

MUSLIM THOUGHT
Its Origin & Achievements

BY

M. M. SHARIF



SH. MUHAMMAD ASHRAF

PUBLISHER, KASHMIRI BAZAR, LAHORE

"... The scientific attitude is in some degree unnatural to man; the majority of our opinions are wish-fulfillments, like dreams in the Freudian theory" Russell, "The Scientific Outlook."

"Traditional theology, as is natural, has always been flattering to the human species; if it had been invented by monkeys or inhabitants of Venus, it would, no doubt, not have had this quality."

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1953

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AUJAZ

Syed *M. M. Sharif*

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TO
THE REVERED MEMORY
OF MY FATHER AND MOTHER

PRAFACE

In my conversation with friends I have often been asked if there is such a thing as Muslim thought. To dispel such appalling ignorance a good deal of literature should be poured into this country. This work represents my contribution towards that aim. Some parts of it come from the address I delivered as General President of the 20th Session of the Indian Philosophical Congress held at Travandrum in Dec. 1945. They were later published in a very much modified form in the Aryan Path. I owe my thanks to the Secretary of the Indian Philosophical Congress, and the Editor of the Aryan Path for permitting me to incorporate them in the present work.

In the text I have mentioned only the most illustrious writers, their most outstanding works on philosophy or science and the most lasting aspects of their systems. Thus within the limits I have imposed upon myself to keep this work small in size and handy, I have not been able to say even a word about hundreds of other famous writers and their works. Besides, for the same reason, I have given no account of the philosophy of any individual thinker among the rationalist scholastics, orthodox scholastics and mystics, except al-Ghazzali. Such expansions I have left for some other occasion.

My indebtedness to such Orientalists and writers on medieval history and philosophy as, Jurji Zaydans, Y. Polacios, Goldziher, M. De Wulf, Renan, Macdonald, O'Leary, Hitti, especially the last three, is overwhelming, and I claim no originality for what I have written, though I own responsibility for the many mistakes that I might have made. I only claim to have endeavoured to satisfy an urgent need, and hope that in Chapter IV I have succeeded in making clear some ideas that might have been left somewhat vague in other writings.

I have to express my thanks to Professor K.M. Hosain and Mr. Muhammad Abdullah Iqbal for reading through the proofs.

Lahore

October, 1951

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MUSLIM THOUGHT
Its Origin and Achievements

MUSLIM THOUGHT

ITS ORIGIN AND ACHIEVEMENTS

CHAPTER I

THE ORIGIN

I

INTRODUCTORY

About six hundred years before the Christian era philosophical thought took its birth in four different centres of civilization in the world: China, Persia, India and Greece. Of these four different springs of thought, two, the Indian and the Greek, developed into mighty rivers. The former of these after a brief shrinkage has again started flowing and seems to have a great destiny. But the latter, after fertilizing Greece, Alexandria, Rome and Syria for more than fifteen centuries became more or less merged into Muslim thought and then in the 10th century A.D., the world was left with only two great currents of thought, Indian and Muslim.

It is but natural that geographical proximity should lead the flow of water from a higher to a lower place. This analogy holds good in the case of thought. India was on the same intellectual plane and in certain respects on a higher plane than

the Islamic countries in the 8th and 9th centuries and, therefore, streamlets naturally ran out or distributories were dug out to take modes of thought from India to the world of Islam, and later, when these countries rapidly rose to the highest cultural plane yet reached, back from the world of Islam to India. But the West, being geographically nearer the Islamic countries than India and being in the middle ages on a very much lower spiritual plane, was simply flooded by Muslim philosophy and science.

