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MUHAMMAD THE EDUCATOR

by

ROBERT L. GULICK, JR.

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Chapter 1

INTRODUCTION

IT is the purpose of this investigation to trace the life of Muḥammad from the standpoint of influence on world culture. What was the power which enabled Muḥammad to unite the warring tribes of Arabia, a task of such magnitude as to preclude the emperors of Rome, Constantinople, and Persia from undertaking it? Did the handsome camel-driver possess a conquering personality which impelled his neighbours to forsake their pleasures and follow him? Was the message he gave a compilation of Christian, Jewish, and Hanifite teachings which he had heard while leading caravans and at the fairs near Mecca? Was he a master-demagogue or politician? These are some of the questions which must be considered as fundamental to our consideration of Muḥammad as an educator.

The course is uncharted and the destination unpredictable. The primary topic is the inquiry into the methods which Muḥammad used to attain success where other well-meaning and more influential persons had failed. An Arabic scholar told me that Muḥammad had no method. It is possible, however, that the best of methods is that which is not apparent and which, therefore, does not distract the attention of the learner from the subject.

Those who insist on the exclusive importance of environment would demand an exhaustive treatment of the cultural and natural landscape in the Ḥijāz during the time preceding the appearance of Muḥammad. Although it is patently true that many thousands of other Arabs were subjected to the same or similar influences but there was only one Muḥammad, it is quite legitimate to devote some

attention to the historical and geographical background. Brief space will be accorded to the pre-Islamic development of commerce, literature, and religious ideas.

The rise of Islām to the control of a theocratic empire more vast than that of Rome presents another fascinating aspect of the influence of the life and preaching of Muḥammad. Muir and others have made exhaustive studies of the origin, achievement of great power, and decline of the Caliphate. The question of Muslim dominion is so involved and of such doubtful bearing on the core of the problem that it must remain in the fringe of attention.

The desire not to become entangled in a maze of theological notions dictates only passing mention of doctrinal points and a circumspect handling of the Si'ihtea-Sunnte controversy. Some assert that the student must align himself with one side or the other. Many scholars, even some of Sunnite persuasion, defend 'Alī. The literature is replete with attacks on the Abbasids but these allegations are usually undocumented. Labelling the Sunnites orthodox and the Shi'ites unorthodox, even though the former are in the majority, can scarcely be regarded as in the interest of objectivity.

Aside from the life of Muḥammad, the most interesting topic related to the educational aspects of Islām is the Muslim contribution to culture in its manifold manifestations: economic theory and practice, music, literature, architecture, sculpture, mathematics, chemistry, physiology and medicine. The gifts to world civilization of the followers of Muḥammad have been thoroughly set forth by such competent scholars as Sarton, Meyerhof, Sir Thomas Arnold, Khuda Bakhsh, and Baron Carra de Vaux. Only a specialist would care to survey definitively how each field of knowledge has been enriched but it is believed that it would be worthwhile to summarize the most important contributions. It is proposed to render accessible the gist of the facts and to indicate where additional data may be found.

Nicholson alleges that no other religion has historical attestations comparable to Islām but that nowhere else do we find pious men more given to falsehood than in Islamic tradition.¹ In view of the fact that much of the information is contradictory, it will frequently be necessary in this study to apply the recognized criteria of historical investigation and research to determine the reliability and authenticity of the data, the shifting of internal and external evidence in the assignment of dates and the ascription of acts placing a premium on resourcefulness and judgment.

In addition to the rather general phases of the problem sketched above, there are such specific tasks as tracing the authenticity of some of the aphorisms on learning attributed to Muḥammad and commonly memorised by Muslim school-children. The following sayings are typical :

The ink of the scholar is more precious than the blood of the martyr.

Seek ye learning from the cradle to the grave.

To seek learning is the duty of every Muslim man and woman.

A seat of learning is a garden of heaven.

Angels bend down their wings to a seeker after knowledge.

The day on which I have learned nothing is no part of my life.

These and other proverbs are commonly quoted by reputable writers, but almost invariably without a shred of evidence to support their ascription to Muḥammad. It should be possible to trace the chain of evidence (*isnād*) of some of these beautiful utterances. It would be highly significant if it were established that such statements were actually made by Muḥammad at a time when Christians were praising ignorance as the mother of faith.

¹ R. A. Nicholson, *Literary History of the Arabs*, p. 22.

The title of this study, Muhammad the Educator assumes that Muhammad is entitled to a place in the ranks of those who have influenced the educational and cultural progress of the human race. Is Muhammad usually so regarded and is the assumption justifiable? Does religious feeling becloud the vision of investigators? It is doubtless true that Muhammad is seldom regarded as an educator and this fact largely accounts for the unwillingness of reputable scholars in the English-speaking world to deign to write his biography from a pedagogical standpoint. It seems at first glance incredible that an unlettered man should be hailed as an educational leader. Muhammad said that the Qur'an was his only miracle, it being the revelation of an untutored mind and the first book in Arabic. That an educator could be illiterate might be the corollary of this miracle. The writer believes that only the most provincial concept of education would gainsay the legitimacy of placing Muhammad among the great educators of all time for, from the pragmatic standpoint, he who elevates human behaviour is a prince among educators. In line with the usual tendency to ignore the greatest Arab is the absence of articles on either Muhammad or Islam in Monroe's *Cyclopedia of Education*.¹

There is no intention to imply that the importance of Islamic culture in the development of contemporary civilization has been wholly ignored. On the contrary, some scholars give full credit and recognition to the fruit of the seed sown by Muhammad. Briffault traces the scientific method and spirit of inquiry to the Arabs in these words²:

It is highly probable that but for the Arabs modern European civilization would never have assumed

¹ Monroe's *Cyclopedia of Education*, I, does contain an article on Arabic Education; a tree is recognized but a forest is overlooked.

² Robert Briffault, *The Making of Humanity*, pp. 190-91.

that character which has enabled it to transcend all previous phases of evolution. For although there is not a single aspect of human growth in which the decisive influence of Islamic culture is not traceable nowhere is it so clear and momentous as in the genesis of that power which constitutes the paramount distinctive force of the modern world and the supreme source of its victory—natural science and the scientific spirit . . . What we call science arose in Europe as a result of a new spirit of inquiry, of new methods of investigation, of the method of experiment, observation, measurement, of the development of mathematics in a form unknown to the Greeks. That spirit and those methods were introduced into the European world by the Arabs.

Stanwood Cobb, founder of the Progressive Education Association, states in similar vein¹:

Islam, impinging culturally upon adjacent Christian countries, was the virtual creator of the Renaissance in Europe.

That important contributions to world intellectual progress were made by the Arabs is not open to question. But were these developments the result of the influence of Muhammad? Were the propagators of the Muslim creed lukewarm and unbelieving apostles? Briffault contends that at the time of its origin and throughout its heyday these leaders of thought were utterly indifferent to religion.² It appears incredible that anyone acquainted with the struggles, hardships, and sacrifices which characterized the lives of the companions of Muhammad could draw such a conclusion. It may well be, of course, that Briffault's

¹ Stanwood Cobb, "Islam's Contribution to the World Culture," *World Order* 6: 202 (9/40).

² Briffault, *op. cit.*, p. 186.

materialistic outlook led him to ignore the element of religious faith and devotion so clearly discernible in the lives of 'Alí, Abú Bakr, Ḥamza, and numerous other outstanding men who were willing and eager to endure persecution, to have friends turn against them, and to abandon their possessions in order to proclaim allegiance to the One God ("Ahadun ! Ahadun !"). Even so, some writers feel that it is as ridiculous to claim for Islám the work of Ibn Siná as it would be to point to the discoveries of Galileo as bestowals of the Catholic Church. Without attempting to settle the issue in that particular application and context, it is undeniable that Muḥammad did introduce the order and stability which stimulated the development of Islamic culture, a veritable revolution of unparalleled tempo and challenging virility. Concrete examples to verify these points will be cited as the study proceeds.

Henri Pirenne, the late Belgian historian, pointed out that, generally speaking, the Roman Empire had had practically no dealings with the Arabian peninsula before the Muhammadan epoch.¹ The Arab conquest was without precedent, the swiftness of its victory comparable to that which marked the beginnings of the Mongol Empires of Attila, Jenghis Khan, and Tamerlane. To quote from M. Pirenne² :

But these Empires were as ephemeral as the conquest of Islám was lasting The lightning-like rapidity of its diffusion was a veritable miracle as compared with the slow progress of Christianity.

The point as to whether the vast dominion of the followers of Muḥammad and the Islamic world culture were directly attributable to religious faith has been partly answered in the affirmative. Pirenne provides additional

¹ Henri Pirenne, *Mohammed and Charlemagne*, p. 147.

² *Ibid.*, p. 149.

evidence of a corroborative nature¹ :

While the Germans had nothing with which to oppose the Christianity of the Empire, the Arabs were exalted by a new faith. It was this, and this alone, that prevented their assimilation. For in other respects they were not more prejudiced than the Germans against the civilization of those whom they had conquered. On the contrary, they assimilated themselves to this civilization with astounding rapidity ; they learnt science from the Greeks and art from the Greeks and the Persians.

The Germans had no influence on Romanic civilization but were Romanized as soon as they entered Roman territory. On the other hand, the Romans became Arabized as soon as they were subjugated by Islám. In ninth-century Spain the Christians no longer knew Latin and the texts of the Councils were translated into Arabic.² The Arabs apparently had a motivation of an intensity and profundity unknown to pagan peoples.

Writing over a century ago, the Reverend George Bush had this to say about Islám and its influence³ :

No revolution in history, if we except that effected by the religion of the Gospel, has introduced greater changes into the state of the civilized world, than that which has grown out of the rise, progress, and permanence of Mohammedanism.

The Arabs customarily refer to the period prior to the advent of Muḥammad as the *Jahiliyya* or "time of ignorance." Muslim authorities may go a bit too far in their proneness to designate that period a "dark age," but the contrast between it and the epoch subsequent to the coming of Muḥammad is most striking. Without becoming overtly

¹ Henri Pirenne, *Mohammed and Charlemagne*, p. 150.

² *Ibid.*, p. 152.

³ Reverend George Bush, *The Life of Mohammed*, p. 17.

involved in controversy, it can be concluded that the genesis of the greater Arabic culture was centered on Muḥammad's miracle, the Qur'án. Moore presents the idea tersely and convincingly¹:

A people whose religion is revealed to them in a book must make provision for the study and interpretation of that book.

The most important and authentic of these sources is the Qur'án itself, probably the most studied book in the world. It was the first book written down and copied in Arabic. Parts were in writing during the lifetime of Muḥammad and all of the verses had been memorized by ear-witnesses. A few months after the death of Muḥammad a collected edition was made by Zayd—at the command of Caliph Abū Bakr—who “gathered it together, from date-leaves, and tablets of white stone, and from the breasts of men.”² In his travels a warrior named Hodzeifa noticed that the copies of the Qur'án exhibited variations of text and he warned Caliph 'Uthmán to “stop the people before they should differ regarding their Scripture, as did the Jews and Christians.”³ Some time after 33 A.H., 'Uthmán ordered Zayd and three others of the Quraysh to make a new and careful recension. This became the established text and copies were sent to Basra, Kufa, and Damascus, and one was retained at Madína. The text has remained unaltered to this day. The Treaty of Versailles required Germany to surrender one of these 'Uthmán Qur'áns.⁴

Translation of the Qur'án into any other language from the original Arabic results in loss of effectiveness. A single Arabic word may be a shorthand way of expressing a wealth

of connotations and significations. Then, too, the verses of the Qur'án are a poetic prose in which sound and rhythm are vital factors. The late Marmaduke Pickthall in the introduction to his attempt at translation rhapsodizes in this word-picture of the Qur'án: “that inimitable symphony the very sounds of which move men to tears and ecstasy.” Translation may be a bold effort, but that it is not a too forbidding one is attested by the number who have essayed it. A curious part of the record is the fact that the early renderings into English were made by enemies of Islám. The first one worthy of consideration was published in 1734 by George Sale who regarded Muḥammad as an impostor. This translation is surprisingly accurate although Yúsunf 'Alí, a recent translator, charges that Sale's work was based on the Latin version of Father Lewis Maracci, a confessor to Pope Innocent XI. Maracci's translation was produced in 1698 for the alleged purpose of giving the worst possible impression of Islám to the literate Europeans; it was dedicated to the Holy Roman Emperor Leopold I and was preceded by a refutation upon which, according to Yúsunf 'Alí, Sale based his notes and “Preliminary Discourse.” It is true that Sale regarded the Maracci translation as very exact and the only one “which represents the sense of the original.” But Sale considered Maracci's “refutations” as of little or no use and sometimes impertinent. He continues¹:

The work, however, with all its faults, is very valuable, and I should be guilty of ingratitude, did I not acknowledge myself much obliged thereto . . .

The Rodwell translation of 1861 was less literal than Sale's but more poetic and the Suras were arranged in rough chronological order. In 1876, Palmer produced a sort of American revised version which Yúsunf 'Alí, with some justification, condemns as “careless and slipshod.” Among the more recent translations consulted in connec-

¹ Earnest Carrol Moore, *The Story of Instruction*, p. 279.

² Sir William Muir, *The Life of Mahomet*, p. 555.

³ *Ibid.*, p. 556.

⁴ Moore, *op. cit.*, p. 256.

¹ George Sale, *The Koran*, pp. x-xi.

tion with this study are those of Pickthall (1930), Bell (1937), and Yúsuif 'Alí (1937-38). When passages from the Qur'án are quoted herein and the translation is not designated, that of Sale is employed.

The next most important source of biographical data is the *hadith* literature. A *hadith* is an act or saying attributed to Muḥammad. A man who said and did things in public for over three-score years would naturally inspire a vast body of traditions. The most respected collection of *hadiths* was that assembled by Al-Bukhári in 879 A.D.; from an accumulation of some 600,000, he selected 7,398 traditions. Bukhári's great work is available in French as well as in Arabic. Also highly esteemed is the collection of Muslim, a contemporary of Bukhári. The genuineness of traditions rests largely on the number and character of the witnesses in agreement. Traditions, like condiments, are best used in moderation to supplement and add flavour to what is more substantial. Guillaume gives an excellent, even if somewhat hypocritical, discussion of the leading recorders of *hadiths* and provides an insight into the complexity of tracing *isnáds*.

The principal authority for the life of Muḥammad is the

Sira of Ibn Isháq (Abú 'Abdu'lláh Muḥammad Ibn Isháq), native of Madína. He received his education in his home town, later travelling to Egypt, 'Iráq, and finally to Baghdád at the invitation of Caliph al-Mansúr. Thus the *Sira* was written under Abbasid patronage, which may account for its hostile treatment of the Umayyads and its eulogy of the Hashimites from whom the Abbasids claimed descent. Unfortunately, none of Ibn Isháq's works is extant in its original form but this oldest biography of Muḥammad has been preserved in a recension by Ibn Hishám (Abú Muḥammad 'Abu'l-Malik Ibn Hishám b. Aiyúb al-Himyari al-Basri), who died around 833 A.D., or about 65 years after the death of Ibn Isháq. Ibn Hishám's work is entitled *Kitáb Sirat Rasúhlláh*. The present form of the work dates from

the tenth-century revision by Wazír al-Maghribi. The next in line of authority is the *Kitáb al-Magházi* of al-Waqídi ('Abdu'lláh Muḥammad ibn 'Umar al-Waqídi). Another important book is the *Kitáb at-Tabaqát al-Kabir*, written by al-Waqídi's secretary, Ibn Sa'd (Abú 'Abdu'lláh Muḥammad b. Sa'd b. Mani uz-Zuhri), who died in 844 A.D. Two-thirds of the account of the life of Muḥammad by Abú Ja'far Muḥammad b. Jarír at-Tabarí is drawn from Ibn Isháq and it is interesting and revealing to compare this version with the recension of Ibn Hishám. We are also indebted to Tabari for one of the outstanding *tafsirs* or commentaries, the *Book of Religion and Empire* (published in English). The later biography of Abu'l-Fida (Isma'il b. 'Alí b. Muḥammad Abu'l-Fidá), who lived from 1273 to 1331 A.D., was a compilation of earlier sources and is regarded as an inferior authority.¹

The founding of Quranic exegesis has been ascribed to 'Abdu'lláh b. 'Abbás, cousin of the Prophet. The gist of the researches on interpretation is to be found in the encyclopedic commentary of Tabari (died 922 A.D.) and the *tafsir* of Baydawi (died 1286 A.D.) are highly prized in the Islamic world. The *Itqán*, a general survey of Quranic sciences, was compiled by Suyúti (died 1505 A.D.).

Among the leading biographies of Muḥammad written in the twentieth century are those of Emile Dermenghem, Tor Andrae, and Sirdar Ikbál 'Alí Sháh: these are available in America. The late D. S. Margolioth, most widely read of the biographers, was an ordained clergyman; his contempt for Muḥammad is often subtle and concealed, a characteristic which renders his writings perhaps less trustworthy than those of a candid opponent. Father Lammens, a man of great erudition, applies impossible criteria for judging *hadiths*, important biographical sources; he avers, for instance, that when traditions agree with the Qur'án, they copy the Qur'án and are not authentic. Ordinarily,

¹ De Lacy O'Leary, *Arabia Before Muhammad*, p. 214.

the agreement of sources is held to constitute substantiation, but it may be that the Jesuit scholar is concerned more with trans-substantiation than with substantiation. Prejudice is not confined to the Christian presentation. Some Muslim writers are not without sin; rare is he who adheres to bare facts without exegetical ornamentation; Dinet and Muḥammad 'Alī go so far as to attribute miracles to Muḥammad.

Those who have no religious predilections, frequently tackle the subject and often with less success than the religionists whether judged from an academic or an artistic standpoint. Dibble in his flippant book asserts that he has found the secret which explains the power of Muḥammad: epilepsy. But Dibble cites no instance of a proved epileptic building an empire and he seems unaware of the opinion of competent medical men that the trances of Muḥammad could not have been epileptic because occurrences or ideas experienced during fits of epilepsy are not remembered afterwards.

At the outset, it must be conceded that absolute objectivity is impossible. The body of material is so vast that selection is essential and selection involves subjective judgment. Even so, the *tu quoque* argument used by both Christians and Muslims can be eliminated, thus advancing that much toward unvarnished reality. The goal is to present Muḥammad as a moulder of human affairs and, if possible, to discover his eminently successful methods. Treatment of the subject by one who approaches it from the view-point of educational interest, should be of value at least to teachers. In this brief paper, only a beginning can be made. Inshá'lláh, this humble effort may stimulate others to undertake more ambitious research projects. As Abū'l-Fidá has written "knowledge of a part is better than ignorance of the whole." The writer believes that it is worthwhile to shed even one candlepower of light on the Islamic attitude towards human brotherhood, the attitude of several hundred million human beings who

regard the differences of wealth, nation, and race as of minor importance, whose vision of democracy excels that of the ancient Greeks.¹ Townsend presents this rare picture of Islam²:

The slave who embraces Islam is free; not simply a freed man, but a free citizen . . . competent *de facto* as well as *de jure* to all and every office in the state.

He goes on to say that "Under Mahommed . . . there sprang up *ex necessitate rei* a form of democratic equality more absolute than any the world has elsewhere.³ Muḥammad was a more thorough educator than the modern reformers whose libertarian teachings during the inter-war period in Europe could not measure up to the task of preventing tyranny and war.

¹ Owen Rutter, *Triumphant Pilgrimage*, p. 230.

² Meredith Townsend, *Mahommed*, p. 34.

³ *Ibid.*, p. 50.

Chapter 2

THE SETTING

KNOWLEDGE of the historical and geographical background of the Arabs contributes in an essential way to an understanding of the influence of Muḥammad. The methods and techniques of Muḥammad must be considered, not from the contemporary American standpoint, but in the light of the exigencies of time and place. Writers of history often feel constrained to ascribe every important idea of an outstanding man to his contact with the natural and social landscape. It is not difficult to argue the dominant significance of environment but beyond a certain point the theorising tends to get out of hand and clash with facts.

Dr. O'Leary draws this conclusion on the development of Islām¹ :

The result of the ancient penetration of Arabia and the intercourse of the Arabs with their neighbours was that the religion of Islām, so far from taking its rise amongst secluded desert tribes, was a natural stage of development in the religious life of West Asia

Now it is important to be aware of the ferment in religious thinking induced by the Jews and Nestorian Christians but some of the critics of Muḥammad go to the extreme of assuming that the ideas of Islām were offered to a people waiting and anxious to receive them. Such a theory is refuted by the known facts of the persecutions of Muḥammad and his followers. Hell provides an antidote for O'Leary's analysis of Islām as an evolutionary phenomenon² :

¹ O'Leary, *op. cit.*, foreword:

² Joseph Hell, *The Arab Civilization*, p. 9.

At the beginning of the seventh century Central Arabia was not even externally organized as a State. This makes it all the more remarkable that precisely that portion of Arabia which was wholly uninfluenced by the neighbouring civilizations should be the issuing-point of the great Islamic movement.

Reverend Zwemer would make it appear that Muḥammad borrowed the elements of Islām from "Heathenism" (comprising all religions rejected by Christian missionaries, e.g., the teachings of Zardusht and Buddha as well as Arabian idolatry), Judaism, and Christianity¹. The facile charge of plagiarism may more readily be preferred than substantiated, particularly when directed against an unlettered man. It is recalled that some have claimed that the teachings of Jesus are so strikingly similar to those of Gautama Buddha as to make credible the notion that the forty days reportedly spent by Christ in the wilderness must have been passed in a Buddhist temple. Actually, the Faith of Islām contains numerous administrative provisions and laws concerning fasting, marriage, providing for orphans, prohibition of the use of wine, abolition of gambling and infanticide, and so on, which are not to be found in any of the creeds mentioned by Zwemer. It is undeniably true that many of the doctrines concerning belief in God, immortality, the brotherhood of man, and the law of love are either implicit or explicit in religions preceding Islām. The fact, however, that an individual reiterates a thought previously expressed by another elsewhere should not lead a scholar to the conclusion that a causal relationship necessarily exists. The writer in meditating on the subject of the effect of music on character reached the conclusion that good music will not make bad people good nor will bad music make good persons bad. That same day, he opened a book by Al-Ghazzālī, none of whose writings he had previously read, and chanced upon a passage in which the revered man of

¹ Samuel M. Zwemer, *Arabia: The Cradle of Islam*, p. 178.

God held that music exalts the soul of the spiritual man but degrades the sensual man. There was no borrowing of ideas notwithstanding the fact that Al-Ghazzali had expressed similar thoughts eleven centuries earlier than the writer. Leaving aside the question of whether the ideas of Muhammad came from God or whether they were indigenous to Arabia, the fact remains that Muhammad alone possessed the power to infuse the spiritual dynamism requisite for their concrete realization.

Topics germane to this chapter pertain to these aspects of Arabian life: literature, religion, geography, art, and economics. Political features will be noted in discussing family and tribe.

