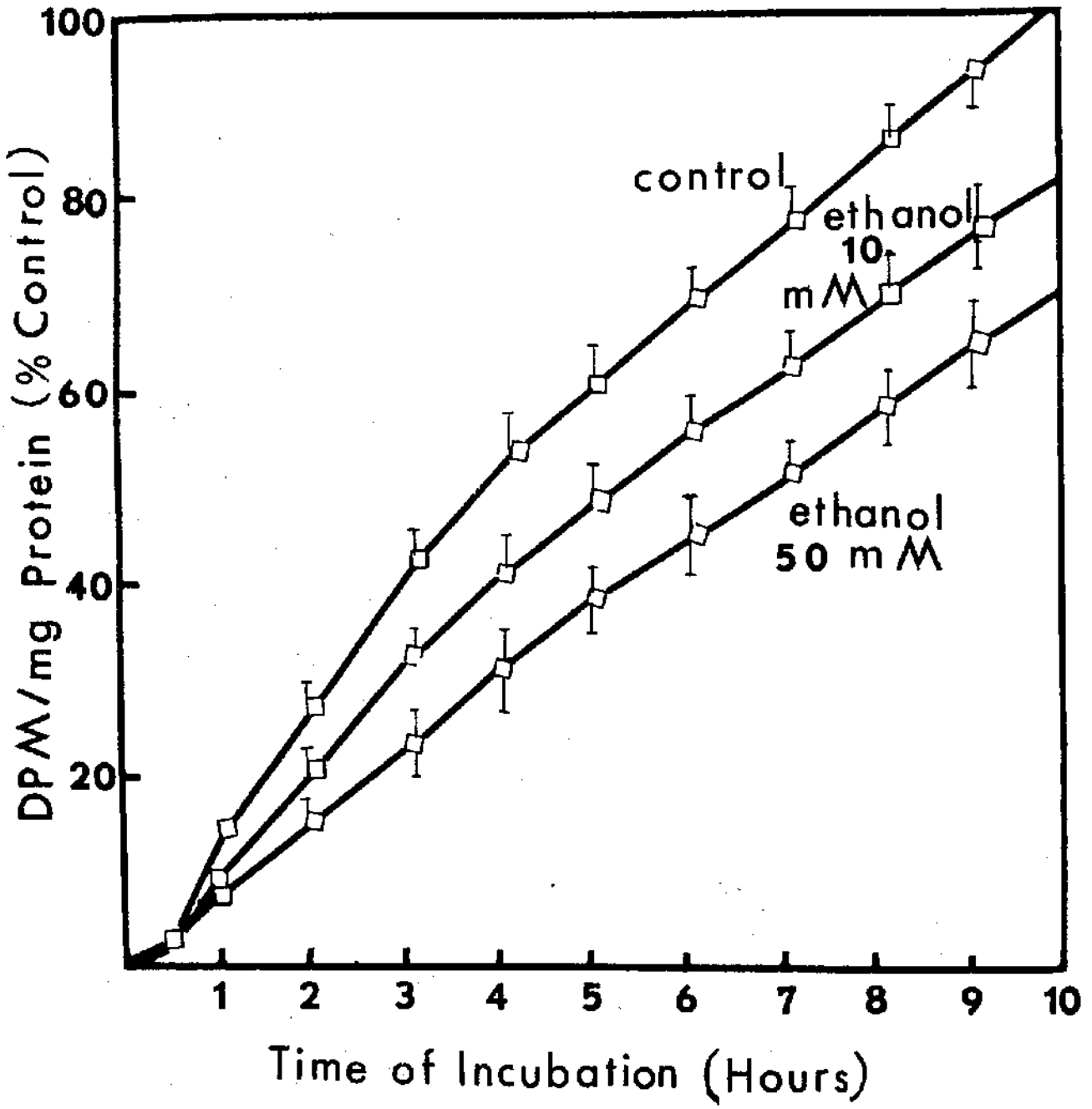
Ethanol Concentration (mM)	Percent Lysosonal Enzymes in the supernatant		
	DNAase	RNAase	ACPase
10	18 ± 3.3	15 ± 2.8	19 ± 3.1
25	24 ± 4.1	21 ± 3.5	27 ± 3.8
50	31 ± 5.3	28 ± 4.2	33 ± 4.6

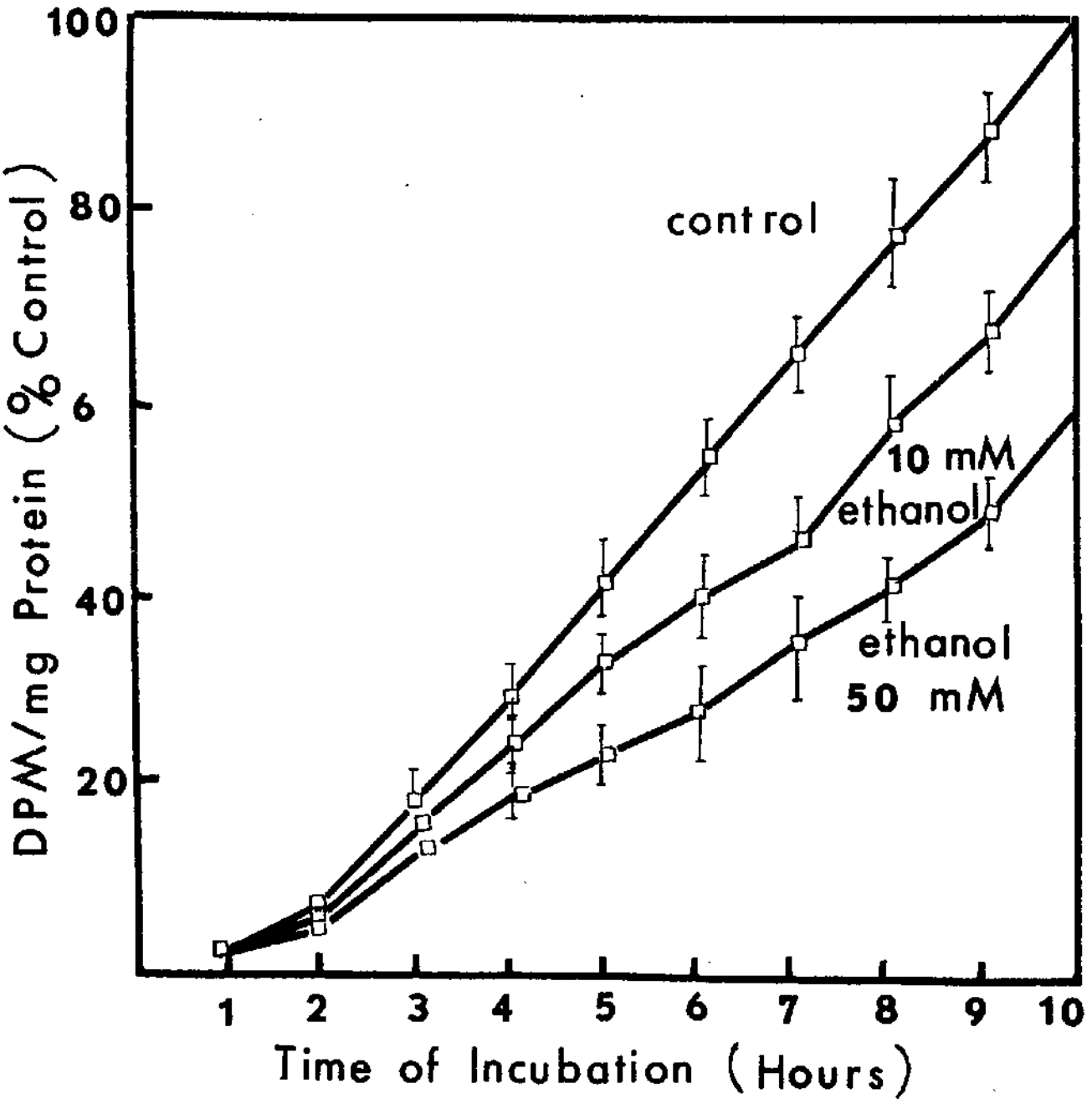
Ethanol was added to the suspension of hepatocytes and the specific activity of lysosomal enzymes was determined at hourly intervals as described under "Assays". For simplicity, the 10-h values compared to the controls are presented. Values are means ± standard deviations of six experiments.

Figure Legends

Figure 1. Incorporation of labelled leucine in isolated hepatocytes. (^{3}H) leucine was mixed with the cell suspension initially. Values are percent of results obtained in control experiments at given time intervals.

Figure 2. Incorporation of labelled leucine into proteins released from hepatocytes into the medium. Values are percent of results obtained in control experiments at given time intervals.


100
80
60
40
20
DPM/mg Protein (% Control)
control
ethanol 10 mM
ethanol 50 mM
1
2
3
4
5
6
7
8
9
10
Time of Incubation (Hours)


100
80
6
40
20
DPM/mg Protein (% Control)
control
10 mM
ethanol
ethanol
50 mM
1
2
3
4
5
6
7
8
9
10
Time of Incubation (Hours)

CHAPTER TWO

(Some Selected Papers - Not Presented)

1. ROLE OF CIGARETTE SMOKING IN THE DEVELOPMENT OF CARDIOMYOPATHY OF CHRONIC ALCOHOLISM
   Dr. Sultan Ahmed
2. OCULAR MANIFESTATIONS OF ALCOHOLISM. EXPERIENCE IN MANAGEMENT OF ALCOHOL-INDUCED AMBLYOPIA
   Prof. Dr. Mohammed H. Emarah
3. IS ALCOHOL A REMEDY?
   Dr. M. Ali Al-Bar
4. EFFECTS OF ALCOHOL CONSUMPTION OF ZINC AND COPPER METABOLISM IN HUMAN SUBJECTS
   Dr. Zaffrallah T. Cossack

ROLE OF CIGARETTE SMOKING IN THE DEVELOPMENT OF CARDIOMYOPATHY OF CHRONIC ALCOHOLISM

Dr. S. Sultan Ahmed

USA

INTRODUCTION

It is well recognized that alcohol when consumed even in non-intoxicating doses causes cardiac dysfunction and that its use over long term results in irreversible damage. Ample evidence citing the data both from our laboratory and from the literature was presented in the proceedings of the first International Conference on Islamic .Medicine[1].

Production of a functional deficit has not been uniform in chronic experiments with ethanol[2–4]. The fact that heart failure has not been produced in an animal model has raised the questions as to whether the cardiomyopathy observed in human alcoholics is solely attributable to ethanol intake. Nutritional status of the patient and the possibility of heart disease from other causes have been considered as potential factors in the pathogenesis of alcoholic cardiomyopathy.

Since most human alcoholics indulge in cigarette smoking as well, nicotine and/or other toxic components of cigarettes may play a role. In previous studies of an animal model exposed to chronic cigarette smoking, left ventricular performance was observed to decline associated with morphologic evidence of collagen accumulation[5–6]. This present study was undertaken to determine if cigarette use intensifies the abnormalities of myocardial function and composition observed in experimental alcoholism.

MATERIALS AND METHODS

To assess the role of cigarette smoking in the development of heart muscle disease from chronic alcoholism, 18 month old litter-mate beagles were prepared with a permanent tracheostomy. They were alternately placed into four groups: Group 1, a control of ten animals; Group 2, nine animals smoking seven cigarettes per day (reported earlier)[5]; Group 3, seven animals fed ethanol as 20% of calories; and Group 4, six animals receiving ethanol and also smoking cigarettes as the animals in Group 2 and 3.

All were vaccinated against distemper, hepatitis and leptospirosis, and were housed in individual cages. They were free of intestinal parasites and clinical evidence of disease for a period of two to four weeks of observation before admission to the study. Blood samples were negative for heart worms and both hematocrit and serum proteins were initially normal.

Smoking in Group 3 and 4 was performed by the method of Cahan and Kirnan[7]. The cigarettes were a standard brand manufactured by the University of Kentucky, Division of Agronomy, Tobacco and Health Research Institute[8], were without filter and contained 1.35mg nicotine/cigarette, excluding the nicotine in the 23mm butt remaining from the 85mm cigarette. The smoking was done in two sessions each day.

Both the control and experimental animals were fed approximately 28 calories/lb. The controls and the smokers received a diet sufficient to maintain body weight in the adult animal[9], consisting of 26% of calories as protein, 12% fat, and 62% carbohydrate. The corresponding values in the alcoholic groups were 16.6% of calories as protein, 7.7% lipid, and 39.7% carbohydrate, which met the minimum standard for maintaining a normal nutritional state[9]. All animals received a vitamin supplement twice weekly.

After four weeks of progressively increasing doses, animals consuming virtually all the ethanol provided were admitted to the experimental group. The chronic ethanol animals were provided 20% of calories as ethyl alcohol for six days per week. On the seventh day, the caloric composition

was the same as the control group. Due to the difficulties of feeding by gastric tube for a prolonged period, the ethanol (USP, acquired from U.S. Industrial Chemicals, Division of National Distillers & Chemical Corp., NY) was administered in drinking water up to a final concentration of 40%. The actual intake per animal was estimated by measuring the residual ethanol solution of the previous day, correcting evaporation from a separate container. The intake of each animal remained relatively constant but varied between animals, from 70% of the administered dose in some, to 100% in others.

Body weight, hemotacrit, serum proteins and electrolytes were monitored throughout. At the end of the study which lasted 18 months, these animals were anesthetized with morphine sulfate (3 mg/kg) and sodium pentobarbital (15–20 mg/kg) 18 hours after eating and placed in the right lateral position. After insertion of a cuffed endotracheal tube, respiration was regulated with a Harvard respiratory pump. This facilitated the maintenance of arterial pH, pO_2 and pCO_2 in the normal range[5].

To minimize the acute influence of the last administered dose, the experimental groups did not receive ethanol for the previous 36 hours and smoking was not done in the previous 18 hours. Each animal in all groups was provided its regular diet on the previous afternoon and feeding was completed by 6:00 p.m. Hemodynamic data were obtained with chest intact.