In the early part of the 7th century, A.D. a new spring of thought burst forth in the deserts of Arabia and soon swelled into a sea seething with life. It was Islam. It infused into men a spirit the like of which history had never known before. Persia and Byzantium, the two greatest empires of those days, tried to stem its rising tides, but in the struggle were themselves swept away; and by the first centennial of its founder's death, it spread from the Bay of Biscay to the Indus and the confines of China, and from the Aral sea to the upper cataracts of the Nile, over more than half of the then known world, wielding an empire greater than the Roman Empire at its zenith. This was an empire, which inspite of vast changes in its boundaries, and inspite of being now closely now loosely knit, saw its rise till the third quarter of the 16th century. It could boast of one language, Arabic, as its *lingua franca*. It had towns with a prosperous population of ten to forty lacs of inhabitants, with tens

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of thousands of garden villas, lavishly furnished with magnificent paintings, rich tapestries, curtains and chandeliers, with thousands and thousands of public baths and with strongly macadamized roads and solidly paved lanes lighted with public lamps. It possessed the largest navy in the medieval world and had mastery over the Atlantic off the coast of Spain and West Africa, the Mediterranean Sea, the Red Sea, the Indian Ocean, the China Sea and the Pacific Ocean; and kept a mercantile fleet that made monthly voyages from the Atlantic to the Pacific, touching at all the important ports, including those of Malabar on the way. It ran industries that manufactured highly finished goods such as leather and metallic goods, carpets, tiles, pottery, soaps, perfumery, paper, glass, jewelry and cotton, silk and woolen fabrics admired both in the East and the West, with factories spreading from Persia to the banks of the Danube on the one side and the heights of the Pyrenees on the other. In leather, cotton and silk fabrics alone several European names owe their origin to the Muslims. Such are, for example morocco, cordovan, muslin (from Musul) cotton (from Ar. Qutn) baldachine (from Baghdād) damask (from Damascus) fustian (from Fustat); taffeta (from the Persian Tafta) tabis (from Attabic, the name of a silk manufacturing family in Baghdad). It carried on trade by sea routes from Korea, Japan and the Phillipines to Spain and France, and

indirectly through Jewish and European tradesmen, to England, Sweden and Norway and by land routes from North Africa to the heart of Siberia. It was the first to manufacture gunpowder, an invention as important in the medeival ages as the atomic bomb today, and to blazon shields of Heraldry and coats of arms and use them in warfare. Its men dived deep into the sea to bring out pearls and penetrated low into the earth to dig out gold, silver, lead, iron, antimony, mercury, marble, turquoise, rubies, lapis-lazuli, azurite, kaoline, naphtha, cornelian, sulphur, asbestos and tar. They spread a "veritable network" of canals in the lands, through which pass the Euphrates, the Tigris and the Nile, and gave to Europe the taste for spices, scents, ginger, sugar and coffee. They set ideals of civic life, home life, hygiene agriculture, architecture, irrigation, calligraphy, music, dress, food, and games for the whole of Europe. And all this centuries before Columbus went westward in his search after the queen of the East and sighting the shores of America shouted with joy "Indiana! Indiana!" centuries before Vasco de Gama could reach the land of Columbus's dreams, by the calamitous help of Ahmad, an Arab Sailor of repute, whom he entertained as his honoured guest and guide throughout the voyage; and centuries before the time "when there was not" yet "so much as one public lamp in London" and the streets of Paris were yet unpaved, when "the dwellings of the

rulers of Germany, France and England were” still “scarcely better than stables, chimneyless, windowless, with a hole in the roof for the smoke to escape,” and when the priests of Europe deemed it a great virtue not to bathe and change for months.

However, we are not just now concerned with these aspects of the life of the Mussalmans in their days of glory. For our present purpose what we want to study, and that too very briefly, is their contribution to the development of thought.

II

THE ISLAMIC BASIS

The remarkable impetus that the spirit of Islam gave to knowledge came direct from the *Qur'ān* and the sayings of the Prophet of Islam and this is a fact that the Christian writers of history generally ignore.