A large part of Arabia consists of desert. There are three main types of desert. The *nefud* is an area of wind-tossed sand piled in dune and ridge formations. The *dahana* is a hard, gravelly plain, in spots covered with sand. The surface is very dry and barren but water may be obtained by sinking wells. The *harra* is an area of sharp, corrugated lava or scoriaceous rock. The great northern *nefud* extends about 140 miles from north to south and about 180 miles from east to west.¹ The soft sand yields tamarisk, yerta, and smaller desert flora during some seasons. South of the *nefud* in a convex crescent is the Jebel Shammar and to the west is the Hijaz or "barrier," containing the Qiblih of the Islamic world and the location of the ancient trade route running between the mountain ranges from San'a to Aqaba². A *dahana* extends inside the coast of the Persian Gulf and another occupies the comparatively unexplored south-central region, the Rubá-l-Khálí or "abode of emptiness³." The slopes of the high inland mountains are covered with *harra*. The rocks common to both *harra* and *dahana* are very destructive of shoes but an Arabian traveller reports that the

¹ O'Leary, *op. cit.*, p. 6.

² *Ibid.*, p. 8.

³ *Ibid.*, p. 6.

natives negotiate them barefoot with impunity.

The south-west corner of Arabia is the location of Yaman which is similar to the Hijaz in that it is composed of two main ranges which encompass a series of plains. The *tihama* or coastal belt has an enervating climate with extremes of temperature. The outer ridge, a bit off the coast, has a favorable climate and is suited to the cultivation of coffee. Ancient cities of Yaman include San'a, Nijran, and Adin.

To the east of Yaman lies Hadramaut, probably the Hazar-Naveth of Genesis 10 : 26 and First Chronicles 1 : 20. Hazar-Naveth was the third of the sons of Joktan of the family of Shem (2210 B.C.). Joktan settled in the Yaman which at one time was within the boundaries of Hadramaut, a center for trade with India and Africa.¹ The main valley of Hadramaut is very fertile and water is accessible. The plateau, averaging four or five thousand feet in elevation, is dry. Farther east, extending to the Persian Gulf, is Oman.

Generally speaking, it may be stated that Arabia is an arid, forbidding land, an isolated region having a maximum length of 1,500 miles, a breadth of 1,300 miles, and a total area of over 12,00,000 square miles, a third of which is stony desert. Much of the remainder has but scanty rainfall and is unsuited to agriculture, supplying only thorny plants appropriate in quality for indiscriminating camels and goats. Even these acrid herbs are so scarce as to prevent the animals from camping long in one place. There are hardly any rivers but mostly transitory *awda*, "rushing torrents in the brief rainy season, parching beds of hot stones for the remainder of the year²."

The Hijaz contained fertile, irrigated land which made settled urban life possible. The leading cities included Mecca, Yathrib (later Madina), and Taif. Taif, east of

¹ Robert Young, *Analytical Concordance to the Bible*, p. 458.

² W. S. Davis, *A Short History of the Near East*, p. 102.

Mecca in the mountains, was a resort popular, especially in summer, among the wealthy inhabitants of Mecca. It remains today in relation to Mecca pretty much what Darband is to Tīhrán. Mecca itself was hardly a favored spot in which to dwell. Al Haiqatan, the Negro poet, wrote¹ :

If Mecca could stir up longings you would see Himyarite princes hurrying there at the head of their warriors. Winter and summer are alike intolerable there. Nowhere in Mecca do the springs gush forth as at Jowatha. Not a blade of grass to rest the eye...no hunting...Instead, only merchants, the most contemptible of all professions.

Mecca was especially intolerable in summer. The heat of the flagstones surrounding the Ka'ba was too intense for even the thick-skinned Arabs who sprinkled them with water for the ritual procession. No tree of any size was there to cast some shade. It was sufficient punishment for a criminal if he were stretched naked on the ground. Mecca also suffered from lack of water, the famous wells of Zamzam being irregular and often bitter. Dermenghem quotes the descriptive phrases of the geographer, Al Maqdisi: "Suffocating heat, deathly winds, clouds of flies²." It is not surprising that those who lived there were anxious to escape to Taif in the Thaqifite Mountains, where grapes flourished and the only place in Arabia in which water froze in winter and where there were even frosty nights in summer³.

Winter in Mecca was also disagreeable. The furnace was succeeded by the bog. The Ka'ba felt the impact of the floods which swept from the hills down the ravines to deposit a sea of mud, rubbish, and filth at its door. The people had to remove the debris in carts and climb up to the door of the temple on a ladder. Dermenghem paints

¹ Emile Dermenghem, *The Life of Mahomet*, p. 22.

² *Ibid.*

³ *Ibid.*, p. 22.

this unattractive picture¹ :

It happened on just such a day of rain that the godly Ibn Zubair, determined not to abandon his daily *tawaf* (the seven processional rounds of the Ka'ba), made them, they say, by swimming.....By a distressing paradox, when the rains and torrents everywhere else in the peninsula brought blessings, covering the soil with greenery, washing the salty sheathes from the plants, freeing the land from want for months to come, at Mecca the water only caused devastations. It destroyed the houses, killed the animals, carrying with it the unburied carrion, and spreading temporary epidemics which added to the endemic ophthalmia.....Hygienic conditions were odious.

The original Arabs were probably a darker people than those of today. It is believed that a proto-negroid belt extended from Africa to Malaya, giving rise to the Hamitic people of Africa, the Dravidians of India, and to the intermediate dark-skinned inhabitants of the Arabian peninsula². It is supposed that virile caucasoid invaders overcame the dark-skinned Arabs, absorbing most of them and driving others to the Rub'al-Khálí, probably during the late Pleistocene period when the land that now constitutes the American States was covered with ice. At that time, Arabia may have been enjoying a Pluvial Period; at any rate, experts believe that Arabia was better adapted at that time for supporting human life than it has been within the historical period. Thomas presents interesting evidence of former conditions³ :

Considerable dried-up river systems I came upon in the southern borderlands, and the fauna I

¹ Emile Dermenghem, *The Life of Mahomet*, pp. 23-24.

² Bertram Thomas, *The Arabs*, p. 355.

³ *Ibid.*, p. 356.

collected in the Qara Mountains—fauna that have African rather than Arabian affinities bear witness to a common climate with a wet tropical Africa at some remote time, and to a land-bridge, that made the Red Sea an inland lake, and which later submerged to form the shallow straits of Bab al Mandab. As the ice of the Northern Hemisphere receded, and the rain-belt moved north behind it, Arabia was bereft of its rains, its climate changed, it became drier with the passing of the ages until to-day it is one of the hottest and most rainless parts of the earth's surface.

The ancient Arab appears to have been a long-headed man and the Jew a roundhead. Three distinct Arab types are discernible today : the dark, Hamitic man of the South ; the roundheaded Armenoid, whose evolutionary home is probably Asia Minor ; the narrow-skulled Mediterranean type found in the North and perhaps the most common type among the ancient Arabs living in our era¹.

Arab historians have distinguished primarily between the Qahtan, the Yamanites or South Arabs, and the 'Adnan or North Arabs². The Arabic traditions bear out the idea of divers ethnic origins. After referring to the "people of Noah" and what befell them, the Qur'án mentions "Ad and Themoud, and the men of Rasâ" (believed by the writer to refer to those who lived along the Aras River).

The most ancient Arab races which can be traced are said to be the 'Ad, Samood (Themoud), Tasm, and Jadis, the group collectively known as the *Baida*. Muhammad 'Alí relates their story³ :

The destruction of the tribe of Noah was followed by the rise of the 'Ad whose settlements spread far and wide beyond the limits of Arabia. Historical evidence bears out their domination over Arabia,

¹ Bertram Thomas, *The Arabs*, pp. 358, 359.

² O'Leary, *op. cit.*, p. 15.

³ Muhammad 'Alí, *Muhammad the Prophet*, pp. 16, 17.

Egypt, and many other places. At the fall of this race the Samood rose in power.

Then came the rise of the Banu Qahtan, whose homeland was Yaman. In their day they too attained to great power and ascendancy. The Aus and Khazraj were the off-shoots of this tribe. All these races are known as the 'Ariba, or pure Arabs. Last of all came Ishmael whose progeny goes by the name of the Musta'riba, or naturalized Arabs. In obedience to Divine behest he was left by his father, Abraham, along with his mother Hajira (Note : the Hebrew is transliterated Hagar and the Greek Agar), at the place where stands the Ka'ba.

Arabia was famed among the ancients as the land of frankincense and myrrh. Even more important was its location along the sea-route to India, in an era when the stretch of water was a medium through which the merchandise of the East commonly passed¹. Frankincense was used in Egypt on all sacred and solemn occasions (and their number was legion), in the mummification of princes, and funeral rites. The Israelites burned it before the Tabernacle of the Lord². The main groves were probably in the southern mountain valleys of Arabia. The main trade route probably went from Saba to Aqaba by way of Mecca, Yathrib, and Taima, this last a great distributing center and the cross-roads of routes going to Egypt, Babylonia, and Judea. Ships carried goods up the Red Sea, the volume being determined by political and security conditions along the land caravan routes³.

It has been noted that Mecca was situated on an important trade route. The dominant people of Mecca were the Quraysh, the tribe to which Muhammad belonged,

¹ O'Leary, *op. cit.*, p. 59.

² Thomas, *op. cit.*, p. 18.

³ Pringle Kennedy, *Arabian Society at the Time of Muhammad*, p. 24.

Professor Hell claims that the pre-eminence of Mecca was secured not by its market-place, sanctuary, or fairs—other towns had these, too. He denies that its geographical position was favorable, for it lay in a barren basin. It was rather, according to Hell, the intellectual superiority of the Quraysh which gave Mecca its exalted position as a religious and economic center. They were public-spirited and prosperous. According to First Kings 10 : 15, Solomon received gold from the kings of Arabia. There is some reason for regarding them as the first, or among the earliest, international traders. The Book of Ezekiel, 27 : 21-2, mentions the dealings of the merchants of Arabia and Sheba (Saba) with Tyre. Thus the Arabs were long experienced in commercial dealings and the Quraysh were among the most crafty of traders. The Romans paid dearly for the treasures of Arabia. The early seventh-century wars between the Greeks and the Persians aided the Meccan trade¹.

In addition to incense, perfumes, and gums, the Arabs brought dates from Hijáz, taking in exchange grain, oil, raisins, and textiles. The Quraysh had two main caravans—in the summer to Yaman and in the winter to Syria. These were large-scale operations by two or three hundred men². In the plutocratic republic of Mecca, the speculators gambled on the arrival and departure of caravans and made money from arbitrage. Like some modern American business men they knew the secret of selling fictitious commodities and of making money without capital. The debtors charged that Quraysh meant "shark." "Ah," jeered the Bedouin poet, Abu't-Tamahan, "If my camel could hear the tricks of trade, what a lot she could gain in Mecca by exchanging green grass for dried grass³."

Personal freedom was regarded as an inviolable right by the Bedouin but the individual was unable to withstand a

hostile and malignant environment. For this reason strangles of kinship were a necessary part of the struggle for existence which centered round water and pasturage. Other objects of economic desire were vantage points for robbing caravans. Professor Hell concisely analyzes the situation⁴ :

These struggles destroyed the sense of national unity, and developed an incurable *particularism*; each tribe deeming itself self-sufficient, and regarding the rest as its legitimate victims for murder, robbery and plunder . . . If the struggle for existence split the Bedouins up into fragments and made them hostile to each other, the common fight against stubborn and malignant Nature drew them closer together; and the result was the *one* duty which the old Bedouins acknowledged and which they carried to a fault—hospitality.

An important classification of the Arabs is the one according to permanency of habitation. The nomadic desert-dweller at the end of the sixth century of the Christian era knew no law according to the Western concept of the word. Tribal opinion, with its taboos, was of supreme importance as a regulator of behavior. The worst punishment was expulsion from the tribe and the fear of becoming an outcast acted potently to restrain deviation from accepted standards. A wandering outcast is seldom accepted by another tribe. Some of these pariahs went to Mecca where they lived in an "apache" quarter. Even the settled group, the residents of the town, had no body of law and few written rules, although the merchants very likely had unwritten or "gentlemen's" agreements to preserve some sort of order and security in business dealings⁵. The inhabitants of the desert were far more numerous than the town-dwellers.

¹ Bermenghem, *op. cit.*

² *Ibid.*, p. 26.

³ *Ibid.*, p. 25.

⁴ Hell, *op. cit.*, p. 10.

⁵ Kennedy, *op. cit.*, p. 40.

The former stopped wherever they could find grass and water. Their favorite occupation was war or raiding, mainly of the surprise sort¹.

The city folk lived under more favorable conditions. As business men, they found a certain amount of honesty the best policy. Patriarchal rather than community law flourished and there was virtually no co-operative activity. The man of the city had on the average a greater intellectual endowment than his country cousin. There was greater freedom of thought and activity in the town, but even there tribal excommunication was truly to be feared.

Eminent among the virtues of the Arab were daring, virility, hospitality, generosity, and love of freedom. Even these virtues, however, were carried to excess and became manifest as barbarity, prodigality, brutality, and an anti-social attitude inimical to unity. Side by side with hospitality was the common practice of robbing wayfarers and plundering weaker tribes. Trifling disputes brought on blood-feuds and conflagrations which consumed the attention and wasted the resources of the participants. Peace and order, the *sine qua non* for the development of social qualities and the advancement of civilization, were unknown. Muhammad 'Ali underlines this point².

Then there was no central government to enforce law and order. The whole country was rent into innumerable petty states, each clan forming a separate independent political unit. The few provincial governments that existed here and there were too weak to enforce justice. To wrench one's right from another, one had to depend upon one's strength of arm. Each tribe had a chief of its own who would lead them in battle against a hostile tribe, to vindicate their rights. But there was no law whatsoever, binding the individual to the tribe

¹ Kennedy, *op. cit.*, p. 21.

² Muhammad 'Ali, *op. cit.*, p. 25.

or the tribe to the nation. Each was independent, owing no allegiance to any central authority.

Sir William Muir, Christian biographer of Muhammad, agrees in substance¹.

The first peculiarity, then, which attracts attention is the subdivision of the Arabs into innumerable bodies, governed by the same code of honour and morals, speaking for the most part the same language, but each independent of the others; restless and often at war amongst themselves; and even where united by blood or by interest, ever ready on some insignificant cause to separate and abandon themselves to an implacable hostility.

The prophecy concerning Ishmael was equally applicable to his nomadic, pagan descendants: (Genesis 16 : 12) "And he will be a wild man; his hand will be against every man, and every man's hand against him." Instances of collective living were rare and without significance. Instances of predation and violence were prevalent and characteristic. One of the few tenets of the nomadic code of honor was the rejection of the principle of extradition. The right of asylum was sacred and was rigidly adhered to regardless of the crime of the refugee or the price put on his head².

For centuries, Arabia was left pretty much alone. The rest of the world knew little about the country and regarded attempts at subjugation as of dubious profit. Muir gives a plausible explanation³:

The freedom of Arabia from foreign conquest was owing not so much to the difficulties of its parched and pathless wilds, as to the endless array of isolated clans, and the absence of any head or chief power which might be made the object of subjugation. The problem had yet to be solved, by what force these tribes could be subdued, or drawn to one

¹ Muir, *op. cit.*, p. vi.

² Thomas, *op. cit.*, p. 15.

³ Muir, *op. cit.*, p. vi.

common centre.....

The Romans had a bitter experience in 26 B.C. when they sent a force of 130 ships and over 11,000 troops with Aelius Gallus, Eparch of Egypt, in command. They disembarked at Keuke Kome and for fifty days were led through treacherous desert, the men suffering from scurvy of the gums and legs. After six months, during which battles were won but no treasure gained, the Romans retreated. Thomas claims that "They never invaded Arabia again, and this expedition is the isolated example of a European invasion through the centuries¹." This is not strictly accurate for in 105 A.D., Trojan sent his general, Cornelius Palma, who subdued the Nabathean kingdom of North Arabia².

Our knowledge of the history of the pagan Arabs is based largely on legends, although numerous Sabæan inscriptions dating as far back as 800 B.C. survive. The Queen of Sheba (Saba) is said (First Kings, 10) to have visited Solomon around 950 B.C., but the inscriptions bear no mention of this event. These legends have been transmitted as poems, proverbs, and orations. One of the most valuable sources is the *Kitabu'l-Aghāni*, the book of songs by Abu'l-Faraj of Isfahān (967 A.D.).

We know more about the Sabæan kingdom than we do about the other realms of ancient Arabia. The Makarib period in Saba extended from the ninth to the sixth century B.C. The rulers were priest-kings whose capital was located at Sirwah. The second period is that of the kings of Saba who held sway from 550 B.C. until 115 B.C. Their capital was at Ma'rib and their rule appears to have coincided with the golden age of Yaman. These kings were succeeded in 115 B.C. by the Himyarites who embraced Judaism. The Himyarites were in constant strife first with Hadramaut and Katabanu and later with Christian Abyssinia. In the fourth century A.D., the Abyssinians overthrew the

¹ Thomas, *op. cit.*, p. 28.

² Zwemer, *op. cit.* p. 160.

Himyarites but the latter managed to form a Jewish Sabæan kingdom. It in turn was conquered by Christian Abyssinia in 525, but in 575 the Persians were victorious and appointed governors over Yaman.

The Minæan kingdom embraced the South Arabian Jauf. Its chief cities were Karnau, Ma'in, and Yathil. Inscriptions in the Minæan language have been uncovered in al-'Ula in North Arabia, suggesting the possibility of colonies or at least establishing the existence of cultural intercourse. The Minæans either preceded or were contemporary with the Sabæans. The Sabæans make no mention of the Minæans but their inscriptions are not concerned with history.

Pre-Islamic culture attained its highest development in the kingdoms of Hira and Ghassan¹. Toward the beginning of the third century after Christ, ten residents of Yaman, Tihama, and Nejd migrated to the fertile country separating the Euphrates from the Arabian desert. They were collectively known as the *Tanukh*, many of whom enjoyed a nomadic life although the good quality of the soil provided an inducement for settled agricultural endeavor. This intrusion resulted in the creation of the Kingdom of Hira. Other groups included the *Ibad*, Christian Arabs living in houses in the town of Hira, and the *ahlaf*, fugitives, outcasts, and penurious emigrants. The Lakhmid Dynasty arose toward the end of the third century, its first ruler being 'Amr b. 'Adib, Nasr b. Rabi'a b. Lakhm. Numan I, whose reign occurred in the first quarter of the fifth century, is renowned as the builder of a famous castle, the *Khawarnaq*, near Hira². The last Lakhmite king, Numan III, reigned from 580 to 602, during the youth of Muḥammad; he was brought up by a Christian family and was probably the only member of the dynasty who was actually converted to Christianity. In 602, Chosroes II, Shah of Iran, appointed an Arab of the

¹ Nicholson, *op. cit.*, p. 37.

² *Ibid.*, p. 40.

tribe of Tai as governor of Hira.

Toward the start of the sixth century A.D., the Jafnids ruled over the tribe of Ghassan in the extreme northwest of Arabia, about where Transjordan now lies. Members of this tribe lived in Yathrib in Muhammad's lifetime. The first prince of Jafnid was Harith ibn Jabala, known in Arabian chronicles as "Harith the Lame." Harith was a Christian of the Monophysite Church¹. In 528, he sent a hundred men against the 100,000 men of the army of Mundhir b. Ma'al-sama, ostensibly to make peace. They surrounded Mundhir's tent and slew him and his companions. The hundred "champions" were clad in shrouds of white linen and coats-of-mail by Halima, daughter of Harith². Harith was succeeded by his son, Mundhir b. Harith, who defeated the new King of Hira on Ascension Day, 570 (the year of Muhammad's birth). About 581, unable to pursue his advantage, he was captured and forced into exile in Sicily. This marked the virtual end of the dynasty and anarchy prevailed until the Persian conquest of Palestine in 614.

Around 490 A.D., a new power had arisen in Arabia, the tribe of Kinda under the family of Aqil ul Murar, who came from the South, probably with the blessings of the rulers of Yaman. The chiefs of Kinda accompanied Abraha at the time of his invasion of the Hijaz. The Kinda ruled over Bahrayn as well as Yemama and possibly gained power over the Lakhmids of Hira. The moving spirit in the conquest, extending over the greater part of central and northern Arabia, was Hujr, an ancestor of the poet, Imru'ul Qays.

The history of Arabia before Islam is replete with murder and plunder. In general, sixth-century Arabia was in a state of political chaos. Davis does not exaggerate in his description of the state of affairs³:

¹ Nicholson, *op. cit.*, p. 51.

² *Ibid.*, p. 50.

³ Davis, *op. cit.*, p. 106.

Ordinarily the Saracens had seemed hopelessly divided into petty bands which the governors or satraps of the frontier provinces had usually looked upon as robbers rather than as possible invaders. Many desert sheiks with their followers had indeed enlisted as mercenaries in the Roman service, and fought valorously, but that all Arabia could suddenly fuse itself into a single military state, and in the name of an upstart fanaticism precipitate itself upon the lands of established civilization was about the last thing which the lords of Constantinople and Ctesiphon dreaded. Heraclius and Chosrose II continued the wars which were exhausting their empires, while in the southern deserts there was arising the cloud no bigger than a man's hand. When the tempest suddenly broke—East Roman and Persian could reproach themselves for many things, but not assuredly for failing to realize that the impossible had happened in Arabia.

One of the most controversial aspects of life during the *Jahiliyya*, or "age of ignorance," the period preceding Muhammad, is that relating to the position of woman. The Muslim writers stress her servitude while their Christian adversaries picture her as the embodiment of freedom. Zwemer, whose prejudice exceeds his scholarship, hysterically charges that "Muhammad improved on the barbaric method (of infanticide) and discovered a way by which not some but *all* females could be buried alive without being murdered, namely, the veil¹." It is apparently true that the veil was unknown in Arabia before the coming of Islam but this does not necessarily prove the theory that Muhammad introduced it. It must not be taken for granted that Muhammad taught that women should conceal their faces.

The Arabic word for veil, *hijab*, is often used synonymously for clothing and betokens modesty rather than slavery. The loveliest delineation of woman to be found in the

¹ Zwemer, *op. cit.*, p. 161.

poetry of heathen Arabia, and the only instance in which woman's moral beauty is hailed in pagan Arabic verse, is the *lamiyah*. A portion of its description of Umayma follows¹:

She charmed me, veiling bashfully her face,
Keeping with quiet looks an even pace ;
Some lost thing seems to seek her downcast eyes :
Aside she bends not—softly she replies.

Women wore veils long before Muhammad was born ; many centuries earlier, it was a common practice among the Assyrians². Marzieh Khánum Gail reports the common Persian view that the patrician Iranians, in ancient times, had their wives veiled. The Bible associates the use of the veil with a sense of shame or of unworthiness. Moses veiled his face from God (Exodus 34 : 33). Genesis³ contributes these interesting verses :

And she (Tamar) put her widow's garments off from her, and covered her with a veil, and wrapped herself, and sat in an open place, which is by the way to Timnath ; for she saw that Shelah was grown, and she was not given unto him to wife (Genesis 38 : 14).

When Judah saw her, he thought her to be an harlot ; because she had covered her face (38 : 15).

