THE HISTORY AND PHILOSOPHY OF ISLAMIC SCIENCE

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In the Name of God, Most Merciful, Most Compassionate

Preface

The essays presented in this book deal with various facets of the history and philosophy of Islamic science. By 'Islamic science' we mean the totality of the mathematical and natural sciences, including psychology and cognitive science, cultivated in Islamic culture and civilization for more than a millennium beginning from the third century of the Islamic era (the ninth century of the Christian era).

These sciences are Islamic not just because they have been produced by Muslims. As a matter of fact, many non-Muslims made important contributions to the growth and development of Islamic science. Rather, these sciences deserve the name 'Islamic science' because they are, conceptually speaking, organically related to the fundamental teachings of Islam, the most important of which is the principle of *tawḥīd*. This book seeks to reveal different dimensions of the organic link that exists between *tawḥīd* and science as seen through Muslim scientific eyes.

The essays cover four major themes, namely, (1) the epistemological foundation of Islamic science, (2) Man, Nature, and God in Islamic science, (3) Islamic science and the West, and (4) Islam and modern science. Through these essays, we seek to convey the important message that Islamic science, the most immediate predecessor of modern science, shares with the latter many outstanding features such as the rational and logical nature of its language, the adoption of scientific and experimental methods of inquiry, and the international character of its scientific practice and organization.

However, we strongly feel that it is incumbent on us to highlight the fact that there are also important differences between the two sciences. Islamic science is at the same time of a religious nature in the sense that it is consciously based upon the

metaphysical, cosmological, epistemological, and ethical and moral principles of Islam. In the light of its spiritual and moral conception of nature, Islamic science adopts goals and methodological principles that are different in several respects from those of modern science. In Islamic culture, the place of science in relation to other branches of knowledge such as the religious and social sciences is also somewhat different from the one we see in modern Western culture.

A salient feature of our essays is their interdisciplinary character. We have also adopted a blend of historical and philosophical approaches to the study of Islamic science. We hope this book is of value for all who are concerned with the problem of knowledge in all its dimensions, whatever their discipline.

Except for chapters one, five, ten and eleven, all the essays have previously appeared in learned journals or as chapters of books published outside Malaysia. They are reprinted here with only minor changes:

"The Question of Methodology in Islamic Science," *Muslim Education Quarterly*, 2:1 (Autumn 1984), pp. 16-30; also published in *Quest for New Science: Selected Papers of A Seminar*, Centre for Studies on Science, Aligarh (India), pp. 91-109.

"The Meaning and Significance of Doubt in al-Ghazzālī's Philosophy," *The Islamic Quarterly*, 30:1 (1986), pp. 20-31; also in *Iqbal Review*, April - June 1985, pp. 29-48.

"The Unity of Science and Spiritual Knowledge: The Islamic Experience," in R. Ravindra (ed.), *Science and Spirit* (International Cultural Foundation: New York, 1990), pp. 87 - 101.

"The Philosophy of Islamic Medicine and Its Relevance to the Modern world," *MAAS Journal of Islamic Science*, 6:1 (Jan - June 1990), pp. 39-58.

"Umar Khayyām's Criticism of Euclid's Theory of Parallel Lines," *MAAS Journal of Islamic Science*, 1:2 (July 1985), pp. 9-18.

"Islam and Bioethics," *Greek Orthodox Theological Review*, 31:2 (1986), pp. 157-179.

"Designing a Sound Syllabus for Courses on Philosophy of Applied and Engineering Sciences in a 21st Century Islamic University," *Muslim Education Quarterly*, 7:3 (Spring 1990), pp. 19-25.

The essays brought together here have been written over a period of about seven years, the earliest being published in 1984. Entitled "The Question of Methodology in Islamic Science," the essay was originally presented as a seminar paper at an international seminar on *The Quest for New Science* held at Aligarh University, India in April 1984 and organized by the Center for Studies on Science, Aligarh. Other essays originally written for international seminars/conferences are chapter four (presented at the *Unity of the Sciences Conference* in Los Angeles), chapter six (presented at *International Seminar on Islamic Philosophy and Science* in Penang), chapter nine (presented at a conference on *Muslim-Orthodox Christian Relations* in Boston), and chapter eleven (presented at the *International Conference on Islamic Civilization* in Kuala Lumpur).

In bringing together a collection of essays written over a long period of time and covering so many topics and issues, even if these are one's own, there is always the problem of thematic unity which one must address. That there is a thematic unity in our essays presented here we are quite satisfied. In fact, we can claim that the said problem has never arisen at all in our case, primarily because the essential intellectual framework of our philosophy of science has remained unchanged ever since we first embraced it in 1971 when we were a postgraduate student in mathematics (specializing in *group theory*) at Bedford College, University of London.

We are grateful to Dato' Hj. Musa Mohamad, the Chairman of the Board of Advisors, the Secretariat for Islamic Philosophy and Science, the Science University of Penang, and also the Vice

Chancellor of the University, for being kind enough to publish this work. We also wish to thank Nurin Enterprise for having agreed to be a co-publisher.

It also affords me great pleasure to record my sincere thanks to the University of Malaya. Most of the essays brought together here were written during our doctoral studies in Islamic philosophy at the Department of Religion, Temple University, Philadelphia. Our postgraduate studies (1981 - 1986) were financially supported by the University of Malaya.

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CHAPTER 1

Religious Consciousness and the Scientific Spirit in Islamic Tradition

As an integral religious tradition encompassing all aspects of human life, Islam deals not only with what man must and must not do, but also with what he needs to know. In other words, Islam is both a way of acting and doing things and a way of knowing. Of the two ways, the aspect of knowing is the more important. This is because Islam is essentially a religion of knowledge. Islam looks upon knowledge as the central means to salvation of the soul and to the attainment of human happiness and prosperity in this life as well as in the hereafter.

The first part of the testimony of faith in Islam, *Lā ilāha illa' Llāh* ("There is no god but God"), is a statement of knowledge concerning Reality. Muslims look upon the various sciences, natural, social, and others as so many different bodies of evidences which point to the truth of this most fundamental statement in Islam. This statement is what is popularly known in Islam as the principle of *tawḥīd* or Divine Unity.

CHAPTER 6

An Introduction to the Philosophy of Islamic Medicine

Introduction

By *Islamic medicine* is meant that system of medicine, which was conceptualized and cultivated by the Muslim peoples of diverse racial and ethnic origins and climes for more than a millennium since the birth of the first Islamic community until the present times. Like everything else which deserves to be called Islamic, Islamic medicine is primarily based upon principles which are derived from the basic teachings of the religion of Islam. It is the fruit of a conscious attempt by some of the best of Muslim minds at finding the solution to the problem of medical and health care of the Muslim community in conformity with the Islamic worldview in which God, man, nature, and society are closely intertwined and harmoniously interrelated. Islamic medicine is indeed one of the most important cultural manifestations of the spiritual, moral, and ethical values of Islam.