For pressure measurements an 80 cm., 8F NIH catheter was passed through the right carotid artery into the left ventricular chamber. A 50 cm. 7 F Swan-Ganz Catheter was passed via the jugular vein into the pulmonary artery and a small polyethylene catheter C (PE) into the femoral vein. Statham transducers were used for the measurement of left ventricular (LV) (P23Gb) and aortic (P23Db) pressures. These were placed at the midthoracic level and balanced for equal sensitivity. The maximum rate of LV pressure rise (dp/dt max) was obtained using the resistance-capacitance differentiating circuit. Systolic ejection period was obtained from superimposed aortic and LV pressure pulses. The frequency response of this system is linear from 0–30 cycles/sec. End-diastolic (ED) pressure were measured over at least two respiratory cycles and averaged. These have been found to correlate to a high degree with pressure measured from a micromanometer tip (Millar R) catheter in accord with previous studies[2,10]. Cardiac output was measured from the indicator dilution curves sampled from the pulmonary artery after the right atrial injection[11,12]. Three successive curves were used to calculate the forward flow. The stroke volume and stroke work were obtained as previously reported[2].

Left ventricular ejection fraction was measured by indicator dilution using cold saline injected into the left ventricle rapidly[13]. The thermistor for the ejection fraction was placed into the NIH catheter, 1–2 cm above the aortic valve. Three or four such curves were obtained and ED volume was calculated as a ratio of mean stroke volume to mean ejection fraction[14]. Left ventricular ejection fraction by this technique has shown good reproducibility in a model under nearly ideal conditions of mixing and sampling with a mean coefficient variation of 3%[14]. The dilution curves, pressures, left ventricular dp/dt max and EGG were recorded on an Electronics for Medicine DR–8 recorder.

Left ventricular function and contractility were estimated in several ways. Contractility was assessed in the intact animal from an index expressing the end-isometric force-velocity relation normalized for intial fiber length[15]. The formulation included (dP/dt max/MIP 2 r), where dp/dt is the maximal rate of rise of left ventricular pressures in millimeters of mercury per second, MIP the maximum isovolumetric pressure in millimeters of mercury, 2 r the end-diastolic left ventricular circumstance in centimeters[15]. The units of contractility are muscle length per second per centimeter of initial circumferential fiber length. The left ventricular radius was calculated from ED volume on the assumption that the ventricle was a sphere at the end of the isovolumetric period, and circumferential fiber length was calculated as $2\pi r$[15].

Another index expressing the myocardial contractility used in this study was velocity of contractile element (V_{ce}) at peak dP/dt calculated as the ratio of dP/dt max for simultaneous LV pressure in accord with Levine and Brittman[16].

Resistance to left ventricular ejection was achieved by infusing angiotensin intravenously[17] at a rate of 1.5 to 3_U g/min to augment the aortic diastolic pressure by 15 mmHg and continued at that rate for 15 min. The average dose administered was 2.7_U g/min. Left ventricular function was further assessed during volume expansion[12]. Saline was infused into the LV through a separate catheter at the temperature of blood at 48 ml/min for three to five minutes. Cardiac output and ejection fraction were determined immediately at the end of infusion, when the animals were in a steady state as judged by heart rate, aortic pressure and LVEDP. Electrophysiologic studies of left ventricular conduction were also performed usually prior to the hemodynamic studies by an electrocatheter technique in accord with Ettinger et al[18].

At the conclusion of these studies, the heart was rapidly arrested with iced Ringer's solution. Samples of the left ventricle, approximately 15 gm, were taken from the periapical region for analysis of cation and myocardial lipids as reported earlier[5]. Calculation of cell and extracellular water and electrolyte distribution was done according to Manery[19].

The data are expressed as mean $\pm$ standard erros. When only when statistical comparison was employed between a control and intervention Student's test for paired data was used. To assess statistical significance between groups, analysis of variance was performed using Duncan's multiple range test for comparison when F values were significant[20]. A level of 0.05 was considered significant.

RESULTS

The nutritional status of the experimental animals was quite comparable to the controls (Table I). There was a small weight gain in the majority of animals. slightly more in Group 3, with no group differences in the final weight. Nutritional indices including hematocrit, serum albumin, potassium and fasting blood glucose were not significantly changed from control levels. No group exhibited changes in plasma levels of free fatty acids, glycerides or cholesterol.

The resting hemodynamic values in the anesthetized state at the onset of the study in the four groups are shown in Table 2. Compared with Group 1, both the smokers and the animals receiving alcohol alone or in combination with cigarette smoking became hypertensive and had significantly higher systolic and diastolic pressures. The systolic pressure in Group 3 animals consuming alcohol only, was however, not significantly different from the control animals of Group 1. There were no significant differences in pressures between the three experimental groups. Heart rate, stroke volume and left ventrilcular end-diastolic and pulmonary artery pressures, did not differ significantly among the four groups. The left ventricular end-diastolic volume was increased in alcoholic smokers of Group 4 only. The other three groups had similar end-diastolic volume values.

Left ventricular ejection fraction in the dogs receiving alcohol only (Group 3) or in conjunction with cigarette smoking (Group 4) was reduced to 27 and 23% respectivelt, compared with 40 and 35%, respectivelt in Groups 1 and 2 (each $P < 0.03$). Both the smoking and the alcohol groups exhibited significant deficit in the contractile function of the left ventricular muscle. This index was 1.41, 1.21 and 1.28 muscle lengths/sec/cm, respectively, versus 2.25 in the normal dogs (each $P < 0.007$). The more readily measured index of contractility, the velocity of contractile element at peak isometric stress (Vce), which is not corrected for end-diastolic fiber length also showed a similar reduction, 19, 17.6 and 19.9 muscle lengths/sec, respectively, versus 29.7 in the normal dogs (each $P < 0.003$). The contractile deficit in the alcoholics did not appear to be exacerbated by the addition of cigarette smoking. The indices of contractility did not significantly correlate with the enhanced arterial pressure in the smoking and the alcoholic groups.

Assessment of left ventricular function during afterload increments with angiotensin were undertaken with aortic diastolic pressure elevation of 16 ±3 mmHg in four groups (Fig. 1). Stroke work increased modestly, but significantly, in the controls at approximately the same filling pressure. No such increment occurred in either experimental group despite a substantial increase of the end-diastolic pressure in the alcoholics and the smokers. To assess relative myocardial stiffness, saline was infused into the left ventricular chamber. The normal controls exhibited a modest rise of stroke work without increasing the filling pressure. Those dogs receiving alcohol with or without concomitant cigarette smoking showed a significant rise in filling pressure with minimal increase of stroke work (Fig. 1). Significantly, higher end-diastolic pressure and tension were elicited after saline in the dogs receiving alcohol with or without concomitant cigarette smoking than in controls (Fig. 2). With the large variance, the differences in the two alcohol groups were not significant.

To determine whether the reduced contractility may have been at least in part related to a delay in the spread of excitation to the conduction fasicles and myocardium. His bundle electrograms were performed on the left side. The intracardiac times in all dogs were essentially similar indicating no gross delay of conduction through the myocardium of those receiving alcohol or cigarette smoking. The P-H times (ms) in Groups 1–4 were 71±5, 75±6, 72±6, 72±5, respectively. The respective H-Q times (ms) were 27.6±2.5, 24.4±1.2, 26.9±1.6, and 26±2.4; and the values for QRS duration (ms) were 58±3, 66±4, 60±5.3, and 63±3.8.

At the conclusion of the study the weight of the left ventricle and septum in g/kg of total body weight in Groups 1–4 was not significantly different between the four groups (Table 3). Analysis of left ventricular lipids revealed a higher triglyceride concentration in Groups 3 and 4 versus controls. Myocardial water content did not vary from normal in the three experimental groups. However, concentrations of sodium and potassium in the alcoholics were significantly reduced from those of Groups 1 and 2 (Table 3). Addition of cigarette smoking to the alcoholics did not further alter the myocardial concentrations of these cations.

DISCUSSION

The frequent conjoint use of cigarette and ethanol in patients with a cardiomyopathy that is usually attributed to abuse of the latter agent, has raised the question of a potential contribution of smoking to the alterations of myocardial performance and composition in this entity. In the presence of a nutritional status that evidenced no apparent difference from normal controls, abnormalities of left ventricular contractility indices were present in both the smoking and alcoholic groups. However, Group 4, in which these agents were given in combination for 18 months, showed no greater decline of contractility or increase of end-diastolic pressure and volume than the animals that received ethanol alone.

During afterload increments with angiotensin, th alcohol group had a distinctly abnormal response, while the smokers of Group 2 approximated controls in terms of increases of end-diastolic pressure and stroke work. The abnormal response in Group 4 was no different from the response in animals that received ethanol without cigarettes.

Diastolic characteristics of the left ventricle in response to saline infusion revealed significant abnormalities in both Groups 3 and 4 with higher end-diastolic pressure and tension than in normal controls, presumably on the basis of myocardial collegan accumulation[5,21,]. The apparantly higher values in Group 4 were not significant due to a large variance. Although animals using cigarettes alone were not stated, it is noteworthy that use of chronic nicotine, the putative major cardio-active agent in cigarettes has previously been associated with diminished diastolic compliance[5].

Diminished ventricular compliance after chronic ethanol use has previously been described in a mongrel dog model after 18 months of ethanol as 36 percent of calories[2,21], but no associated decline of contractility was observed until exposure was increased to 48 months[21]. Thus diminished

left ventricular contractility in the beagle after 18 months may represent a greater susceptability of the myocardium in this species to the toxic effects of ethanol. However the significant elevation of aortic pressure and resistance at the time of hemodynamic study in the beagle was not present in the mongrel and may be a basis for the difference in contractile state. Elevated aortic pressure has been decribed in the early hours after interruption of a chronic ethanol regimen in high dose[22]. The longer interval after the last ingestion of ethanol in the mongrel experiments may account for the normotensive state during those hemodynamic observations[2,21].

We have previously examined the relationships of the modest hypertensive response to chronic smoking in beagles to the decline of the contractility indices[5]. The indices of contractility did not significantly correlate with the enhanced arterial pressure in smoking animals. To further evaluate whether the observed abnormality in the indices of contractility was secondary to persistently elevated afterload, arterial pressure was reduced acutely by phlebotomy in four smoking beagles to a level noted in resting control animals. Heart rate, left ventricular end-diastolic pressure and volume, stroke volume, dP/dt and stroke work decreased significantly. However, ejection fraction and the indices or contractility remained significantly below those of the resting control animals. It would thus appear that the contractile deficit in Groups 2, 3 and 4 was independent of increased afterload.

The significant reduction of left ventricular cation concentrations after ethanol contrasts with prior observations in the mongrel dog[2]. This may relate to the earlier time of tissue sampling in the beagle during the post-ethanol period. The moderately diminished potassium and sodium concentrations were not due to a dilutional effect since tissue water was not significantly elevated. The decline of both cations suggests that Na-K ATPase is not affected but recently discovered Na+-K+ contransport system may be operative[23]. Under the special conditions used to demonstrate this system a net loss of both cations has been observed in some tissues.

Although this study has revealed no intensification of the effects of chronic ethanol ingestion by simultaneous cigarette use over the 18 month experimental period, the development of cardiomyopathy generally requires a prolonged period of exposure, usually a minimum of ten years in man[24].

While plasma lipids were not altered by any of the chronic interventions, myocardial triglyceride in the chronic ethanol group was increased significantly above that of smokers, but significantly versus Group 1. Presumably the large variance in the latter is responsible since this lipid class has been regularly found to be increased in prior chronic studies[2,25]. This lipid increment was apparently inhibited by simultaneous cigarette use.

It has been postulated from epidemiologic studies that the cardiac risks of long term smoking are only evidenced when associated with other risk factors[26]. Under the conditions of this study the cardiomyopathic effects of ethanol were not intensified by the use of cigarettes.

CONCLUSION

The results of this study indicate that long term use of both cigarette smoking and alcohol produce significant abnormalities of left ventricular myocardial function and composition in the purebred experimental animal. The conjoint use of the two however produced no further abnormalities either in the function or the composition. It is thus concluded that cigarette smoking plays no role in the production of heart muscle disease of the chronic alcoholic - the alcoholic cardiomyopathy.

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TABLE 1

NUTRITIONAL STATUS IN CONTROL AND EXPERIMENTAL DOGS

	Weight (kg)		Hematocrit		Potassium (mEq/1)		Glucose (mg%)		Albumin (g%)		Free Fatty Acids (m mol/1)		Triglycerides (m mol/1)		Cholesterol (m mol/1)	
	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E
Group 1 (Mean)	11.6	12 2	37	39	5.1	5.0	80	85	3.8	3.6	398	296	0.58	0.34	3.60	3.16
SEM	0.8	0.6	2	3	0.5	0.3	8	4	0.2	0.1	66	55	0.05	0.08	0.6	0.31
Group 2 Mean	12.6	12.8	39	39	5.6	5.1	88	100	3.6	3.2	342	383	0.68	0.48	5.34	4.11
(smokers) SEM ±	0.8	1.4	4	2	0.2	0.6	4	6	0.1	0.2	46	130	0.04	0.04	0.52	0.2
P vs 1	NS															
Group 3 Mean	10.8	13.6	40	36	5.2	5.3	96	111	3.4	3.0	296	227	0.62	0.39	3.50	4.33
(alcoholics) SEM ±	0.8	1.1	4	2	0.4	0.3	9	16	0.2	0.3	40	24	0.08	0.07	0.30	0.61
P vs 1 & 2	NS															
Group 4 Mean	11.4	12.1	39	37	4.8	4.8	80	88	3.6	2.8	340	243	0.52	0.32	3.58	4.42
(alcoholic SEM ±	0.5	0.8	2	3	0.4	0.5	4	8	0.6	0.4	50	35	0.04	0.04	0.36	0.59
smokers)																
P vs 1, 2 & 3	NS															

1 = values at beginning of observation period; E = values at end of observation period.