Let us see what the *Qur'ān* says in this connection. In the very first verses revealed it commands Muhammad to read in the name of the Beneficent and the most Bountiful who taught man the use of the pen and gave him the knowledge of things (XCVI-1f). It advises him to pray “O my Lord! Advance me in knowledge.” (XX-114). It says that those who have no knowledge are not on an equality with those who have knowledge (XXXIX-9),

that those who do not observe and understand are worse than cattle (VII-179), that those who do not hear, understand and speak are the vilest of animals in God's sight (VII-29), that the details of revelation are given to those who have knowledge" (VI-98)— "who have understanding" (VI-99) that "whosoever has been given knowledge has indeed been given abundant good," (II-269) that crown is deserved by those who in the eyes of God have preference over others and have physical strength coupled with knowledge (II-247), and that of all things it is knowledge by virtue of which man is superior to angels and is the vicegerent of God on the earth (II-30f). It teaches men to reflect on the phenomena of nature, the creation of the heavens and the earth, the changes of seasons, the cycle of day and night, the sea, the clouds, the winds, the sun, the moon, the stars and the laws they imply. It bids them to ponder over the mysteries of death and birth, growth and decay, of men and nations, and to contemplate sunsets, dawns, hills, streams, ravines, vineyards, gardens of palms, cattle going out to pasture and returning home, the canopy of the starry heavens, the ships sailing on the sea, and the beauties of the soul more than those of the sense (II-164; III-190; X-6; XIII-2f; XVI-3f; XVI-78f; XL-67; XLV-5). It declared knowledge to be of three degrees in the ascending scale of certitude; (1) knowledge by inference, (2) knowledge by observaton and (3) knowledge by

personal experience (LXIX-50; CII-5f)—a distinction which may be exemplified by my certitude of (1) Fire always burns, (2) it has burnt John's fingers, and (3) it has burnt my fingers.

Deutsch recognises this teaching of the *Qur'an* in these words: "The *Qur'an* is a book by the aid of which the Arabs... came to Europe as kings to hold up the light to humanity while darkness lay around, to raise up the wisdom and knowledge of Hellas from the dead, to teach philosophy, medicine, astronomy and the golden art of song to the West as to the East, to stand at the cradle of modern science and to make us latecomers for ever to weep over the day when Granada fell."

Coming to the sayings of the Prophet, "The first thing created" says he, "was reason" and "God has not created anything better than reason." "He who leaveth his home in search of knowledge walketh in the path of God"; therefore, "To seek knowledge is the duty of every Muslim man and every Muslim woman." "Acquire knowledge," he exhorts, "it enableth the possessor to distinguish right from wrong; it lighteth up the path to Heaven. It is our friend in the desert, our security in solitude, our companion when friendless. It guideth to happiness, it sustaineth in adversity. It is an ornament among friends and an armour against enemies." "Seek knowledge from the cradle to the the grave;" again "acquire

knowledge, because he who acquireth it in the way of the Lord performeth an act of piety ; he who speaketh of it, praiseth the Lord ; who seeketh after it, adoreth God ; who dispenseth instruction in it, bestoweth alms ; and who imparteth it to others, performeth an act of devotion to God." "The angels offer their wings to the seeker of knowledge," and "he dieth not who seeketh knowledge."

A few sayings in which he compares knowledge with devotion are : "To listen to the words of the learned and to instil into others the lessons of science is better than religious exercises." "The preference of the learned man above the devotee is as my preferment above the lowest of you." "Whosoever revereth the learned, revereth me." "The ink of the scholar is more holy than the blood of the martyr." "An hour's contemplation and study of God's creation is better than 70 years' prayer." "To listen to the instructions of science and learning for one hour is more meritorious than standing up in prayer for a thousand nights."

With such teaching of the *Qur'ān* and the Prophet of Islam, it is no wonder that there was a "meteoric rise" in the intellectual activities of the Mussalmans and that they drank deep at all the fountains of knowledge, the brinks of which they reached in their forward march to progress.