Some women attained great prominence in pagan times. There was the noble Zenobia, widow of Odenathus and self-styled "Queen of the East," who was finally led captive before Aurelian's chariot through the streets of Rome in 274 A.D.³ Nicholson believes that women were not treated as slaves and chattels but were accorded some measure of equality and he approvingly quotes the statement⁴ :

Knight-errantry, the riding forth on horseback in search of adventures, the rescue of captive maidens,

¹ Nicholson, *op. cit.*, p. 90.

² *Cambridge Ancient History*, Vol. III, p. 107.

³ Nicholson, *op. cit.*, p. 34.

⁴ *Ibid.* p. 88.

the succour rendered everywhere to women in adversity—all these were essentially Arabian ideas, as was the very name *chivalry*, the connection of honourable conduct with the horse-rider, the man of noble blood, the cavalier.

When Fatima, daughter of Khurshub, was taken prisoner and heard that her captor intended to have her herd camels, she committed suicide by throwing herself headlong from her camel in preference to dishonoring her sons.¹ It was also regarded as a disgrace for a woman to marry below her station. Said Ibn Zuhayr to the Namir, "If you cannot find an equal match, the best marriage for them is the grave²."

Thomas depicts the darker side³ :

Men were of course polygamous, where they could afford it there being no limit set to the number of wives one man could have. He had dominion over these wives and could divorce them at will, and if a man died his brother inherited his widows as though they were chattels... Contraception must have been as repugnant then as now, yet the Arab traditions insist that female infanticide was commonly practised—a sidelight on Arabia's habitual hunger.

Not economic reasons alone but also a perverted sense of honor caused men to put away their daughters : they feared that their daughters might be made prisoners of war. The Qur'an mentions this feeling of dread⁴ :

And when any of them is told the news of the birth of a female, his face becometh black, and he is deeply afflicted ; he hideth himself from the people, because of the ill tidings which have been told him ; considering within himself whether he shall keep it

¹ Nicholson, *op. cit.*, p. 90.

² Zwemer, *op. cit.*, p. 162.

³ Thomas, *op. cit.*, pp. 16-17.

⁴ George Sale, *The Koran*, p. 147.

with disgrace, or whether he shall bury it in the dust.

A father, poor in worldly goods, desires death for his daughter rather than the hard mercies of relatives in these pathos-filled verses¹ :

The Poor Man's Daughter

But for Umayma's sake I ne'er had grieved to
want nor braved,
Night's blackest horror to bring home the morsel
that she craved.
Now my desire is length of days because I know
too well
The orphan girl's hard lot, with kin unkind
enforced to dwell.
I dread that some day poverty will overtake my
child,
And shame befall her when exposed to every
passion wild.
She wishes me to live, but I must wish her dead,
woe's me :
Death is the noblest wooer a helpless maid can see.
I fear an uncle may be harsh, a brother be unkind,
When I would never speak a word that rankled
in her mind.

Muhammad 'Ali portrays the stark reality of pagan conditions² :

Barring the love-songs in praise of the beloved, which were the outcome of carnal lust, woman was accorded no better treatment than the lower animals. Polyandry which is characteristic of a very primitive stage of human society was also in vogue among them. Besides, there was no limit to the number of wives a man could take...Over and above plurality of wives, he could have illicit intercourse with any number of sweethearts. Prostitution was rife among

¹ Nicholson, *op. cit.*, pp. 91-92.

² Muhammad 'Ali, *op. cit.*, p. 26.

them as a profession. Captive women, kept as handmaids, were forced to make money for their master in this mean manner. Married women were allowed by their husbands to conjugate with others for the sake of offspring (a practice called *istibza*).

It also appears that Arabian hospitality extended to the lending of wives to guests, although the practice may have been confined to the older and uglier ones. Muhammad 'Ali continues¹ :

Moreover, woman was looked upon as mere chattle. She was entitled to no share of the legacy of her deceased husband, father or other relations. Nay, she was herself inherited as part and parcel of the property of the deceased . . . He (the heir) could marry her himself, or give her in marriage to anybody he chose. On the death of his father, a son would even marry his step-mother, she being a part of his inheritance. The practice of divorce among them was no less barbarous. A thousand times could a man divorce his wife and take her back within a prescribed period known as '*iddat*'.

Zwemer claims that the right of divorce belonged to women as well as to men and that women could choose their own husbands². He cites the case of Khadijah, who chose Muhammad. But the traditions insist that Khadijah, a woman of about forty, still required her father's consent to the match, and that she felt constrained to resort to the stratagem of getting her father intoxicated in order to secure his permission ! Under the personal marriage contract called *mota'a* the woman remained at home and owned the children. Under the *nikah*, the woman was either captured or purchased. Neither type of arrangement would indicate a high position for woman. Zwemer's flimsy evidence that captive women were not enslaved consists of poetry from Hatim³ :

¹ Muhammad 'Ali, *op. cit.*, p. 27.

² Zwemer, *op. cit.*, p. 162.

³ *Ibid.*

They did not give us Taites, their daughters in marriage ;

But we wooed them against their will with our swords.

And with us captivity brought no abasement.

They neither toiled making bread nor made the pot boil ;

But we mingled them with our women, the noblest.

And they bare us fair sons, white of face.

Perhaps the captives were not abased at first, but what of the other women who had to do all the housework ?

The spirit of revenge and hatred of enemies was an important element in the mentality of the pagan Arab. The man who exhibited kindness towards his enemies was regarded as a good-for-nothing coward. This spirit is expressed by these verses from the *Hamasa*¹ :

Humble him who humbles thee, close tho' be your kindredship :

If thou canst not humble him, wait till he is in thy grip.

Friend him while thou must ; strike hard when thou hast him on the hip.

Blood called for blood, and if vengeance could not be wreaked on the murderer, a member of his tribe might be selected as the victim. In some cases blood-money was paid in the form of, say, a hundred camels. It was believed that until revenge was realized, the dead man's spirit would hover over his tomb in the shape of an owl crying "*Isquni*" ("Give me to drink").

In the days before Islám wine flowed like rain in the streets of Yathrib. Many of the poets sang of wine. The most celebrated of these poems was written by A'sha, a portion of it being expressed in translation as follows² :

Propped at ease I greet them gaily, them with myrtle-boughs I greet,

¹ Nicholson, *op. cit.*, p. 93.

² *Ibid.*, p. 94.

Pass among them wine that gushes from the jar's mouth bitter-sweet,

Emptying goblet after goblet but the source may no man drain

Never cease they from carousing save to cry, "Fill up again."

Strong drink added to the rashness of a temperament that required no such stimulation.

Gambling was a common pastime and those who refused to indulge in it were looked upon as miserly. Men who complained that they could not afford daughters regarded games of chance and alcohol as necessities for self-respecting Arabs¹.

The intellectual development of the pre-Islamic Arabs is shown most favorably in their *Cultural activity*. There was virtually no prose before the days of Islám ; the Qur'án is the oldest Arabic book². The two principal dialects of Arabic in Arabia are South Arabic, spoken in Yaman and including Sabæan, Himyarite, Minæan, and the related dialects of Mahra and Shihr ; and Arabic proper, spoken throughout the rest of Arabia³. The oldest extant Arabic poems date from about 512 A.D. but it was nearly two centuries later before writing came into general use among the Arabs⁴. It was the *râwi* or "reciter", resembling the Greek Rhapsodist, who was really responsible for the perpetuation of the *qasidas*.

The poet (*sha'ir*) was reputedly one endowed with supernatural knowledge, a sort of soothsayer. He was regarded as indispensable in battles of first rank. "The menaces which he hurled against the foe were believed to be inevitably fatal⁵." The oldest form of poetry in Arabia was a sort of rhymed prose or rhyme without metre,

¹ Nicholson, *op. cit.*, p. 125.

² Muhammad 'Ali, *op. cit.*, p. 29.

³ Nicholson, *op. cit.*, p. xxii.

⁴ *Ibid.*, p. xxi.

⁵ *Ibid.*, p. 73.

known as the *Saj*, from which developed the *Rajaz*, an irregular iambic metre having four or six feet in the line, all the lines rhyming with each other. *Rajaz* means "a tremor in the hindquarters of the camel," which suggests the theory that the Arabian metres derived from the *hudi* or camel-driver's song, the metre varying with the shifting gait of the camel.¹

The only finished type of poetry in existence during the literary flowering of the pagan period, sixth century A.D., was the *qasida* or ode, a poem with an artistic purpose (although not always a lofty one)². The mass of the Arabs spoke a Semitic dialect which had not previously attained literary status. The most correct form of the speech of northern and central Arabia, from which modern Arabic is derived, was flourishing among the nomads rather than in Yathrib or Mecca³. Neither scriptures nor liturgy existed in Arabic. The Christian ecclesiastical language was a form of Aramaic, Syriac⁴. But from most humble origins (i.e., humble in the eyes of men), Arabic became one of the great languages of the world, a marvellously designed medium of expression equally adaptable for expressing the terminology of modern science or for transmitting the ideas of the intellectual giants of the ancient Greece⁵.

What did the pagan Arabic literature express? Most of the surviving remnants deal with war, feats of prowess, and fair women. Kennedy's epitome is just⁶:

The Pre-Islamic poetry shows nothing sweeter to the Arab of the desert than the stealthy tracking of the prey, the attack at early dawn and the carrying away of the spoil whether cattle, crops, or captives.

¹ Nicholson, *op. cit.*, p. 74.

² *Ibid.*, p. 76.

³ Thomas, *op. cit.*, p. 33.

⁴ O'Leary, *op. cit.*, p. 137.

⁵ Thomas, *op. cit.*, p. 34.

⁶ Kennedy, *op. cit.*, p. 15.

Muhammad 'Alī observes that all the poetical compositions of the *Jahiliyya* have come down through oral traditions with the exception of the *Mu'allaqat* which were written down and suspended in the Ka'ba. He also questions whether poetry must be considered a hallmark of enlightenment¹:

As regards the fact that the Arabs had developed the art of poetry, suffice it to say that mere poetry, as such, affords no sure criterion of a people's stage of civilization. Interest in poetry is observed in almost every society, however crude and primitive... The people at this stage have very few objects of interest, which multiply only with the growth of civilization, and hence their sole devotion to the only available form of fine art—poetry. But even Arab poetry is devoid of the breadth of vision and loftiness of thought which come only with culture.

It is difficult to establish a negative conclusion but it appears safe to say that the ancient Arabs, during the many centuries preceding the appearance of Muhammad, did not, so far as we know, contribute anything of significance to the body of scientific knowledge or to scientific method. To be sure, they were intrigued by the stars but their interest was more akin to that of the fortune-teller than to that of the astronomer. It is possible that there was a meagre offering in the field of music.

Southern Arabia evidently made abundant use of the excellent building materials at its disposal—granite, porphyry, and marble. The ruins of numerous castles of vast proportions witness a high stage of architectural progress. Hell mentions some of these structures²:

The twenty-story high castle of Ghomdam in San'a; the temple of Marib, whose walls, ellipse-like, encircled a natural elevation and reached a height of 9½ metres; again the immense dam of

¹ Muhammad 'Alī, *op. cit.* p. 21.

² Hell, *op. cit.*, p. 7.

Marib—the remains of which are still visible.

It is to be noted, however, that these buildings were located in a region where the influence of Judaism was strong, the Sabæan kingdom. Hell inclines to accept the report of the Arab geographer, Hamadani, concerning the ornamentations of the facades of the temples and castles.¹

You see figures of all kinds sketched on them : wild and ravening animals . . . eagles with flapping wings and vultures pouncing on hares . . . herds of gazelles hurrying to their death-trap, dogs with drooping ears, partly leashed and partly loose, and a man, with a whip, amidst horses.

But this artistic endeavor was alleged to exist in Southern Arabia, not in the Hijáz. The Ka'ba and town-hall of Mecca did not show evidence of architectural skill or experience with or judgment of materials. When Muḥammad cleansed the Ka'ba of the three hundred and sixty idols, he was probably not destroying highly perfected sculpture, for it is recorded that the image of the pigeon, for example, was made of palm rind, a material not suitable for the expression of ideas in the realm of the free fine arts².

It must be said for the Hijáz, however, that its commercial importance after the fall of Himyarite rule in Southern Arabia made it a gathering place of persons interested in purveying wares, enjoyment, or ideas. The Quraysh may deserve the credit for making Mecca the center, but apart from that question the fact remains that the great annual market held in the neighbourhood of the Ka'ba was a culminating point in Arab life, literary and intellectual as well as commercial and religious³.

Superstition was rife among the Arabs and the literate were few in number. Muḥammad 'Ali declares that there

¹ Hell, *op. cit.*, p. 8.

² *Ibid.*, p. 14.

³ *Ibid.*, p. 12.

was no education worthy of the name and he particularizes¹:

In times of drought, they would fasten dry blades of grass and underwood to a cow's tail and set fire thereto and drive the animal to the mountains. They thought the flame of fire resembled a flash of lightning and would, by reason of similarity, attract rainfall... Those who believed in a life after death would tie a camel at a tomb and starve it to death, thinking the deceased would mount on its back on the day of resurrection . . . They believed in soothsayers and fortune-tellers, and had implicit faith in whatever they told them. In short, these and a hundred and one other superstitions were believed by the Arabs of the pre-Islamic days of ignorance.

Before leaving the subject of culture, it should be explained that many scholars believe that when Muḥammad used the term *jahiliyya* he alluded to ignorance of the Faith of God as taught by His Messengers and did not mean to imply that his ancestors were ignorant of what the "world" accounted knowledge.

The chief religions in Arabia, other than pagan idol-worship, were the Jewish, Christian, Sabæan, and Hanifite. The old gods and goddesses were nominally worshipped by the majority of the Arabs but the influence of the deities had waned and Judaism and Christianity had considerably leavened the heathen lump.

The Ka'ba in Mecca was certainly a very ancient house, the Muslims dating it as far back as 2500 B.C.² In the early centuries of its existence, it may well have been dedicated to the worship of one God, but it is obvious that in the age when Muḥammad appeared the one God received scant attention in comparison with that given the hundreds

¹ Muḥammad 'Ali, *op. cit.*, p. 30.

² *Ibid.*, p. 15. The Ka'ba is associated with Abraham who lived in the nineteenth and twentieth centuries B.C.

of minor deities. Muḥammad 'Alī's characterization is hardly overdrawn¹:

No doubt the Arabs professed faith in the unity of God, but it was too shallow. Their practical life belied their lip-profession. They were given to idolatry, thinking that Almighty God had entrusted the discharge of the various functions of the universe to different gods, goddesses and idols. They would therefore turn to these, invoking their blessings in all sorts of undertaking . . . They would fall down prostrate before any good-looking piece of stone they might come across; Should they fail to find out a piece of stone, they would worship a sand-hill, after having milked their she-camel thereon . . . Going out on a journey they would carry four stones with them, three to make a hearth, and the fourth to serve for an object of worship . . . Over and above the three hundred and sixty idols set up in the Ka'ba, every tribe had an idol of its own. Nay, one was kept in each and every household. Idol-worship had, in short, become a second nature with them which influenced their everyday life in all its details.

Zwemer asserts that the old national idolatry had degenerated, that the better classes at Yathrib and Mecca had ceased to believe in anything at all, that gross fetishism was the creed of many, and that "the time of ignorance was a time of chaos²."

The center of pagan Arabia was naturally Mecca whose Ka'ba was the national pantheon. The Zoroastrians, few in number, were concentrated in eastern Arabia near the country of their prophet, Persia. The Jews settled in Yaman, Khaybar, Yathrib, and Taima. Christians were active in the highlands of Yaman, Najran, Ghassan, Hira,

¹ Muḥammad 'Alī, *op. cit.*, pp. 22-23.

² Zwemer, *op. cit.*, p. 168.

Bahrayn, and other islands of the Persian Gulf. To this day, they are scattered followers of John the Baptist comprising a secretive, ingrown community that refuses to accept Jesus as the one foretold by John. In southern Arabia there must have been some Sabæans, followers of an ancient creed whose tenets are most elusive and a people difficult to trace.

Christians and Jews fought among themselves not just verbally but with the sword. Dhu Nuwas, a fanatical adherent of Judaism, marched against the Christians of Najran in 523 A.D. and is said to have burned 2,000 of them in a cave³. In retaliation, the Negus of Abyssinia sent an army 70,000 strong, under the command of Aryat, to invade Yaman and destroy the remains of the Himyarite Empire. Dhu Nuwas spurred his horse and plunged into the waves of the sea⁴. The Negus ordered his representative to kill a third of the male population, to abduct a third of the women and carry them as captives into Ethiopia, and to lay waste a third of Yaman. These deeds made the Negus' chief very unpopular and he was slain by a lieutenant, Abraha. The Negus thereupon swore that he would set foot upon the soil of Yaman and cut off Abraha's hair. Abraha made it easy for the Negus to keep his oath by cutting off his own hair and sending it to the king with a bag of Yamanite earth⁵. Around 570 A.D., the year of Muḥammad's birth, Abraha advanced on an elephant and with a well-organized army against Mecca, but he met with misfortune; the army was presumably decimated by smallpox. According to an Islamic tradition, mysterious birds swarmed over the invaders and hurled stones at them⁶. The idolators apparently made no serious attempt to turn back the invaders, leaving it to God to defend His house.

³ Dermenphem, *op. cit.*, p. 20.

⁴ Nicholson, *op. cit.*, p. 27.

⁵ Dermenphem, *op. cit.*, p. 21.

⁶ *Ibid.*

Zwemer is doubtless right in concurring with Wellhausen that "Neither the fear of Allah nor their reverence for the gods had much influence. The chief practical consequence of the great feasts was the observance of a truce in the holy months; and this in time had become mainly an affair of pure practical convenience¹." Instead of inspiring self-sacrifice for the common good, religious convictions were demonstrated in the form of tattoo marks or *wasms* on hands, arms, and gums.

Judaism with its numerous purifications, minutiae of ritual, and regulation of food and drink strongly appealed to a segment of the Semitic Arabs. Jewish law was in effect in Yathrib during the lifetime of Muhammad, although its power was declining².

Christianity was associated with the selling and consumption of wine. Christian doctrines were carried to the heart of the Arabian Peninsula by Ibadi wine merchants³. The most numerous Christians were of the Essene type with a sprinkling of Nestorians and Monophysites. Although Christians elsewhere were killing each other because of differences of opinion on abstruse points of theology, the Arabs probably did not have many violent disputes as to *Homoousian* and *Homoiousion*⁴. The Abyssinian and Roman empires accounted mainly for the influence of Christianity in Arabia and the defeat of Abraha spelled the termination of African aid for the Christians in that land. Kennedy speaks of the marked change in the Christian attitude toward the world and they that dwell therein (*alam va alamiyyan*). In the early days, the Christians preferred death to the worship of Cæsar, but the attainment of temporal power brought subservience to the emperor. "No longer was it the pure creed which had been taught some three centuries before. It had become largely despiritualiz-

¹ Zwemer, *op. cit.*, p. 167.

² Thomas, *op. cit.*, p. 36.

³ Nicholson, *op. cit.*, p. 138.

⁴ Kennedy, *op. cit.*, p. 12.

ed, ritualized, materialized¹." Davis dismisses the Christianity of pre-Islamic Arabia with these words²:

As for the Christians they frequently belonged to sects which had delivered themselves over to outlandish mysticism or sheer superstition. Some questioned the deity of Christ; others practically denied His human aspect and considered the Crucifixion a kind of stage-play designed to impose upon the evil-minded Jews.

"Outlandish mysticism" comprehended also the practices of the stylites and other ascetics.

Muhammad 'Ali elaborates on the shortcomings of the Christians of those days³:

The Doctrine of Trinity had given rise to numerous complications. Diverse schisms and sects vied with one another in the exercise of their brains in the disentanglement of the riddle how man became God or how three make one or *vice versa* . . . The general evils of Christianity: drinking, gambling, and adultery, were in full swing even in those days. Dozy quotes the Caliph 'Ali as speaking of the Taghlib, a Christian tribe, in the following significant words: "All they have borrowed from that Church is the practice of winebibbing." In short, Christianity which was the last of the revealed religions of the world was practically defunct. It had lost all driving force to bring about moral reformation.

Muir's delineation of its sad state is hardly brighter⁴:

Thus the star of Christianity was not in the ascendant: in some respects it was declining.

"The prospects of Arabia before the rise of Mahomet were as unfavorable to religious reform as to political union

¹ Kennedy, *op. cit.*, p. 10.

² Davis, *op. cit.*, p. 105.

³ Muhammad 'Ali, *op. cit.*, p. 20.

⁴ Muir, *op. cit.*, p. viii.

or national regeneration¹." Muir presents this vigorous summary². :

Causes are sometimes conjured up to account for results produced by an agent apparently inadequate to effect them. Mahomet arose, and forthwith the Arabs were aroused to a new and spiritual faith.

Hence the conclusion has been drawn that Arabia was fermenting for the change, and prepared to adopt it. To us, calmly reviewing the past, pre-Islamite history belies the assumption. After five centuries of Christian evangelizations we can point to but a sprinkling here and there of Christian converts ; the Bani Harith of Najran ; the Bani Hanifa of Yemama ; some of the Bani Tay at Tayma ; and hardly any more. Judaism, vastly more powerful, had exhibited a spasmodic effort of proselytism ; but as an active and converting agent, the Jewish faith was no longer operative. In fine, viewed thus in a religious aspect, the surface of Arabia had been now and then gently rippled by the feeble efforts of Christianity ; the sterner influences of Judaism had been occasionally visible in a deeper and more troubled current ; but the tide of indigenous loyalty and of Ishmaelite superstition, setting strongly from every quarter towards the Kaaba, gave ample evidence that the faith and worship of Mecca held the Arab mind in a thralldom rigorous and undisputed.

It is impossible to reconcile the various opinions as to the hold of idols on the Arab mind, but there is fairly general agreement that the outlook for enlightened religion was very dark.

The religionists whose ideas were closest to those of

¹ Muir, *op. cit.*, p. vii.

² *Ibid.*, pp. viii-ix.

Islām were perhaps the Hanifites, believers in one God but reportedly aligned with no particular sect. Muḥammad 'Alī discusses the strength and weakness of the Hanifite position¹.

A vast majority of them found no satisfaction in Christianity nor in Judaism. Of these the noteworthy were Zaid bin 'Amru-bin-Nufail, 'Umar's uncle, and Umayya, a renowned poet and the chief of Taif. These people had little zeal for promulgating their newly conceived idolatry, and openly avowed Unitarianism as their faith, which they professed to be the religion taught by Abraham. Feeble though the movement was, it was undoubtedly there. It took no note of the social evils of Arabia. Mere worship of the unity of God in place of idol-worship was its end-all and be-all. But like its predecessors, this internal movement also failed to penetrate beyond the surface, leaving the Arab society as unaffected as ever.

This failure to be concerned with social problems may have saved the Hanifites from persecution.

¹ Muḥammad 'Alī, *op. cit.*, pp. 33-34.

Chapter 3

CONTRIBUTIONS OF ISLAMIC CIVILIZATION
TO WORLD CULTURE

THE contributions of Islamic peoples to the intellectual and spiritual progress of humanity have been so vast and have been manifested in such diverse fields that no one can pretend to do more than indicate certain representative items in our rich heritage. Civilization as we know it today is not solely the product of Christian influence but rather an imperfect blending and synthesis of Greek, Hebrew, Christian and Muslim bestowals.