SEM = standard error of the mean

TABLE 2

LEFT VENTRICULAR FUNCTION IN FOUR GROUPS OF DOGS AT REST (mean ± standard error of the mean)

	HR	AoS	AoD	EDP	EDV	SV	EF	dP/dt	VCE	Cy Ix	TSR	SW
Group 1 SEM ±	133	123	80	7.9	3.65	1.42	40.3	2365	29.7	2.25	4123	2.28
(controls)	13	5	3	1.0	0.46	0.17	3.0	216	2.6	0.22	442	0.33
Group 2	153	153	109	8.4	3.60	1.21	35.0	2035	19.0	1.41	4969	2.42
(smokers)	5	7	4	1.0	0.42	0.21	3.0	139	1.4	0.10	506	0.33
P vs 1	NS	0.003	0.004	NS	NS	NS	NS	NS	0.002	0.003	NS	NS
Group 3	146	143	109	7.3	4.7	1.23	27.0	1991	17.6	1.21	4790	2.32
(alcoholics)	7	13	10	0.9	0.9	0.22	1.6	309	1.4	0.13	649	0.53
P vs 1	NS	NS	0.006	NS	NS	NS	0.003	NS	0.003	0.002	NS	NS
P vs 2	NS	NS	NS	NS	NS	NS	0.03	NS	NS	NS	NS	NS
Group 4	139	160	120	7.0	5.6	1.22	23.2	2370	19.9	1.28	6130	2.58
(alcoholic smokers)	22	11	6	0.9	0.7	0.25	2.0	173	1.2	0.007	832	0.60
P vs 1	NS	0.008	0.0001	NS	0.03	NS	0.0006	NS	0.004	0.001	0.05	NS
P vs 2	NS	NS	NS	NS	0.02	NS	0.006	NS	NS	NS	NS	NS
P vs 3	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

AoD, AoS = aortic diastolic and systolic pressures, respectively (mmHg); Cy Ix = Frank-Levinson index of contractility (muscle lengths/s per cm); dP/dt = first derivative of left ventricular pressure (mmHg/s); EDP = left ventricular end,diastolic pressure (mmHg); EDV = left ventricular end-diastolic volume (ml/kg); EF = ejection fraction (percent); HR = heart rate (beats/min); NS = not significant; P = probability; SV = Left ventricular stroke volume (ml/KG); SW = left ventricular stroke work (g-m/kg); TSR = total systemic resistance (dynes s cm^{-5}); VCE = velocity of contractile element at peak dP/dt (muscle lengths/s); wt = body weight (kg).

TABLE 3

MYOCARDIAL LIPIDS AND CATIONS

		LV	Trig.	FFA	Phospho	Chol	Na	K	H_2O
		wt.							
Group 1	Mean	5.0	2.31	8.4	24.4	5.46	45.2	72.5	79.1
(controls)	SEM ±	.4	0.6	0.8	0.7	0.23	1.5	1.2	0.8
Group 2		4.9	1.71	9.0	22.5	5.82	48.0	72.0	80.0
(smokers)		0.2	0.17	1.7	1.9	1.26	1.6	2.7	1.1
P vs 1		NS							
Group 3		4.8	3.31	7.3	23.3	5.35	39.9	64.4	79.3
(alcoholics)		0.5	0.66	1.1	1.2	0.26	2.7	2.0	0.4
P vs 1		NS	NS	NS	NS	NS	0.04	0.009	NS
2		NS	0.04	NS	NS	NS	0.04	0.01	NS
Group 4		5.6	2.82	8.0	23.7	4.78	38.4	64.3	79.9
(alcoholic smokers)		0.2	0.47	1.7	0.8	0.24	2.9	2.0	0.6
P vs 1		NS	NS	NS	NS	NS	0.03	0.01	NS
2		NS	0.05	NS	NS	NS	0.04	0.01	NS
3		NS	NS	NS	NS	NS	NS	NS	NS

Chol = cholesterol (umol/g dry weight); FFA = free fatty acids (u Eq/g); H_2O = water (percent); K = potassium (u Eq/g wet weight); LV wt = weight of left ventricular septum (g/kg); Na = sodium (u Eq/g wet weight); NS = not significant; P = probability; Phospho = phospholipids (u mol/g); Trig = triglycerides (u mol/g).

ACKNOWLEDGEMENT

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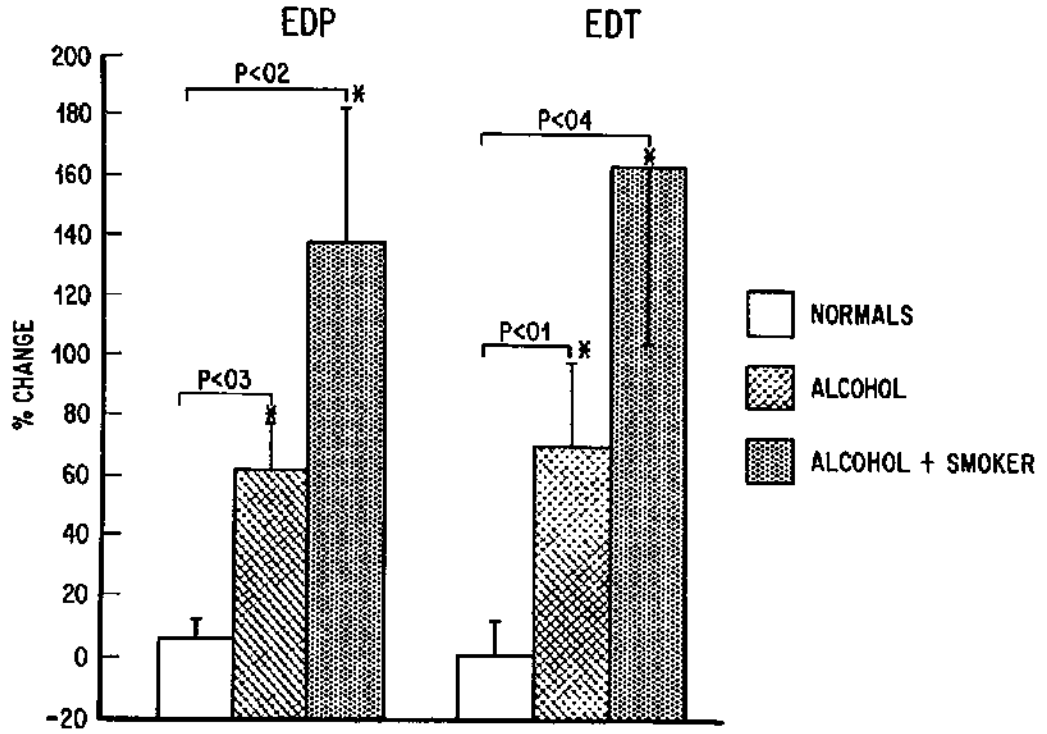

Figure 1:

The response of the left ventricle to pressure and volume increments with angiotensin and saline infusions. Stroke work increased modestly but significantly in normals at about the same filling pressure. No such increments occurred in either experimental group despite a substantial increase of end-diastolic pressure.

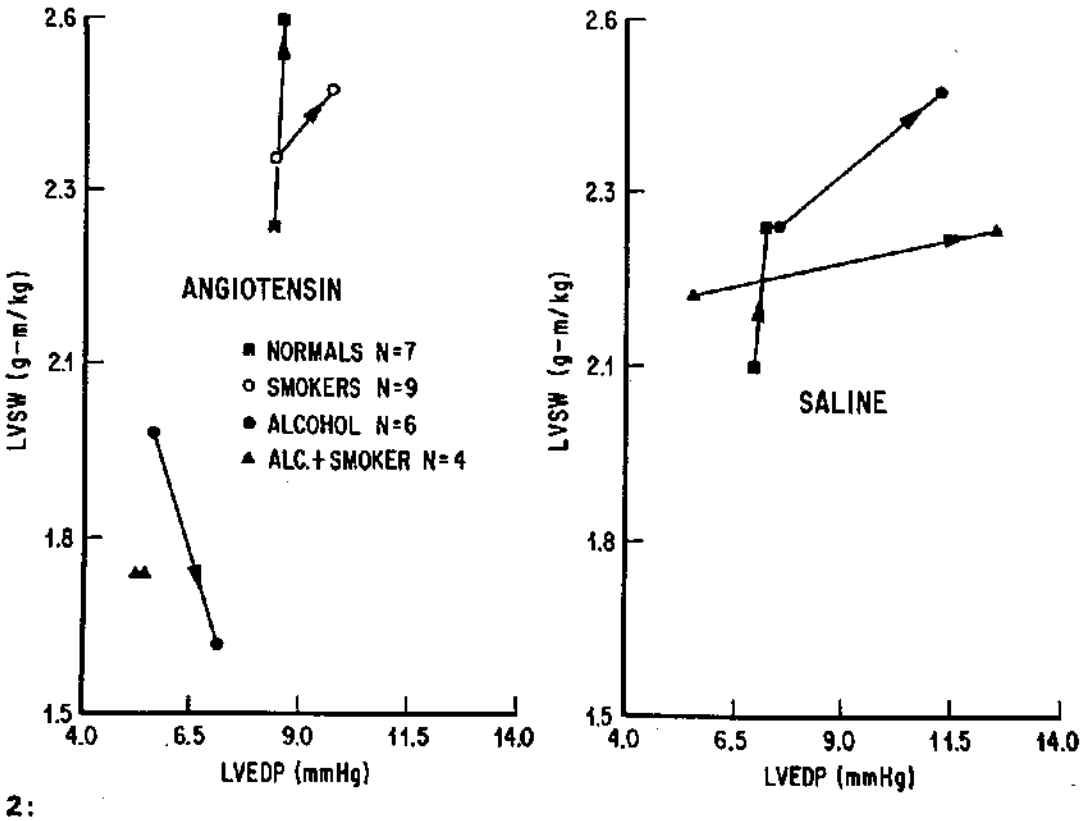

Figure 2:

Left ventricular end-diastolic pressure (EDP) and tension (EDT) response to saline infusion. No change occurred in these two parameters in the normal groups. Expressed as percent change from pre-infusion values a significant decrease in left ventricular compliance occurred in the alcoholics and the alcoholic-smokers.

OCULAR MANIFESTATIONS OF ALCOHOLISM, EXPERIENCE IN MANAGEMENT OF ALCOHOL-INDUCED AMBLYOPIA

Prof. Dr. Mohamed H. Emarah,

EGYPT

بسم الله الرحمن الرحيم:

«يا أيها الذين آمنوا انما الخمر والميسر والأنصاب والأزلام رجس من عمل الشيطان فاجتنبوه لعلكم تفلحون * إنما يريد الشيطان أن يوقع بينكم العداوة والبغضاء في الخمر والميسر ويصدكم عن ذكر الله وعن الصلواة فهل أنتم منهون* ».

صدق الله العظيم

(سورة المائدة الآية ٩٣ و٩٤)

The gracious merciful GOD strictly prohibited, among other things, the intake of alcohol for the sake of prosperity of mankind. In the *Holy Quran* such prohibition is clearly stated:-

> *YE WHO BELIEVE IN GOD, NOTE THAT ALCOHOLIC, GAMBLING, DEDICATION OF STONES AND DIVINATION BY ARROWS ARE ABOMINATIONS OF DEVIL'S WORK; ABSTAIN FROM SUCH ABOMINATIONS WHAT YE MAY PROSPER* BUT DEVIL WANTS TO EXCITE ENMITY AND HATRED BETWEEN THEE THROUGH ALCOHOLICS AND GAMBLING, AND HINDER THEE FROM THE REMEMBRANCE OF GOD AND FROM PRAYERS: WILL YE THEN ABSTAIN*.*
>
> **(S 5 : V 93, 94)**

Chronic alcoholism, resulting from the repeated ingestion of alcohol, predisposes to deterioration of physical and mental health owing to long-standing nutritional deficiencies. The latter may be related to alcoholic chronic gastritis and essentially due to the lack of absorption of a vitamin of the B group possibly thiamine. The ingested methyl alcohol, which may be added as a cheap diluent to ethyl alcohol, is metabolised in the human body to formaldehyde and formic acid which causes haemorrhage and oedema in the brain and other tissues of the body (Ashworth, 1973).

Extensive studies have been conducted on the aetiology, pathogenesis and treatment of intoxication with alcohol because of its socio-economic aspects. Alcohol amblyopia which so frequently complicates chronic alcoholism has been a topic of continued interest to ophthalmologists. Carrol (1935) reported that tobacco-alcohol amblyopia was present in 0.3 to 0.5% of all new patients in the Eye Clinic of the Massachausets Eye and Ear Infirmary. In his series Italians were most frequently affected. He remarked on the supposed immunity of Turks and Spaniards (but this should not encourage the Turks and Spaniards to drink alcohol!!). It has been the general belief in the United States that alcohol amblyopia is a common disorder and that tobacco amblyopia occurs infrequently, whereas, in Britain tobacco is considered as more likely to be the aetiologic factor. Since most individuals who drink to excess also smoke tobacco in excess, toxic amblyopia in such individuals has been called "tobacco-alcohol" amblyopia. However, the literature on the subject is vast and is filled with incosistencies and contradictions so that it is impossible to drive a unified view of what constitutes tobacco-alcohol amblyopia.