In speaking of medicine as a system modern scholars usually wish to refer not only to the body of medical knowledge proper and its numerous branches, but also to such related things as the organization of medical practice and health care in the form of various institutions. Viewed in this sense of a medical system, Islamic medicine must be ranked amongst the most developed and the most effective medical systems the world has ever known. During the long period of its history, Islamic medicine initiated new medical practices and gave birth to new medical and health institutions which made possible a more systematic organization and development of preventive medicine, medical education, medical ethics, drug production, registration and distribution, and therapeutic administration than ever seen before.

These new practices and institutions remain to this day a part and parcel of the very organization of the modern medical system. This is especially true in the field of pharmacy. In the words of Cyril Elgood, a noted contemporary historian of medicine,

> so soundly did the Arabs establish their Materia Medica that their pharmacy has survived longer than any other section of their whole system. Their method of distribution of drugs is virtually unchanged today. The Pharmacy is still a most important part of the hospital.[1]

Thanks to the scholarly efforts of several prominent Muslim physicians, most notably Ibn Sīnā, the whole body of medical knowledge known to the Muslims was put into systematic writing in works which have been widely acknowledged as among the greatest medical encyclopedias of all time. Especially with the help of classifications and the novel features of diagrams and illustrations, these medical encyclopedias facilitated learning and instruction, and consequently served as popular textbooks not only in the medical schools of the Islamic world but also in

1. C. Elgood, *Safavid Medical Practice (The Practice of Medicine, Surgery and Gynaecology in Persia Between 1500 A.D. and 1750 A.D)* (London: Luzac & Company Ltd.,1970), p. 30.

those of the West until as late as the nineteenth century.[2]

The Islamic medical system, at least during its Golden Age, has also demonstrated its remarkable power of synthesis and its flexibility or dynamic nature as reflected in its adaptability to change, as well as its scientific character through its ability to absorb what was best of the doctrines, methods, and techniques in the various traditional medical systems with which the Muslims came into contact. For example, when Islamic medicine spread to the Indo-Pakistani sub-continent beginning in the fourteenth century it got enriched by its encounter with the Ayurvedic medicine and other traditional Indian systems of medicine.

What is noteworthy, however, is the fact that during all these periods when the process of enrichment of the Islamic medical system was taking place the basic philosophical framework and foundation of Islamic medicine remained practically unchanged. The general principles on which the theories of Islamic medicine were based were viewed by Muslim physicians as philosophically and scientifically valid and applicable at all times. Unfortunately, the philosophy and theories of Islamic medicine have been largely forgotten or they are hardly understood by present-day Muslims save in the few places like the Indo-Pakistani sub-continent where Islamic medicine still exists as a living system of medicine. In fact, what we observe today is that while many of the external (physical) and organizational aspects of the Islamic medical system have survived to form an integral part of the modern medical system, the underlying philosophy of Islamic medicine is ridiculed and rejected by many men of science, including Muslims, as unscientific. Their reductionistic notion of science has led them to entertain the idea that modern medicine alone is scientific medicine. Consequently, they dismiss Islamic medicine as irrelevant to the medical and health needs of a modern society.

In this chapter, we take up the position that the principles underlying the Islamic theories of medicine need to be restated,

2. The two most famous medical textbooks of the Middle Ages are Ibn Sīnā's *al-Qānūn fi'l-ṭibb* (*The Canons of Medicine*) and al-Zahrāwī's *Kitāb al-tasrīf* (*The Book of Concession*).

popularized and given fresh application in the light of the crisis in contemporary medical and health care. The main consideration in rediscovering and reviving the Islamic philosophy of medicine is not theoretical or academic. Rather, it is the firm conviction that the Islamic medical system would be the system most suited to the Islamic way of life and the most effective in meeting the overall medical and health needs of the Muslim Community of every age. However, no significant revival of Islamic medicine could be expected unless there is a prior intellectual acceptance, at least by the scientific community, of its philosophy and the scientific theories which arise from that philosophy.

1. Medicine as a Branch of Knowledge within Islamic Culture

In Islamic as in Western culture, medicine is regarded as both a science and an art. More specifically, it is a practical or non-syllogistic art placed in the same category as architecture, agriculture, and navigation.[3] As a science, medicine appears in many Muslim classifications of the sciences as a branch of natural science (or philosophy) since it deals with particular aspects of the human body.

1.1 The subject-matter of medical science

As defined by Ibn Sīnā in his celebrated work, *The Canon of Medicine*, the medical profession's final authority for eight centuries, medical science is that "branch of knowledge which deals with the states of health and disease in the human body, with the purpose of employing suitable means for preserving or restoring health."

Thus, the most fundamental concepts of medical science

3. The notion of practical or non-syllogistic art as understood by many Muslim philosopher-scientists would embrace the modern idea of applied science. We have discussed the nature of this category of branches of knowledge in our *Classification of Knowledge in Islam*.

are the concepts of health and disease. There are many different philosophies and theories of health and disease in the history of medical thought of the human race. Each philosophy is based on a particular conception of the human body,[4] and more specifically on a particular physiological perspective. Also, each philosophy has given rise to a distinct system of medicine. The Islamic theory of health and disease, including its physiological basis, is explained below.

1.2 The goal and role of medical science

The general aim of medical science, according to Muslim physicians, is to secure and adopt suitable measures which, with God's permission, help to preserve or restore the health of the human body. The normal state of the human body is the state of health. This is the state in which all the functions of the body are carried on normally, and which is characterized by the harmony, balance, and equilibrium of all the constituent elements and systems of the body. Illness or disease results from the disruption of this harmony and equilibrium when one or more functions or forms of the bodily organs are at fault. The role of medical science and the physician is to find and employ suitable means for the preservation of that normal state of health or for its restoration in cases where the body has been afflicted with disease.

The preservation of health brings into focus the importance of preventive medicine or prophylaxis. The restoration of health on the other hand pertains primarily to the task of therapeutic medicine. Thus, there are two main areas of concern of medical science: preventive medicine and therapeutic medicine. The Islamic medical system places great emphasis on both.