The first of these fountains were those that arose from the very soil of Arabia herself, the *Qur'ān* and

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the Hadis. These were, so to say, the mother's sacred breasts on which Muslim thought was fed from its infancy. The *Qur'ān* gave the Muslims a new ethics and a new political theory and a new philosophy—a practical ethics, a democratic politics and a monotheistic philosophy. Though it gave a clear cut monotheistic explanation of the universe in its broad outline, it left the details of this conception open to interpretation. All universality ignores particularity and a religion that claims to be universal inevitably has to do so. There is one God, but is He transcendent or immanent or both? He is called by different names, but are these the names of His essential attributes or of the attributes metaphorically so called? He is eternal, everywhere and nowhere, but what kind of relation has He to time and space? From Him all actions flow, though men are themselves responsible for their doings, but how is that possible? Such are the questions which the *Qur'ān* left for the human intellect to solve. To be a Muslim it was enough to be monotheistic, whatever the details of one's conception of monotheism. Hence the differences in this conception even among the most orthodox of Muslim thinkers. The *Qur'ān* did indeed give guidance to the intellect, but in no way did it chain and fetter it. Just as nature gives organisms a start with some inborn impulses and then leaves them to develop in suitable environment; even so were the seeds of Muslim thought supplied

by the *Qur'ān* and the Hadis and its growth was simply the germination and fruition of these in the congenial soil of some pre-existing modes of thought.

"Both Iraqis and Syrians had looked upon their masters as an alien and hated power, and neither the Greek nor the Persian culture, imposed from the top, had ever been fully assimilated by the native peoples."

OTHER SOURCES

P.K. HITTI, "The Arabs—A Short History" pp. 49-50.

The rest of those fountains of knowledge at which the Mussalmans drank were in Syria, Egypt and Persia. Before the advent of Islam, Hellenistic Philosophy had passed from Greece to Alexandria and from there it had spread to Syria. The Neo-Platonism of Plotinus (d. 269 A.D.), combined and fused with Aristotelian elements of Prophyry who taught at Rome towards the end of the 3rd century, was taken up by the Christians of Alexandria, the chief of whom were Clement and Origen. Both of them tried to adapt contemporary philosophy with Christian theology. But local intrigue soon compelled Origen to leave Alexandria for Palestine, in which land he founded a school at Cæsaria on the lines of the one at *Alexandria*. Shortly after that (in about 270 A.D.) Malchion founded a school at Antioch on the same model, and about fifty years later a similar school was established in the midst of a Syriac-speaking community at Nisibis, which was afterwards removed to *Edessa* and then in the middle of the 5th century brought back to *Nisibis*.

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A little earlier a controversy had started between the Orthodox Church which held the Alexandrian theory of the eternal fusion of the Divine and human elements in Christ and those associated with the school of Antioch headed by Nestorius, Bishop of Constantinople, who stressed the complete humanity of Christ with a temporary union with God after birth. Before this controversy the General Philosophical belief was that there was God the father, the source, the first cause of All things, and the Son or Logos or the created spirit was an emanation from him and therefore God, the Son. Also it was believed, under the influence of Alexander of Aphrodisias (about 200 A.D.), that in every soul and so in that of Christ, besides the power of thinking (material intellect) there was an *active intellect*, which too was an emanation from the Deity. The second emanation was supposed to be an emanation of the first emanation. This controversy was really about the relation between the first emanation, the Logos, and the second emanation, the active intellect.

The Nestorians *denied the second emanation and believed that the first emanation entered the body of the human Christ temporarily after his birth.* This controversy ended in the condemnation by the General Council at Ephesus in 431 A.D. of Nestorius and his followers as heretics, their gradual banishment from Antioch and the surrounding Greek-speaking Syria, their repudiation of the Orthodox Church and estab-

lishment of their own Church, known as the Nestorian Church, and the strengthening of their position at Nisibis under the protection of Persian Kings to whom Nisibis now belonged.

The Nestorians of Nisibis defended their Christian doctrines by theories drawn from Greek Philosophy and thus missionary work became a propaganda not only for their theology but also for Hellenistic philosophy. Hence their importance as bearers of the Oriental version of Greek philosophy in the pre-Islamic world. Sometime after the first schism another controversy arose among scholars in the Alexandrian school. One party holding that *both the emanations had the eternal nature of God*, undermined the humanity of Christ altogether, while the other set of thinkers called the Monophysites or Jacobites, as they were later called after Jacob of Serugh who organised this new Church, held that *though Jesus was human, yet the union between the Logos and the rational soul was not temporary as the Nestorians held but eternal*. This controversy resulted in the Council of Chalcedon in 448 A.D. which expelled the Monophysites from the state church. They organised a Church of their own and their Convent at *Qannasrin* (Chalcis) became a new centre of Greek studies.