Wilson (1940) remarked on the alcohol content of the blood and reported that when the level of alcohol is 0.2 to 0.5%, the individual is more or less drunk; when itt reaches 0.6 to 0.7%, the condition is serious but when the level is above 0.7% there is usually a fatal outcome. He also classified alcoholic intoxication into the following types: -

1. **Acute Alcoholic Poisoning** which may result in stupor or even sudden death. However, in moderately drunken state, memory is poor for recent events, speach becomes thick and writing illegible. The vision is usually blurred and markedly diminished. The pupils are frequently dilated and may be sluggish in their response to light.
2. **Chronic Alcoholism,** manifested by the well known stigmata of fine tremors of the muscles of the hands and face, watery eyes, reddened nose, irritability of temper, lack of concentration and deficient memory.
3. **Alcoholic Polyneuritis,** usually occuring in middle-aged individual who take pronounced amounts of alcohol. Numbness and tingling in the hands and feet precede the onset of weakness. The lower limbs are often severely affected.
4. **Alcoholic Psychosis (Delerium Tremens),** is seen in chronic alcoholics. There is loss of apetite, sleeplessness and terrifying dreams after a period of heavy drinking. Soon thereafter visual and auditory hallucinations usually appear.
5. **Alcoholic Meningitis and Encephalitis** are not established clinical entities.

OCULAR MANIFESTATIONS OF ALCOHOLISM

It has been generally accepted that alcohol influences ocular functions. Dimness of vision is the most out-standing symptom. The dimness comes on gradually but occasionally the onset is acute. Trouble with reading is a frequent early complaint. The visual acuity gradually reaches a level of 6/60 or even lower before the affected individual seeks medical advice. The disease always affects both eyes although one eye may be affected at the time of first examination.

Ophthalmoscopic findings differ widely. In advanced cases there is temporal pallor of the optic discs, but in some instances the disc may appear quite normal throughout the entire course of the disease. When recovery takes place, the optic discs sometimes remain pale in spite of vision becoming quite normal. The foveal reflection of the macula often disappears and there may be fine mottling in the maculae of several patients. Occlusion of the central retinal artery was reported after alcohol block of the infraorbital nerve (Markham, 1973).

The ocular effects of chronic alcoholism are mainly on the optic nerve. The initial visual disturbance may imrove but later progressive visual failure and optic atrophy develop. Colour vision is impaired at an early stage. Perception of red and green is disturbed before vision for white is materially reduced. Routine examination of a group of alcoholics showed colour vision anomalies in 50% of alcoholics (Gerhard, 1981). The alterations, detected in 28 out of 103 alcoholics, were consistent with a complete picture or retrobulbar neuritis.

Alcohol also provides limitation of the range of fusion with exophoria for near and esophoria for distance. In a series of 27 young subjects with alcoholaemia of under 1g/L a tendency towards esophoria was detected and the mean increase in tonic convergence was 6-10D. 35 minutes after the ingestion of alcohol (Lopez-Marin et al., 1980).

The field defects of patients with chronic alcoholism consist of pericentral or centro-cecal

scotoma, beginning nasally to the blind spot and gradually extending towards and into the fixation spot. Within the scotoma, islands of denser loss are detectable around the horizontal meridian, particularly adjacent to the blind spot and to the fixation spot (Traquair, 1930). With further extension, an irregular temporal hemianopia for red may appear, or all perception of red may be lost. The edges of the scotoma are sloping and poorly defined and never extend far into the nasal field. During recovery, the sequence is reversed. Clinical observations in patients with "alcohol amblyopia" substantiated the view that the characteristic amblyopia of chronic alcoholism is in reality a deficiency disease and the scotomas are usually peri-central and at times centro-cecal (Victor, 1963).

EXPERIENCE IN THE MANAGEMENT OF ALCOHOL AMBLYOPIA

My personal clinical experience with alcohol induced amblyopia commenced in 1974 during my work in Scotland, United kingdom. During the years 1974-1975, I had the chance to examine fifteen patients with tobacco-alcohol amblyopia, to prescribe treatment for them and to follow-up their progress. After my return home to Egypt late in 1975, only eight patients have come under my supervision because of the Islamic traditions of our community. They were mainly those individuals who went alone to work abroad leaving their families behind in Egypt. Out of the 23 patients whom I saw during the period 1974-1982, 20 were males and 3 females.

PERSONAL CLINICAL OBSERVATIONS

Most patients presented with a history of increasingly blurred vision for distance which could not be corrected sith glasses. In general, the dimness of vision reached its maximum in a matter of few months to few years (6 months to 3 years). Four patients noticed difficulty in reading and in distinguishing red from green traffic lights. Three patients complained of transient attacks of diplopia.

All patients gave history of addiction to alcohol. Few of them had been drinking excessively, consuming between 15-25 ounces of whiskey daily, for many years before the onset of their ocular disorder. The majority of patients smoked tobacco in excess, namely 40-60 cigarettes daily. All patients claimed an inadequate dietary intake due to anorexia. In eleven patients there was a frank history of weight loss in relation to the onset of visual symptoms. There were thinness and wasting of subcutaneous tissue, coarseness and dryness of skin in addition to angular stomatitis. However, all patients showed general signs of malnutrition. The visual acuity, with the best spectacle correction, was less than 6/18 in five patients but less than 6/60 in eighteen patients.

Fundus examination revealed no significant abnormality in thirteen patients but ten patients showed different ophthalmoscopic signs (Table 1). Five patients showed temporal pallor of the optic discs consistent with atrophy of the papillo-macular bundle. Three patients were brought for consultation during an attack of delerium tremens of whom two patients had papilloedema (Fig. 1 and Fig. 2) and one patient showed severe preretinal haemorrhage (Fig.3). Two patients with long-standing history of alcoholism showed partial optic nerve atrophy (Fig.4).

Many patients showed disproportion of visual field defects, red and green perception being affected earlier and more extensively than white (Fig.5). The majority of the patients showed the presence of centro-cecal scotoma for white (Fig.6). In some patients the scotoma could be demonstrated to commence as a small island of visual loss detectable between the blind spot and the fixation point. The scotoma then progressed nasally and temporally to include the blind and fixation spots. The scotomas were always bilateral, though not necessarily symmetrical. Two patients showed central scotoma with enlargement of the blind spot (Fig.7), but none of my patients showed

pericentral scotoma. In two patients the visual fields could not be traced owing to optic nerve atrophy and one patient was inco-operative to have his visual tested.

An additional interesting clinical finding, not reported in literature, was seen in a patient who was claimed to drink a quart of wisky and a pint of red wine during a celebration party with sudden diminution of vision. On examination, there was moderate corneal oedema with marked rise of ocular tensions. The applanation tensions, as measured with the Goldmann applanation tonometer, were right 56 and left 54mm.Hg.. This patient happened to be under my ophthalmic medical care for four years prior to the incident with no evidence, what so ever, of primary glaucoma.

PERSONAL EXPERIENCE IN TREATMENT OF ALCOHOL AMBLYOPIA:

Patients with alcohol induced amblyopia should be investigated prior to treatment in order to differentiate the condition from other causes of poor sight and to identify possible aetiological factors. My investigative routine includes, among other things, the following:

1. Full history including details of diet, tobacco intake, alcohol and exposure to drugs and toxins.
2. Full ocular examination including detailed fundus and visual fields examinations.
3. Careful medical and neurological examination for signs of gastro-intestinal, neurological or other diseases.
4. Full blood picture, blood level of alcohol and estimation of serum B12.

Since I have not had a sufficient number of patients with alcohol induced amblyopia, I cannot give an authoritative opinion but I am merely reporting my experience, that is based on clinical grounds, in the treatment of the few patients that I have seen. My clinical experience has indicated beyond any doubt that if patients with alcohol-tobacco amblyopia stopped drinking of alcohol and smoking early enough before optic atrophy develops, the scotomas usually decrease markedly in size and density and the vision improves considerably within 3-6 months. However, if patients with alcohol induced amblyopia did not discontinue the intake of tobacco and alcohol or markedly reduce their intake, their vision will not improve.

In addition to the abstinence from tobacco and alcohol inkake, the administration of a nutritious diet supplemented by B vitamins is of paramount importance. In fact, improvement in vision has been noted in some patients who refuse to stop smoking, provided they take massive doses of B vitamins specially B12, riboflavin, and in some patients vitamin B1. Also, I encouraged my patients to take a large spoonful of bee honey before meals daily.

My experience confirms the findings by Foulds et al. (1971). that tobacco-alcohol amblyopia reponds well to therapy with vitamin B12 as hydroxocobalamin and not cyanocobalamin. The actual dose of hydroxocobalamin does appear to influence the rate of recovery because the response to therapy varies greatly from patient to patient. The average dose which I recommend for my patients and found to be most effective is 2mg. of Hydroxocobalamin intramuscularly twice weekly for a month, then once weekly for two months then once every fortnight for three months.

The subcutaneous injections of aqueous solutions of biogenic stimulators preparations proposed by Filatov such as Fibs, preserved Placeta Extract and Aloe Extract were tried in patients with alcohol induced optic atrophy and proved to be ineffective in their therapy.

TABLE I

OCULAR MANIFESTATIONS OF CHRONIC ALCOHOLISM

Clinical Signs	No. of Patients	Percentage
Visual Acuity:		
* 6/18 or more	2	8.7%
* Less than 6/18	5	21.7%
* Less than 6/60	16	69.6%
Ophthalmoscopic Signs:		
* No Abnormality Detected	13	56.5%
* Temporal Pallor of Discs	5	21.7%
* Papilloedema	2	8.7%
* Retinal Haemorrhages	1	4.4%
* Optic Atrophy	2	8.7%
Alcohol-Induced Glaucoma:	1	4.3%
Visual Field Defects:		
* Disproportion of fields	9	39.0%
* Centro-Cecal Scotoma	10	43.5%
* Central Scotoma	1	4.3%
* Pericentral Scotoma	0	0.0%
* Visual Fields Not Possible	3	13.0%

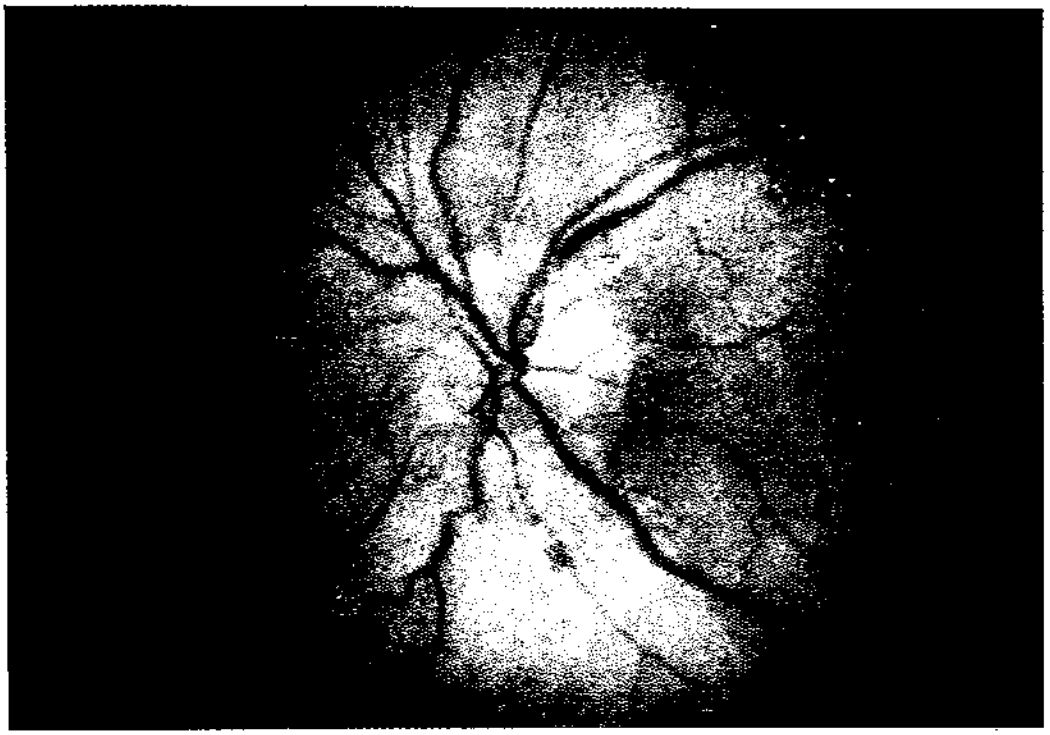

Fig. 1.- Fundus Photograph of an Alcoholic Patient Showing Moderate Papilloedema.

Fig. 2.- Fundus Photograph of an Alcoholic Patient Showing Marked Papilloedema.

Fig. 3.- Fundus Photograph of an Alcoholic Patient During an Attack of Delerium Showing Preretinal Haemorrhage.

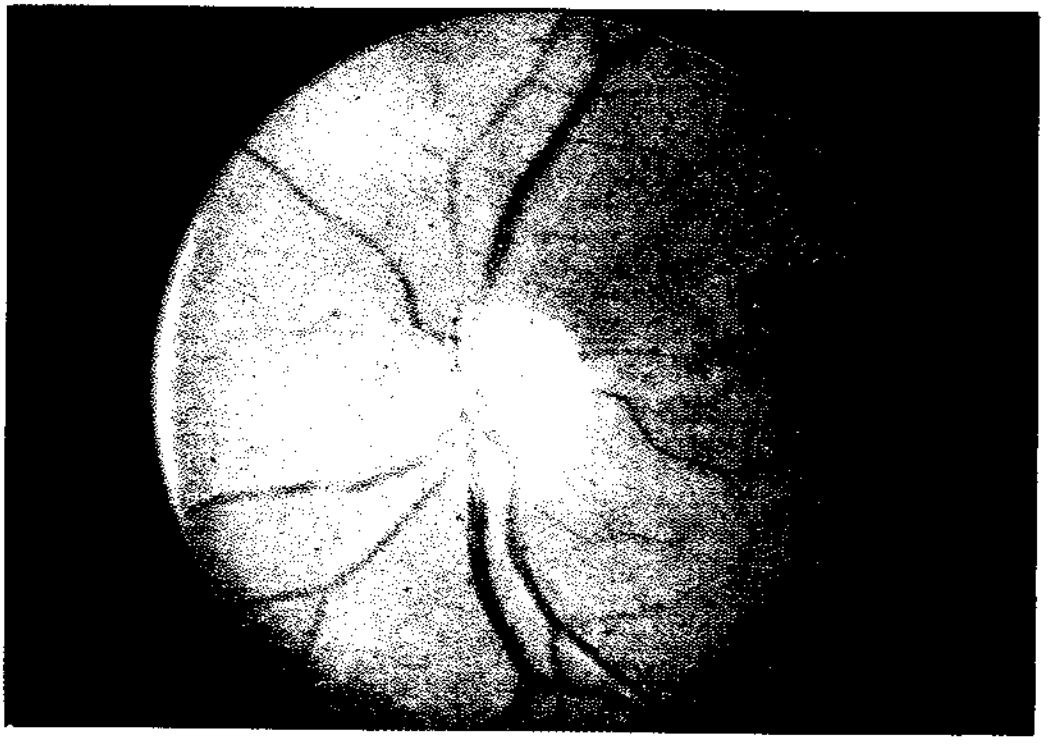

Fig. 4.- Fundus Photograph of an Alcoholic Patient Showing Optic Atrophy.