1.3 Religious valuation of medical science

Of all the practical sciences and arts cultivated by Muslims,

4. For a detailed discussion of the Islamic conception of the human body, see Chapter 9 of this book.

none had been accorded a more noble and esteemed position than medicine. Many among both religious and medical authorities in Islam considered the art and practice of medicine as "a religious vocation of the first order because it helps men and women to help others preserve and restore their health."[5] Human well-being is the goal of Islam. The Islamic notion of well-being incorporates the ideas of safety, wholeness, and integrality of both the human individual and the human collectivity, of which physical health is clearly a necessary and inseparable element.

Health is viewed in Islam in a holistic way with the consequence that Islamic medicine too is holistic in nature. One of the names of the Quran is *al-Shifā'* meaning "that which heals" or "the restorer of health." Muslims understand this health to refer to spiritual, intellectual, psychological, and physical health. All these different dimensions of human health were integrated and unified within the religious worldview of Islam. Thus, the goal of medicine is fully in harmony with the Quranic vision of human well-being.

Medicine has generally been r egarded by Muslims as a science whose roots are clearly established in the Quran and the Sunnah of the Prophet. The nobility and prestige of medicine in traditional Islamic society was further enhanced by the belief that this art was originally revealed to mankind through Prophet Idris.[6]

The high religious value accorded to medicine is also clearly reflected in that Muslim classification of knowledge, which is based upon ethico-legal considerations. According to the ethico-legal criteria of the Islamic *Sharī'ah*, medicine belongs to the category of *farḍ kifāyah* sciences. It is not incumbent upon every Muslim to learn this category of knowledge. Rather, it is obligatory upon the Muslim community as a collective entity to

5. F. Rahman, *Health and Medicine in the Islamic Tradition* (New York: Crossroad, 1987), p.39.
6. This belief was accepted by many Muslim medical authorities and historians of ideas like Sā'id al-Andalusī and Ibn al-Qifṭī, as well as by religious scholars, including al-Ghazzālī.

learn it. The principle asserted by the *Sharī'ah* is that it is necessary that there exist a sufficient number of Muslims who learn medicine to meet the medical and health needs of the community. If this principle is faithfully observed by Muslims, then they would be spared of the acute medical and health problems which befall them at the present moment.

By virtue of this special religious recognition given to medical science the physician came to occupy a highly influential and respectable position in Islamic society. But it is also true to say that the personality and intellectual traits and standing of the Muslim physicians have in turn helped to maintain and enhance the prestige of medical science and the medical profession. The Muslim physician is not a specialist like his modern counterparts. He is generally a person of wide learning, and he takes a great interest in many of the sciences. He is an intellectual in every sense of the word. He is generally the very embodiment of Islamic intellectuality. For as asserted by Nasr,

> the wise man or *ḥakīm*, who has been throughout Islam's history the central figure in the propagation and transmission of the sciences, has usually also been a physician. The relationship between the two is in fact so close that both the sage and the physician are called *ḥakīm*; many of the best-known philosophers and scientists in Islam, such as Avicenna and Averroes were also physicians.[7]

Befitting the great religious honour conferred by Islam on the medical profession it is only natural and appropriate that the Muslim society should have a high expectation of the physician. In general, the physician was expected to be "a man of virtuous character, who combined scientific acumen with moral qualities, and whose intellectual power was never divorced from deep religious faith and reliance upon God."[8] It goes to the credit of the Islamic medical system that the Muslim physicians generally succeeded in living up to that expectation.

7. S.H. Nasr, *Science and Civilization in Islam*, p.184.
8. *Ibid*, p.185.

2. The Scope and Divisions of Islamic Medical Science

Muslim physicians divide medical science into two main parts, namely the theoretical and the practical (see Chart I).

2.1 Theoretical medicine

Theoretical medicine is comprised of five major branches. These are:

2.1.1 Physiology

This science whose name *'ilm umūr ṭabī'iyyah* literally means the "science of natural affairs" (of the human body) is concerned with the functioning of all structures, organs, and parts of the human body viewed as a living organism. Muslim physiology which is based upon the humoral theory is fundamentally different in many respects from the physiology of modern medicine. The humoral theory will be discussed later.

2.1.2 Anatomy

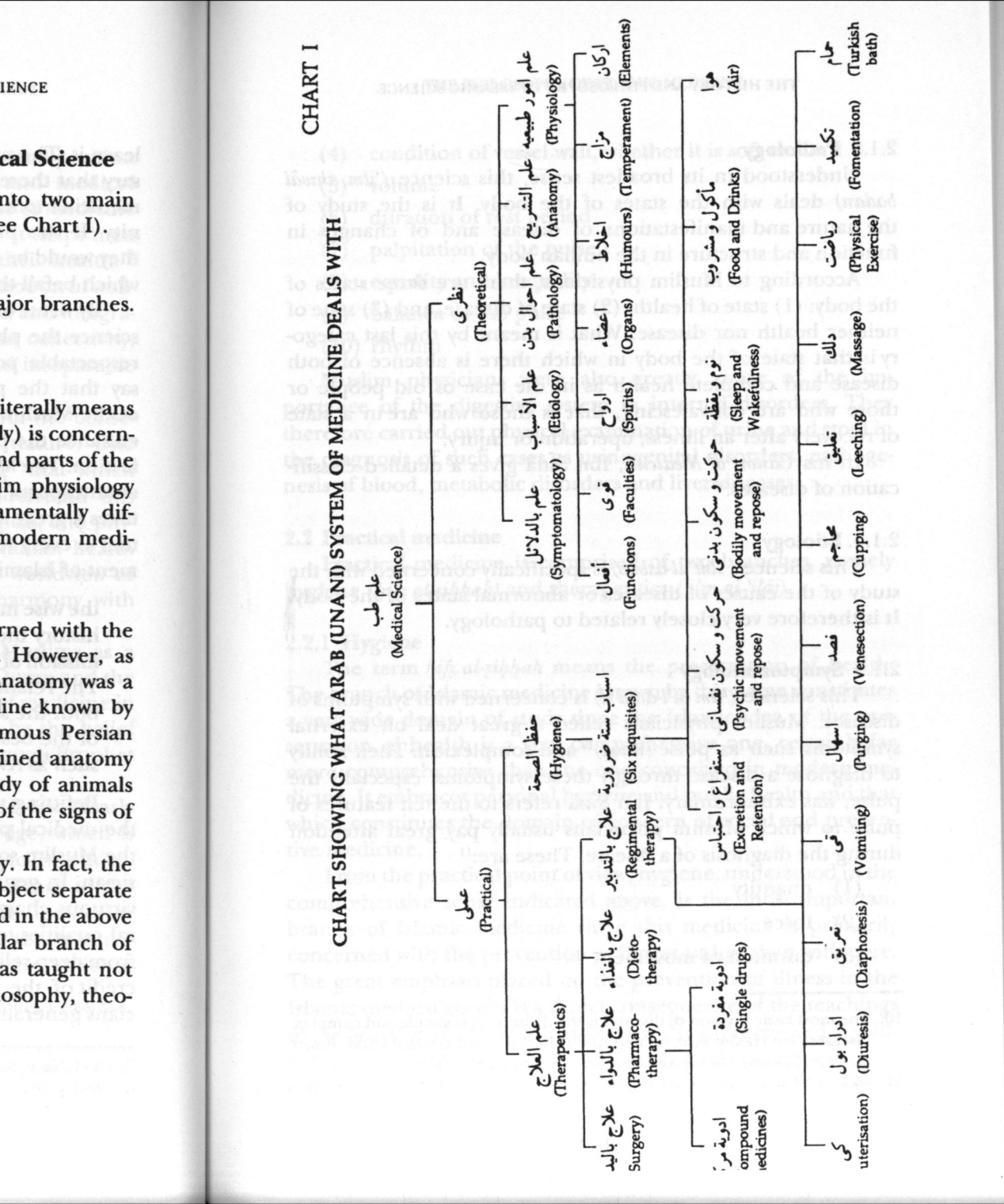
This science (*'ilm al-tashrīḥ*) is mainly concerned with the structures of the human body and of its parts. However, as understood and defined by Muslim physicians, anatomy was a very much wider subject than the modern discipline known by the same name. Ṣadr al-Dīn 'Alī Isfahanī, a famous Persian teacher of medicine of the fifteenth century, defined anatomy as "the science of the individual parts of the body of animals and men, of the purpose for their creation, and of the signs of divine power and wisdom manifested in them."[9]