Prelude. The common belief that the Christian monks of the Middle Ages were the preservers and transmitters of Hellenic culture, that the monasteries alone kept the lamp of learning burning, is based on incomplete and faulty evidence. At the outset, it should be remembered that the Christian society of the period was inferior in level of knowledge to the Islamic world. Barnes rightly points out: "In many ways the most advanced civilization of the Middle Ages was not a Christian culture at all, but rather the civilization of the peoples of the faith of Islam¹." Gibb adds his support, declaring that the Muslim civilization in Spain represented the highest culture in Europe from the tenth to the thirteenth centuries². Haskins, in quoting Renan and adding his own comment, summarizes a position common among investigators³:

The recovery of ancient science and philosophy in the twelfth and thirteenth centuries marks an epoch in the history of European intelligence, "The in-

¹ H. E. Barnes, *A History of Historical Writing*, p. 93.

² H. A. R. Gibb, *Arabic Literature*, p. 81.

³ C. H. Haskins, *Studies in the History of Mediæval Science*, p. 3.

roduction of Arabic texts into the studies of the West," says Renan, "divides the history of science and philosophy in the Middle Ages into two perfectly distinct periods. In the first the human mind has, to satisfy its curiosity, only the meagre fragments of the Roman schools heaped together in the compilations of Martianus Cappella, Bede, Isidore, and certain technical treatises whose wide circulation saved them from oblivion. In the second period ancient science comes back once more to the West, but this time more fully, in the Arabic commentaries or the original works of Greek science for which the Romans had substituted compends"—Hippocrates and Galen, the entire body of Aristotle's writings, the mathematics and astronomy of the Arabs. The full recovery of this ancient learning, supplemented by what the Arabs had gained from the Orient and from their own observation, constitutes the scientific renaissance of the Middle Ages.

No living person can know the extent of the cultural progress of the Muslims for the reason that the bulk of the evidences of their educational attainments has been destroyed by Mongols, Christians and anti-intellectual Muslims. People in the West commonly believe the old canard that the Muslims destroyed the famous library at Alexandria. A certain amount of destruction had been done in street-fighting but the systematic ruination of this celebrated library of Serapis occurred in the year 389 A.D. (nearly two centuries before the birth of Muhammad) on the order of Archbishop Theophilus of Alexandria. Many of the wonderful buildings and beautiful sculptures of the ancient Greeks sustained a similar fate at the hands of the Christians¹. The Crusaders "destroyed the splendid library of Tripoli without compunction; they reduced to ashes many

¹ Gustav Diercks, "Europe's Debt to Islam," *Islamic Review*, 16: 138 (May 1928).

of the glorious centers of Saracenic culture and arts¹." Diercks makes the extreme charge that the "Christian religion, wherever it went, checked mental progress and development and suppressed the already existing culture²." He goes on to assert that the guiding principle kept in mind by Gregory was: "Ignorance is the mother of piety." Acting on this precept Gregory "not only committed to the flames all the mathematical stores (stores) of Rome, but also burned the precious Palatine Library which was founded by the Emperor Augustus. He destroyed the greater part of the writings of Livy; he forbade the study of the classics; he maimed and mutilated the remains of the ancient days³," Ferdinand and Isabella destroyed all the Muslim works they could find in Spain. One of Anatole France's characters remarks: "The most tragic event in history is that of the battle of Poitiers, when the science, the art and the civilization of Arabia fell before the barbarism of the Franks⁴."

Muhammad at-Tūsi (d. 1067 A.D.) composed a bibliography of Shi'ite works, many of which have perished, the greater part no doubt suppressed by the Sunnis. Even more illuminating is the great *Fihrist* which appeared around 987 A.D., nearly three centuries before the destruction of Baghdad. Scarcely one in a thousand of the books mentioned in the *Fihrist* is known to be in existence today.

The initial command given the Prophet in his very first revelation was "Read." Muhammad protested that he did not know how to read. His teaching for the individual and for the society were not the result of reading; no one has submitted a jot or tittle of evidence to show that a single Sura of the Qur'án was based on any writings to be

¹ Ameer 'Ali, *The Spirit of Islam*, p. 351.

² Diercks, *op. cit.*, 16 : 218 (June 1928).

³ *Ibid.*, 16 : 144 (May 1928).

⁴ Anatole France, *La Vie en Fleur*, cited in *Islamic Review*, 22 : 146. (May 1934).

found in seventh-century Arabia. As prophesied in the Christian scriptures, he did not speak of himself but he uttered that which he heard.

The Qur'án contains this beautiful short prayer for intellectual advancement: "And say, O Lord! Increase me in knowledge" (Sura xx, v. 113). It also declares that he who has been gifted with wisdom and philosophy of an ennobling kind has received very great good. The statement in the Qur'án concerning the incomplete state of knowledge—"You have received only a minute quantity of knowledge" (Sura xvii. v. 87)—could well have been pondered by the cocksure materialistic scientists of the nineteenth century.

Unfortunately, virtually all the sayings of Muhammad relating to education are to be found only in the *hadiths* and it is almost impossible to establish their authenticity. It should be borne in mind, however, that these aphorisms have been widely accepted as authentic and it cannot be doubted that they have exerted a wide and salutary influence. The words attributed to Muhammad must assuredly have stimulated and encouraged the great thinkers of the golden age of Islamic civilization.

The most celebrated collection of *hadiths* is probably that of al-Bukhári, accessible to the writer in French. As freely translated from the French, Muhammad is reported to have said: "The learned are the heirs of the prophets who have transmitted to them knowledge as a legacy. He who has chosen learning has taken a great portion and for him who engages himself in the way of acquiring knowledge God will pave a path to the very gates of Paradise¹." "It is necessary for him who enjoys the good pleasure of God to acquire knowledge of religion; knowledge is obtained only through study²." The Prophet gives this interesting bit of advice in the field of educational psychology: "Render the way easy and not difficult. Announce agree-

¹ El-Bokhari, *Les Traditions Islami ques*, p. 39.

² *Ibid.*, p. 40.

able things and do not startle your auditor¹." "There are only two persons that one is permitted to envy : the one to whom God has given riches and who has the courage to spend his means for the cause of truth ; the one to whom God has given wisdom and who applies it for the benefit of mankind and shares it with his fellows²." "Among those doubly-rewarded by God is the man who, possessing a female slave, raises her and gives her a good education³."

Of great importance was this injunction of Muḥammad : "Let the poor and the rich be equal before you in the acquisition of knowledge⁴." It was this statement that led to the establishment of many scholarships at Cairo, Damascus, and elsewhere.

The *Bihāru'l-Anwār* and other commonly accepted collections of traditions attributed the following passage to Muḥammad⁵ :

Acquire knowledge, because he who acquires it in the way of the Lord performs an act of piety ; who speaks of it, praises the Lord ; who seeks it, adores God ; who dispenses instruction in it, bestows alms ; and who imparts it to its fitting objects, performs an act of devotion to God. Knowledge enables its possessor to distinguish what is forbidden from what is not ; it lights the way to Heaven ; it is our friend in the desert, our society in solitude, our companion when bereft of friends ; it serves as an armour against our enemies. With knowledge, the servant of God rises to the heights of goodness and to a noble position, associates with sovereigns in this world, and attains to the perfection of happiness in the next.

"Seek ye learning even unto China," enjoined the

¹ El-Bokhari, *Les Traditions Islamiques*, p. 40.

² *Ibid.*, p. 44.

³ *Ibid.*, p. 51.

⁴ Khalil Totah, *The Contribution of the Arabs to Education*, p. 44.

⁵ Ameer 'Ali, *op. cit.*, p. 331.

Prophet, according to the *Misbah ush-Shariyet*. Syed Ameer 'Ali cites the following hadiths from the *Jamaa-ul-Akhbar* and other comparatively trustworthy sources :

He who leaves his home in search of knowledge, walks in the path of God. He who travels in search of knowledge, to him God shows the way to Paradise. One hour's meditation on the work of the Creator is better than seventy years of prayer. To listen to the instructions of science and learning for one hour is more meritorious than attending the funerals of a thousand martyrs, more meritorious than standing up in prayer for a thousand nights... To the student who goes forth in quest of knowledge, God will allot a high place in the mansions of bliss ; every step he takes is blessed, and every lesson he receives has its reward . . . The seeker of knowledge will be greeted in Heaven with a welcome from the angels . . . To listen to the words of the learned, and to instil into the heart the lessons of science, is better than religious exercises . . . better than emancipating a hundred slaves . . . Him who favours learning and the learned, God will favour in the next world . . . He who honours the learned honours me.

Professor Stephen quotes these words from Muḥammad¹ :

He dieth not who takes to learning.

The worst of men is a bad learned man, and a good learned man is the best.

The *Islamic Review* (5 : 48, January 1917) also furnishes these quotations from Muḥammad :

The desire of knowledge is a divine commandment for every Muslim ; and to instruct in knowledge those who are unworthy of it is like putting pearls, jewels, and gold on the necks of swine.

¹ N. Stephen, "Muhammad and Learning," *Islamic Review*, 5 : 44-7 (January 1917).

Seek ye knowledge from the cradle to the grave.

Excessive knowledge is better than excessive praying . . . It is better to teach knowledge one hour in the night than to pray the whole night.

That person who shall die while he is studying knowledge in order to revive the knowledge of religion, will be only one degree inferior to the prophet.

One learned man is harder on the devil than a thousand ignorant worshippers.

That person who shall pursue the path of knowledge, God will direct him into the path of Paradise; and verily the superiority of a learned man over an ignorant worshipper is like that of a full moon over all the stars.

The knowledge from which no benefit is derived is like a treasure from which no charity is bestowed in the way of the Lord. Who are the learned? Those who practise what they know.

These statements must not be construed as idle and useless words. Their results have been very substantial. The strength of Islamic science was its devotion to practical matters rather than to the vague notions of the Byzantine Greeks. The Companions of the Prophet followed his precepts by studying and participating in discussions when they were advanced in age¹. After the followers of Muhammad brilliantly defeated their persecutors at Badr, a number of captives were taken. They were well-treated and given the best food; the poor went free without payment of ransom, but the rest were assessed "what the traffic could bear." The remarkable feature of the settlement, and one probably unparalleled in the annals of military history, was that those who could read and write were required to teach ten children each in lieu of paying a

¹ El-Bokhari, *op. cit.*, Vol. III, p. 41.

ransom of 4,000 dirhams each. Muhammad 'Ali concludes¹: "To forego a big sum of 4,000 Dirhams ransom money per head and accept the teaching of reading and writing instead, furnishes an ample testimony to the value which learning had in the eyes of the Prophet."

Captious critics of Islām delight in pointing out that a good deal of what we term Islamic learning was the product of Jewish, Christian, and Zoroastrian minds. It can be persuasively argued, however, that it is to the credit of Islām that it provided an atmosphere conducive to productive efforts by such scholars; the facts indicate that absence of discrimination in Islām encouraged free inquiry by students of other faiths.

Westerners associate force with the spread of Islām. Their conception of *Jihad* or "holy war" is distorted beyond recognition. They picture the Saracen with a Qur'ān in one hand and the sword in the other. This is a clear case of mistaken identity. The Christians, not the Muslims, were the chief offenders in this respect. In Spain, during the Inquisition, two million Muslims were threatened with death unless they accepted a particular brand of Christianity. It may be stated categorically that the wars of Muhammad were purely defensive in nature. Had they not been waged, the Muslims would have perished—with what dire results for the future of civilization one can only imagine. Diercks renders this verdict²:

That wars against non-Muslims were religious and for the sake of religion, and were undertaken by Muslims for the oppression of other religions, is not only, generally speaking, out of the question, but also even in special cases it would be very difficult to prove that material and political reasons were not the real causes of those wars.

The best evidence indicates that some of the later wars

¹ Muhammad 'Ali, *op. cit.*, p. 216.

² Diercks, *op. cit.*, 17: 91 (May 1929).

were economic and political in their motivation but that the early ones, during the lifetime of the Prophet, were entirely a struggle for the right to live.

The Eastern Christians and Jews preferred Muslim to Roman rule. Wismar, who inclines to be parsimonious in his concessions to Islām, writes¹ :

When the Muslim army reached the valley of the Jordan and Abu 'Ubaidah pitched his tent at Fihl, the Christians of the country informed the Arabs that they preferred them to the Byzantines, although the latter were Christians. The people of Hims closed the gates of their city against the army of Heraclius, declaring that they preferred Muslim justice and government to Byzantine oppression. The Jews of this city swore by the Torah to sacrifice their lives in the attempt to keep the Emperor from gaining possession of it. Other cities acted similarly and eloquently declared their abhorrence of Byzantine misrule and their approval of Muslim supremacy. On the defeat of the imperial forces at Yarmuk the cities opened their gates and received their victors with wild demonstrations of joy. Nor were they disappointed in their expectations of greater security under Muslim rule. In the early days of Islam Jews and such Christians as did not accept the imperial theology were better off under the Muslim caliph than under the Christian Emperor.

Particularly instructive are the provisions of 'Umar's treaty with Jerusalem² :

This treaty comprehends all Christian subjects, priests, monks, and nuns. This treaty grants them security and protection wherever they may be . . .

A similar external protection shall be granted to their churches, houses, and to their places of pilgrim-

mage, as well as to those who visit these places the Georgians, Abyssinians, Jacobites, Nestorians, and all those who acknowledge the Prophet Jesus. All these deserve consideration because they had heretofore been honoured with a document of the Prophet Muhammad, at the end whereof he affixed his seal, and in which he has emphatically ordered us to be beneficent and to grant them security. . . . On their entry into the church of the Holy Sepulchre and on their entire pilgrimage no kind of tax shall be exacted from them.

It was not uncommon for outstanding Christian scholars to count more of their pupils from among the Muslims than from their co-religionists¹. Bartold, a distinguished scholar with no "axe to grind," asserts that "the Mussulmans never indulged in the persecution of those who believed in another religion as the Christians did in Spain²." At the time of the Crusades, if we are to believe the testimony of a Russian historian of the Church, "the clergy and the masses desired the return of the Muhammadan yoke rather than the continuation of the power of the Latins³".

How were the Christian men of learning in Spain treated by the Muslims? Ameer 'Ali has this to say on the subject⁴ :

The government of each academy was entrusted to a rector, who was chosen from among the most distinguished scholars. In the middle of the thirteenth century of the Christian era this high office in the University of Granada was held by Sirajud-Din Abu Jaafar Omar al-Hakami. No religious distinction was made in these appointments, and learned Jews and Christians were often appointed to the post of rector. Real learning, in the estima-

¹ V. V. Bartold, *Mussulman Culture*, p. 17.

² *Ibid.*, p. 18.

³ *Ibid.*, p. 22.

⁴ Ameer 'Ali, *A Short History of the Saracens*, p. 570.

¹ A. L. Wismar, *A Study in Tolerance*, pp. 104-5.

² Diercks, *op. cit.*, 17 : 375 (October 1929).

tion of the Arabs, "was of greater value than the religious opinion of the literate."

Were women confined to the harem, or could they participate in educational activities? Investigation discloses that women were lecturers as well as students. Women of learning were to be found even in Mecca where Karima lectured to many pupils on *hadith*; Shaheda was another celebrated teacher of traditional theological doctrine. Some of the most famed Spanish surgeons were women¹. Spanish women were also noted for their ability along literary lines "and the names of Nashun, Zainab, Hemada, Hafsa, al-Kalayyeh, Safia, Maria shed an ineffaceable lustre on the land of their birth²". When the Spanish Muslim women sallied forth from their apartments, it was not in sombre garb but in costly dresses bedecked with precious stones and redolent with perfume. The splendor of their appearance in the mosques has been likened to "the flowers of spring in a beautiful meadow³." According to 'Abu'l-Karim, Muhammad gave women the right to own property thirteen centuries ago, a privilege that England did not confer until 1875 and which still does not exist in unrestricted form in France⁴. Al-Maqqari quotes a proud Spaniard: "Has your country produced such women as our Walladah al-Marwaniyyah, who discusses poetry with the vazier, Ibn Zaidun? And have you the match of Zainab, the daughter of Ziad⁵?" Girls attended school with boys and even slave-girls are reported to have been well trained⁶. Other Muslim women scholars included al-Aaruzzieh, grammarian and rhetorician; Um-ul-Hina,

¹ S. H. Leeder, "The Debt of Civilization to the Arabs," *Islamic Review* 4 : 115 (March 1916).

² Ameer 'Ali, *A Short History of the Saracens*, p. 569.

³ *Ibid.*, p. 571.

⁴ 'Abu'l-Karim, "Hazrat Muhammad, the Greatest Social Reformer," *Islamic Review*, 22 : 146 (May 1934).

⁵ Totah, *op. cit.*, p. 82.

⁶ *Ibid.*, pp. 80-1.

poetess and jurisconsult; Mariam of Seville, accomplished in poetry, literature, and rhetoric; Ammat ul-'Aziz, a descendant of the Prophet, also enjoyed an excellent reputation for her erudition¹.

Few students would deny that the influence of the Arabs in bringing about the Renaissance in Europe was considerable. Much translation will have to be done during the decades ahead before the pedagogues of the West will be willing to accord to the Muhammadan Revolution as prominent a place in the history textbooks as that now granted, for example, to the French Revolution. In the light of the vast amount of research remaining to be done in order to uncover the intellectual treasures bequeathed by the Muslims, it behoves present-day writers to avoid negative conclusions as to the volume of original contributions made by the Arabs to contemporary civilization. The other extreme, of engaging in flights of fancy on the achievements of the past, is also fraught with danger. One of our mortal failings is the practice of boasting about a civilization only when it is in its infancy or its senility.

One should be wary about accepting and publicizing strange and unverified claims, such as that of 'Abu'l-Karim who solemnly vouched for the story that the Arabs and Moors of Spain traded with the American Continent 477 years before Columbus². Siyyid Ehsan el-Bakry contributes this item: "Even aviation was attempted by the early Muslims; and Abu'l Kasim, the inventor of glass, did actually succeed in flying, but unfortunately fell and was killed³."

Some of the general reforms instituted by Muhammad were the abolition of drunkenness, gambling, and infanticide. In Persia before Islam, religion sanctioned marriage

¹ Ameer 'Ali, *A Short History of the Saracens*, p. 570.

² 'Abu'l-Karim, *loc. cit.*

³ Ehsan el-Bakry, "How the Qur'an Gave a New Impetus to Education and Scientific Learning," *Islamic Review* 5 : 416 (October 1917).

between father and daughter, son and mother, brother and sister, but such practices have long ceased¹.

Schools played an important role in the spread and advancement of culture in Islamic countries. The Latin origin of the word bachelor has not been finally and indisputably established. The word was used in the *Chanson de Roland* and it has been suggested that it could have been derived from *bihaqq-al-riwaya*. "The right to teach on the authority of another²."

'Alī, son-in-law of the Prophet, and Ibn 'Abbās, cousin of Muḥammad, gave public lectures on poetry, grammar, history, and mathematics. Presumably these adult educational activities in the mosques carried greater prestige than appearances before children. Ameer 'Alī writes that Spain had a well-developed educational system³:

No town, however small, was without colleges and schools, whilst each principal city possessed a separate university. Those of Cordova, Seville (Ishbilia), Malaga, Saragossa, Lisbon (Alishbuna), Jaen, Salamanca, among others, occupied the most distinguished position.

Ameer 'Alī continues his account of the Muslim universities in Spain⁴:

It was customary in the Spanish Arabian universities to hold annual commemorations and periodical meetings, to which the public were invited. On these occasions poems were recited and orations delivered by the most eminent persons in the universities. Every college had the following lines inscribed over its gates: "The world is supported by four things only: the learning of the wise, and the justice of the great, the prayers of the good, and the valour of the brave."

¹ Bartold, *op. cit.*, p. 71.

² Sir Thomas W. Arnold, *The Legacy of Islam*, p. 245.

³ Ameer 'Alī, *A Short History of the Saracens*, p. 577.

⁴ *Ibid.*, p. 570.

Conditions under the Fatimids in Egypt were most favourable for students¹:

Al-Maqrīsi states that a student received five loaves of good bread a day, a sum of money, and light and heavy clothing. Adults were not left out of the educational picture. Ibn Batutah is authority for the assertion that at Damascus was a school called Madrasah Ibn 'Umar, founded for old and middle-aged men who wished to study the Qur'ān; food and clothing were furnished to students and teachers. Girls attended school with boys and ladies taught men's classes in advanced literary subjects.

The Dār ul-Hikmat, free scientific institute at Cairo, "anticipated Bacon's ideal with a fact²." Access to libraries was available without cost. Ameer 'Alī provides interesting information about the interest of Egyptian leaders in education³:

The caliphs frequently held learned disputations, at which professors of these academies appeared, divided according to their different faculties: logicians, mathematicians, jurists, and physicians, dressed in their *Khalaa*, or doctoral mantles.

The gowns of the English universities retain the original form of the Arab *Khalaa*.

Here is a note on school finance in Egypt⁴:

Two hundred and fifty-seven thousand ducats, raised by a carefully regulated taxation, constituted the annual revenue of the colleges, and was employed for paying the salaries of the professors and officials, and providing the requisites for teaching, and other objects of public scientific instruction.

¹ Totah, *op. cit.*, p. 83.

² Ameer 'Alī, *The Spirit of Islam*, p. 342.

³ Ameer 'Alī, *A Short History of the Saracens*, p. 614.

⁴ *Ibid.*, p. 615.

Tracing the use of Islamic symbols in free-masonry would be an intriguing task but the element of secrecy precludes open research. We do know that there was attached to the Central Dār ul-Hikmat a Grand Lodge whose Grand Prior convened weekly meetings. Ameer 'Alī comments¹:

Makrizi's account of the different degrees of initiation adopted in this lodge forms an invaluable record of free-masonry. In fact, the Lodge at Cairo became the model of all the Lodges created afterwards in Christendom.

At Granada as well as at Cordova a great cultural upsurge took place²:

The sovereigns of Granada rivalled the Caliphs of Cordova in their patronage of learning and arts, and in the construction of sumptuous public works; and under their liberal and enlightened government, Granada became the home and birth-place of eminent scholars, distinguished poets, accomplished scholars, "men fit in every respect to serve as models."

Ameer 'Alī cites the tribute of Abu'l Faraj to the Caliph al-Mámún³:

He was not ignorant that they are the elect of God, His best and most useful servants, whose lives are devoted to the improvement of their rational faculties..., that the teachers of wisdom are the true luminaries and legislators of the world.

Ameer 'Alī describes the Islamic devotion to scientific method⁴:

Marching from the known to the unknown, the School of Baghdad rendered to itself an exact

¹ Ameer 'Alī, *A Short History of the Saracens*, p. 569.

² Ameer 'Alī, *The Spirit of Islam*, p. 343.

³ *Ibid.*

⁴ *Ibid.*

account of the phenomena for the purpose of rising from the effect to the cause, accepting only what had been demonstrated by experience; such were the principles taught by the (Muslim) masters.