SCOTOMA CHART

Name Mr. J. A. P. Date January 20, 1975

Vision Rt 6/36 Eglss. Scale 3 mm. = 1°

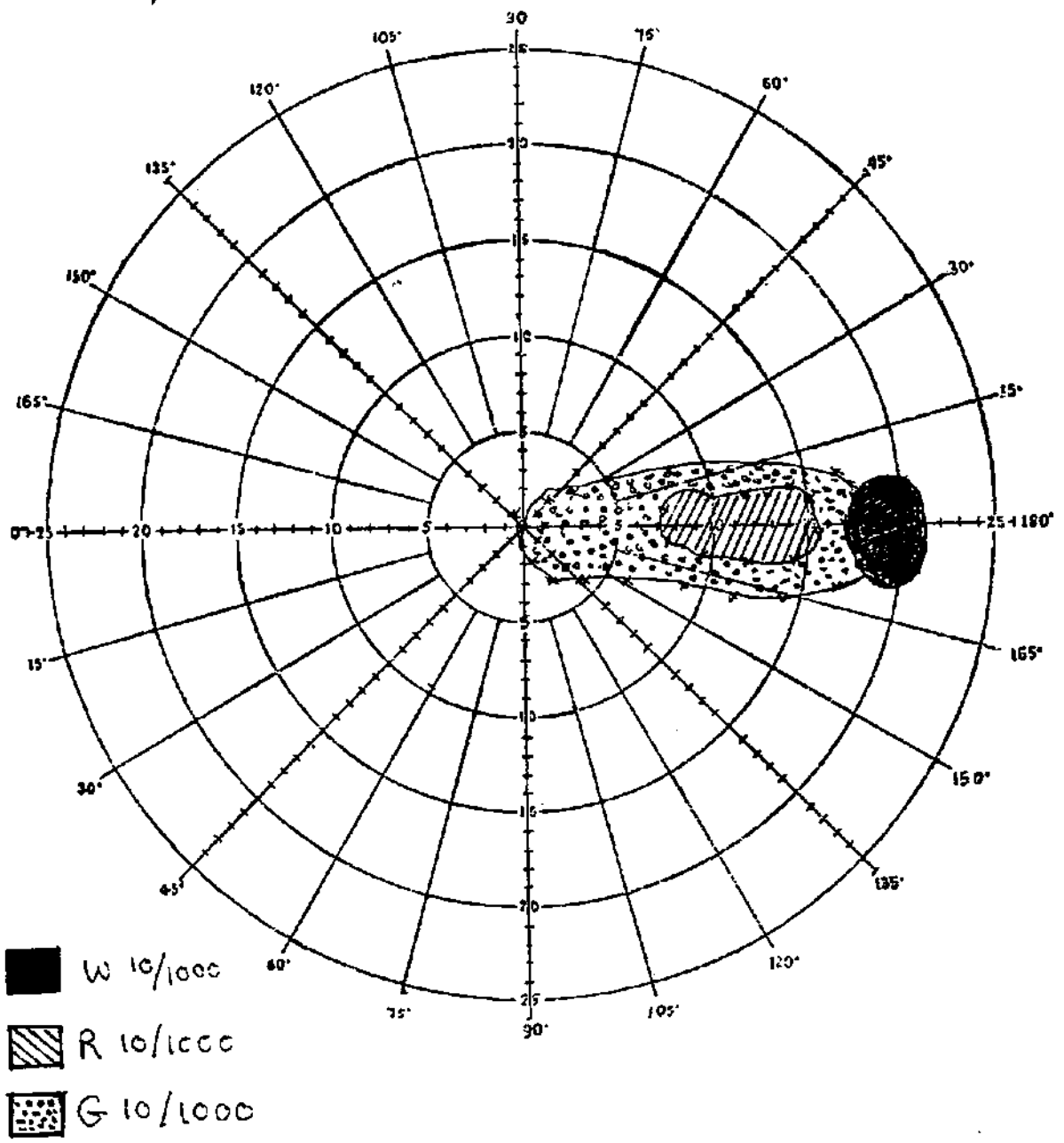

Fig. 5. - Scotoma Chart of an Alcoholic Patient Showing Disproportion of Fields for Red, Green and White.

SCOTOMA CHART

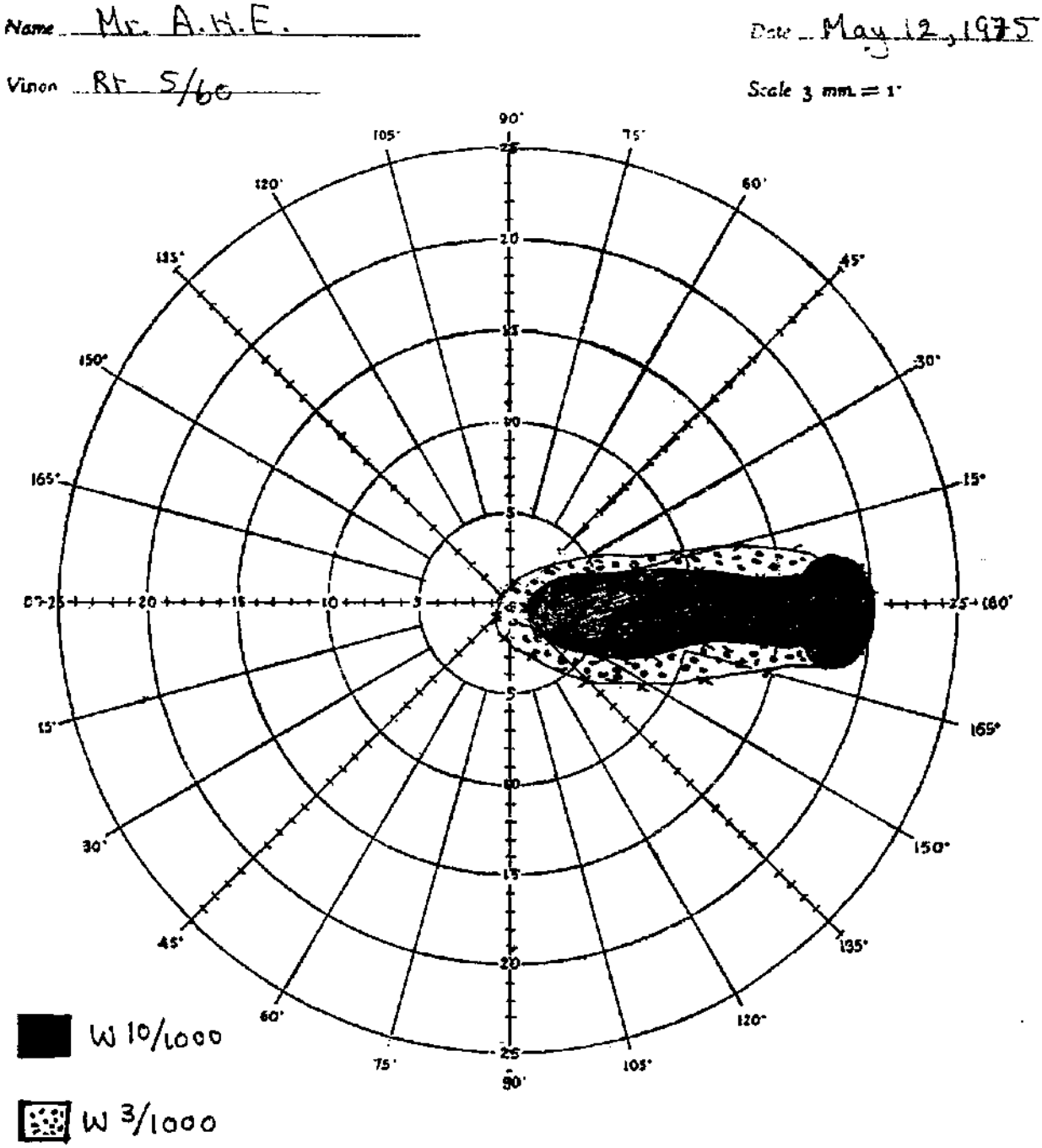

Fig. 6.- Scotoma Chart of an Alcoholic Patient Showing a Cetro-Cecal Scotoma for White.

SCOTOMA CHART

Name Mr. M.E.K. Date March 8, 1980

Vision Rt 6/60 Scale 3 mm. = 1°

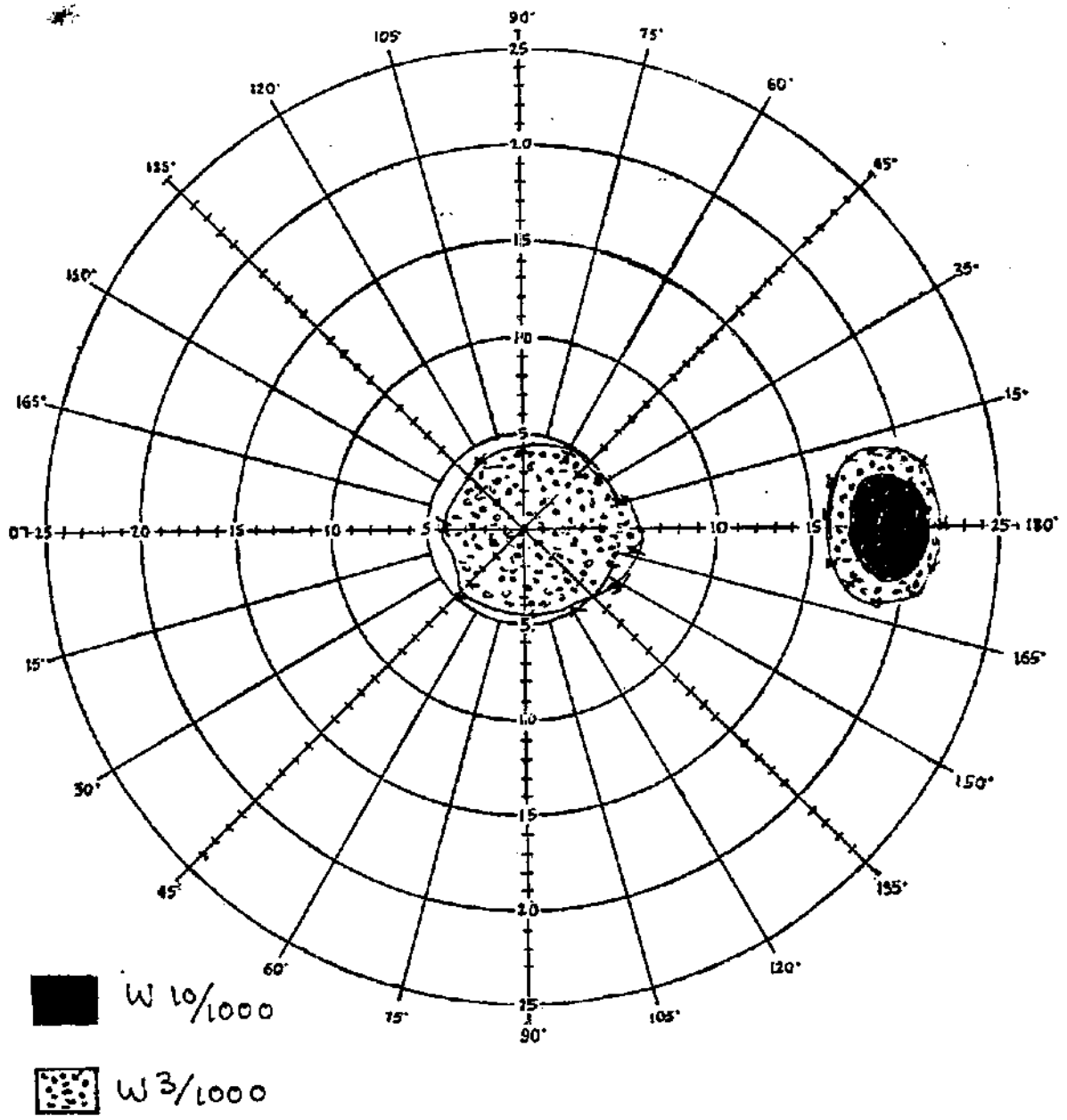

Fig. 7.- Scotoma Chart of an Alcoholic Patient Showing Central Scotoma with Enlargement of the Blind Spot.

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IS ALCOHOL A REMEDY?

Dr. Mohammed Ali Al-Bar

SAUDI ARABIA

Alcohol was used since antiquity, not only as a social lubricant, aperitif and a source of pleasure but it was used as a remedy for many different ailments and diseases ranging from insomnia and indigestion to heart attacks and as an anaesthetic. The list of diseases for which alcohol was used as a remedy was indeed very long.