Thus, anatomy is closely related to physiology. In fact, the Muslim physicians refused to make anatomy a subject separate from physiology or even theology as clearly implied in the above definition. Anatomy was perhaps the most popular branch of medicine among Muslims in the sense that it was taught not only to medical students but also students of philosophy, theology, Sufism and law *(fiqh)*.

9. C. Elgood, *op. cit.*, p.129.

CHART I

CHART SHOWING WHAT ARAB (UNANI) SYSTEM OF MEDICINE DEALS WITH



2.1.3 **Pathology**

Understood in its broadest sense, this science *('ilm aḥwāl badan)* deals with the states of the body. It is the study of the nature and manifestations of disease and of changes in function and structure in the human body.

According to Muslim physicians, there are three states of the body: (1) state of health, (2) state of disease, and (3) state of neither health nor disease. What is meant by this last category is that state of the body in which there is absence of both disease and complete health as in the case of old people or those who are convalescing, that is those who are in a state of recovery after an illness, operation or injury.

In his *Canon of Medicine*, Ibn Sīnā gives a detailed classification of diseases.[10]

2.1.4. **Etiology**

This science *('ilm al-asbāb)* is specifically concerned with the study of the causes of diseases or abnormal states of the body. It is therefore very closely related to pathology.

2.1.5 **Symptomatology**

This science *('ilm bi'l-dalā'il)* is concerned with symptoms of diseases. Muslim physicians relied a great deal on external symptoms such as pulse *(nabḍ)*[10] and complexion. Their ability to diagnose a disease through these symptoms, especially the pulse, was extraordinary. Ibn Sīnā refers to the ten features of pulse to which Muslim physicians usually pay great attention during the diagnosis of a disease. These are:[11]

(1) quantity
(2) force
(3) duration of movement

10. The most basic division of diseases is the division into simple and complex diseases. See Hakim Mohammed Abdur Razzack and Ummul Fazal, *Report on Arab (Yunani) Medicine and the State of Kuwait*, 1977, p.12.
11. *Ibid.*

(4) condition of vessel wall, whether it is soft or hard
(5) volume
(6) duration of rest period
(7) palpitation of the pulse
(8) equality and inequality
(9) balance of the pulse
(10) rhythm

Muslim physicians were also greatly aware of the importance of the digestive system in internal disorders. They therefore carried out physical examination of urine and stool in the diagnosis of such cases as urinogenital disorders, pathogenesis of blood, metabolic disorders and liver diseases.

2.2 Practical medicine

Practical medicine is comprised of two branches, namely hygiene *(ḥifẓ al-ṣiḥḥah)* and therapeutics *('ilm al-'ilāj)*.

2.2.1 **Hygiene**

The term *ḥifẓ al-ṣiḥḥah* means the preservation of health. The branch of Islamic medicine known by this name constitutes a very wide domain of study since the Islamic idea of the preservation of health is a very comprehensive one, certainly far more comprehensive than the one conceived in modern medicine. It embraces personal hygiene and public health and that which constitutes the domain of concern of social and preventive medicine.

From the practical point of view, hygiene, understood in the comprehensive sense indicated above, is the most important branch of Islamic medicine since this medicine is primarily concerned with the prevention of illness rather than with cure. The great emphasis placed on the prevention of illness in the Islamic medical system is a direct consequence of the teachings of the *Sharī'ah*. For Muslims, as we have already remarked, health is the natural or normal state in which God has created man. One prophetic ḥadīth gives the advice that one should preserve

and value one's health, which is a divine gift, before one is afflicted with illness. Such a response involves all aspects of one's existence, spiritual, psychological, and physical.

Similarly, Islamic social philosophy, with its emphasis upon the wholeness and integrality of the human collectivity, has prescribed duties and responsibilities to be honored by society toward those of its citizens who are in illness. Thus, in Islam, illness is never viewed as a mere medical problem with perhaps certain economic implications, as it is, unfortunately, regarded by so many people today. Illness is a multi-dimensional phenomenon which should never be reduced to its medical aspect alone. There are many ḥadīths which emphasize the positive value of illness, and which point to its spiritual and social significance.[12]

Islamic teachings concerning illness in all its dimensions, especially the spiritual, psychological, medical, and the social have enabled traditional Muslim society to produce a healthy human ecology or sociocultural environment in which the sick and the suffering were relieved of much of the kind of psychological and economic burden which many of their modern counterparts have to painfully bear, particularly those in industrialized western societies. Islamic spirituality and its faith tradition, its social relationships and institutions, particularly the family, and the popular nature of the Islamic medical system all played a role in delivering the sick from this "psychological and economic" burden. There is even nobility in the way they responded to failures in finding medical cures.