Now the period between the two great controversies in the Christian Church and the conquest of Syria by the Muslims was rich with translations

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from Greek into Syriac, commentaries and expositions; but this activity was chiefly confined to the narrow limits of theology. The study of metaphysics and Aristotelian logic was emphasised but mainly to defend theology. The study of medicine, chemistry and astronomy was also undertaken but no originality was shown.

The school of Alexandria engaged itself not only in theology, but also in medicine for which lectures were delivered on sixteen selected works of Galen. Besides medicine the Alexandrian school carried on research in chemistry and astronomy, and on the eve of the Muslim conquest of Syria it was known for its scientific studies.

In the middle of the 6th century A.D. Mar Ahba, a convert from Zoroastrianism, established a school at *Seleucia* like the one at Nisibis and a little later the Persian King, *Nawsherwan*, who had offered a home to the ejected Greek philosophers when the Byzantine emperor, Justinian closed the schools at Athens, founded a Zoroastrian school at *Jundi Shapur*. Here not only Greek and Syriac works, but also Indian writings on philosophy and science were translated into Pahlavi and both Indian and Greek systems of medicine were taught and developed.

Besides these, there was a school at *Harran*, established since the time of Alexander which long remained a centre of Greek Paganism and Neo-

Platonism as formulated by Porphyry. It remained for long one of the oases of Greek learning.

Thus Alexandria, Nisibis, Qannasrin, Seleucia, Jundi Shapur, and Harran, as much as nature itself, became veritable nurseries for the newly born Muslim thought. These several schools during their period of existence did not produce many philosophers or scientists of outstanding merit or books of lasting value. But they kept alive an intellectual tradition which offered a rich soil for the production of outstanding men. And when the seed was supplied by the spirit of Islam, such men were produced not by the dozens but by the hundreds. As O'leary says, these schools "supplied the soil on which Muslim theology, philosophy, and science put forth their luxuriant root."

IV

*CAPTURE OF PRE-ISLAMIC
LEARNING: TRANSLATIONS*

The rise of Muslim thought began with a period which, though rich in original thought, was chiefly marked by extensive translations from Sanskrit, Pahlawi, Syriac, and Greek. In 762 A.D. the first Abbasid Caliph, al-Manşūr laid the foundations of his new Capital, Baghdād and he gathered round him scholars from different lands and encouraged trans-

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lations of scientific and literary works from other tongues, many scholars receiving royal encouragement engaged themselves in translation work in their private capacity. They were mostly Jews, christians and new converts to Islam. One of these workers was Abdullah bin-al-Muqaffa' (d. 757 A.D.), a convert from Zoroastrianism whose best known translation was of *Kalilah wa-Damnah*, a pahlawi version of a Sanskrit work on ethics. The Sanskrit original and the Persian translation are lost, but parts of the material of this treatise are found in an expanded form in the *Panchatantra and the Mahabharata*, and from its Arabic version, it has been transmitted to almost all the languages of Europe. Another worker was an Indian traveller who helped in the translation of the *Sidhanta*, an astronomical work, and of a work on Mathematics. Among other translators were a Nestorian physician of al-Manṣūr's court from Junde-Shapūr, George Bakhtishū' (d. 771 A.D.); his sons, Bakhtishu' (d. 801 A.D.) and Jibril (809 A.D.), his pupil, Isa ibn Thakerbakht; John bar Maserjawayh (a jewish Syriac physician); Qusṭā ibn-Lūqa (923 A.D.), al-Ḥajjāj ibn-Yūsuf (between 786 and 833 A.D.), the first translator of the *Elements* of Euclid and one of the first of Ptolemy's *Almagest*, (the very first being Yaḥya ibn-Khālid, a vizir of the Caliph al-Rashīd); Thāwafil ibn-Tūma (L. Theophilus, 785 A.D.), translator of some parts of Homer's *Illiads*; and abu-Yaḥya (between 796 and 806 A.D.)

who translated the major works of Galen¹ and Hippocrates,² *Quadripartitum* and *Almagest* of Ptolemy, and the *Elements* of Euclid. None of these early Arabic versions of Greek works was however very satisfactory.