The Arabs in Jahilia *(pre-Islam)* used alcohol to boost courage and benevolence. The poet of the Prophet Mohammad (ﷺ) , Hassan bin Thabit Al Ansari before his *Islam* said:

ونشربها فتتركنا ملوكاً وأسداً لا ينهنهها اللقاء

When we drink liquor we become like Kings (in our benevolence) and during fight we become lions who never waver or falter from confrontation.

Then also used it as a remedy for their ailments and diseases.

The authentic narrators of *Hadith* (the sayings of the Prophet (ﷺ) and his deeds) quoted many *Hadiths* in which the newly coming Muslims tried to convince the Prophet (ﷺ) that they used alcohol only as a remedy, and henceforth asked for his permission to continue doing so. He (ﷺ) emphatically denied the benefits of liquor as a remedy and clearly said it is a cause of ailment and disease and not a remedy for any disease.

Muslim, Abu Da'ood and Tirmizi narrated the following *Hadith*:

> *"A man called Tariq Al Joofi came to the Prophet (ﷺ) and asked permission to consume liquor (alcohol), the Prophet (ﷺ) refused. The man said: I use it and prescribe it as a medicine. The Prophet (ﷺ) answered: It is no medicine. It is a disease and ailment."*

In another *Hadith*:

> *"Another man called Tariq Ibn Swaid Al Hodrami came to the Prophet (ﷺ) and said: "O Messenger of God (ﷺ), In our land we have vineyards and we make wine and drink". The Prophet (ﷺ) said: "Stop drinking". The man proclaimed: We use it as a remedy for the ill and diseased. The Prophet (ﷺ) said: It's no remedy. It is an illness itself. (Narrated by Muslim.)"*

The people of Yemen who came to the Prophet (ﷺ) asked him to allow them to drink because they live in mountainous cold area, and they drink liquor to fight the cold weather and to help them in their hard jobs. The Prophet (ﷺ) asked if that liquor (made from wheat) is intoxicating. The man, who spoke for the Yemeni delegation agreed. The Prophet (ﷺ) said: Then you have to stop drinking.

Abu Da'ood narrated this *Hadith*:

> *"God has made for every illness a cure, but never get your cure by things prohibited"*:

Al Bokhari narrated another similar *Hadith* in which the Prophet (ﷺ) said:

> *"God didn't make your remedy in any of the things prohibited."*

This shows that Arabs at the time of the Prophet (ﷺ) were strong believers in the medicinal powers of liquor.

However, the Prophet (ﷺ) has emphatically denied that power, instead he repeatedly stated that drinking liquor even in small quantities is a cause of illness and disease.

It is, therefore, quite strange to find that the great medieval Muslim physicians and philosophers like Abubaker Al Rhazi and Ibn Sina, were commending liquor in moderation to keep good health.

Abubaker Al Rhazi in his book "The benefits of foods" said the following: "The intoxicating liquor has the advantage of heating the body, helping digestion of food in the stomach, its delivery to the liver where it is well digested. Henceforth it helps its distribution from the liver to the blood vessles and the rest of the body. Liquor quenches thirst especially if it is mixed with water. It makes the body fertile especially if it is taken with good nutritious meals. It also gives the body a good healthy colour and helps to push out the harmful exreta out of the body... Therefore, it is a great asset and a big assistant in keeping good health".

What is more astonishing is that even men of religion highly esteemed like Ibn Kathir AlDinshigy believed in the medicinal and health procuring powers of the intoxicating liquor.

In his *Tafsir* "Sura Albagra 2/Verse 219" which states

«يسألونك عن الخمر والميسر قل فيهما إثم كبير ومنافع للناس. وإثمهما أكبر من نفعهما».
سورة البقرة/٢١٩

THEY ASK YOU ABOUT THE INTOXICATING LIQUOR AND GAMBLING. SAY: IN BOTH THERE IS A GREAT EVIL AS WELL AS SOME BENEFIT; BUT THE EVIL THEY CAUSE IS MUCH GREATER THAN BENEFIT THEY BRING.

Ibn Kathir comments: "The evil is in religion. The benefits of liquor are:

a) it helps the health of body
b) helps the digestion of food
c) helps excreting the obnoxious excreta out of the body
d) it sharpens the thinking of some brains.

Besides it gives the sense of pleasure which Hasan Ibn Thabit has proclaimed in his poetry before *Islam* (already quoted on page 1).

Through the ages many Muslim scholars, down to the present day believed in the medicinal and health procuring powers of the liquor.

It is even more astonishing to find a contemporary well esteemed and known *Fakih,* Syed Sabig in his text book "Fikh Al Sunna" stating that "Drinking alcohol is permissible for a man who gets in a very cold weather if he drinks alcohol to be warmed. It is also permissible if a man gets a heart attack or angina and his doctor advises him to use alcohol as a remedy".

The misconception about the medicinal and health procuring powers are long lasting, Up to the present day where science and medicine have proved beyond doubt the fallacy of the medicinal powers of liquor, the misconceptions still hold on.

Alcohol was used and is still used as aphrodisiac. The talented English poet Shakespeare denied this claim saying:

"It provokes the desire, but takes away the performance".

The second well held misconception is that alcohol heats the body and therefore is a good remedy for cold weather.

The third strongly held misconception is that it helps the digestion. Since antiquity wine was and is still used as an aperitif. It is believed to help the digestion of food.

The fourth adhered to misconception is that it is a stimulant of the brain. Many people since the time of Ibn Kathir believe that it sharpens many brains, make them witty and quick to respond.

Many other misconceptions are still holding in many areas. The benefits of the liquor for angina and heart attacks are die-hards.

The hypnotic effect is still considered of use even by some physicians who prescribe it to treat insomina and anxiety.

Liquor is still drunk for its courage provoking effects.

Imam Jaffar AlSadig (a descendant of the Prophet Mohammad, (ﷺ) was asked by a man suffering from severe bleeding piles to allow him to drink liquor as his physicians prescribed it. The Imam refused and said: "God has never made your remedies in things that were prohibited".

Another similar story, also with Imam Jaffar, showed his stoic refusal to allow his disciples to use alcohol even as a remedy.

He also refused emphatically the idea of dissolving the ingredients of medicine in alcohol.

Many Imams took the same stance as that held by Imam Jafar AlSadig.

Ibn AlQaim, one of the renowned jurists of the seventh century of Hijra wrote many a chapter in his books to deny the medicinal uses of alcohol claimed by the physicians of his era.

He stated the following in his book *(Al Tib Al-Nabawy)*:

> "Liquor drinking is a cause of disease, as has been stated by the Prophet Mohammad (ﷺ) , and therefore, it cannot be allowed to be used as a remedy. It causes the nature of man and his soul ill effects. The nature of man is greatly affected by the nature of the drug. If that drug is bad (like liquor), the nature will be badly affected. That is why God has prohibited the use of bad food (e.g. pork, carcasses, blood), bad liquors, and bad clothings, because the psyche is affected deeply by the nature of the bad food, drink or clothing".

There is a sound saying claiming that "We are what we eat". This is true to a great extent, as the food and drink we consume is transformed in our bodies by the processes of anobolism into the cells of our bodies, and the processes of catobolism into the energy that we need to perform the functions of our life.

Therefore, it is no wonder, that alcohol when it enters the body, affects both the psyche and the soma, badly."

That was what Ibn AlQaim was explaining to his contemporaries including the physicians of his age. He was denying emphatically the benefits of alcohol claimed by AlRhazi and Ibn Sina and the whole of the medical profession of his days.

At his time there was little proof for what he said except that it was clearly stated in the Prophet's sayings (*Hadith*). As a firm believer, he argued very well using all his intellectual and superb semantic power.

Now we have ample evidence to what he was trying to prove. The ill effects of alcohol on both psyche and Soma are well documented. They are taught in the schools of medicine all over the world.

The learned men of religion (jurists) agreed that liquor should never be used as a drug for medication, neither it should be allowed to quench the thirst.

Allmam AlNawawi, states in his reference text book *"Al Majmooh"*(المجموع)that there are 4 opinions in the use of liquor for medical treatment and to quench thirst.

First: The majority of jurists *"Al Jomhoor"* never allow the use of liquor for any reason including its use as a remedy or to quench thirst even if there is no other permissible fluid available.

2nd: Few of the jurists say that it is allowed to drink liquor as a remedy for diseases provided a competent physician advises its use. If a person is very thirsty and finds no other permissible liquid to drink then he is allowed to drink alcohol to save his life.

3rd: It is permissible to use alcohol for medication but not to quench thirst.

4th: It is allowed to use alcohol to quench thirst when there is no other liquid available for drinking, but it is not allowed to be used for remedy.

However, the jurists allowed the use of alcohol as a solvent of drugs provided that:

1) there is no other available drug which does not contain alcohol.
2) the amount of alcohol as a solvent is minute and does not cause drunkenness.
3) It is prescribed by a competent Muslim physician.

Ibn Qudama Al Madgsi states this quite clearly in his text book *"Mughni AlMuhtaj"*.

> "The use of liquor as a remedy is prohibited by our religion. However, the use of drugs which have been mixed with liquor as a solvent is another matter. It is permissible to use that drug provided the liquor (alcohol) used is very small in quantity, and provided that a competent good Muslim physician has prescribed it".

The medical and pharmacological professions in the Muslim world are strongly called to replace the drugs containing alcohol with others which are alcohol-free.

Most of the drugs containing alcohol found on the counter e.g. tonics etc could easily be replaced by alcohol free drugs.

A ban could be enforced if the governments do agree.

المراجع

١) القرآن الكريم
٢) تفسير ابن كثير الدمشقي
٣) صحيح البخاري - صحيح مسلم - سنن ابو داود - سنن الترمذي
٤) النووي: المجموع
٥) ابن القيم: الطب النبوي
٦) ابن قدامه المقدس: مغني المحتاج
٧) سيد سابق: فقه السنه.

EFFECTS OF ALCOHOL CONSUMPTION ON ZINC AND COPPER METABOLISM IN HUMAN SUBJECTS

Dr. Zafrallah T. Cossack,

U.S.A.

INTRODUCTION

Zinc is an essential trace element for growth and development. Zinc deficiency has been first described in human subjects in the Middle East, however, moderate or mild deficiency of zinc is very likely to occur worldwide[1]. Zinc is involved in several enzymatic systems in the body[2] and an estimated 105 zinc dependant enzymes have been identified. Zinc deficiency has been shown to result in cessation of growth due to suppressed somatomedin generation as reported by Cossack[3], impaired wound healing[4], acrodermatitis like skin changes[5], impaired dark adaptation test[6] due to decrease in the activity of retinal reductase[7], and impaired lymphocytes function[8] resulting in impaired immune response.

Malnutrition is common among alcoholics because alcohol displaces protein, vitamin, and mineral containg foods in the diet, and chronic consumption of alcohol would result in malabsorption of nutrients. The use of alcoholic beverages has become very common worldwide and regularly consumed by individuals in some societies. Several investigators[9,10] have reported impaired absortion of some essential nutrients due to alcohol consumption.

The objective of the present investigation was to evaluate the effect of alcohol consumption on the absorption and status of zinc and copper inasmuch as both are essential micronutrients for humans.

MATERIALS AND METHODS

Subjects. Four male volunteers participated in this study. The same subjects volunteered in a previous study to determine human requirements of zinc. They were fully informed of the purpose and nature of the study. All subjects were chosen after extensive review by the investigator and they were free of any known metabolic disorder. They were within 45-55 years of age. Routine hematologic tests and zinc and copper concentrations in plasma and red blood cells were determined to be in the normal range. Serum electrolytes, blood urea nitrogen, serum creatinine and fasting blood sugar values were normal in all subjects.

Diet and Experimental Design. This metabolic study consisted of 12 days experimental period. Adaptation period lasted 7 days followed by 5 days of fecal and urinary collections plus measurements of food intake. Subjects were given 2 tablets of povan (pyrvinium pamoate, Parke-Davis, Fajardo, Peurto Rico), as a stool marker; one at the beginning and one at the end of the collection period. Latin square design (4 × 4) was employed in this experiment. During the experimental period subjects consumed a regular hospital diet which was carefully analyzed (Table 1). Subjects were offered alcoholic beverages with alcohol contents equivalent to 750 ml. of wine (9% alcohol) daily. Beverages were prepared in equal volume in all treatments using deionized water. Control group received deionized water only. Blood was drawn at the beginning of the experiment and 2 months later after subjects have been released from the metabolic unit but continued on alcohol consumption as designed in the trial.

Analytical Procedures. Food and fecal samples were weighed, lyophilized, digested with nitric acid, diluted to volume with deionized water, and analyzed by an atomic absorption spectrophotometer. Determinations of zinc and copper in samples including plasma and red blood cells have been described previously[11]. Statistical analysis was done according to Snedecor etal[12].

RESULTS AND DISCUSSION

Results of routine laboratory tests (clinical) remained essentially the same in all subjects throughout the study. No abnormal clinical symptons were observed.

Table 1 shows the daily nutrients intake from the diet fat to the volunteers. Those values were within the range recommended by the National Research Council as shown in the same table.

TABLE 1. Daily Nutrients Intake of Subjects (mean ± S.D.)[1]

Nutrient	Daily Intake	Recommended Dietary Allowance
Protein (g/day)	72.80 ± 1.10	56
Energy (Kcal/day)	2150	2000-2800
Zinc (mg/day)	12.26 ± 0.71	12-15
Copper (mg-day)	2.10 ± 0.63	2
Iron (mg/day)	14.32 ± 4.60	10
Magnesium (mg/day)	340.12 ± 93.51	350
Calcium (mg/day)	950.31 ± 151.23	800
Crude Fiber (g/day)	9.75 ± 1.98	—

[1]values do not include zinc and copper from beverage intake.