As the appearance of many modern diseases has clearly shown, there is a very close link between life style and health. Chronic and degenerative diseases such as heart disease and cancer, stress-related ailments, including what modern Japanese call *karoshi*[13], sexually transmitted diseases (STD) such as syphilis,

12. For a discussion of the spiritual and social significance of illness in Islam, see F. Rahman, *op. cit.*, especially the chapter entitled "Wellness and Illness in the Islamic worldview," pp. 11-28. See also Chapter 9 of this book.
13. *Karoshi* is the modern Japanese name for death from overwork. See the article "Living to Grips with *Karoshi*" in *Time*, Jan. 30, 1989.

chlamydia, genital herpes, genital warts, gonorrhea and now the latest addition, namely AIDS, diseases related to drug abuse, and iatrogenic diseases, that is diseases produced by diagnostic or therapeutic procedures, all have to do with a life style associated with modern industrialized societies.

The fundamental constituents of any life style are (1) dietary habits and modes of food production and consumption, (2) sex habits, (3) work habits, (4) organization of the environment, and (5) general attitude toward health, illness, disease and therapy. Each of the categories of diseases mentioned above is related to one or more of these aspects of modern life style. STDs are clearly related to sex habits. Stress-related ailments, including heart attacks and strokes, are direct consequences of modern work habits. Iatrogenic diseases result from the lack of a holistic attitude toward health, disease, and treatment among the moderns. Some of the consequences of this lack of integrated approach to the causes and treatment of diseases are "the prevalence of unnecessary and often risky surgery, doctors' over-readiness to prescribe inappropriate or dangerous drugs, and overuse of dangerous diagnostic procedures."[14] It is widely known that some 80 percent to 90 percent of all cancers are caused by such environmental hazards as air pollution, smoking, food additives, pesticides and radiation. And overweight-related diseases, not mentioned above and which are today a major medical concern in the West, are closely related to the problem of diet and dietary habits.

In the light of this close link between modern life style and many of the modern diseases, one should perhaps reflect more on the wisdom embodied in the Islamic life style. The Islamic life style as a whole, which is based upon the teachings of the *Sharī'ah*, may be viewed as a form of preventive medicine. In fact, to all faithful Muslims, the various rules and injunctions of the *Sharī'ah* concerning such things as ritual cleanliness, food

14. John Ehrenreich (ed.), *The Cultural Crisis of Modern Medicine* (New York: Monthly Review Press, 1978), p.14.

and drinks, dietary, sex, and work habits, the organization of the environment, and medical treatment are all ordained by God so that men and their society can preserve health and prevent diseases and illness to the best extent possible. For this reason, Islamic medicine incorporates these religious teachings into its literature to become an integral part of the medical curriculum, or more specifically of the subject called hygiene and public health. In this connection, it should be noted the whole body of prophetic ḥadīths dealing with medical questions had been systematized by many Muslim writers under the name of the *Medicine of the Prophet (Ṭibb al-Nabī)*.[15] This body of knowledge serves as the religious basis of Islamic medicine. Medical education in Islam must always begin with the study of this book.

Islamic medicine has laid down six essential pre-requisites for the preservation of health. These six principles, usually referred to as the "Six Necessities" *(Sittah ḍaruriyyah)*, form the subject of discussion by many authors.[16] These are:

(1) Air
(2) Food and drinks
(3) Bodily rest and movement
(4) Sleep
(5) Emotional rest and movement
(6) Excretion and retention

(1) **Air**

Good and clean air is necessary for health. Included in the Muslim exposition of this principle is the question of the influence of climates and soils up on the health of the individual. According to Ibn Sīnā, a change of environment can help relieve patients of many diseases. To ensure that good and clean

15. See, for example, C. Elgood's English translation of this work in *Osiris*, 14 (1962), pp.33-192.
16. C. Elgood, *Safavid Medical Practice*, pp.17-18.

air is available to city dwellers, Ibn Sina strongly recommended that the city should have plenty of gardens and that the architectural design of city buildings be ecologically harmonious with its climatic conditions.

(2) **Food and drinks**

A discussion of this second necessity involves, among other things, the following: (1) what is good to be eaten and drunk, and by extension what food and drink to be avoided, (2) the amount that should be eaten and drunk, and (3) the proper times of meals.

Muslim physicians maintain that we should only consume fresh food which is free from putrefaction and disease producing matters. Drinking water should be pure. Ibn Sīnā, for example, recognized the medical value of natural water obtained from certain kinds of wells thanks to its mineral content. On the other hand, polluted water was recognized as a carrier of disease. According to Hakim Abdul Razzack, Ibn Sīnā was the first to recognize this fact.[17] Muslim physicians further maintain that what is good to be eaten and drunk is relative to the individual since each person has a unique humoral constitution.

Concerning religiously prohibited food and drink such as pork and alcoholic drinks, many treatises were written by Muslim physicians, which specifically discuss or contain discussions of medical and scientific justifications for the prohibitions. For example, al-Razi (d. 925), the greatest of Muslim clinicians, wrote the following concerning drunkenness and the effects of alcoholic drinks on both the soul and body of man:

> Chronic and habitual drunkenness is one of the evil dispositions that bring those indulging it to ruin, calamity and all kinds of sickness. This is because the excessive drinker is imminently liable to apoplexy and asphyxia, that filling of the inner heart which induces sudden death, rupture of the arteries of the brain, and stumbling

17. H.M.A. Razzack & U. Fazal, *op. cit.*, p.15.

> and falling into crevices and wells; not to mention various fevers, bloody clots and bilious swellings in the intestines and principal parts, and delirium tremens and palsy especially if there be a natural weakness of the nerves. Besides all this, drunkenness leads to loss of reason . . . Drink weakens the rational soul and stultifies its powers, so that it is scarcely able to undertake careful thought and deliberation.[18]

These kinds of treatises clearly demonstrate the unity of religious and scientific principles governing Muslim dietary habits.

(3) **Bodily rest and movement**

Perfect health requires both bodily rest and bodily movement, especially in the form of physical exercises. Also, the treatment of certain kinds of diseases and physical afflictions depends on either bodily rest or bodily movement. For example, Muslim physicians maintain that inflammation and fractures require complete rest to get properly cured whereas paralysis requires specific kinds of movement. The medical value of physical exercises was very much emphasized.

(4) **Sleep**

Sleep is viewed as an ideal form of rest, physical as well as mental. Lack of sleep will bring about dissipation of energies, mental weakness and digestive disturbances.

(5) **Emotional rest and movement**

Muslim treatment of this principle involves primarily a discussion of which emotional states of a person help or harm his health. Happiness is to be encouraged because it helps to keep a person healthy. Sorrow or suffering, anger, and emotional strain generally are to be avoided because these emotional states can

18. S.H. Nasr, *op. cit.*, p.206.

give rise to many diseases. Some of the diseases mentioned by Muslim physicians were tuberculosis, hysteria, and mental disorder resulting from a disruption in the functioning of the neurophysiological system.