"In Siluki's lecture-hall at Nisapur there were 500 ink-pots always ready for use¹." A thousand years ago, the Al-Azhar University was founded in Cairo. It is still the chief Islamic institution of higher learning. The library of al-'Aziz at Cairo contained at least 120,000 volumes while that of al-Hakam at Cordova was even larger. In Baghdād, princes and viziers vied with each other in establishing libraries and *madrisahs* (colleges). A minor college founded in Baghdād in 990 A.D. contained 10,400 books. No one was permitted to use a book at a public lecture without the author's written comment; perhaps this regulation was the prototype of modern copyright legislation².

Khuda Buksh relates the tragicomic tale about the Muslim addiction to books³:

Even in the first century of the Hegira we find learned men scolded by their wives for possessing great numbers of books and one was actually killed by the fall of a pile of folios which he had heaped around him while sitting on the floor. It was deemed a matter of pride to possess a large collection of books, and not merely *savants* but even statesmen gloried in their collection. A Buwayiid Wazir never travelled without carrying with him thirty camel-loads of books.

The baths of Cordoba street lights, and various other comforts and conveniences installed by the Muslims, surely provided excellent demonstration lessons for the ameliora-

¹ S. Khuda Buksh, *Contributions to the History of Islamic Civilization*, Vol. II, p. 282.

² Khuda Buksh, "The Educational System of the Muslims in the Middle Ages", *Islamic Culture*, 3 : 455 (July 1927).

³ *Ibid.*, 3 : 453 (July 1927).

tion of European conditions¹. Cordoba merits further elaboration²:

Cordova in the tenth century was the most civilized city in Europe, the wonder and admiration of the world, a Vienna among the Balkan states. Travellers from the north heard with something like fear of the city which contained 70 libraries and 900 public baths; yet whenever the rulers of Leon, Navarre or Barcelona needed such things as a surgeon, an architect, a dress-maker, or a singing master, it was to Cordova that they applied.

Rosenthal reinforces this opinion³:

In Muslim days Cordova was the center of European civilization and one of the greatest seats of learning in the world. After the expulsion of the Moors from Spain, however, Cordova sank to the level of a provincial town. Yet her wonderful mosque is a superb legacy of the days when Cordova was the capital of the Arab empire in Spain.

In 1238 A.D., the mosque was converted into a cathedral. Great numbers of pillars were removed and other æsthetic crimes were committed. To undo some of the damage, the civil authorities in Spain are undertaking partial restoration; for example, the bases of the pillars are being uncovered.

How the transmission of Islamic culture to Europe was brought about has not been precisely ascertained, but we do have certain clues. Haskins affirms that "the broad fact remains that the Arabs of Spain were the principal source of the new learning for Western Europe⁴." Thompson advances plausible reasons for regarding Lothar-

¹ Totah, *op. cit.*, p. 103.

² Arnold, *op. cit.*, p. 9.

³ E. Rosenthal, "Traces of Arabic Influence in Spain," *Islamic Culture*, 11 : 336 (July 1937).

⁴ Haskins, *op. cit.*, p. 5.

ingia as the central point of dissemination of the new learning in Latin Europe¹:

I am convinced that the schools of Lorraine in the last half of the tenth century were the seed-plot in which the seeds of Arabic science first germinated in Latin Europe, from which the knowledge radiated to other parts of Germany—witness Hermann Contractus in Reichenau—to France, and especially, owing to the preference of Knut the Great for Lotharingian church-men, into England.

The fact that Peter the Venerable sponsored a Latin translation of the Qur'án, around 1150 A.D., is further evidence of Cluny's interest in Arabic learning. Today, the name of the French province is primarily associated with Cluny lace. "The most brilliant author of the time was al-Idrisi who was entrusted by the Christian Norman King Roger of Sicily with the composition of a description of the known world, indicating the acknowledged superiority of Muhammadan learning²."

Adelard of Bath, pioneer student of Arab science and philosophy in the twelfth century under Henry I and traveller to distant lands, has been called "the greatest name in English science before Robert Grossetete and Roger Bacon³." Others active in diffusing Arabic culture in Europe were Plato of Tivoli, Robert of Chester, Hermann of Carinthia, Rudolf of Bruges, and the great Gerard of Cremona. Michael Scot, who served at the court of Frederick II, translated the works of Ibn Síná, al-Bitrújî, and other Muslim thinkers.

An intriguing figure in the history of Europe and one significant for his role in the dramatic spread of Muslim influence was Frederick the Great. He discoursed on philosophical subjects with Fakhru'd-Din, exchanged

¹ J. W. Thompson, "The Introduction of Arabic Science into the Lorraine in the Tenth Century," *Isis*, 12 : 191 (May 1929).

² Arnold, *op. cit.*, p. 89.

³ Haskins, *op. cit.*, p. 20.

geometric and algebraic questions and problems with al-Kāmil, and associated with the most renowned Arab astronomers. Muslim architecture interested him, notably the octagonal Mosque of 'Umar in Jerusalem, with its green and gold cupola and artistic pulpit. He also collected information on hunting: "When we were in the Orient we observed that the Arabs themselves use a hood in hawking, for the Arab kings sent us their most skilful falconers with falcons of every kind¹."

The following report shows his distaste for the claims of the Roman Church²:

He was discussing the Khalifate with Fakhru'd Din. The Amir explained to the Emperor how the Khalifat of the Abbasids could be traced back in unbroken line to al Abbas, the uncle of the Prophet, and thus still remained in the family of the Founder. "That is excellent," said Frederick, "far superior to the arrangement of those fools, the Christians. They choose as their spiritual head any fellow they will, without the smallest relationship to the Messiah, and they make him the Messiah's representative. That Pope there has no claim to such a position, whereas your Khalif is the descendant of Muhammad's uncle."

Frederick gradually transferred some 16,000 Muslims from various parts of his empire to Lucera, which was transformed into a military fortress. Frederick apparently wanted them to remain Muslims so that he could tax them on the basis of their faith. They seemed to appreciate his rule and even called him "sultan." "Thus there grew up in the heart of the oldest Christian country near the frontier of the papal *patrimonium* a genuine Muhammadan town with all its characteristic mosques and minarets visible afar across the levels of Apulia³."

¹ Robert Kantorowicz, *Frederick the Second*, p. 192.

² *Ibid.*, pp. 192-3.

³ *Ibid.*, p. 130.

"I know nothing," writes Von Kremer, "which brings home to us a picture of the Muslim zeal for truth more clearly and emphatically than an account of the travels of the last great Arab geographer—Yaqut-i-Hamwi. The Mongol menace, which was to destroy the throne of the Abbasids and the old Bagdad, begins its steady forward course, but does not in the slightest degree interfere with the quiet work of our author in the libraries of Merv. In his flight he saves the greatest portion of his gathered materials, and though hardly at leisure or in peace, he sets to work to complete his task before he embarks on his last journey—never to return."¹ Yaqūt (circa 1179-1229), by birth an Anatolian Greek, was enslaved in youth. Educated as a Muslim, he became one of the most successful of the Arabic scholars in the compilation, collection, and classification of data. His *Geographical Dictionary* or *Gazetteer* is the greatest work of its kind in Arabic; no mere assortment of dry facts, it is enriched with anecdotes, descriptions of natural scenic beauties, and so on. Of major importance also is his *Dictionary of Men of Letters*.

Another fascinating figure in Islamic geographical science is al-Birūnī from whom we learn that by the eleventh century Muslim merchants had founded colonies in the Indian Ocean near the Java Islands and had married native women. It is possible that the Arabs knew Australia and that Ibn Rushd's reference to a place in the land of the Zenjis where "the day lasts only six hours" relates to South Australia. Al-Birūnī also possessed information about South Africa and Mozambique. The Chinese official map for the year 1331 A.D. was composed either by or in dependence upon Muslim geographers."² Muhammadan geographers assigned greater value to civic

¹ Khuda Buksh, *Contributions to the History of Islamic Civilization*, Vol. II, p. 47.

² Ahmet Zeki Validi, "Islam and the Science of Geography," *Islamic Culture*, 8: 514 (October 1934).

and cultural life, description of manners, language and belief than did most Greek authors and their determination of longitude and latitude is characterized by greater exactness.

The following illuminating disquisition on the more favored research conditions made possible by Islām is taken from a manuscript of al-Bīrūnī which was written on the completion of certain geographical investigations, September 21, 1025¹:

Most of the data of the Geography (of Ptolemy) concerning the longitude and latitude of points on the Earth have really been adopted only on the ground of rumours which had come from far-off districts... Anyhow, the ground on which these data rest is mere report; indeed those lands were very difficult of access in the past owing to the national divisions (*at-tubayān al-millī*), for national division is the greatest obstacle to travel in countries. We see, for example, some people who think—as do the Jews—to come nearer to God through treacherous attacks on folk of other nationalities. Or they take foreigners as slaves, as do the Romans, and that is the lesser evil. Or travellers, because they are foreigners, are turned back, held in every kind of suspicion and they are thus brought to a very dangerous and unpleasant plight.

But now the circumstances are quite different. Islam has already penetrated from the eastern countries of the Earth to the western; it spreads westward to Spain (Andalus), eastward to the borderland of China and to the middle of India, southward to Abyssinia and the countries of Zanj (*i.e.*, South Africa, the Malay Archipelago and Java), northward to the countries of the Turks and Slavs. Thus the different peoples (*al-umam, al-mukhtalifah*) are brought together in mutual understanding (*ulfat*),

¹ Ahmet Zeki Validi, "Islam and the Science of Geography," *Islamic Culture*, 8: 417-18 (October 1934).

which only God's own Art can bring to pass...

To obtain information concerning places of the Earth has now become incomparably easier and safer (than it was before). Now we find a crowd of places, which in the (Ptolemaic) "Geography" are indicated as lying to the east of other places, actually situated to the west of the others named, and *vice versa*.

This quotation, by itself, disproves the belief common in the West that the Arabs accepted uncritically whatever came down from the Greeks and were mere imitators.

Bartold acknowledges that "it is only because of the Arab geographers that modern scholars possess material by which they can judge how little the climatic and physico-geographical conditions of Higher and Central Asia have changed during the last thousand years."¹

It is claimed that Ibn Majīd piloted Vasco da Gama from Africa to the Indian coast.

Among the best known in the West of the Arab geographers is Ibn Batūta (Abu 'Abdullah Muḥammad, b. 1304 A.D., d. 1378 A.D.), whose descriptions of his travels in Central Asia are justly famed.

Al-Mas'ūdī (d. 956 A.D.) studied science and philosophy and travelled throughout the East by land and sea. Unfortunately, only a single volume remains of the thirty that comprised his encyclopedia of the history, geography, philosophy, and religious conceptions of the Muslims, their neighbors, and precursors. Some regard *The Golden Meadows*, an abridgement of what remains of his exhaustive work, as among the most delightful books in the Arabic language.

Al-Maqdisī was an excellent literary craftsman and deserves some credit for anticipating our modern interest in the cultural landscapes of other countries—the different mores, customs, beliefs, likes, dislikes, interests, and state of culture.

¹ Bartold, *op. cit.*, p. 59.

Indubitably, the Pilgrimage to Mecca stimulated geographical research. It is true, of course, that pilgrimages were made to the Ka'ba before the advent of Muḥammad but in those times the pilgrims came only from nearby regions, not from distant lands. What had been a tribal shrine became a consecrated spot to many nations and peoples.

The geographical studies of al-Battānī and his colleagues kept alive the idea of the sphericity of the earth, a concept nearly forgotten in the "Dark Ages" and one without which the discovery of America would have been impossible. Ibn Ruṣḥd mentioned the dome of Arin, world summit, an idea found in the *Imago Mundi* of Cardinal Peter of Ailly. Columbus was familiar with the *Imago Mundi* and it may have been from it that he reached the conclusion that the earth was round; in any case, it probably encouraged him to pursue the theory; after all, he could hardly be persecuted as a heretic for advocating a doctrine sanctioned by Cardinal Peter. "Thus Islamic geographical theory may claim a share in the discovery of the New World."¹

The coming of Islām stimulated the spirit of adventure and enterprise. About the middle of the tenth-century Muhammadan ships had reached the Chinese town of Khanfu (now Canton) and there is reason to believe that they knew of the existence of Japan and Korea. Trade with India and Ceylon was active and of considerable volume. Muslim vessels reached Sufala, noted for its gold and situated opposite Madagascar on the east coast of Africa. When Vasco da Gama, after his circumnavigation of Africa in 1498 had reached Malindi on the east coast of Africa, it was an Arab pilot, Aḥmad ibn Majīd, who showed him the way to India. According to Portuguese sources, this pilot possessed a very good sea-map and other maritime aids and instruments. Some of the Abbasid caliphs had the idee of piercing the Isthmus of Suez,²

Commerce of Islamic peoples.

¹ Arnold, *op. cit.*, p. 94.

² *Ibid.*, p. 96.

Cloth known as fustian took its name from its place of manufactory, Fustat, the first Muslim capital of Egypt. Taffeta is the English equivalent of the Persian *taftah*. The descendants of 'Attab in Baghdad were renowned for a special fabric which was imitated in twelfth-century Spain where it was known as attabi silk, France and Italy adopting it as tabis. Tabby cats naturally possess a brown and yellow attabi pattern. The Muslims took the cotton plant to Europe. The word damask is derived from Damascus, gauze from Gaza, and muslin from Mosul. Cotton manufacture was first introduced into Europe by the Arabs, 'Abdu'r-Raḥman III having been responsible for the start of the industry in Spain in 130 A.D. According to Draper, "The Arabs were also the authors of the printing of calicoes by wooden blocks, a great improvement on the old Indian operation of painting by hand."¹

The carpet, now a universal necessity, came into Europe as a luxury reserved for connoisseurs who at first regarded it more as a treasure than as a thing of use. "In the sixteenth century Persian craftsmen carried carpet-weaving to heights never attained before or since, producing with miraculous skill designs unparalleled in beauty."²

The Muslims took the sugarcane to Granada; from there it went first to Madeira and thence to the West Indies, the present world sugar bowl. Paper, so indispensable to contemporary literate civilization, came to Europe from the Arabs. Also from the Muslim east came sesame and carob, maize and rice, lemons and melons, apricots, and shallots (onions from Ascalon). Baldachins originated in Baghdad; samites, dimities, and diapers were imported from Byzantium. Central Asia and the Near East exported rugs, carpets, and tapestries. The regular channels of commercial intercourse brought additional contributions from the Muslim world: lacquers; new colors, e.g., carmine, and

¹ John W. Draper, *History of the Intellectual Development of Europe*, Vol. II, p. 386.

² Arnold, *op. cit.*, pp. 137-38.

ilac (Arabic words); dyes, spices, and drugs including aloes, cloves, incense, indigo, and sandalwood; glass mirrors; works of art in pottery, glass, and enamels; even the rosary presumably came from the Buddhists of India by way of Syria to western Europe. Woodwork, brassware, and mattresses are objects of comfort and attraction for which the Europeans are indebted to the Arabs. Coffee, spices, candy, oranges, and other delicacies made European diets more palatable, thanks to the Muslims. The following words, derived from Arabic, reveal more of the pictures: alcohol, cumin, divan, jar, lemon, lute, mattress, saffron, sherbet, syrup, julep, sofa, spinach, sugar, and candy. The word captain is derived from *capudan pāshā*, admiral from *amirū'l-bahr*.

Important in international trade were the caravan routes across Central Asia and the sea route from Persian ports to China and India. Bartold concludes that these trade relations, furthered by the common enmity of Mongols, Persians, and Europeans toward the sultans of Egypt, were largely responsible for the cultural progress of Europe in the thirteenth century; Irán occupied the position of cultural leader.¹

Browne makes this significant observation²:

We flatter ourselves on the facilities of communication existing in these our days, but it is questionable whether an idea, a book, or a philosophical doctrine would travel so quickly now from Tunis to Tabriz or from Seville to Samarqand as it did in the fourteenth century. So potent was the unifying effect of Islam and its universal medium the Arabic language.

Theoretically, Islām has no church, no priests, no sacraments, but emphasises self-discipline based on the constant watchfulness of God Who, according to the Qur'án, is nearer to man than

¹ Bartold, *op. cit.*, p. 114.

² E. G. Browne, *Arabian Medicine*, pp. 107-08.

his own jugular vein. Muslim law rests on good faith and equality before God. Muḥammad said, "The white man is not above the black nor the black above the yellow; all men are equal before their Maker." Good faith is elevated above personal fealty and becomes a universal ethical conception.¹

Islām substituted the community of faith for the blood tie, which was the political and social foundation of the Arab tribe. "He who adopted Islam had to forget all connexions, even his own kith and kin, unless they were his companions in the faith."² Equality before the law is fundamental to the system. De Santillana quotes this delightful *hadith*: "The Muslims are a single hand, like a compact wall whose bricks support each other."³

The Qur'án, fountain and source of all the good things that later developed in Islām, created a new type of social order and founded a new basis for political organization in that it revealed a new material law that superseded the laws and ordinances of the past.⁴ Patriotism, a rational love for one's country, transcended the narrower loyalty and became identified with the worship of God.

Muḥammad is credited with being the first judge to distinguish between intentional, premeditated murder and accidental homicide: "The *intention* of the accused was the determining factor for him in all cases."⁵ The Muslim jurist was required to decide a case only upon the record before the court, after hearing both parties⁶:

When 'Alī was appointed judge in al-Yaman, he was instructed by the Prophet on the eve of his

¹ Arnold, *op. cit.*, p. 305.

² *Ibid.*, p. 285.

³ *Ibid.*, p. 287.

⁴ Bashir-ud-Din, "The Political Theory of Islam," *Islamic Culture*, 8 : 588 (October 1934).

⁵ Muhammad Hamidullah, "Administration of Justice in Early Islam," *Islamic Culture*, 11 : 107 (April 1937).

⁶ *Ibid.*, 11 : 167-68.

departure : "When the two parties sit before thee, do not decide in favor of one of them unless and until thou hast heard from the one as thou hast from the other. This will more likely suggest thee right decision."

Muhammad Hamidullāh gives further credit to the Prophet as a legal reformer¹ :

The Prophet laid down an important rule of law and court procedure : the burden of proof lies on the claimant, and the defendant who declines to admit the claim must deny simply on oath.

An important change of practice instituted by the Qādī Shurayh, an appointee of the Caliph 'Umar, was the decree that witnesses should appear separately ; formerly, all the witnesses remained in the court-room and heard one another's testimony. Shurayh performed judicial duties over a period of seventy-five years.

The letter of instructions sent by the Caliph 'Umar to Abū Mūsā al-Ash'ari upon the latter's appointment as judge in Basrah has been summarized as follows² :

(a) Administration of justice is a (Divine) ordinance and a practice (of the Prophet) which ought to be followed. (b) If a suit is filed before you, decide it after careful consideration and execute it, for even the most rightful judgment without execution is useless. (c) Both parties should be treated equally so that the poor might not despair of your justice and the tyrant might not long for your partiality. (d) The burden of proof lies upon the claimant, and the defendant can deny the claim on oath. (e) The parties may compromise out of the court, but the conditions of their compromise should not violate religious commands or prohibitions. (f) Review of judgment is not disallowed

¹ Muhammad Hamidullah, "Administration of Justice in Early Islam," *Islamic Culture*, 11 : 168 (April 1937).

² *Ibid.*

in clear cases, since a revocation is always better than persistence in injustice. (g) In the absence of law and precedent (Qur'ān and *Sunnah*) on some question, deduction should be made with analogy to similar cases, and after due consideration of everything such judgment be pronounced as be nearer to right and dearer to God. (h) A claimant must be given time to procure evidence. If he is thereafter unable to prove his case, his claim may be dismissed. (i) The evidence of every Muslim is admissible except of one who has received corporeal punishment for immorality (*Majlud fihadd*) or is notorious for false evidence. Again, one cannot give evidence for one's own kin and relatives. (j) The judge must not behave in a haughty manner or evince displeasure on the utterance of truth. God is All-Knowing and All-Hearing and with Him one must have clear accounts.

Islamic doctrine does not regard any man as being free from error or incapable of making a mistake. As an example for his followers, Muhammad even entertained civil suits against himself and in the cases known to us always decided in favor of the claimant.³

The Caliph 'Uthmān constructed a special building for the court of justice (*Dār al-Qada*). 'Ubayd Allāh b. al-Ḥassan al-'Aubari and 'Umar b. 'Amir were appointed jointly as judges in Basrah : "They sat together as a Bench and combined in hearing and deciding"⁴ During his farewell pilgrimage a decade after the Hijrah, Muhammad decreed that life, property, and honor, the three elementary rights of every man, must be respected.⁵

De Santillana appraises our debt to Islamic Law⁶ :

¹ Hamidullah, *op. cit.*, 11 : 169.

² *Ibid.*, 11 : 170.

³ *Ibid.*, 11 : 171.

⁴ Arnold, *op. cit.*, p. 310.

Among our positive acquisitions from Arab law, there are legal institutions such as limited partnership (*qirad*), and certain technicalities of commercial law. But even omitting these, there is no doubt that the high ethical standard of certain parts of Arab law acted favorably on the development of our modern concepts; and herein lies its enduring merit.

Islám did not follow the European pattern of imposing serfdom. In Persia and Turkistán it brought in its train the development of city life and the disintegration of the caste system and a more equitable apportionment of the huge landed estates.¹

Some of the ablest mediæval historians were Muslims and the greatest of them, Ibn Khaldún, completely outdistanced all historians of the Middle Ages in his fundamental grasp of the principles of human cultural development. Barnes expresses the view that, as a group compared with their Christian contemporaries, the Muslims were characterized by independent judgment, relative impartiality, and a better grasp of chronological methods. On the whole, they dated their materials and events far more precisely than did the Christian writers.² Incentives for Muslim historical writing were the desire to establish the authenticity of *hadiths*, to determine who were the descendants of Muḥammad, and to celebrate Muslim conquests and remember the heroes of Islám.

The earliest of these historical efforts were biographies of the Prophet, the first of which we have knowledge being that of Ibn Isháq (d. 768 A.D.) a sincere attempt to collect the facts about Muḥammad and Islám which has been partially preserved for our time in a recension by Ibn Hishám. Al-Baladhúrí (d. 892 A.D.) brought the early

¹ Bartold, *op. cit.*, p. 59.

² Barnes, *op. cit.*, p. 94.

accounts of the Muslim conquests into a detailed consecutive narrative entitled *History of the Conquests of the Countries*. His chief predecessor in this field was al-Waqidi (747-823 A.D.), the earliest chronicler of Saracenic conflicts; his chief book was a *History of the Wars of the Prophet*. Al-Dinawári (d. 895 A.D.) composed a standard *History of Arabia and Persia*. At approximately the same time, al-Ya'qúbí wrote a chronological summary of universal history from the Shi'ite stand-point and the earliest historical geography in Arabic literature. The best work on the Caliphate of Baghdád, in the estimation of some scholars, was the *History of Baghdád and its Caliphs* by Ibn Abi Táhir (d. 902 A.D.).

At-Tabarí (839-923 A.D.) had an unequalled store of theological, philological, and historical learning. He was a traveller and a man of vast erudition who wrote, among other things, *The Annals of the Apostles and Kings*, in which he gives events year by year up to 915 A.D. as related by different authorities. Called the "Livy of the Muslims," his style may have been inferior to Livy but his presentation was more accurate. A comparatively large portion of his work survives.