In 832 A.D. the Caliph al-Ma'mūn founded an academy with an observatory, a library and a translation bureau at Baghdād. As Hitti says this academy in certain ways proved to be the most important institution after the Alexandrian Museum established in the first half of the 3rd century B.C. Here works were translated from Syriac and Pahlawi, the Syriac and Pahlawi works being themselves translations from Greek and Sanskrit. Yaḥya bin Māsawayh (777-857 A.D.), a Nestorian physician and a pupil of Bakhtishū', was appointed as the head of the academy. He is said to have translated for the Caliph al-Rashīd certain medical manuscripts. But the most important work of the academy was done by his pupil Ḥunayn ibn-Ishāq (L. Joannitius, 809-873 A.D.), also a Nestorian Christian, and his disciples. He was first a dispenser to ibn Māsawayh, than a manuscript collector in Greek-speaking lands in the service of the sons of Mūsa ibn-Shākir, then in charge of the academy and its translation bureau, and last of all private physician to the caliph al-Mutawakkil.

1. 200 A.D.

2. ca. 436 B.C.

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Hunayn, probably with the assistance of a number of collaborators, translated into Arabic the books of Euclid (ca. 300 B.C.); parts of Galen, Hyppocrates, Archimedes and Apollonius; the Republic, Laws, and *Timaeus* of Plato; the Categories, Physics, *Magna Moralia* and the spurious Minerology of Aristotle; and the commentary of Themistius on book XXX of the Metaphysics, the Old Testament and medical pandects of Paul of Aegina (ca. 650 A.D.). His son rendered into Arabic the Sophist of Plato, the Metaphysics, *de anima*, *de generatione et de corruptione* and the *Hermeneutica* of Aristotle and the commentaries of Porphyry, Alexander of Aphrodisias and Ammonius. Abu-Bishr Matta bin-Yūnus (d. 939 A.D.), besides writing commentaries on Aristotle's categories and the *Isagoge* of Porphyry, produced the Arabic version of Aristotle's *Analytica Posteriora* and *Poetica*, Alexander of Aphrodisias's commentary on *de generatione et de corruptione* and Themistius's commentary on Book XXX of the Metaphysics. Hunayn's nephew Ḥubaysh, 'Isa bin-Yaḥya and Mūsa ibn-Khālid were other prominent translators of this school.

Just as Hunayn was the head of the Nestorian group of translators, so was Thābit ibn-Qurrah (836 A.D.) the leader of the Ṣābian group of workers from Harran, an old seat of learning which had become famous for its philosophical and medical studies. Thābit and his disciples translated the

major part of the Greek mathematical and astronomical works and improved upon earlier translations. In later life he became a great favourite of the caliph Mu'taḍid. His work was continued by his sons, Ibrāhīm and Sinān, his two grandsons, Thābit and Ibrāhīm, and two great grandsons, Ishāq and Abu-al-Faraj.

In the second half of the 10th century rose the school of Jacobite translators, prominent among whom were Yaḥya ibn-'Adi (d. 974 A.D.) and Abu-'Ali 'Isa ibn-Zurah (1008 A.D.). The former of these revised many of the early versions and produced fresh translations of the *Categories*, the *Sophist*, *Elench.*, *Poetics*, and *Metaphysics* of Aristotle; *Laws* and the *Timaeus* of Plato, and commentary on the *Categories* by Alexander of Aphrodisias and on the *Moralia* by Theophrastus. The latter Abu 'Ali 'Isa ibn Zurah, translated the *Categories*, the *Natural History* and the *Partibus animalium* with the commentary of John Philoponus.