Diseases which are caused by psychological factors are usually treated with psychological means. This method of treatment forms a part of the branch of Islamic medicine called "psychological therapy" which is known today under the name "psychosomatic medicine." Muslim physicians recognized the therapeutic value of music, pleasant company, and beautiful natural scenery in dealing with diseases generated by psychological ill health.

(6) **Excretion and retention**

Proper and normal functioning of the excretory system is essential for sound health. Included in the discussion of this principle is the effects of sexual intercourse on health. Any irregularity in the excretion of waste products of the body, whether this be excess, dimunition or blockage, can lead to disease. Examples of the natural means of excretion of body waste products are diuresis, diaphoresis, vomiting, faeces, excretion through the uterus in the form of menses, and respiration.

2.2.2 **Therapeutics**

The term *'ilm al-'ilāj* means the science of treatment or curative procedures.

The science is divided into four main branches:

(1) regimental therapy *('ilāj bi'l-tadbīr)*

(2) dietotherapy *('ilāj bi'l-ghidhā')*

(3) pharmacotherapy *('ilāj bi'l-dawā')*

(4) surgery *('ilāj bi'l-yad)*

According to a famous ḥadīth of the Prophet, "God has sent down a treatment for every ailment." Another version reads:

"There is a medicine for every ailment such that if a right medicine hits a corresponding ailment, health is restored by God's permission." In the practice of Islamic medicine, the search for the "right medicine" went hand in hand with a deep reliance on divine help. Muslim physicians were guided by the principle that the treatment of a particular ailment depends very much upon its nature and causes. Centuries of experience based upon careful observation and systematic rational deliberations have enabled Islamic medicine to accumulate a staggering wealth of knowledge concerning therapeutics, which deserves to be studied by contemporary Muslims. In many areas and aspects, there is much that the modern world could benefit from Islamic therapeutics.

(1) **Regimental therapy**

This category of treatment covers a wide range of special techniques and physical means, and processes of a generally simple nature. These include venesection or phlebotomy, cupping, sweating, diuresis, the use of turkish baths, massage, exercise, purging, vomiting and even leeching.[19]

(2) **Dietotherapy**

Diet plays a more important role in Islamic medicine than in modern medicine. As already pointed out, consuming the right food and drink and in the right amount as well as in the right manner is one of the six essentials of sound health. In the view of Muslim physicians, the effect of diet on both health and illness is generally more powerful than that of drugs.

The scientific basis of dietotherapy, according to Islamic medicine, is the theory of correspondence between the natures within the humors of the body and the natures in food. Like drugs and the humors, food possesses various natures in different degrees, thereby affecting the humoral constitution of the person

19. For further discussion of these methods of treatment, see H.M.A. Razzack & U. Fazal, *op. cit.*, pp.16-17.

who consumes it. Accordingly, Islamic dietotherapy seeks to cure certain diseases by regulating the dietary habits of the patient. Since the fundamental idea of therapeutics in Islam is to find a medicine which can aid the body's natural power of self-preservation, traditionally called *medicatrix naturae*, to fight off the disease in question, the task of a dietotherapist is to prescribe a diet whose nutritive and pharmacological properties are capable of strengthening the body's natural power or what we now call immune system. The following remarks by a contemporary nutritionist and naturopath are very much in the spirit of Islamic medicine:

> We know that the human body has all sorts of weapons at its disposal to fight off invading germs. There are many factors affecting how well these various weapons function, including previous exposure to similar germs, heredity, stress, emotions and *nutrition*.[20]

There are many Muslim works on dietotherapy which contain discussions of nutrition and pharmacological properties of food.[21]

(3) **Pharmacotherapy**

This is a field in which Muslims possess a remarkable wealth of knowledge and made many outstanding contributions to the advancement of medicine. In Islam, the principles of pharmacology and pharmacotherapy are very closely related to the humoral theory of medicine. The use of a particular drug is governed by three main factors: (1) the nature of the drug in question, (2) the nature of the ailment in question, and (3) the temperament of the patient. The guiding principle is that the drug to be prescribed should possess qualities opposite to those present in the disease in question.

20. Eu Hooi Khaw's article "Science and Health: Eating Right for Stronger Resistance" *New Straits Times*, 19th May, 1989.
21. Several of these works are mentioned by H.M.A. Razzack and U. Fazal, *op. cit.*, p.18.

Islamic literature on pharmacology contains a detailed treatment of the following:

(1) The nature, qualities and temperament of drugs

(2) Gradation of the potency of drugs

(3) Division of drugs according to quality

(4) Action of drugs on various systems or organs of the body

(5) Use of purgatives

(6) Administration of drugs dealing especially with

  (a) dosage and timings

  (b) modes of administering drugs

  (c) forms and shapes of drugs

(7) Correction of harmful effects of drugs

(8) Drugs substitute

Islamic pharmacology is very much concerned with the classification of drugs. We have already referred to the classification according to their qualities. On this basis, drugs are classified into four groups:

(1) drugs with hot temperament

(2) cold drugs

(3) moist drugs including lubricants

(4) dry drugs

However, the most wellknown classification is the distinction between simple *(mufradāt)* and compound drugs *(murakkabāt)*. The simples are those drugs which occur in their natural and simple state. This branch of pharmacology is today known as pharmacognosy. The compounds are drugs as they are usually understood today. The branch of Islamic pharmacology dealing with compounds is usually discussed under the topic *aqrabadhin*

which means drugs catalogue, pharmacopoeia, or medical formulary.

It is important that the full significance of Islamic pharmacology be made better known to the modern world, especially in the light of the threat to human health posed by many allopathic drugs. As aptly pointed out by Nasr,

> Islamic pharmacology is the depository of the experience and observation of countless generations of human beings extending over aeons of prehistory. It seems even from the empirical point of view absurd that such a wealth of knowledge acquired through experience and observation should be so easily discarded by many, even when there is a clear choice, in favour of drugs the ill-effects of many of which are often forced upon the public without a close study of their long-term consequences for the human body as a whole.[22]

(4) Surgery

In Islamic medicine, surgery is usually disapproved unless it is considered absolutely necessary. Muslim surgery was limited to the various forms of cauterization, caesarean and eye operations, oral surgery and dentistry. Traditional osteology, which is still widely practiced today in many parts of the Muslim world, is not really a part of surgery (unlike in modern medicine) since the treatment of broken or disjointed bones in Islamic medicine generally does not involve operations.

3. The physiology of Islamic medicine

Much of what we have discussed concerning preventive medicine and therapeutics in Islamic medicine may be best understood and justified by referring to the physiology upon which the whole of that medicine is based. Both health and illness are defined in terms of the fundamental concepts underlying this physiology.