Barnes declares that al-Mas'údí (d. 956 A.D.) "has been fairly appropriately designated 'the Herodotus of the Arabs', for he possessed the same avid curiosity and zeal for information as did 'the father of history'."¹ His *Meadows of Gold* and other works were unusual in containing a wealth of ethnographic material and a good deal of cultural and social history.

The Khatib al-Baghdádí (d. 1012 A.D.) showed a subtle critical technique in the judging of traditions and an exhaustive biographical knowledge. "Most admired in the Khatib was his keenness in detecting genuineness or otherwise of a document by the anachronism of the subscription."²

¹ Barnes, *op. cit.*, p. 96.

² Khuda Buksh, *Contributions to the History of Islamic Civilization*, vol. II, p. 193.

Ibn al-Athir (1160-1234 A.D.), Arab by birth, ranks among the greatest Arab historians, his principal work being the *Perfection of History*, a twelve-volume universal history of Islám. He was one of the first Arabic-writing historians to have a philosophical grasp on cause and effect in the unfoldment of civilization.

Miskawaih, who died toward the end of the tenth century, displayed intelligence of a high order and exhibited a first-hand knowledge of political and military affairs. His *Experiences of the Nations* is noteworthy for its objectivity, impartiality, and outspoken judgments. In more than one quarter of the twentieth century world, despite proud claims of intellectual progress and vaunted adherence to scientific method, such a candid analysis of contemporary affairs would be suppressed and the author jailed or put at forced labor or exiled or killed.

The most celebrated of the biographical dictionaries is *The Obituaries of Eminent Men* by Ibn Khallikán (1211-1282 A.D.). The writings of Muḥammad Ibn Batúta have already been mentioned; his travels were more extensive than those of other writers in his day and his accounts are invaluable for the light they shed on those times.

Al-Maqrísí (1360-1424 A.D.) holds high place as a compiler of historical works; a learned and sagacious chronicler, he gave an excellent account of old Cairo and a topographical description and history of Muslim Egypt. We know of 561 works from the mind and hand of Jalálu'd-Din as-Suyúti (1445-1505 A.D.) including the *Itqan* and the *History of the Caliphs*. Prominent historians of Muslim Spain were Ibn Hayyan, Ibn u'l-'Abbas, Abu 'Ubaydu'llah al-Bakrî, Ibn Bushkuwal, Ibn us-Said, Ash-Shakandî, and Ibn u'l-Khatîb.

Ibn Khaldún (1332-1406 A.D.), native of Tunis, was the chief historian of his age and the inventor of a new science of history; apparently for the first time in historical literature, he introduced a philosophic conception of the stream of history. Early in his career, Ibn Khaldún

secured a post in the secretariat of the Sultan Abú Inán but soon fell into disfavor with the result that he was imprisoned; he was confined until the Sultan's death in 1358 A.D. An independent thinker and candid writer, he frequently had to leave town because of official displeasure. Such situations tend to occur when scholars become subservient to politicians. On one occasion, he felt constrained to remark that a despotic government finds it necessary to enfeeble the people by a system of education that instills servitude and dependence.

Ibn Khaldún stressed the influence of climate and the important bearing of the natural landscape in molding civilization and in determining physical, mental, and moral characteristics. He pointed out that persons living near the equator are dark-skinned because of the intensity of the sun's rays. He accounted for the cheerful, carefree, exuberant character of the Negroes on the basis of the high temperature of the country. He found the inhabitants of the temperate zones conspicuous for intellectual and physical endowments; the prophets and thinkers arose in these middle zones where dwell the Arabs, Persians, Romans, Greeks, Israelites, Indians, and Chinese.

He declared that "no rule or dynasty can be founded without the support of the tribe and the communal spirit."¹ He believed that empires, like individuals, have their own life cycle in which they grow, mature, and then decay, few possessing the flexibility to adapt to changing environments. In expounding this last idea, he was apparently a forerunner of Oswald Spengler. He regarded urban life as the highest stage of civilization but also as the prelude to decay and disintegration. With characteristic intelligence, he stated that the foundation of empire "is naught but a complete identification of the interests of the people with those of the sovereign."²

¹ Khuda Buksh, "Ibn Khaldun and his History of Islamic Civilization," *Islamic Culture*, 4: 578 (October 1927).

² *Ibid.*, p. 589.

Of history, Ibn Khaldún decided¹ :

It is a science by itself, for it sets a very definite object before it ; namely, civilization and human society. It deals with the different questions that serve to interpret and explain facts intimately connected with the essence of civilization. The sections, in which I treat these subjects, contain a branch of science remarkable alike for its originality and utility. They are the fruits of protracted reflection and unwearying research.

Concerning the appropriate function of historical study, he adds² :

History should aim at shedding light on the social groupings of men ; that is to say, on society and the various stages through which it passes in the natural course of events. It should shed light on its passage from savagery to greater and yet greater refinement of manners and customs ; on the realization of the common interests of family and tribe ; on the various ways in which one nation gains predominance over others, leading on to the establishments of empires and dynasties and, finally, on all changes, which in the course of natural events affect the character of society.

Barnes evaluates Ibn Khaldún's rank as a historian³ :

His importance lies in the unique feat, for the time, of having been able to rationalize the subject of history and to reflect upon its methods and purposes. He was the Roger Bacon of medieval historiography. He believed that history should be a science and that it should treat of social development, which he held to be an outgrowth

¹ Khuda Buksh, "Ibn Khaldun and His History of Islamic Civilization," *Islamic Culture*, 4 : 671 (October 1927).

² Khuda Buksh, *Contributions to the History of Islamic Civilization*, Vol. II, pp. 205-6.

³ Barnes, *op. cit.*, p. 96.

of the interaction between the physical environment and the group life of man...Anticipating Vico and Turgot, he comprehended the unity and continuity of historical development...In marked contrast with the static or eschatological conceptions of contemporary Christian historiography was his dynamic thesis that the process of historic growth is subject to constant change, comparable to the life of the individual organism. He made clear the cooperation of psychic and environmental factors in the evolution of civilization. There was a pre-Marxian flash in his observation that the usages and institutions of peoples depend upon the way in which they provide for their subsistence.

Flint adds this estimate¹ :

The first writer to treat history as the proper object of a special science was Mohammad Ibn Khaldun. Whether on this account he is to be regarded as the founder of the science of history is a question as to which there may well be difference of opinion ; but no candid reader of his *Prolegomena* can fail to admit that his claim to the honor is more valid than that of any other author previous to Vico.

Al-Birúni, whose contributions to the physical sciences are noted elsewhere in this study, is mentioned by Barnes as a chronologist² :

The eminent Muslim encyclopedist, mathematician and astronomer, al-Biruni (973-1048), did the best work on Muslim historical chronology, trying to clear it up and to systematize it through placing it on an astronomical basis. Not until the time of Scaliger (1540-1609) was there as able a chronologist in Christendom.

One of the civil servants of the Muslim empire deserves

¹ Robert Flint, *The Philosophy of History in France*, pp. 158 ff.

² Barnes, *op. cit.*, p. 97.

singling out for special commendation. Reference is made to Ibn Khurdadhbih, postmaster at Samarra who, in 844 A.D. compiled a list of post-roads, post-stations, and revenues due.

Export duties were commonly levied in the eleventh and twelfth centuries. Import duties sometimes varied on the basis of the country of origin of the merchandise. Searches by customs officers in Oman were considered very objectionable by travellers. In the twelfth century, Ibn Jubair registers the following complaint about the conduct of customs met at Alexandria¹:

Scarcely had we arrived when the Government officials boarded the boat to take charge of everything that was there. Every Muslim was produced one after another: his name, his personal description, the place he came from—all was noted down. Everyone was questioned as to the goods and the cash that he had with him... Ahmad Ibn Hasan was brought ashore for information regarding the Maghrib and the goods on the boat. He was taken to the authorities, then to the Qadhi, then to the customs officers, then to a band of the Sultan's servants, and was interrogated about everything. They commanded the faithful to unpack their luggage, their provisions. Guards were quartered on the bank to see that everything was actually brought into the customs office. They then questioned the passengers one after another. Everyone's luggage was brought in until the customs office became choked full. This was followed by searches of things—big and small—and everything was thrown pell-mell. They felt the pockets of travellers to see if there was any thing there. When this was done they made them swear if they had any thing else besides. In this process and owing to a pressing crowd, many things were lost. After a degrading and humiliating scene the travel-

¹ Adam Mez, *The Renaissance of Islam*, p. 119.

lers were sent away.

Ibn Jubair's description to this day strikes a responsive chord in the hearts of world travellers who find existing customs formalities equally irksome.

One reason for the Muslim pre-eminence in the arts and sciences during the period immediately preceding the European Renaissance was the comparative freedom of inquiry prevailing under Islamic rule. The poet Sa'ib was not obliged to confront inquisitors after writing these sentiments¹:

Free thought and faith—the upshot's one: they
wrangle o'er a name;

Interpretations differ, but the dream is still the
same.

While the bloody Albigensian war raged in Europe (1012-22), free-thinking Ma'arri wrote such lines as these with impunity²:

Nothing endures, everything is doomed to perish,
even Islam itself. Moses taught and passed away.
Christ succeeded him. Then came Mohammed
with his five daily prayers. A new faith will
come later, supplanting, outshining this. Human-
ity is thus hounded to death between yesterday and
today.

Contrary to biblical doctrines, Ma'arri also asserted "Perishable is the earth. Its end is not unlike its beginning. To laws of birth and death everything is subject."³ Ma'arri did not conceive of the course of events as obscene repetition nor did he believe in the cliché, often spoken but without proof, that history repeats itself. The following words reveal a realistic attitude which surpasses in objectivity the religious traditionalism of his time, and, one may

¹ Khuda Buksh, *Contributions to the History of Islamic Civilization*, Vol. II, p. 59.

² Khuda Buksh, "Ibn Khaldun and his History of Islamic Civilization," *Islamic Culture*, 4: 596.

³ *Ibid.*, p. 597.

believe, the cynical materialism of the nineteenth century¹ :

On and on flows the stream of time ever bringing something new...

The past never returns ; the course of events, old in its texture, is ever new in its colouring and fashion.

In the Holy Qur'án, God underlined the importance of good and just deeds and discounted the worth of theological disputations. "Why wrangle over that which you know not?" says the holy Book. "Strive to excel in good deeds ; when you return to God, He will inform you about that in which you have disagreed." The text of Qur'án explicitly renounces coercion in religion : *La ikráha fi'd-Dín*. In the *hadith* literature, the Prophet is reported to have affirmed that "There are as many ways to God as there are people on the earth." Not many orthodox Christians would be liberal enough to subscribe to such a statement. Muḥammad gave the perfect answer to those destructive critics who are ever ready to tear down the social order before having anything concrete and substantial to put in its place : "Repel evil with that which is better" (Qur'án, Surah XXIII). The Christian Bible does not say that God helps those who help themselves but Quran indicates that leading individuals will not automatically form a golden society when it says, "Alláh changeth not the condition of a folk until they (first) change that which is in their hearts" (Surah XIII). There is no modern mechanical gadget that, by pressing a button, will change the heart of man.

The Qur'án makes it abundantly clear that there is no substitute for the good life :

And each one hath a goal toward which he turneth ; so vie with one another in good works... Alláh loseth not the wages of the kindly (Surah XII). Hast thou observed him who belieeth religion ? That is he who repelleth the orphan and urgeth not the feeding of the needy (Surah CVII).

¹ Khuda Buksh, " Ibn Khaldun and his History of Islamic Civilization," *Islamic Culture*, 4 : 597.

We owe a debt of gratitude to the Muslims for preserving, translating and transmitting to Europe the works of the Greek philosophers. As previously pointed out, the charge that the Muslims destroyed the library at Alexandria is an absurd fiction. What happened is explained by Meyerhof : "It is certain that the last remnants of the philosophical school of Alexandria were not destroyed by the Arabs, but transferred, eighty years after the Arab conquest, to Antioch."¹

Guillaume, a reputable and cautious scholar, testifies to Arab influence.²

It can hardly be doubted that Europeans took up the study of Aristotle because their zeal for philosophy had been quickened by contact with Arabian thought. Indeed, if the first effective influence was not Arabian, how are we to explain the fact that for generations Aristotle was confounded with the teaching ascribed to Averroes ? (Ibn Rushd)

In 1292 A.D., Roger Bacon wrote ³ :

The greater part of Aristotle's philosophy failed to have any effect (in the West) either because manuscripts were hidden away and extremely rare, or because the subject matter was difficult and distasteful, or because of the wars in the East, until after the time of Mahomet when Avicenna and Averroes and the rest brought back Aristotle's philosophy into the light of comprehensive exposition.

Al-Farábí (d. 950 A.D.) was a commentator on Aristotle and Plato. His treatises on *The Soul* and *The Faculties of the Soul* were well known to the Latins. He passed on to his successors the problem of the *intellectus agens* or active intellect and taught that the world had no beginning ; he

¹ M. Meyerhof, "On the Transmission of Greek and Indian Science to the Arabs," *Islamic Culture*, 11 : 21 (January 1937).

² Arnold, *op. cit.*, pp. 246-47.

³ Cited in *ibid.*, pp. 259-60.

defined time as the movement holding things together.

Christians who lived during the Islamic rebirth of culture often recognized Arabic intellectual superiority, while the Arabs displayed a legitimate and pardonable pride in these attainments, as shown in this summing up by Ibn Tumlus of Alcira (d. 1223 A.D.)¹:

In the sciences of Geometry, Arithmetic, Astronomy, and Music the scholars of Islam have surpassed their ancient predecessors. Still, although it can be said with great probability that men nowadays have access to fuller knowledge than the ancients, it is only fair to remember that it is likely that a good many of the works of the ancients have perished.

The foremost Jewish scholar of the Middle Ages was Moses Maimonides (1135-1204 A.D.) whose searching criticism of the Arabian *Mutakallimun* was freely used by St. Thomas Aquinas. Another Jewish leader of thought was Avicbron (Ibn Gabirol, mid-eleventh century) of Malaga, whose influence on Spanish metaphysical studies is claimed to have even exceeded that of Al-Ghazzáli. A Nestorian Christian meriting honorable mention was Hunayn Ibn Isháq al-Ibádi (809-873 A.D.) who translated Greek medical and mathematical treatises into Arabic; philosophical works which he translated in whole or in part included the *Categories*, *Physics*, and *Magna Moralia* of Aristotle, and the *Republic Laws*, and *Timaeus* of Plato.

Ibn Hazm of Cordoba (994-1064 A.D.) was the chief literary figure of his century in Spain. We remember him as the founder of a logical, systematic treatment of the subject of comparative religion. His original and valuable work in this field is entitled *The Book of Religions and Philosophical Sects*. Az-Zamakhshari (1075-1143 A.D.) belonged to the philological school of theology and his *Unveiler* is still the most popular commentary on the Qur'an

¹ Arnold, *op. cit.*, p. 21.

in Muslim countries. Az-Zamakhshari held to the Mu'tazilite heresy. One of the most creditable metaphysical works in Arabic literature in *The Book of Religions and Philosophical Sects* of Ash-Shahristáni (1086-1153 A.D.) Fakhr u'd-Din ar-Rázi (1149-1209 A.D.) was a philosopher and encyclopedist and one of the outstanding humanists of his time.

The eschatology of Dante's *Divine Comedy* was probably drawn from Muslim sources. Asin Palacios points out that "The infernal regions, the astronomical heavens, the circles of the mystic rose, the choirs of angels around the focus of divine light, the three circles symbolizing the Trinity—all are described by Dante exactly as Ibn u'r-Arabi described them¹."

Al-Ghazzáli (1059-1111 A.D.) was the Socrates of the Muslims. He knew the language of the mystics but did not succumb to their delusions of divinity. The chief work of this great Persian was *The Revivification of the Religious Sciences*. Apparently materialistic doubts nearly caused him to lose his reason but he found sanity, retreat, and sanctuary in prayer and meditation; he bade farewell to his previous studies and issued a condemnation of heretical doctrines under the title *Disintegration of the Philosophers, Rescuer from Error*. The books of Al-Ghazzáli on logic, physics, and metaphysics became known to Europeans through the Latin translations made in the twelfth century in Toledo. Al-Ghazzáli's treatise on the place of reason as applied to revelation and theological theories may have inspired some of the reasoning of the *Summa contra Gentiles* of Thomas Aquinas. Both agree on the value of human reason in explaining or demonstrating the truth about divine things; the ideas of contingency and necessity as demonstrating the existence of God; the unity of God implied in His perfection; the possibility of the beatific vision; the divine knowledge and the divine simplicity; God's speech a

¹ Arnold, *op. cit.*, p. 227.

verbum mentis ; the names of God ; miracles a testimony to the truth of the Prophet's utterances ; the dogma of the resurrection of the dead¹. Unlike many of the Sufis, Al-Ghazzálí did not desert the house of Islám or claim exemption from its laws. He clearly distinguished as three separate and distinct stations the positions of God, the Prophet, and man.

Most renowned of Muslim translators in Europe was Averroes or Abu'l-Walíd Muḥammad Ibn Ahmad Ibn Muḥammad Ibn Rushd, born in Cordoba in 1126 A.D. The doctrines of Averroes and Averroism are quite different as may be inferred from the fact that the University of Paris which condemned Averroistic studies required its alumni a century later to take solemn oath to teach only those things which were consistent with Aristotle as expounded by Averroes². His *Tahafut al-tahafut* was a reply to Al-Ghazzálí's attack on rationalistic philosophy. Sarton interprets this chief philosophical work of Ibn Rushd as "essentially a reaction against the mysticism and pragmatism of al-Ghazzálí, a return to what one might call Aristotelian positivism, as much as this could be reconciled with Muslim theology³." The idea of twofold truth, that the simple devout souls must be taught different things in less complicated terminology than would appeal to sophisticated philosophers, has been attributed to Ibn Rushd in a pejorative way. Actually, he probably did not mean to imply that the revealed teachings should be changed in substance but merely that their exposition should be adapted to the comprehension of the auditor. Sarton defends him⁴ :

Ibn Rushd was not by any means less honest and sincere, nor was he necessarily less pious, than the other schoolmen ; but he was more intelligent, and

¹ Arnold, *op. cit.*, p. 274.

² *Ibid.*, p. 276.

³ George Sarton, *Introduction to the History of Science*, Vol. II, p. 357.

⁴ *Ibid.*, p. 358.

his deeper vision enabled him to reconcile statements which seemed irreconcilable to others. The more narrow and evil interpretation of the theory of twofold truth was expressly refuted by him (Miguel Asín, 1904).

As Guillaume has shown, Ibn Rushd and Thomas Aquinas stand side by side as defenders of the harmony of faith and reason and the "Angelic Doctor" uses many of the arguments which the "Muslim Doctor" had previously employed. Guillaume contributes this comparison¹ :

The resemblances between Averroes and St. Thomas are so numerous that they must be traceable to something firmer than mere coincidence. A common desire to reconcile philosophy and theology is not of great significance, but when the plan is worked out on parallel lines it is only natural to conclude that Averroes has bequeathed something more than a commentary on Aristotle to Christian scholarship. In both writers we find after the philosophical proofs of dogma quotations from the Qur'án or Bible ; both begin by setting out doubtful or apparently contradictory testimonies. We find the same proof of God's existence from movement, and the providential guidance of the world ; the same argument for God's unity from the unity of the world. In advancing the proposition that in order to acquire knowledge of God one must use the method of *via remotionis*, both temper it with the *via analogiae*.

Thus we see that the first study in Europe of the Old and New Testaments in a critical and systematic way was the work of a Muslim, Ibn Hazm of Cordoba, and that St. Thomas Aquinas was strongly influenced by both Al-Ghazzálí and Ibn Rushd.

The Muslim schools of theology and law may very possibly have produced an effect on the Christian divinity

¹ Arnold, *op. cit.*, p. 280.

schools established centuries later. Apart from the question of the validity of such a hypothesis, it is instructive to take note of some facts pertaining to the Mustansiriyyah at Baghdád. This institution had four separate law schools, one for each Sunni sect, each accommodating 75 students under the guidance of a professor who received a monthly salary. The 300 students each received one gold dinar a month and daily rations of bread and meat. There was a library where rare manuscripts could be consulted and pens and paper were furnished the scholars who wished to copy the manuscripts. Lamps and olive oil were supplied for lighting the college. Food, drink, and medicines were appropriately kept in readiness. A clock in the hall marked the hours of the day and the times of prayer. The Mustansiriyyah also had a bath house and a hospital with a resident physician who prescribed for the sick.

It is impossible to pass final judgment on metaphysics, let alone the Muslim contribution to the subject. One can with discretion go along with Guillaume who ventured the following cautiously prophetic utterance¹:

When all the rich material in Europe's libraries has been brought to light it may yet be seen that the abiding influence of the Arabs on medieval civilization is much greater than has hitherto been recognized.

Guillaume voices the feelings of many impartial investigators when he concludes²:

To do justice to the many ramifications of Muslim influence a history of medieval culture would have to be written, and far-reaching controversies would be stirred. The streams of national culture flow into the vast ocean of human thought; once they reach the sea it is difficult, if not impossible, to separate the fresh from the salt.

¹ Arnold, *op. cit.*, p. 282.

² *Ibid.*, p. 281.

It has already been mentioned that the true and most great miracle of Muḥammad, the unlettered educator, was his gift of the Qur'án, the first prose book of the Arabs. This work perpetuated the Meccan dialect as the literary language of the Arabs and ultimately, by reason of the universal character of Islám as a mercy for all mankind, the common tongue of the world of culture. Gibb concluded¹:

The influence of the Koran on the development of Arabic literature has been incalculable. Though for several decades at least there was no other prose work written in Arabic and it exercised little immediate influence on the poets, it was to the studies connected with the Koran that the majority of branches of Arabic literature owed their origin.

It was the Islamic literature of Spain that exercised the most profound influence on European literary developments. Spanish genius played an important role in the development of strophic measures, but in return there was the interaction of the refinements of technique imposed by Arabic laws of form and metre upon the strophe in its literary form (the *muwashshah*), reproduced in the popular bilingual ballad (the *zajal*) and thence creeping into purely romantic poetry². Gibb terms Ibn Zaydún of Cordoba (1003-1071 A.D.) the greatest of the Spanish poets of the age, both, in his early love-songs and in his later poetic epistles. His contemporary and fellow-townsmen, Ibn Hazm (994-1064 A.D.) wrote a book about love expressing the spirit of romanticism and unfolding an anatomy of love whose sentiments were inadequately and imperfectly echoed a century later by the troubadours. The Muslim contribution to the form, the subject-matter, and spirit of European poetry was so considerable that it led Professor

¹ Gibb, *op. cit.*, p. 26.

² Arnold, *op. cit.*, p. 189.