TABLE 2. Zinc and Copper Balance Data (mean ± S.D.)[1]

Treatment		Zinc (mg/day)	Copper (mg/day)
Wine	Intake	15.30	2.25
	Urine	1.40 ± 0.50	not detected
	Feces	11.20 ± 2.40	1.48 ± 0.67
	Balance	2.70 ± 0.92[a]	0.77 ± 0.25
Ethanol	Intake	15.30	2.25
	Urine	1.9 ± 0.60	not detected
	Feces	13.6 ± 1.95	1.75 ± 0.53
	Balance	-0.2 ± 0.20[b]	0.53 ± 0.32
Beer	Intake	15.30	2.25
	Urine	1.7 ± 0.30	not detected
	Fecus	13.7 ± 1.22	1.46 ± 0.51
	Balance	-0.1 ± 0.11[c]	0.69 ± 0.21
Control (deionized water)			
	Intake	15.30	2.25
	Urine	0.62 ± 0.30	not detected
	Fecus	12.38 ± 2.50	1.49 ± 0.40
	Balance	2.30 ± 0.31[a]	0.76 ± 0.32

[1]means (in same column) not having same superscript are significantly different at the level of $P < .05$

Results on zinc and copper balance are shown in Table 2. Mean zinc balance (mg/day) were negative when subjects consumed ethanol or beer. However, zinc balance was positive and almost the same when subjects consumed wine or deionized water. This observation clearly indicates that alcohol component of alcoholic beverages is the major ingredient that results in a negative zinc balance. When ethanol, beer or wine where consumed an increase in urinary excretion of zinc occured compared to values obtained when deionized water was consumed by the same subjects. In normal non-alcoholic subjects under normal conditions[11]; urinary excretion of zinc ranged from 0.4 to 0.8 mg/day.

Fell and co-workers[13] administered radioactive 65-Zinc to patients before surgery. They found an increase in urinary excretion of 65-Zinc few days after the surgery. The amount of 65-zinc correlated highly and significantly with urinary nitrogen. This indicates that an increase in muscle catabolism may have occured. The present data shows that a deficiency of zinc has been developed due to alcohol consumption as seen in subjects consumed beer or ethanol. Other investigators[14] obtained similar observations in studies involved alcohols. Plasma zinc concentrations (Table 3) decreased due to ethanol or beer consumption which is in accordence with zinc balanced date.

CONCLUSIONS

1. Alcohol consumption resulted in an increase in urinary excretion of zinc which in turn resulted in a negative zinc balance in human subjects.
2. The present study indicated an increase in muscle catabolism due to alcohol consumption, however, the possibility that an impaired renal conservation mechanism due to alcohol consumption cannot be ruled out.

TABLE 3. Concentrations of Zinc and Copper in Plasma and/or Red Blood Cells (mean ± S.D.)[1]

Treatment	Plasma (ug/dl)		RBC (ug/gm.Hb)
	Zinc	Copper	Zinc
Baseline (before exp.)	113 ± 8[a]	105 ± 9	42 ± 3
Wine	116 ± 12[a]	104 ± 7	42 ± 6
Ethanol	90 ± 9[b]	100 ± 7	43 ± 8
Beer	93 ± 10[b]	102 ± 3	43 ± 4
Control (deionized water)	115 ± 9[a]	103 ± 6	43 ± 3

[1]means (in same column) not having same superscripts are significantly different at the level of $P < .05$

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PART ELEVEN

CLOSING SESSION

Part Eleven: *Closing Session*

CHAPTER ONE

(Closing Session)

1. REPORT ON THE CLOSING SESSION
   The Editors
2. OPENING REMARKS
   Prof. Ihsan Dogramaci
3. RAPPORTEUR'S REPORT & RECOMMENDATIONS
   Prof. Yunus Muftu
4. DISCUSSION

REPORT ON THE CLOSING SESSION

This important and last session of the Conference was held in the evening hours. H.E. Dr. Abdul Rahman Al-Awadi, Minister of Public Health and Minister of Planning of Kuwait was present on the dais as the President of Islamic Organization for Medical Sciences. The session was conducted by H.E. Mehmet Aydin, Minister of Health and Social Assistance of Turkey and Prof. Ihsan Dogramaci as Chairman and Co-chairman respectively. Prof. Yunus Muftu was the Moderator.

First of all, Prof. Ihsan Dogramaci gave his opening remarks, then Prof. Yunus Muftu presented a report in Arabic about the activities of the four days of the Conference and also read recommendations for discussion and comments. Later on some participants spoke and mentioned their observations. They also put some suggestions to be considered by the Organization authorities. All suggestions were accepted and noted for consideration and taking action. Thus the recommendations were approved.

At the end Prof. Ihsan Dogramaci thanked all the participants for their contributions and keen interest in deliberation. He also thanked The Amir of Kuwait, the Government and his people for their support to the cause of Islamic Medicine. He thanked H.E. Dr. Abdul Rahman Al-Awadi too, who is the author and founder of the Organization. Then H.E. Dr. Abdul Rahman Al-Awadi also spoke, in Arabic and gave his final comments.

Editors

OPENING REMARKS

Prof. Ihsan Dogramaci

Now we have come to the end of the Conference. I thank all those who have contributed for the success of the Congress. So, I am going to request the Rapporteur to give the report of some of the important matters and what happened during last four days.

You will be getting the Proceedings of the Scientific Sessions, of the papers which were presented in full text, in due time. This is just the high-lights of some of the important matters and recommendations. At the end of this session, if there are any comments you would like to make, they will be noted and they will be disscussed at the meeting of the Board of Trustees for considerations. Now I will ask Prof. Yunus Muftu to present his report.

RAPPORTEUR'S REPORT

Prof. Yunus Muftu *

TURKEY

IN THE NAME OF GOD, MOST GRACIOUS, MOST MERCIFUL

Praise be to *Allah* and Peace be upon His Apostle, Muhammed (ﷺ), the Seal of Prophets and Messengers.

With the grace of *Allah*, and at the invitation of the Turkish Republic, the Islamic Organization for Medical Sciences (IOMS) convened its Third International Conference on Islamic Medicine in Istanbul under the auspices of His Excellency President Kinaan Evrin during the period from Muharram 3, 1405 Hijri (September 28, 1984 A.D.), to Muharram 7, 1405 Hijri (October 2, 1984 A.D.)

H.E. Torgot Ozal, the Prime Minister of the Turkish Republic, kindly accepted the Conference chairmanship. Three Deputies were also named: H.E. Muhamed Aydin, Minister of Health of Turkey; Dr. Ihsan Dogramaci, President of the Council of Higher Education in Turkey, representing the IOMS Board of Trustees; Dr. Gimy Dmir Oglo, President of Istanbul University. Dr. Yunis Miftu, Professor at the Faculty of Medicine of Hagit Tebah, was named the Conference Rapporteur.

The following committees were set up:

1. The Conference General Committee.
2. The Heritage Committee.
3. The Committee of Applied Studies.
4. The Committee of Jurisprudence in *Islam*, Islamic conduct, and Health.
5. The Formulation Committee.

The Inaugural Session was held at Istanbul University. The ceremony started with the National Anthem and a recitation of the *Holy Quran*. On behalf of the IOMS President, a briefing about the IOMS achievements in the scientific and practical fields since the previous conference was then given by Dr. Ahmad Ragae Al-Gindi, the Conference Secretary and Head of the Islamic Medicine Centre. The briefing showed that the interval between the two conferences has been optimally invested.

The Inaugural Session also included a speech delivered by the IOMS President, Dr. Abdul Rahman Al-Awadi, in which he sincerely expressed the participants' feelings of joy and happiness at having this Conference convene in Turkey. He thanked His Excellency the President of Turkey for gracing the Conference. He also expressed his appreciation for the support given to the conference by the Turkish Government as well as the warm welcome extended to its participants.

In his speech, Dr. Al-Awadi touched upon past and present considerations from which he could draw future indications to certain needs. There is, for instance, the need to focus on building up the faithful Muslim so that he may best be invested in scientific pioneership for his nation. There is also the need to recruit an "elite" of Muslim scholars with adequate funds and immunities so that they may not be hampered by the political, communal or sectarian disputes that have plagued our Islamic World and which was sincerely hope will come to an end. The IOMS president also called for the need to cooperate within the limits of a minimum common ground. This cooperation, he said, should be a scientific guideline to be adopted by all the Islamic Nation.

The next Speaker was H.E. the Minister of Health of Turkey who greeted the participants and welcomed them most warmly to the conference lauding the spirit of brotherhood that bind them

* *Since deceased*

together and hailing the great hopes targeted by the conferees.

In his speech, Dr. Ihsan Dogramaci reviewed the onward march of the IOMS of which he has been part and parcel since it was a mere idea, then an embryo, then a baby until it grew up into a full-fledged Organization. He lauded the IOMS President, Dr. Abdul Rahman Al-Awadi, for his tireless efforts and for the enormous amount of time and efficiency he put into all the stages of work even before issuance of the law establishing the Organization and, of course, after it. The speaker praised Kuwait: Amir, Government and people, for supporting these Conferences that have become a meeting place for Mulsims where they pool their scientific endeavours for the consent of God and the benefit of the whole Islamic Nation.

Then H.E. Torgot Ozal, the Prime Minister of the Turkish Republic, delivered the inaugural speech which he started by reading out the message sent by His Excellency the Turkish President addressed to the IOMS President. The text of this message is as follows:

MESSAGE OF THE PRESIDENT OF REPUBLIC OF TURKEY H.E. KENAN EVREN - READ AT INAUGURAL CEREMONY

YOUR EXCELLENCY: DR. ABDUL RAHMAN AL-AWADI

MINISTER OF HEALTH AND PLANNING OF THE STATE OF KUWAIT.
PRESIDENT OF THE ISLAMIC ORGANIZATION FOR MEDICAL SCIENCES, ISTANBUL.

I WISH I COULD PARTICIPATE IN THE PROCEEDINGS OF THE THIRD INTERNATIONAL CONFERENCE ON ISLAMIC MEDICINE, BUT MY ENGAGEMENTS AND PREVIOUS COMMITMENTS STOOD IN THE WAY. IT IS MY PLEASURE TO SEIZE THE OPPORTUNITY OF THE CONVENING OF THIS CONFERENCE TO WELCOME THE DISTINGUISHED MEN OF MEDICINE WHO HAVE COME FROM THE FRIENDLY ISLAMIC COUNTRIES AND EXPRESS MY GREAT JOY FOR YOUR PRESENCE WITH US. YOUR CONFERENCE, I AM QUITE SURE, WILL HELP ESTABLISH THE BASIS OF THE BROTHERLY RELATIONS THAT BIND OUR COUNTRIES. THE MEDICAL SCIENCES WITH ALL ITS BRANCHES PERFORM A SACRED AND HONOURABLE DUTY IN THE SERVICE OF MAN WHEREVER HE MAY BE. FOR MANY CENTURIES, THE ISLAMIC WORLD HAD POSESSED THE MEANS OF A FLOURISHING CIVILIZATION AND INCESSANT PROGRESS THE LANDMARKS OF WHICH WERE THE SCHOLARS OF ISLAMIC MEDICINE WHO WERE ALSO ITS FIRST PIONEERS. AS OUR WORLD TODAY IS OVERWHELMED WITH A SUCCESSIVE WAVE OF DISCOVERIES AND INNOVATIONS AND WITNESSES TREMENDOUS ADVANCES IN A WIDE RANGE OF MEDICAL FIELDS, THE SCHOLARS OF ISLAMIC MEDICINE ARE REQUIRED TO DO THEIR VERY BEST TO MAKE THE MOST OF THESE ADVANCES IN OVER-COMING THE PRESENT HEALTH PROBLEMS IN OUR AREAS.

WE ARE QUITE CONFIDENT THAT THE EXISTING COOPERATION AMONG THE ISLAMIC COUNTRIES IN THE FIELD OF MEDICINE WILL BE MORE AND MORE CONSOLIDATED IN THE COMING YEARS AND THAT THE HOPES TARGETED FOR THE ESTABLISHMENT OF THIS ORGANIZATION WILL BE REALIZED.

WITH THESE FEELINGS AND THOUGHTS I WISH YOUR CONFERENCE SUCCESS IN ACHIEVING ITS OBJECTIVES AT THE END OF ITS PROCEEDINGS IN A WAY THAT WILL CLEARLY POINT UP THE MOST FEASIBLE MEANS OF POSITIVELY SOLVING OUR PRESENT HEALTH PROBLEMS.

WITH MY BEST WISHES TO YOU AND TO THE DISTINGUISHED CONFERENCE MEMBERS.

SEPTEMBER 28, 1984

KENAN EVREN
PRESIDENT

In his valuable speech which gratified the audience and bolistered their hopes, H.E. the prime Minister hailed the responsible role played by medicine and appealed to the Islamic Nation to live up to the challenge of working for a future that corresponds to its past civilization. Then, he declared the Conference sessions open.

The participants then moved to Sulaimaniyya Library where H.E. the prime Minister opened the exhibition of Manuscripts and Islamic Arts after which he accompanied the Conference members to the Sulaimaniyya Mosque for Friday prayers. The Friday sermon dealt with Health considerations in *Islam.*

The conference Sessions were then held at Istanbul-Sheraton where an exhibition of contemporary Turkish calligraphists was opened. On display were several verses and *Hadith* texts besides many other beautifully hand-written renditions that were unlike anything old calligraphists had produced. In fact, they were modern innovations of these contemporary artists, which bears evidence of the maintained glory of Arabic calligraphy in Turkey.

The conference then held its regular scientific sessions and listened to the main papers, the schedule of which will be shown in a special section. The full details of these sessions and papers will appear in the Proceedings of the Third International Conference on Islamic Medicine to be issued later Insha'lla.

The topics taken up by the conference were: Heritage; Applied Studies; Jurisprudence, Islamic Conduct and Health.