22. S.H. Nasr, *Islamic Science*, p.185.

Muslim physiology is based on the humoral theory which presupposes a knowledge of the four elements and the four natures.[23]

3.1 Humors as "elements" of the body

In the world of Nature, there are four elements and four natures. The four elements are fire, air, water, and earth; the four natures are cold, hot, dry, and humid. The elements are not to be taken as being identical to the physical substances of the same names, which are found in the physical world. Rather, they are principles of which the physical substances in question are manifestations on the physical plane in the same sense that we speak, for example, of angels as being cosmological principles of the natural world. Similarly, the four natures are to be viewed as principles of the physical natures or qualities of the same names, which can be sensually experienced by man in his environment. Each element has two natures: fire is hot and dry, air hot and humid, water cold and humid, and earth cold and dry.

The humors, which constitute the "elements" or the "building units" of the body are the primary body-fluids produced from digested food. There are four such humors present in the body: blood, phelgm, yellow bile and black bile. These humors, like everything else in the world of nature, are composed of the elements and natures in different mixtures, proportions, and combinations.

Like the elements, each humor has two natures: blood is hot and humid, phelgm cold and humid, yellow bile hot and dry, and black bile cold and dry. There is thus a correspondence between the natures in the human body and the natures in things found in the world of nature.

In the human body, the humors mix together to produce a certain humoral constitution or temperament. Each person pos-

23. For a discussion of the theory of the four elements, the four natures and four humours in a more detailed manner, see O.G. Gruner, *A Treatise on the Canon of Medicine, Incorporating a Translation of the First Book* (London, 1930); Hamdard Institute, *Theories and Philosophies of Medicine,* (New Delhi, 1962); S.H. Nasr, *op. cit.*, pp. 159-161; H.M.A. Razzack & U. Fazal, *op. cit.*

sesses a unique temperament which represents his healthy state. Thus, in each individual, health means the harmony of the humors relative to his own constitution. Illness means the disturbance of that harmony. To restore health the physician must therefore re-establish the state of equilibrium of the humors.

It is not just the body as a total entity, which possesses a unique temperament. Each organ of the body too possesses a unique temperament. The health of each organ, which is so essential to the health of the whole body, is likewise defined as that state in which its constituent substances are in the correct proportion to each other, both in strength and quantity, and are well mixed.

According to Ibn Sīnā, the diversity of temperaments is what accounts, biologically speaking, for the different durations of creaturely lives, that is, the differences in longevity. This diversity of temperaments is determined by many factors apart from the particular nature of each human body. Ibn Sīnā mentioned race, climate, age, and sex as among the factors.

The nature and characteristics of Islamic therapeutics is largely determined by the above theory of the humors. The fact that the temperament of each person is unique means that no two people suffering from the same kind of disease or illness can be given the same mode of medical treatment. It also means that the defense mechanism of the body or the responsiveness of the immune system varies from individual to individual. The correspondence between the natures in the human body and the natures in the external world of nature further means that, for the sake of his health, man must live in harmony with his natural environment. Serious attention was therefore given in Islamic medicine to the understanding of the actual temperament of each patient, to the factors which determine the uniqueness of the temperament of each body, as well as to the external factors which affect health and illness, like the six necessities earlier discussed.

In the light of the above definition of health and illness, diagnosis for illnesses then consists in searching for the ways in which the balance of the humors has been disturbed.

3.2 The biological systems of the human body

In speaking of the biological systems of the human body, we are referring to what the Muslim physicians call the faculties or powers *(quwwah)* of the body and the various organs and physiological functions connected with them. The three fundamental systems of the body are the physical *(ṭabī'iyyah)*, nervous *(nafsāniyyah)*, and vital *(ḥayawāniyyah)* systems. The unity of these systems is made possible by the presence in the body of a vital force or spirit *(rūḥ)* which, according to Muslim physicians, has its centre in the left ventricle of the heart.

The medical and biological use of the term *rūḥ* is to be distinguished from the theological use of it. The latter refers to the purely spiritual substance which is identified with the angelic world. The vital spirit is neither a physical nor a spiritual substance. Rather, it is a subtle body or a form of subtle energy which stands intermediate between the physical body and the spirit in its theological sense. The function of the vital spirit is to direct the organization of life of the body. The possibility of this function presupposes a certain level of refinement and perfection in the mixtures of the humors of which the body is comprised.

The vital spirit is of three kinds:

(1) **the natural spirit**

This is the vital spirit as located in the liver. It is hot and moist. It is associated with the functions of nutrition and growth and reproduction, which are performed by faculties of the same names and subservient faculties. It travels within the veins.

(2) **the psychic spirit**

This spirit which is cold and moist has its centre in the brain. It produces sensation and perception through the cognitive faculty and movement through the motive faculty. It travels within the nerves.

(3) **the vital spirit proper**

This spirit is hot and dry. Functioning through the heart,

which is its centre, it preserves life by preparing suitable conditions for the functioning of the biological systems associated with the natural and psychic spirits, and by traveling within the arteries to all organs and tissues.

The natural spirit gives rise to the physical system, the psychic spirit to the nervous system and the vital spirit to the vital system. Health of the body depends on the proper functioning of each system and its constituent elements and the interrelation of the three systems within the total unity of the body. Consequently, Islamic medicine gives much importance to knowledge of these biological systems.

3.3 The metaphysical and cosmological basis of Muslim physiology

The historical origin of the above physiological theory may be traced to the Greek medical theories of Galen and Hippocrates. However, the theory was easily accepted by Muslim philosopher-scientists to become an essential component of the general theory of Islamic medicine, because it is in conformity with the following metaphysical and cosmological teachings of the Quran and Ḥadīth:

(1) that there are hierarchic levels of reality, from the lowest, namely, the physical world, to the highest, namely, God who is the Creator of the universe, including man. The three fundamental qualitative divisions of the universe are the physical, the purely spiritual, and the intermediate world which stands in between, namely, the subtle world. In the Quran, these three divisions are represented respectively by creatures of light, creatures of fire, and creatures of earth.

(2) order, justice, balance, harmony, and equilibrium pervade the whole universe

(3) the unicity of the universe, which is a cosmological consequence of the metaphysical idea of the unity of God.

(4) man, who has been created in the "best of moulds" is a microcosm of the universe; he is a multi-dimensional and

multi-layered creature with numerous natures, faculties (Chart II), and qualities, and yet a unified living entity characterized by wholeness and integrality; he is body, soul, and spirit.

(5) human felicity, well-being, and health, understood in its all-embracing sense, is the fruit of a way of life, which is in harmony with God, the natural and social environment, and with oneself.