Mackail to exclaim: "As Europe owes its religion to Judæa, so it owes its romance to Arabia." The *Arabian Nights* infused into literature the spirit of adventure, supplying the clue that led to the writing of *Robinson Crusoe*, which had an earlier Arabic counterpart, and even to *Gulliver's Travels*.¹

The elements of Muslim cosmogony and the legends of the ascent of Muḥammad have entered into the *Divina Comedia* and Arabic philosophical ideas and the imagery and eroticism of Muslim mystics are clearly reflected in Dante's works and are also discernible in the chief conceptions of the other poets of the *dolce stil nuovo*.²

Ibn Qutayba (d. 885 A.D.) wrote, in ten volumes, a literary thesaurus entitled *The Fountains of Story*. In the *Book of Subjects of Knowledge* and in his *Book of Poetry and Poets*, he challenges the presumed superiority and matchlessness of the ancient Arabic poetry of the *jahiliyya*: "I have not preferred the ancient poet for his antiquity nor scorned the modern poet for his recency, but have scanned both with an equitable eye and given each one his due."³

Cervantes declared that the original of Don Quixote was the work of a Moor named "Sidi Hamete ben Engeli" and that the novel had originally been written in Arabic. This ascription is quite possibly fictional but it attests the prestige of the Arabs.

Volumes have been written on the influence of Arabic on the languages of Spain and Portugal and even of the Anglo-Saxon countries. Dozy and others have compiled lengthy glossaries; the words given here are merely representative of multitudes to be found elsewhere. The contributions of Persian to other languages would doubtless merit extensive research. Some of the terms used in the game of chess, borrowed by Europe from the Muslim world,

¹ Arnold, *op. cit.*, p. 191.

² *Ibid.*, p. 201.

³ *Ibid.*, p. 198.

⁴ Gibb, *op. cit.*, p. 55.

are of Persian origin: "check," for instance, is derived from *shahmât*.

Arabic words carried over into Spanish include *funduq* (*fonda*, hotel); *tahuna*, mill (*tahona*, bakery); *ta'rif*, notice, definition (*tarifa*, tariff); *ar-ruz* (*arroz*, rice); *as-saqiya* (*acequia*, canal or dyke); *as-sutaiha* (*azotea*, flat roof); *al-qubba*, dome; (*alcoba*, bedroom); *tarima* (*tarima*, stand, footstool); *al-muḥhadda* (*almohada*, pillow); *quba'*, outer garment (*gaban*, overcoat); *al-banna'* (*albanil*, builder); *ad-da'a'im*, pillars, supports (*andamio*, scaffolding); *al-maḥhzan* (*almacen*, warehouse); *al-qatran* (*alquitran*, tar); *al-kira'* (*alquiler*, hire); *'awar* (*averia* damage); *al-diwan* (*aduana*, customhouse, cf. French *douane*); *taqa* (*taquilla*, ticket office); *al-qadi*, judge (*alcalde*, mayor); *al-wasi* (*albacea*, executor); *hattu* (*hasta*, until); *faniqa*, a large sack (*fanega*, 1½ bushels); *as-sukkar*, Persian, *shakar* (*azucar*, sugar); *sharab*, drink (*jarabe*, syrup); Guadalajara is derived from the Arabic *wadi-l-hijdra*, the river of stones; Guadquivir from *wadi-l-kabir*, the great river; Guadarrama, *wadi-l-ramla*, the sandy river; Guadalupe, *wadi-l-lubb*, wolf river.

As Farmer aptly and poetically puts it, music accompanied the Arab from the lullaby to the elegy, from the cradle to the grave. Interest in music is further demonstrated by the fact that the Muslims carried the manufacture of musical instruments to a fine art. The flowering of the art of music did not occur until after the advent of Muḥammad.

Al-Buzjání (d. 998 A.D.), one of the greatest of the Arab mathematicians, composed an important *Compendium on the science of Rhythm*. Al-Fárábi (Latinized, Alfarabius), a Turkish Muslim (died in the middle of the tenth century A.D.) wrote the most significant oriental work on musical theory, *On Music*. Farmer avers, "The introduction to al-Fárábi's *Grand Book on Music* is certainly equal, if not superior, to anything that has come down to us from Greek

sources."¹ Instruments of the lute, pandore, harp, and woodwind families were described by al-Kindí (died around 874 A.D.), al-Farábí, al-Khwárizmí (tenth century A.D.), and the Ikhwán al-Safá' (tenth century A.D.), hundreds of years before European musicologists wrote about them.

Instead of merely accepting Greek tuning, the Muslims experimented with the neutral third of Zalzal (22/27) and the Persian third (68/81). The Systematist School of Safi al-Din (d. 1294 A.D.) produced what Sir Hubert Parry acclaimed as the "most perfect scale ever devised." In the opinion of Helmholtz, "their use of the major 7th of the scale as a leading note to the tonic marks a new conception, which admitted of being used for the further development of the tonal degrees of the scale, even within the domain of purely homophonic music."² The major seventh as the leading tone to the tonic has since been employed by all leading composers of the West.

Morris dancers, *i.e.*, Moorish dancers, are reminiscent of Arab minstrels. As late as 1589, they painted their faces to resemble the Moors. The word "troubadour" may quite possibly have been derived from the Arabic *tarrab*, minstrel. The origin of the words "lute," "rebec," "guitar," and "naker" from the Arabic *al-'ud*, *rabab*, *qitara*, and *naqqara*, respectively, is well established.³ Prior to the Islamic contact, European minstrels had only the cithara and harp among stringed instruments, and the ear was the sole guide in tuning. The Arabs brought to Europe their lutes, pandores, and guitars, with the places of the notes fixed on the fingerboard by means of frets (*cf.* Arabic *farida*, *farid*.)

At the mention of Islamic architecture, such structures, as the exquisite mosques of Işfahan with their intricate tile patterns, the massive mosque of Seville, the Giralda, the mosques of

¹ Arnold, *op. cit.*, p. 367.

² *Ibid.*, p. 368.

³ *Ibid.*, p. 374.

Cordoba and Cairo, the Alhambra, and the Taj Mahal come to mind. These marvellous edifices richly deserve the honors that have been showered upon them; their influence on European architecture was overwhelming.

It was the Faith of Islám which was the transmuting factor in welding together the diverse architectural styles and modes of building into one style exemplifying the spirit of unity in diversity. The first buildings erected by the Muslims were mosques and palaces; the important structures of the following centuries—mosques, governmental buildings, observatories, and schools—bore a close relationship to Islám. The buildings continued to show individual differences and varying characteristics but, whether in the East or in the West, the likenesses were more striking and apparent than the differences.

The most original contribution of the Mosque at Cordoba to architectural advance was the system of vaulting based on intersecting arches and visible intersecting ribs, a system which attacks the main problem of architecture—that of covering space with a roof—in much the same way as the Gothic vaulting which developed two centuries later.¹

The Great Mosque at Samarra has in the south wall of the sanctuary a row of small window-openings of cusped or multifoil heads; if this feature did not originate in India, and such an origin has not been proven, it must be credited to the Muslims. Even more important in this mosque is the method used to support arcades—brick Piers, octagonal on a square base and each having four circular or octagonal marble shafts joined with metals dowels and having bell-shaped capitals. The impressive external walls of the Mosque of Ibn Tulún in Cairo (started in 876 A.D.) are crowned with ornamental battlements which may be regarded as the prototype of Gothic pierced and crested parapets.² Cairo used light and dark stone alter-

¹ Arnold, *op. cit.*, p. 12.

² *Ibid.*, p. 166.

nately in horizontal courses. Dr. John S. Badeau, President of the American University at Cairo, once remarked to the writer that the Mosque of Ibn Tulún, with its dignity and simplicity, was the kind of place in which he could pray and worship and sense a nearness to God. Pisa, Genoa, Siena, Firenze, and other Italian cities may have borrowed their similar architectural practices such as using dark and light stone alternatingly, from Cairo, a city with which they had close trading relations during the Middle Ages. It is known that the Crusaders, termed marauders by the Muslims, acquired ideas about fortification from the Saracens.

Authorities on the history of architecture ascribe the invention of the pointed arch to the Muslim architects of Syria and Egypt. The ogee arch almost certainly and the "Tudor" arch possibly have a similar origin. Probably the tracery-patterning of surfaces and conceivably even the bar-tracery in windows are Islamic in derivation. The *mashrabiyyah* or lattice of woodwork used to conceal the women's apartments of a house or as the screen in a mosque, were copied in English metal grilles.¹ Thompson states that "The cathedrals of the Midi were situated upon routes followed by thousands of pilgrims and borrowed architectural motifs from the mosques of the Peninsula."²

Reproduction of the human form was regarded as forbidden to Muslims generally (the
Minor arts. Persians did not always subscribe to this doctrine), and this attitude held back progress in painting and sculpture. The Islamic world has not contributed significantly to portrait-painting but the miniatures of Irán reveal mastery of form and color. It is in the minor arts that the Arab world made greater contributions.

The name "arabesque" given to conventional bas-relief patterns in England from Elizabethan days onwards gives an

¹ Arnold, *op. cit.* p. 178.

² Thompson, *op. cit.*, 12 : 193.

inkling of a further debt to the medieval Muslims. Muslim artisans, known as Mudejares, built the Alcázar in Seville and excelled in woodwork, pottery and textiles, and were the creators of the Spanish national style, perhaps the most characteristically Spanish contribution to the art of Europe; their work is to be seen all over Spain. The glazing of wall-tiles, an ancient art in Egypt, persisted in obscurity until the Arab invasion when, under Muslim influence, potters again commenced experimenting with new technical processes and ornamental schemes. In Venice, Muslim metal work inspired native craftsmen so profoundly that a distinct Venetian-Oriental school came into being; Muslim technique and designs were adapted to Italian Renaissance taste¹.

The gold tooling and lettering now universal upon fine leather bindings find expression by means that were perfected by Muslim artisans. Toward the end of the sixteenth century, some books bound in the Occident featured Oriental end papers. The following passage epitomizes Europe's debt to Islám in the minor arts²:

Ever since the beginnings of Islam, Western piety, learning, commerce, and curiosity have found each something to its taste in the products of Muslim skill; but in knowledge of their technical excellence and their beauty master craftsmen such as Odericus of Rome, who in 1286 wrought Islamic patterns upon the inlaid marble pavement of the Presbytery of Westminster Abbey, and William Morris, who wove another into his velvet in 1884, together with a host of others before, since, and between them, have time and again refreshed Western art from a fund which has been to us rather an annuity than a legacy.

¹ Arnold, *op. cit.*, 12 : 193.

² *Ibid.*, pp. 150-51.

The Arabic language lends itself very well to scientific use by reason of its flexibility and precision. It preserved and transmitted the scientific theories of the Greeks and during the early Middle Ages was the international language of research. Baron Carra de Vaux wrote¹:

Mathematics and Astronomy.

When at the Renaissance the spirit of man was once again filled with the zeal for knowledge and stimulated by the spark of genius, if it was able to set promptly to work, to produce and to invent, it was because the Arabs had preserved and perfected various branches of knowledge, kept the spirit of research alive and eager and maintained it pliant and ready for future discoveries.

Másh'alláh (d. 815 A.D.) wrote on astrology, on the astrolabe, and on meteorology, and his book on prices, *de mercibus*, is the oldest scientific work that we possess in Arabic. The astrolabe, invented by the Greeks and improved by Ptolemy the Alexandrian, was perfected by the Muslims and transmitted by them to Europe in the tenth century. Qusta b. Luqa of Barlbek (flourished 835 A.D.) made during the reign of that generous patron of learning, al-Mámún, renderings into Arabic of Aristotle and other philosophers and wrote copiously on mathematics, astronomy, and so on.

Al-Mámún had a degree of the meridian measured in the plain of Sinjar by a method that would have startled the Greeks: A number of observers setting out from the same point walked, some to the north, the others to the south, until they had seen the pole star rise and sink one degree. They then measured the distance traversed and took the mean of the results; they unwisely failed to adhere to the mean but adopted the larger of the figures, 56 2/3 miles, a result slightly too large.

Al-Kindí (died in the middle of the ninth century A.D.) in Baconian fashion took the whole field of Greek science as

¹ Arnold, *op. cit.*, p. 370.

his province; he composed 265 treatises on music, astronomy, and medicine and, at least to his own satisfaction, harmonized the philosophies of Plato and Aristotle. Al-Farghání wrote a compendium of astronomy which was translated into Latin by the indefatigable Gerard of Cremona and by Johannes Hispalensis. At the time of the Renaissance, Regiomontanus studied the *Compendium*, and Melanchthon published an edition based on that study in 1537 at Nuremberg.

The early leader in mathematics was al-Khwárizmí (the word "algorism" or "algorithm," signifying the Arabic numerals one to nine and zero was derived from his name) and it was from Latin translations of his works on arithmetic, algebra, and astronomy that Europe received decimal notation. With him emerged the idea of the double sign: $ax/c = bx$; he said that in this case addition and subtraction could be equally well employed. The theory of equations of the second degree remained as al-Khwárizmí left it until the sixteenth century. In the eighteenth century, Leonardo Fibonacci of Pisa, a well-known algebraist, avowedly owed a great deal to the Arabs whose methods he regarded as superior to that of Pythagoras. The zero was known to the Arabs at least 250 years before it came to the West. The words "algebra" and "cipher" (*sifr*, empty) survive as witnesses of the part played by the Arabs in the foundation and diffusion of the science of calculation.

Thábit ibn Qurra (born 826 A.D.), often considered the greatest Arab geometrician, translated into Arabic seven of the eight books of the conic sections of Apollonius and thus preserved three that are now lost in the original Greek.¹ The use of sines is not a Greek invention borrowed by the Arabs, but a real step taken by the Muslims toward the science of trigonometry. It was ibn Qurra, not al-Battání, who, of all Muslim mathematicians, was the first to use sines.²

¹ Arnold, *op. cit.*, p. 387.

² A. Adnan, "Review of Salih Zeki's *Athar-i-Baqiya*," *Isis*, 19: 508 (September 1933).

In his treatise on the balance, al-Khazíní highly developed the idea of equilibrium and of gravity and he discussed specific gravities.¹

Al-Battání made his astronomical observations from 877 to 918 A.D. Calculations or observations like those relating to the first appearance of the new moon, to the inclination of the ecliptic, to the length of tropic and sidereal year, to lunar anomalies, to eclipses, and to parallaxes show greater divergence from Indian methods and are more refined, complicated, and accurate than those of al-Khwárizmi. He substituted the sine for the chord in trigonometry, used tangent and cotangent, and was acquainted with two or three fundamental relations in trigonometry. Bartold claimed that the first knowledge of trigonometrical functions in Europe was derived from al-Battání.²

The introduction of tangents as a trigonometrical line in the formulas was accomplished by Abu'l-Wafá'. Regiomontanus did not rediscover the tangents but found them in the writings of al-Battání, Jabir ibn Aflah, or others. The Hindu arithmetic was greatly developed by the Arabs. They included in it all the rules for the determination of unknown quantities, for instance, the rule of double false position, and the proportions and geometrical problems giving numerical values to lines, planes and solids. Abu'l-Wafá' translated the algebra of Diophantus and with him trigonometry becomes more explicit and acquires the formula for the addition of the angles:

$$\sin(a+b) = \frac{\sin a \cos b + \sin b \cos a}{R}$$

Copernicus was apparently unaware of this formula of Abu'l-Wafá'. Abu'l-Wafá' also studied the quadrature of the parabola and the volume of the paraboloid.

Habash, contemporary of al-Battání who died in 929 A.D., divided the gnomon into sixty parts. Hence we get

¹ Arnold, *op. cit.*, p. 388.

² Bartold, *op. cit.*, p. 50.

tables of cotangents in parts of the gnomon based on the equation $\cot a = \frac{\cos a}{\sin a}$. The altitude of the sun is determined, starting from the cotangent, by the formula $\sin(90-a) = \frac{\cot a}{\sqrt{12^2 + \cot^2 a}}$

The formulæ $\frac{\sin \infty \tan \infty}{\sqrt{1 + \tan^2 \infty}}$ and $\frac{\cos \infty}{\sqrt{1 + \tan^2 \infty}}$ are explained in

al-Battání. "This brings us very far beyond the point reached by the Greeks and really opens the era of modern science."¹ In the works of Abu'l-Wafá' is also to be found the secant, the introduction of which is often erroneously attributed to Copernicus. Thus during the tenth and eleventh centuries; Islamic thinkers gave final form to these discoveries which are at the very foundation of twentieth-century civilization.

Al-Kindí (d. 873 A.D.), first of the great scholastics, wrote on meteorology and optics. He also endeavoured to discover the laws governing a falling body. Al-Farábí's great work on music contains the germ of the idea of logarithms, the musical theory of the Arabs finding expression in fractions. Carra de Vaux elucidates²:

It contains logarithms *in posse* because the addition of the intervals, fourths, tones, semitones, quarter-tones, et cetera, corresponds to the multiplication of the lengths of chords which define them and the subtraction of the intervals corresponds to the division of these terms; the notes on a stringed instrument are connected by a logarithmic law.

Omar Khayyam ('Umar b. Ibrahim al-Khayyami) wrote his poems and mathematical treatises in the late eleventh and early twelfth centuries A.D. (died 1123 A.D.). His works are characterized by power of logic and penetrating insight. Carra de Vaux acclaimed his *Algebra* in these

¹ Arnold, *op. cit.*, p. 389.

² *Ibid.*, p. 391.

words: "His *Algebra* is a book of the first rank and one which represents a much more advanced state of this science than that we see among the Greeks."¹ The greater part of the book is devoted to cubic equations. His fourth category of equations contains the three classes: $x+bx=cx+d$; $x+cx=bx+d$; $x+d=bx+cx$. Sarton hailed Omar's calendar²:

The eleventh century approached its end with an astounding achievement: the *Tarikh Jalali* of Omar Khayyam (1079) which was probably more accurate than our Gregorian calendar.

"When Alfonso of Castille wanted to construct an armillary sphere, which would be the finest and best that had yet been made, it was to the Arabs that he turned for information."³

Nasir al-Din edited the works of Greek and Muslim predecessors and wrote a treatise on the quadrilateral, a first-rate book on spherical trigonometry. He dispensed with the use of Ptolemy's theorem of the quadrilateral with a "supplementary figure" which is simply the idea that sines of angles are proportional to those of the sides, $\frac{\sin a \sin b \sin c}{\sin A \sin B \sin C}$. To this rule he add sa method of the

tangent based on the relation $\sin b \frac{\tan c}{\tan C}$. "Trigonometry, plane and spherical, is now well established and finds in this book its first methodically developed and deliberate expression."⁴

The Arabs taught the use of ciphers and thus founded the arithmetic of everyday life. They made algebra an exact science, developing it considerably, and laid the foundations of analytical geometry. They were the creators

¹ Arnold, *op. cit.*, 392.

² Sarton, *op. cit.*, Vol. II, p. 28.

³ Arnold, *op. cit.*, p. 396.

⁴ *Ibid.*, p. 397.

of plane and spherical trigonometry which, properly speaking, did not exist among the Greeks.

Ameer 'Alí pointed out that Muhammad contradicted the Ptolemaic and Grecian conceptions of stars as gems fixed in crystalline domes; the Prophet referred to these celestial bodies as swimming in their orbits. The *Biháru'l-Anwár* quotes Imám Ja'far-as Sádiq's statement to a heretic: "God has so arranged about the stars, that they swim in their orbits." Muhammad also referred to the sun moving in a fixed place and to the eleven planets, but the ecclesiastical authorities interpreted away those remarks that did not conform to the Ptolemaic astronomy. It took the scientists a thousand years to learn the truth of that which the Prophet had revealed.

Muhammad Ibn Shákir (died 873 A.D.) ascertained the obliquity of the ecliptic, marked for the first time the variations of the lunar altitudes, determined the procession of the equinoxes, and observed the movements of the solar apogee (which were unknown to the Greeks). According to Ameer 'Alí, "Abu'l Hassan invented the telescope, of which he speaks as 'a tube to the extremities of which were attached diopters'."¹ Ameer 'Alí quoted Sedillot on Abu'l-Wafá²:

Struck by the imperfection of the lunar theory of Ptolemy, he verified the ancient observations, and discovered, independently of the *equation of the centre and the eviction*, a third inequality, which is no other than the variation determined six centuries later by Tycho Brahe.

Highly important in the development of mathematical geography was the *Jami' al-mabadi' wal-ghayat* (1229 A.D.) of al-Hasan al-Marrakushi. Superior to any similar work of its time and a genuine contribution to both astronomy and geography, it includes the co-ordinates of 135 places, 34 of

¹ Ameer 'Alí, *The Spirit of Islam*, p. 345.

² *Ibid.*, pp. 346-47.

them determined by personal observation. Sarton testified that "No mediæval writer has taken equal pains to explain scientific methods and instruments."¹

In the last half of the thirteenth century, 'Alí ibn 'Umar al-Katibi and Qutab al-Dín al-Shirází, Persian astronomers, discussed the possibility of the rotation of the earth but rejected the idea on the mechanical ground the sublunar motions cannot be circular. Qutb al-Dín formulated the first satisfactory theory of the rainbow.² Al-Birúní (died 1048 A.D.) summarized in twelve books the astronomical science of the Arabs under the title, *The Canon Dedicated to Mas'úd*. Evidence that he was a precise and exacting scholar is revealed in his study of comparative chronology, *The Surviving Monuments of Past Generations*. In *India*, he treated an alien civilization objectively. He translated the *Patanjali*, *Yoga Sutra*, and many other Indian books into Arabic. When he compiled the *Canon*, it is said that the Sultan Mas'úd rewarded him with an elephant-load of silver but he returned it to the treasury, pleading his ability to do without.

In astronomy, the Muslims made valuable observations and they preserved in translation a number of Greek works, the originals of which have been lost, including: the three books of the *Conics* of Apollonius, the *Spherics* of Menelaus, the *Mechanics* of Hero of Alexandria, the *Pneumatics* of Philo of Byzantium, a short book on the balance attributed to Euclid, and a work on the clepsydra ascribed to Archimedes.³

From the eleventh to the seventeenth century, Persian influence dominated Chinese astronomical studies. In fourteenth-century Byzantium, Persian studies were translated into Greek. Ulugbek, grandson of Timur (Tamerlane), ruled wisely the Mongolian Empire from 1409 to 1449 A.D.

¹ Sarton, *op. cit.*, p. 42.

² *Ibid.*, p. 22.

³ Arnold, *op. cit.*, p. 376.

He erected the Madrisih at Bukhára on which was inscribed: STRIVING FOR KNOWLEDGE IS THE DUTY OF EVERY MALE AND FEMALE MUSSULMAN. He built an observatory for scientists from Persia and their pupils. Truly a scholar on the throne, it was in his name that the astronomical tables and catalogue of stars representing, according to Bartold, the last word in the astronomy of the Middle Ages and the highest point which astronomical science had reached before the perfecting of the telescope, were compiled and published.¹

It has been asserted that the glory of Muslim science is in the field of optics. Meyerhof, *Physical and chemical science*, concluded that "Here the mathematical ability of an Alhazen and a Kamal al-Din outshone that of Euclid and Ptolemy."² Outstanding among the scientists who developed the knowledge of optics was Abú 'Alí al-Hasan ibn al-Haytham (965-1038 A.D.) of Basra. His main work, *On Optics*, survives only in Latin translation. He discussed the propagation of light and colors, optical illusions, the law of reflection, spherical and parabolic mirrors, and refraction, and he related the details of experiments for testing the angles of incidence and reflection. He was perhaps the first physicist to note the magnifying power of lenses. He examined the refraction of light-rays through transparent media (air, water). "In detailing his experiments with spherical segments (glass vessels filled with water), he comes very near to the theoretical discovery of magnifying lenses."³ Roger Bacon and all other medieval European writers on optics, notably Witelo, base their optical works largely on *Opticæ Thesaurus*, a work which influenced Leonardo da Vinci and Johann Kepler. Ameer 'Alí says of al-Hasan⁴:
He corrected the Greek misconception as to the

¹ Bartold, *op. cit.*, p. 127.