RECOMMENDATIONS

In light of the conference sessions and the discussions therein, the Conference has decided to adopt the following recommendations:

1. The conference have been deeply touched by the brotherly welcome and genuine hospitality extended to them by every official in the host country, Turkey. They also appreciate that the Turkish Republic has been the venue of the Third Conference on Islamic Medicine to which the host country has given all possible attention and support. Therefore, the Conference recommends that H.E. the IOMS President convey its deepest gratitude to His Highness the President of Turkey, to H.E. the Prime Minister and to the sisterly country Turkey, government and people, and to all notables who have exerted great efforts for the convening and success of the conference.

2. With regard to the observed benefits of putting forward well-defined topics that turned out to be of such importance that they require more time for discussions, and in respect of the great value felt by everybody of the main lectures delivered in the sessions, the conference recommends that more time given to these activities in the coming conference. It also recommends that the opportunity be given to the specialised Islamic societies within the framework of the IOMS conferences to deal with the specialised topics and papers.

3. In this connection, the conference gives its blessing to the initiative already taken by the Organization in holding its specialised seminar on *"Islam and Child-birth"*, for which a distinguished group of notable scholars in Jurisprudence, medicine and social sciences were selected. The conference also sanctions the Organisation's preparations for the next specialised seminar on *"Human Life: its beginning and end"*, and recommends that such efforts be kept up.

4. The Conference has felt the dire need for setting up a consultative-board at the level of the Islamic World to be jointly membered by notable scientists and specialists in Islamic *Sharia* (law). The foremost duty of this proposed board will be to go through and study carefully the medical innovations of our times and then come to conclusions concerning the appropriate Islamic view about them so that the Islamic nation should not be left unguided in dealing with these issues. The Conference, therefore, recommends continued efforts for the realization of this need.

5. The Conference recommends that all parties and organizàtions concerned should be approached in a bid to exhort them to coordinate their efforts in collecting full health data about the Islamic World. These collective data-gathering processes should clearly indicate the needs and where they arise, and the resources and facilities and where they can be available. In this way, instead of efforts being parallel, successive, repeated or divided, they become fruitfully integrated.

6. In view of the fact that many of the physiological and psychological diseases plaguing the world today can be preventively averted if people observe certain appropriate values, the Conference recommends the necessity of a grassroots review of preventive medicine, social medicine and psychiatry in the light of *Islam*.

7. The Conference has gone through the recommendations of the previous two conferences and come out with the feeling that more attempts should be made to rectify the academic courses offered by the various educational institutions whereby these courses can be based on Islamic values and enriched by Islamic culture indispensable for the Muslim physician.

8. The Conference noticed with concern the appearance of infectious diseases, traced back to pigs, in some Islamic countries that were known to be completely free of such complica-

tions. The conference recommends in this connection that this matter should be brought to the attention of the authorities concerned.

9. The Conference recommends the publication of a biographical index of the renowned names in our Islamic Medical heritage the first phase of which should cover regional indices undertaken by the specialists in each Islamic country. All financial and scientific facilities should be sought to put this idea into effect.

10. In this age, a large number of diseases have been ascribed to the prescribed drugs themselves, and developed countries have allocated big funds to finance a amass of scientific research on ways of benefiting from medical plants and herbs in treatment that entails no prohibitions or harmful side effects. Accordingly, the Conference recommends that such plants available in the environment of the Islamic World be carefully studied. A preliminary step to introducing them into actual prescribed treatment. descriptive and pharmacological dictionaries should be prepared about them.

11. The Conference regards with interest the prospects of a bright future and the great hopes pinned on the Muslim youths who are strained by the oppressive circumstances surrounding their financial, cultural, psychological and even religious lives. The future of the nation requires that these youths should be guarded against anything that may harm or hurt them. The conference, therefore, recommends dissuasion from the unsuccessful, traditional methods of addressing the youths and dealing with them. Instead, investigation should be carried out into the causes behind the crises complicating their life with a view to averting these crises by preventive measures against their causes. It is felt that such a serious matter warrants a special study.

12. It is recommended that the IOMS efforts, already underway, exerted in the field of writing and two-way translation from and to Arabic in relevant subjects should receive every possible encouragement.

13. It is also recommended that intensive courses of study on the latest in specialisms needed by the Islamic World should be held.

14. In closing its proceedings, the Conference mentions with gratitude and appreciation the efforts of the State of Kuwait, Amir, government and people, in adopting the IOMS and passing the law establishing it together with the decree of its Constitution. The Conference thanks also go to Kuwait Foundation for the Advancement of Sciences for contributing grants and prizes and for subsidising the IOMS publications. The IOMS President has been entrusted to convey these feelings of gratitude and appreciation.

DISCUSSION

Prof. Ihsan Dogramaci

Thank you very much Prof. Muftu. In your report you have mentioned in brief what you have been doing and working during the last four days. I would also like to thank all those who helped you. They have done a lot in a very short time to be precise. Before I open the floor for the suggestions and comments, I would just like to add that the President of the Organization, H.E. Dr. Abdul Rahman Al-Awadi has sent two cables; one to H.E. Kenan Evren, the President of Turkey, in which he thanked him for his best wishes for the success of the Conference and for his very kind measures and desire that Muslim nations should prosper in all fields, specially in the areas of medicine which is the topic of this conference and second cable was sent to H.E. the Prime Minister for taking keen interest and spending some time with us.

Now, the floor is open for suggestions, comments and discussion. May I ask the names and occupation of those who want to speak? We have one hour for discussion. I would request you who have some comments, to be precise about your suggestions.

Prof. Ihsan Dogramaci

Thank you Dr. Taha Sadeq, your suggestion is very interesting and constructive and will be noted and considered at the Meeting of Board of Trustees.

Dr. Hussaini

I am very pleased that I have taken part in this very great meeting but I observed that this association and meeting has been held on un-Islamic way. So first of all I have to suggest that Islamic issue should be considered always. Thus many difficulties and problems would be solved if we adopt the Islamic ways. I think Islamic Hijab should be considered at least in appearance. Our meetings should always be conducted in Islamic way and from this great meeting, we can show to our friends and tell them that we are longing for them and not ashamed of them.

The other suggestion, I would like to make is, if the Board agrees, to put meeting devoted to practical and research fields, which we can take from Islamic Medicine, because we know that we have got a great deal in the store but what is the result? What can we teach to our medical students.

If the Board agrees, this should begin to bring practical results in order to this or in future meetings.

Prof. Ihsan Dogramaci

Thank you very much Dr. Hussaini, Your comments are noted and they will be considered in the next city, where the meeting will be held. In this connection, I want to add one thing. I have listened to your comments in the most conscientious and respectful manner. In Turkey the sex, sect and religion are separate. Of course, I know but here policy of the State should also be respected by our guests. In future, wherever we shall be going, your very important suggestions will be noted and considered.

Prof. Ihsan Dogramaci

Thank you very much Dr. Onaizy. There are two parts of your very important suggestions. I am trying to touch upon the last one. The Turkish literature is not new, but of hundred years old, even since Ottoman regime. In Turkish..... is God, like in English you write God, you may write *Allah* and you may write God, but there is only one God, whether you write *Allah* or God you mean the one God. The dictionary may say something, but I may assure you that it means God and the one God.

Dr. Choudhry

Mr. Chairman and colleagues. First of all I must thank the Organization for giving me this opportunity to come over here and speak occasionally.

One thing I must say is that there must be a references library, which must be ready at least at one headquarter, may be the headquarter of this organization in Kuwait. We were discussing yesterday that there is difficulty when somebody is writing history or even doing research in Islamic Medicine. This reminds me of my work I did and wrote a thesis from 1957 - 1959, in the Institute of Psychiatry in London, that was on epilepsy. I wrote about history of epilepsy. I was rather strengthened what I heard here and I talked to my friends to translate that history into various languages. To be translated in Urdu, I requested Hakim Mohd. Said and he has agreed; in Arabic, I have asked Dr. Abul Azayem, and he agreed and others also agreed. Then I would say that while I was writing this history, I met various historians commenting on it. It was Bu Ali Sina, the first man who used the word epilepsy, Epiderminane, which means the seize of fall. Then there was also one adverse remark, a question occured and came across that our Prophet (ﷺ) was described as suffering from epileptic effects. Though in my thesis I said, that there is no evidence. Now these things you have to see when you will be dealing with this. Another thing, apart from the library and apart from the references, I should say that there are people who have done work in writing history on Islamic Medicine with some original research. They must be given some medal or award, because this is very important for their encouragement.

Then another thing is that we are talking about our own past history but what we have missed over the years we should not just burn ourself on what people say or they talk about us. We should look into it, why we have given them opportunity to comment on us because we have been just sleeping over these years. Now there is time, because there is an awakening and I see, this first conference that I am attending, a conference on Islamic Medicine and I am very pleased to say and comment on it. I congratulate all the organisors by they must keep it up. They must co-ordinate with each other. That is most important thing, because there are people working in different countries, there should be no duplication. There should be better communication. There must be come place where we can refer back, where we can reach that something has been done, so that the same thing is not repeated again and again. I am very grateful. I must say it again. We talk about that depression in our Islamic countries is less but we have to prove it by scientific measures, that it is really and definitely less. Talking about narcotics, unfortunately we have got injections in Holy *Quran,* but again the addiction is strong in our Islamic countries. We have to go in those things also. We should not be the Muslims in name, we must practice as true Muslims. That is very important. I am sorry I have taken more of your time but I am most grateful for giving me this opportunity.

Prof. Ihsan Dogramaci

Thank you Dr.Choudhry. Certainly you have not taken too much of time because you made very important comments. We have taken note of your comments and they will be considered. I must thank you again.

Prof. Ihsan Dogramaci

Thank you very much. Your interesting and important suggestions will be, I am sure, fully considered.

Dr. Fahim Abdul Rahim

Chairman, I would like to thank not only the President and Prime Minister, Ministers and colleagues who have participated in the Conference but I like to thank the people on the floor and those who have made every body to feel at home.

I would like to add few things. I attended the 2nd Conference at Kuwait. To encourage the people who have participated in these meetings they must be given some sort of compensation. The best way to do that is, to give them the full proceeding of the Conference, so that the results, particularly of the applied work on plants in the Islamic Medicine should be handed to all the participants in complete form and not only in parts or

Volumes which contain their subject on which the participants had talked. This may help and cover more subjects to be handled by those who are encouraged or interested in the work of this aspect.

Another thing I would like and hope to be considered is that there are many parts in our Islamic world where the people have shortage of apparatus or shortage of references to continue their applied resources and applied researches in the subjects. They are interested and they must have the material to improve their work.

I want and hope that something will also be done in this respect.

Prof. Ihsan Dogramaci

Thank you, I am sure your suggestions will be fully considered.

Dr. Farukh Hussain

Thank you very much, Mr. Chairman. As the last speaker, I find my job very difficult, because almost every thing which was useful and sensible has already been said. After having said that, just 3 minutes and 3 points, if you will please be able to do so.

Number one point is that there is no serious scholar or scientist who will not agree with me on this subject and that whenever you want to look at the progress of anything, any where, you first have to look at the down fall or its causes. As serious scholars of history, we have learned a lot but when you talk about progress, it is very heartening to know that the encyclopedia you are producing will be a step in the right direction, but please, just do not burn the colours of the encyclopedia as a demonstration, but try to take away the distorted facts for the future historians and students.

Number two is that we must start with the medical students, because this is where the future is and one of the downfalls of Muslims in the past has been not only the imbalance between education and science and religion. These three major themes of the future but not working in the frame work of religious level.

Number three is that when you talk to the Medical students and give knowledge to them, I remember and I am sure you all do so well that in your medical schools. You have lectures, on Medical Ethics, may I sir, beg of you to introduce the subject of Islamic Medical Ethics in medical curriculum. I am sure on the floor there are amongst you many scholars who can easily go home, back to their countries and within no time can produce a little booklet or a guideline or a pamphlet which is The Islamic Medical Ethics in true sense of the world.

Dr. Farukh Hussain

The last recommendation is about many problems which we are facing and which we are likely to face, not only those Muslim Physicians, who are practicing in the West and what I would say who have the dilemma of psychiatrists but I would like to include other serious scientists, surgeons, physicians and doctors who are working with the new advancements of science in this world. First of all to begin with we should know, what does the Medical Sharia, what does the Medical Law, what does the Medical Jurisprudence, what does the Fiqha say about transplant? What does it say about the insemination in the test tube? What does it say about the various products which will come in the future, including new methods of treatment. There is a revolution, not only in our mode of life, even the West is facing the dilemma, is it legal or illegal?

We do not want to fall far behind. Perhaps we should set up a committee, of Jurisprudence, legal experts and senior medical doctors who might provide us with answers to this, perhaps in the next meeting.

Many thanks for letting me to say the last words and I hope they are not the final words on the future of medicine as far as Islamic concepts are concerned.

Prof. Ihsan Dogramaci

Thank you very much indeed for your very important and very interesting suggestions. We have already two or three written notes and we shall pass them to Chairman who is also President of the Board of Trustees of the Organization for his observation before consideration.

Now before I pass the floor to the President of the Organization for his final comments about our Conference, I want to thank once again Dr. Abdel Rahman Abdullah Al-Awadi for his dedication and for being the Author of the Organization and the founder. I pray that it would grow and grow and fulfil its message. I have to thank his team devoted to him, believing in his course.

Of course, I will thank again Kuwait, The Amir of Kuwait, the Government and his people for their support. I want to thank every one of you for your contribution, your delibration and for your papers. I would like to thank many whom we have not seen here, who have been working for months to make preparations including those who worked in Exhibitions, taking their time and reproducing those small book, which was presented to you. Those who have tried to make your stay comfortable, they might have not been perfect but they tried their best. In this connection I want to thank V.I.P. tourism Corporation. I am sure they tried their best. Behind those glasses in cubical, there are some people who helped a great deal, because they always produce every thing in other languages what I am saying in English or Arabic, in a better version, I want to thank them. They will translate what I am saying now. I want to thank all of you once again for making this conference a success. I am certain that the next conference will be far more successful than this one. I am passing the microphone to the President of the Organization for his final comments. Thank you very much.

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