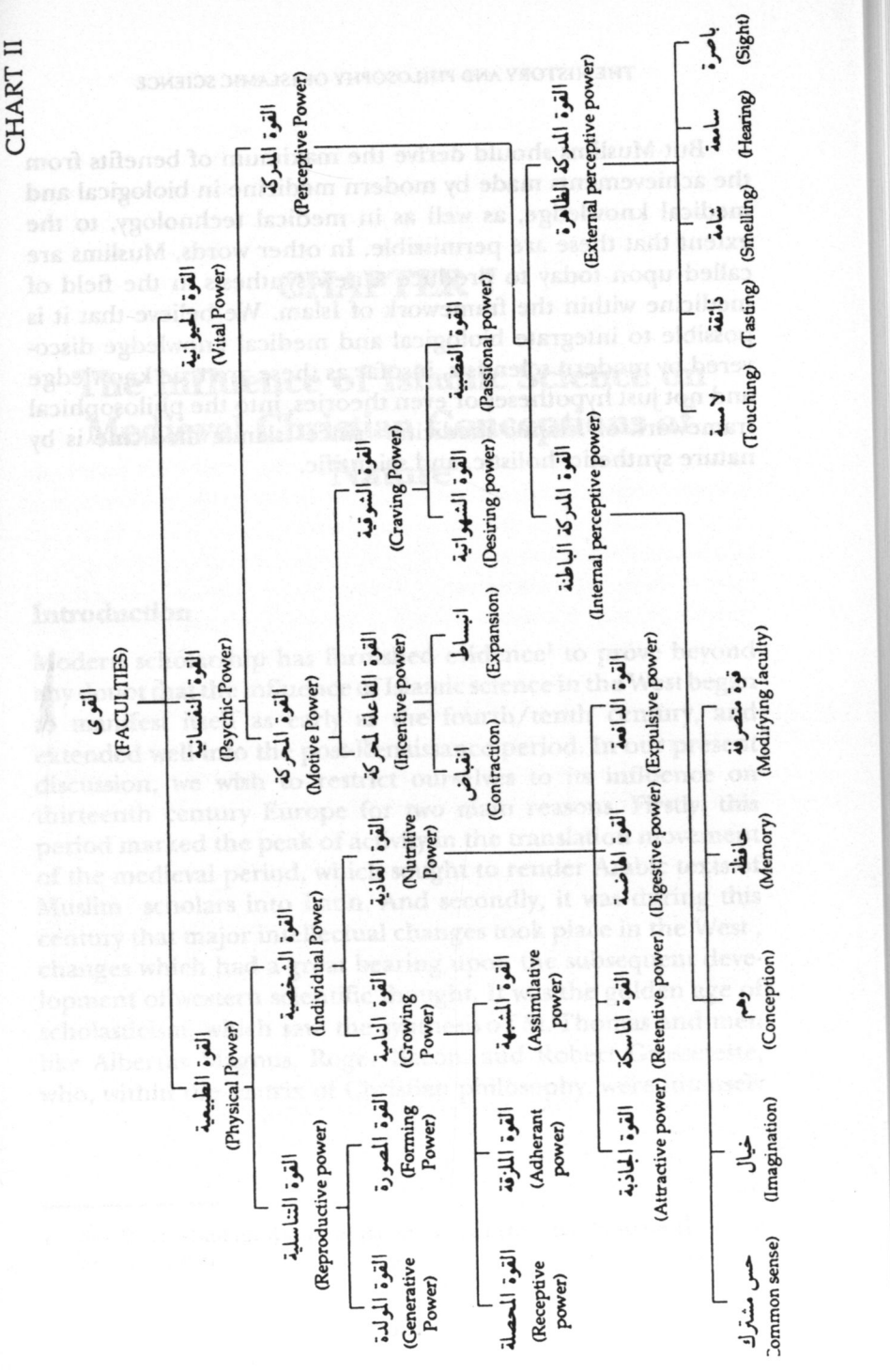
4. The need for a new synthesis

Islamic medicine in both theory and practice is the product of the application of the above metaphysical and cosmological principles to the study of health, illness, and cessation of life. There is no doubt that the philosophy of Islamic medicine is very much different from, and even opposed to, that of modern medicine. Islamic medicine, like many other traditional systems of medicine, is holistic in nature whereas modern medicine is reductionistic.[24] But like the latter, Islamic medicine is also scientific.

Reviving Islamic medicine in the contemporary world does not entail a total rejection of modern medicine. Islamic medicine, as is true also of the other aspects of the Islamic system of life, has never been outright rejectionistic in its spirit. Its spirit is one of synthesis. Obviously, many essential elements of the philosophy of modern medicine have to be rejected. The traditional philosophy of medicine we have just presented would be the one which best conforms to the beliefs and values of Islam.

24. Fritjof Capra has well summarized this reductionistic nature of modern medicine: "Modern scientific medicine has overemphasized the reductionist approach and has developed its specialized disciplines to a point where doctors are often no longer able to view illness as a disturbance of the whole organism, nor to treat it as such. What they tend to do is to treat a particular organ or tissue, and this is generally done without taking the rest of the body into account, let alone considering the psychological and social aspects of the patient's illness." *The Turning Point*, p.157.

CHART II



But Muslims should derive the maximum of benefits from the achievements made by modern medicine in biological and medical knowledge, as well as in medical technology, to the extent that these are permissible. In other words, Muslims are called upon today to produce a new synthesis in the field of medicine within the framework of Islam. We believe that it is possible to integrate biological and medical knowledge discovered by modern scientists, insofar as these are true knowledge and not just hypotheses or even theories, into the philosophical framework of Islamic medicine since Islamic medicine is by nature synthetic, holistic, and scientific.

CHAPTER 7

The Influence of Islamic Science on Medieval Christian Conceptions of Nature

Introduction

Modern scholarship has furnished evidence[1] to prove beyond any doubt that the influence of Islamic science in the West began to manifest itself as early as the fourth/tenth century, and extended well into the post-Renaissance period. In our present discussion, we wish to restrict ourselves to its influence on thirteenth century Europe for two main reasons. Firstly, this period marked the peak of activity in the translation movement of the medieval period, which sought to render Arabic texts of Muslim scholars into Latin. And secondly, it was during this century that major intellectual changes took place in the West, changes which had a great bearing upon the subsequent development of western scientific thought. It was the golden age of scholasticism, which saw the synthesis of St. Thomas and men like Albertus Magnus, Roger Bacon, and Robert Grosseteste, who, within the matrix of Christian philosophy, were intensely

1. See D. M. Dunlop, *Arabic Science in the West* (Karachi: Pakistan Historical Society, 1958).