² Arnold, *op. cit.*, p. 345.

³ *Ibid.*, p. 334.

⁴ Ameer 'Alí, *The Spirit of Islam*, p. 347.

nature of vision, and demonstrated for the first time that the rays of light come from external objects to the eye, and do not issue forth from the eye, and impinge on external things. He determined the retina as the seat of vision, and proved that the impressions made upon it were conveyed along the optic nerves to the brain. He explained the phenomena of a single vision by the formation of visual images on symmetrical portions of the two retinas.

Ameer 'Alí mentioned the contents of the Balance of Wisdom¹ :

He describes minutely the connection between the weight of the atmosphere and its density, and how material objects vary in weight in a rare and in a dense atmosphere. He discusses the submergence of floating bodies, and the force with which they rise to the surface when immersed in light or heavy media ; he fully understands the principle of gravitation, and recognizes gravity as a force. He knows correctly the relation between the velocities, spaces, and times of falling bodies, and has very distinct ideas of capillary attraction.

Muslims were responsible for the main improvements in the art of warfare in the eleventh and twelfth centuries, two treatises in Arabic on military science having been written by the Syrian, al-Hasan ar-Rammah.

Kamál al-Dín (died around 1320 A.D.) improved on al-Hasan's experiments with the camera obscura. He also observed the path of the rays in the interior of a glass sphere in order to examine the refraction of sunlight in raindrops, which led him to an explanation of primary and secondary rainbows. According to Sartón, "Some empirical knowledge of surface tension is revealed in the writings of Bhaskara and al-Khazini."²

¹ Ameer 'Alí, *The Spirit of Islam*, p. 348.

² Sartón, *op. cit.*, p. 28.

Al-Farábí wrote an important work on the classification of the sciences. Similar in nature was Muḥammad al-Khwárizmí's *Keys to the Sciences* (976 A.D.). The most renowned of the works in this category was, of course, the *Fihrist al-'Ulúm (Index of the Sciences)* which appeared around 987-988 A.D. from the pen of Ibn an-Nadím ; this constitutes one of the main sources of our knowledge of the efforts of early Islamic and Greek philosophers and scientists. The *History of Philosophers* by Ibn al-Qifti (died in Damascus, 1248 A.D.) contains no less than 414 biographies of Greek, Syrian, and Islamic physicians, astronomers and philosophers, indicating the extent of the Greek literature possessed by the Arabs and giving much information about Greek antiquity which has not survived in classical sources.¹

As Gibbon and others have shown for many decades, the science of chemistry owes a great debt to the industry of the Muslims who invented and named the alembic (used for distillation), analyzed vegetable, animal, and mineral substances, tested the affinities of alkalis and acids, and converted poisonous minerals into life-giving medicines. While these constructive experiments were going forward, many great Muslim thinkers such as Ibn Khaldún, intellectual giant of the fourteenth century, opposed violently the "black magic" type of alchemy.

Jabir, perhaps to be identified with Geber, was recognized as the father of alchemy, but there were two Jabirs living in periods a couple of centuries apart. Jabir at-Túsi died in 815 A.D. It appears that Jabir stated more lucidly and explicitly the importance of experimental research than any other early chemist. No less an authority than Meyerhof states that "His influence can be traced throughout the whole historic course of European alchemy and chemistry."² He described, possibly introduced, improved

¹ Arnold, *op. cit.*, p. 343.

² *Ibid.*, p. 327.

methods of evaporation, filtration, sublimation, melting, distillation, and crystallization. He described the preparation of such chemical substances as cinnabar (sulphide of mercury) and arsenious oxide. Meyerhof elaborates on Jabir's knowledge¹:

He knew how to prepare nearly pure vitriols, alums, alkalis, sal-ammoniac, and saltpetre, how to produce so-called "liver" and "milk" of sulphur by heating sulphur with alkali, and so on. He prepared fairly pure mercury oxide and sublimate, as well as acetates of lead and other metals, sometimes crystallized. He understood the preparation of crude sulphuric and nitric acids as well as a mixture of them, *aqua regia*, and the solubility of gold and silver in this acid.

From the writings of Jabir through Latin into modern European languages have come such terms as realgar, tutia, alkali, antimony, alembic, and aludel. His *Book of the Composition of Alchemy* was translated into Latin by the Englishman, Robert of Chester in 1144 A.D. The *Book of the Seventy* was imperfectly and incompletely translated into Latin by the noted Gerard of Cremona (died 1187 A.D.).

The *Rutbatu'l-Hakim*, thought to have been written in the early eleventh century (probably not by al-Majriti), emphasizes practical experiment and presents the details of an experiment performed by the author²:

I took quivering mercury, free from impurity, and placed it in a glass vessel shaped like an egg. This I put inside another vessel like a cooking-pot and set the whole apparatus over an extremely gentle fire. The outer pot was then in such a degree of heat that I could not bear my hand upon

¹ Arnold, *op. cit.*, p. 328.

² E. J. Holmyard, "Muslim al-Majriti and the Rutbau'l Hakim," *Isis*, 6 : 302.

it. I heated the apparatus day and night for 4 days, after which I opened it. I found that the mercury (the original weight of which was $\frac{1}{4}$ lb.) had been completely converted into a red powder, soft to the touch, the weight remaining as it was originally.

This is an early and accurate observation of the oxidation of mercury—an experiment which, in the hands of Lavoisier, led to epoch-making developments in the eighteenth century.

Berthelot was among the earliest investigators in the field of Arabic chemistry and this perhaps accounts for the high standing often accorded his inquiries. Holmyard has shown, however, that Berthelot is not a safe guide because he touches only the fringes of the subject and his choice of material is inadequate. Berthelot knew chemistry well but he did not know Arabic; his translator, Monsieur Houdas, knew Arabic but was uninformed in the science of chemistry, with the result that numerous passages that he translated simply do not make sense. Worst of all, Berthelot's pretensions to accuracy of translation are wholly unfounded.

"The notable interest in the work of mediæval Muhammadan chemists which has arisen is the last few years probably has its origin in a fuller appreciation of the fact that the numerous puzzling problems presented by European chemistry of the early Middle Ages cannot be solved until a thorough investigation has been made of the rise and development of chemistry in Islam, whence it was imported to Christendom during a long period beginning in the first half of the twelfth century."¹

Draper contrasts sharply and critically the respective attitudes of Christianity and Islâm toward biological science²:

¹ E. J. Holmyard, "A Critical Examination of Berthelot's Work upon Arabic Chemistry," *Isis*, 6 : 479.

² Draper, *op. cit.*, Vol. II, pp. 121-22.

Mohammedanism had all along been the patron of physical science; paganizing Christianity not only repudiated it, but exhibited towards it sentiments of contemptuous disdain and hatred. Hence physicians were viewed by the Church with dislike, and regarded as atheists by the people, who held firmly to the lessons they had been taught that cures must be wrought by relics of martyrs and bones of saints, by prayers and intercessions and that each region of the body was under some spiritual charge—the first joint of the right thumb being in the care of God the Father, the second under that of the Blessed Virgin, and so on of other parts. For each disease there was a saint.

It remained for the Muslims to teach the Christians cleanliness.

Ar-Rázi (Rhazes, died around 930 A.D.) was the greatest of the mediæval doctors, and served for a time as physician-in-chief at the great hospital at Baghdád. He introduced the use of *minoratives* and is said to have invented the seton and discovered the nerve of the larynx.¹ His scientific output amounted to more than 200 works, half of which were medical. His treatise, *On Smallpox and Measles* presented the first clear account of these diseases extant. This work was translated into Latin, English, and various other languages and printed forty-odd times between 1498 and 1866 A.D.²

Hunayn ibn Ishâq (809-877 A.D.) translated into Arabic nearly the whole of Galen's *Missive*. He was responsible for Galen's supreme position in the Orient during the Middle Ages and, indirectly, also in the Occident.

One of the greatest scholars of the Islamic world was Abu 'Alí al-Husayn ibn Síná (980-1037 A.D.) known to the West as Avicenna. He concentrated and restated the legacy of

¹ Ameer 'Alí, *The Spirit of Islam*, p. 355.

² Arnold, *op. cit.*, p. 323.

Greek medical knowledge, adding thereto the Arabic contribution in his monumental *Canon of Medicine* (*al-Qánún fi't-Tibb*), the "culmination and masterpiece of Arab systematization." This book was translated into Latin by Gerard of Cremona in the twelfth century and it was issued fifteen times in Latin and once in Hebrew during the last thirty years of the fifteenth century. From the time of its translation by Gerard until the seventeenth century, it was the guide of medical study in European universities, continuing in use at Montpellier and Louvain until 1650.

Ibn Síná recognized the importance of the emotions in healing. When a person had a mental or other disease caused by separation from a loved one, he would discover the name and address of the loved one in this manner¹:

The device whereby this may be effected is that many names should be mentioned and repeated while the finger is retained on the pulse, and when it becomes very irregular and almost ceases, one should then repeat the process.

Similarly streets, houses, and families are mentioned. "Then," concluded Ibn Síná, "if you can discover no cure except to unite the two in such wise as is sanctioned by religion and law, you will do this."²

Among the works of Ibn Síná is an important treatise on the formation of mountains, stones, and minerals, a scientific document bearing significantly on the development of knowledge of geology and notable particularly for its discussion of the influence of earthquake, wind, water, temperature, sedimentation, desiccation, and other causes of solidification.

Abú Rayhán Muḥammad al-Bírúni (973-1048 A.D.) determined almost exactly the specific weight of eighteen precious stones and metals, described many minerals from the natural, commercial, and medical point of view, and

¹ Edward G. Browne, *Arabian Medicine*, p. 86.

² *Ibid.*

composed a pharmacology (*saydala*). Most of his mathematical works remain unpublished. Al-Mas'ūdī (died in Cairo around 957 A.D.) in his delightful *Meadows of Gold* described an earthquake, the waters of the Dead Sea, the first windmills (possibly invented by Islamic peoples), and he also set forth what has been termed the rudiments of a theory of evolution. The treatises of the Christian oculist, 'Alī ibn 'Isā of Baghdād, and of the Muslim 'Ammar of Mosul were the best textbooks on the eye-diseases until the first half of the eighteenth century when the renaissance of ophthalmology occurred in France.¹ The Moorish physician, Ibn Khatima (died 1349 A.D.), wrote a book about the plague that ravaged Almeria in Spain, 1348-49 A.D., a study far surpassing all the spate of plague tracts edited in Europe from the fourteenth to the sixteenth century.²

'Abd al-Latif (1160-1231 A.D.) contributed the *Description of Egypt*, an original scientific work on flora, fauna, and ancient monuments of Egypt. He also gave an account of famines and earthquakes in that land from 1200 to 1202 A.D. and reported his osteological research in a cemetery northwest of Cairo. Abandoning the arm-chair technique cherished and practised by the Greeks, he established by observation that Galen was wrong in his description of the lower jaw and the sacrum.

Draper, Baas, and many others have emphasized in no uncertain terms that while the Christians were kneeling before images and ragged relics in the hope of being cured, the Muslims had licensed physicians and pharmacists and accredited hospitals. The practice of medicine was regulated in the Muslim world from the tenth century onwards. At one time, Sīnān Ibn-Thābit was Chairman of the Board of Examiners in Baghdād. Pharmacists were also regulated and the Arabs produced the first pharmacopeia and established the first drug stores. Barber shops were also subject

¹ Arnold, *op. cit.*, p. 332.

² *Ibid.*, pp. 340-41.

to inspection. Travelling hospitals were known in the eleventh century.

The great hospital of al-Mansūr, founded at Damascus around 1284 A.D. by Qala'un al-Malik al-Mansūr, had an endowment amounting to a million dirhams annually; it was opened to all sick persons, rich or poor, male or female, and had separate wards for men and women. One ward was set apart for fevers, another for ophthalmic cases, one for surgical cases, and one for dysentery and kindred intestinal ailments. There were in addition kitchens, lecture-rooms, a dispensary, and so on.¹

Rashīdu'd-Dīn (b. 1247 A.D.) described the achievements of Tabriz with its 24 caravanserais, 1500 workshops, and 30,000 beautiful houses. There was a Scholars' Street on which resided 400 divines, jurisconsults, and traditionists with suitable salaries and in the students' quarters were a thousand scholars whose studies were subsidized and directed according to their aptitudes (guidance in actual practice somewhat comparable to the tutorial methods introduced centuries later at Oxford and Cambridge Universities in England). Back of the hospital was the Street of the Healers. Fifty physicians from various countries were each assigned ten students with definite hospital duties (an early application of the internship and work-study ideas); the hospital had surgeons, oculists, and bone-setters—in addition to the physicians—and each was placed in charge of five students.²

Meyerhof expressed the thought that the Crusades may have been instrumental in transmitting to Christian Europe some of the Muslim doctrines regarding the care of the sick³:

We may suppose that the foundation of hospitals throughout Europe during the thirteenth century, hospitals which were no longer under clerical

¹ Browne, *op. cit.*, p. 102.

² *Ibid.*, p. 109.

³ Arnold, *op. cit.*, p. 349.

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supervision alone, was partly due to the Crusades. They may well have been imitations of such splendidly installed *Bimaristans* as that of the contemporary Seljuq ruler Nur al-Din in Damascus, and that of the Mamluk sultan al-Mansur Qalawun in Cairo.

Valuable Information on the Classes of Physicians by Ibn Abi Usaybi'a, a physician and oculist of Cairo (died 1270 A.D.), is a kind of medical "who's who" dealing with more than 600 physicians, taking information partly from works now lost, partly from an intimate knowledge of many thousands of medical studies. The main surgical treatise of the Arabs was the *Kitabu'l-tasrif* of Abu'l-Qasim al-Zahrawi, translated into Latin by Gerard of Cremona, and into Hebrew about a century later by Shem-tob ben Isaac.

The *Kitabu'l-Mahki* of al-Majusi (d. 982 A.D.) contains this passage¹:

And you must know that during the diastole such of the pulsating vessels (*i.e.* the arteries) as are near the heart draw in air and sublimated blood from the heart by compulsion of vacuum, because during the systole they are emptied of blood and air, but during the diastole the blood and air return all fill them. Such of them as are near the skin draw air from the outer atmosphere; while such as are intermediate in position between the heart and the skin have the property of drawing from the non-pulsating vessels (*i.e.* the veins) the finest and most subtle of the blood. This is because in the non-pulsating vessels (*i.e.* the veins) are pores communicating with the pulsating vessels (*i.e.* the arteries). The proof of this is that when an artery is cut, all the blood which is in the veins also is evacuated.

Browne concluded: "Here, as it seems to me, we clearly have a rudimentary conception of the capillary system."²

Ibn an-Nafis (d. 1288 A.D.) was the first in time and rank of the precursors of William Harvey. Three centuries before Michael Servetus, he propounded this theory of pulmonary circulation¹:

The blood, after having been refined, must rise in the arterious vein to the lung in order to expand in its volume and to be mixed with air so that its finest part may be clarified and may reach the venous artery in which it is transmitted to the left cavity of the heart.

Meyerhof credited at face value the statement of Ibn an-Nafis that his conclusions were based solely on theoretical considerations. With due respect to Meyethof, the writer feels that this is not evident and he inclines to the view that Ibn an-Nafis may have engaged in dissection without wanting the public to know about it. Dissection was forbidden by the ecclesiastical authorities and it is doubtful that an obscure physician would be so indiscreet and foolhardy as to confess in his writings that he had violated the law. Ibn an-Nafis reached conclusions that could hardly have been based on *a priori* reasoning. He insisted that there is no passage between the right and left ventricles of the heart, visible or invisible. He dared to refute that claim of Avicenna (Ibn Sina), the unquestioned medical authority of the time, that the heart has three ventricles. No other leaders of contemporary medical thought, so far as we know, advanced such views. It is more than possible that such conceptions were arrived at not by fortuitous guess-work but by dissection. Perhaps a lesser light, for such Ibn an-Nafis was among the practitioners of his day, would be more inclined to depart from the ways of the past and have temerity to engage in a type of experimentation frowned upon by the divines than would his colleagues with their larger and more lucrative practices and with less time for research. Of course, this is a matter

¹ Max Meyerhof, "Ibn an-Nafis and his Theory of the Lesser Circulation," *Isis*, 23: 116 (June 1935).

¹ Browne *op. cit.*, p. 124.

² *Ibid.*

of conjecture.

The Treasure Book, sometimes attributed to Thábit Ibn Qurra, concludes with a contraceptive measure said to have been advised by al-Harith b. Kalada, contemporary of Muḥammad¹.

The Pilgrimage to Mecca played a prominent part in fostering the progress of biological science²:

The Pilgrimage to Mecca and Medina, the duty of every Muslim, favoured the spread of science, since it compelled students from India and Spain, from Asia Minor and Africa, to pass through many lands where they could visit mosques and academies and have intercourse with prominent scholars.

It is reported, for instance, that a physician at Cádiz installed in the parks of the governor a garden where he cultivated rare medicinal plants brought back from his travels. Sarton praised the accounts and narratives of the Muslim pilgrims³:

The Arabic narratives of Muslim pilgrims are far superior to the Christian ones and their scientific value is greater. For example, the Latin relations are truly childish as compared with the one wherein Ibn Jubair of Valencia described his first journey to the Near East, 1183-1185. We have also for the same period an elaborate guide book by the Persian 'Alī al-Harawī; then about a century later, the itineraries of another Valencian, Muhammad al-'Abdari and of the Moroccan, Muhammad Ibn Rushaid. These Muslim travelers were many-sided men who took pains to obtain information of various kinds and to meet famous scholars.

Ibn al-Baytar, author of the greatest Arabic book on

¹ Max Meyerhof, "The Book of Treasures, an Early Arabic Treatise on Medicine," *Isis*, 14: 73 (May 1930).

² Arnold, *op. cit.*, p. 337.

³ Sarton, *op. cit.*, p. 35.

botany of that age, *Collection of Simple Drugs*, collected plants and drugs on the Mediterranean littoral from Spain to Syria, described more than 1,400 medicinal drugs, and compared them with the records of over 150 authors preceding him.

"By far the most important herbalistic tradition in almost every respect was the Arabic or Muslim one."¹ Al-Ghāfiqī of Cordoba traveled widely in Spain and Africa to collect samples "and he described them with greater precision than had ever been done before."² The great geographer, al-Idrīsī, described 360 samples preceded by an elaborate botanical introduction. Ibn al-Sūrī botanized in the country around Damascus, carefully observing plants at different stages of growth.

The most important agricultural work of the time was written in Arabic by the Moor, Ibn al-'Awwam of Seville, toward the end of the twelfth century. It dealt with 585 plants—explained methods of cultivating many different varieties of fruit trees, and included numerous valuable observations including the rudiments of phytopathology. Sarton declared that "horticultural improvements constituted the finest legacies of Islam, and the gardens of Spain proclaim to this day one of the noblest virtues of her Muslim conquerors."³ Among other important additions to alimentary products, they introduced such plants of medicinal or pharmaceutical value as rhubarb, tamarinds, cassia, senna, and camphor. Among the plants and drugs unknown to the Greeks were these that came through the Persians: amber, sugar-cane, galange root, and musk.

Scholars who should know better sometimes make the unfounded assertion that the medical school at Salerno was wholly uninfluenced by the Muslims. The fact is that the man whose genius was in large measure responsible for the establishment of the new European centre of learning at

¹ Sarton, *op. cit.*, p. 51.

² *Ibid.*

³ *Ibid.*, p. 56.

Salerno was the monk Constantine who spent 39 years of his life on a scientific pilgrimage in the East, returning from Baghdád to Salerno.¹ The inhumane treatment of the insane in Europe requires no comment other than that the Middle Ages were a dark age for mental cases but few students realize that the Muslims founded a lunatic asylum in Cairo in 1304 A.D., at least a century earlier than any similar European institution on record.²

Islamic thinkers devoted attention to various theories of evolution. An-Nazzam (first half of the ninth century A.D.) explained the theory of an unfoldment of hidden creation. The essential point of this doctrine is that creation was complete at the outset although only part of it appears at a time. According to Sarton, "This is truly a theory of evolution, and the word *evolution* was first used by Charles Bonnet about 1762 with that very acceptance."³ A Persian work, twelfth century, entitled *Four Discourses*, tells of attempts to identify "missing links"; it describes coral as intermediate between mineral and vegetable kingdoms; the vine which seeks to avoid and escape from the fatal embrace of a kind of bindweed called *'ashaqa* as intermediate between the vegetable and animal kingdoms; and the *nasnás*, a kind of ape or wild man, as intermediate between the animal and human kingdoms.⁴

A strong case can be made for the belief that wherever Islám penetrated it left in its wake a more advanced, an enriched civilization. There are Persians who maintain that Islám ruined their country. History does not support this chauvinistic, prejudiced statement. Irán attained the summit in the arts and sciences when the light of Islám shone at its fullest intensity. Her greatest achievements in astronomy, architecture, weaving and painting, and, most

¹ S. H. Leeder, "The Debt of Civilization to the Arabs," *Islamic Review*, 4: 69 (February 1916).

² *Ibid.*, 4: 70.

³ Sarton, *op. cit.*, p. 61.

⁴ Browne, *op. cit.*, pp. 118-19.

striking of all, in literature featuring such giants among men of all time as Háfiz (the tongue of the invisible), Sa'dí, and Jalál u'd-Din Rúmí, took place after she had benefited from the noble teachings of His Holiness Muḥammad, one of the few thorough educators of the human race.

Meyerhof advanced this beautiful analogical description of the general role of Islamic medicine and science¹:

Looking back we may say that Islamic medicine and science reflected the light of the Hellenic sun, when its day had fled, and that they shone like a moon, illuminating the darkest night of the European Middle Ages; that some bright stars lent their own light, and that moon and stars alike faded at the dawn of a new day—the Renaissance. Since they had their share in the direction and introduction of that great movement, it may reasonably be claimed that they are with us yet.

It is the duty of every man of learning to follow after truth wherever it may lead, to investigate with a mind from which all prejudice is banished. Clinging to the best that the past has bequeathed to us, we must continue the march of intellectual progress toward ever-unfolding horizons. Above all, our outlook must be world-embracing and we are duty-bound to apply our knowledge for the benefit of humanity.

Muḥammad was indeed an educator, the tree of direction to guide humanity toward greater freedom and happiness. This study concludes with a passage from the Qur'án:

God is the LIGHT of the heavens and of the earth. His light is like a niche in which is a lamp—the lamp encased in glass—the glass, as it were, a glistening star. From a blessed tree is it lighted, the olive neither of the East nor of the West, whose oil would well-nigh shine out, even though fire touched it not! It is light upon light!

¹ Arnold, *op. cit.*, p. 354.

N.B.—This study was slightly revised by the author in 1949.