So extensive was the range of Arabic translation of philosophical and scientific classics, that within eighty years of the establishment of Baghdād, the Arabs were in possession of the greater parts of the works of Aristotle including the spurious mineralogy, mechanics and theology, which last was actually an abridged paraphrase of the last three books of Plotinus's *Enneads*, some of the works of Plato and

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Neo-platonists, the important works of Hyppocrates, Galen, Euclid, Ptolemy and subsequent writers and commentators and several Persian and Indian writings. All this was taking place in the Muslim world when Greek thought was almost unknown in the West. "While in the East," says Hitti, "al-Rashīd and al-Ma'mūn were delving into Greek and Persian philosophy, their contemporaries in the West, Charlemagne and his lords were dabbling in the art of writing their names."

CHAPTER II

DISSEMINATION OF KNOWLEDGE

I

SCHOOLS, COLLEGES AND UNIVERSITIES

In the last chapter we have seen that the sources of Muslim thought were both internal and external. From the internal sources the Mussalmans received the teachings of the *Qur'ān* and the Hadis and their zest for knowledge. From the external sources they acquired much that was vital in the wisdom of India, Persia and Greece—especially Greece.

Having acquired knowledge from all these sources the Muslims took up the task of disseminating this knowledge.

Education spread in the Muslim world with electric speed. There was no village without a mosque and elementary and secondary schools sprang up as adjuncts to mosques, their curriculum being the teaching of the *Qur'ān*, stories about the life of the Prophet, reading and writing, a little poetry and the elements of arithmetic and grammar. As Professor Ballasteros and Professor Ribera tell us schools were provided for nearly all children. For higher education students went either to colleges, academies

and Universities or to individual teachers. Rulers, princes, ministers and wealthy nobles regarded it as a fashion to become patrons of learning, hold academic discussions, open schools and colleges, set up laboratories and establish hospitals and libraries. The first college was established by al-M'amūn in Baghdād. The second college for higher studies called the Nizāmīyyah was founded in Baghdad in 1065 or 7 by Nizām-al-Mulk, a Persian Vazir to the Saljūq King Alp Arslān. It was a residential college in which theological studies had the same place as afterwards classical studies had in European Universities. Reuben Levy (*A Baghdād Chronicle*, Cambridge, 1929) holds that some details of its organisation appear to have been copied by the early European Universities. Al-Ghazzālī was the head of this institution for four years from 1091 to 1095 A.D. An interesting story is told about a pupil of the Nizāmīyyah who along with a group of students once took a heavy dose of an infusion of anacardia, lost his wits and came naked to the class. When amidst the laughter of the class, the professor asked him to explain his shameful conduct, he very seriously replied that he and his class-mates had drunk the infusion of anacardia to sharpen their intellect and that made them all lose their sense with the exception of himself who had luckily remained sane. After a little over three centuries the Nizāmīyyah was merged into a new institution named al-

Mustansirīyyah which was the first educational institution to have a hospital attached to it. Other well-known colleges were al-Rashīdīyyah, Amānīyyah, Tarkhānīyyah Khatunīyyah and Sharīfīyyah in Syria and Rambīyyah, Nasīrīyyah and Salahīyyah in Egypt. In course of time the Nizāmīyyah type of colleges spread all over the empire, thirty being in Baghdād, twenty in Damascus, thirty in Alexandria, six in Mawsil and one at least in all other important cities such as Cairo, Nayshapūr, Samarkand, Ispahān, Merv, Bulkh, Aleppo, Ghazni, Lāhore, and so on. In Spain “Cordova alone had several hundred colleges, and in some at least of these philosophy, literature, history and science (in a dozen special branches) were taught as well as theology.”

It was in Spain that the foundations of what are now called the Universities were laid. The Chief of these were the Universities of Cordova, Seville, Malaga and Granada. The portals of the University of Granada bore this inscription: “The world is supported by four things only: the learning of the wise, the justice of the great, the prayers of the religious and the valour of the brave.” Scholars from all over Europe flocked to these Universities for study.

II

OTHER EDUCATIONAL INSTITUTIONS

Besides these institutions of higher studies education was also imparted by individual teachers in

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their own homes or in the mosques or shrines which had special quarters reserved for travellers, students and teachers. Both the teachers and the students were supported by the endowments given to these mosques or shrines by wealthy people. These teachers were highly respected. In mosques lectures were delivered not only on theology but also on other branches of learning, and not only to regular students but to all those adults who cared to attend them. Nāṣir Khusro writes in the 11th century that the mosque at Cairo was daily visited by five thousand men to hear lectures on various subjects of study.

Moreover, a large number of observatories which sprang up in different parts of the Empire were also colleges for teaching astronomy, just as the hospitals which also arose at the same time served as colleges for medical studies. Furthermore there existed literary societies and study circles which held their meetings in the homes of the aristocracy.

III

LIBRARIES

During the Abbasid period paper manufacture became an indigenous industry. Books began to be written and to be sold by book-sellers and book agencies in large numbers and thousands of private and public libraries sprang up. Paper-making was indeed the greatest boon that Islam gave to Europe

through Sicily and Spain. In the 10th century Al-Mawsil had a private library where scholars were supplied with free paper. In the same century the founder of the library at Basrah granted stipends to scholars working in it. Some libraries were very generous in lending books. Yāqūt mentions to have borrowed two hundred books from the Damiriyyah library of Merv. There were twenty public libraries in Spain alone. The library of Cardova possessed in the 10th century about four hundred thousand (some say six hundred thousand) books "at a time when there were probably not 10,000 elsewhere in Europe, possibly not even 4,000." If the Catholic Encyclopaedia gives the correct figure, four centuries later, after all the achievements of the 13th century, Canterbury headed the list of Christian libraries with 1800 volumes. The Bayt al-Hikmat at Cairo is said to have had two million books and that of Tripolis in Syria which was burnt by the first Crusaders contained three million books of which fifty thousands were copies of the *Qur'an* and its commentaries. That means that this library alone had three-fourths of the volumes which the Bodleian Library has, or more than half the volumes that all the libraries of India and Pakistan have been estimated to possess today. In the library of Al-Hakim books were arranged in forty chambers, each containing about eighteen thousand books. The Khazinat al-Kutub, a library founded at Sheraz by 'Aḍud-al-Daulah, a

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Persian King (d. 984 A. D.) was surrounded by parks and had three hundred and sixty rooms and pavilions. The magnificence of these libraries becomes all the more astounding when we realise that all the books were manuscripts, for we are talking of a period when there were no printing presses. Besides these, there were several other famous libraries such as those of Baghdād, Ram Hur-Muz, Basrah, Ray, Merv, Bulkh, Bokhara and Ghazni. All over the empire mosques also served as repositories of books. Men of learning were appointed as librarians. Even such renowned scholars as ibn-Sīna, ibn-Maskawayh and Ash-Shabushti held posts of librarians.

CHAPTER III

ADVANCEMENT OF LEARNING : SCIENTIFIC THOUGHT

We have already seen what the Mussalmans received from their predecessors. Let us now see what they transferred to their successors. They received from Alexandria, Syria and Persia an old tradition, but passed on to Europe an entirely new tradition, not only old but also new sciences, new studies and a vast store of knowledge. From the 7th to the 12th century A. D. was the period of Islamic glory. During this period the Mussalmans became the leaders of philosophical thought. But it was in the field of science that they achieved their greatest triumph. In this chapter we make a rapid survey of their contribution to scientific knowledge.

I

JURISPRUDENCE

The Muslims perfected the science of jurisprudence and brought it to bear upon the minutest details of life. Its recognition of personal liberty and of the rights of women and children, its universality and comprehensiveness are the features which distinguish it from the Roman law. "The Mohammeden

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law," says Edmund Burke, "is binding upon all, from the crowned head to the meanest subject. It is the law interwoven with a system of the wisest, the most learned and the most enlightened jurisprudence that ever existed in the world." They created a new science which may be called the applied science of testimony (Hadis) which formulated principles for the verification of statements made in the past and about the past, and applied them to the sayings and doings of the Prophet to the minutest details covering the whole range of life. One great worker in this field (Bukhāri) collected 600,000 sayings and statements about the life of the Prophet from 1000 religious leaders in the course of 16 years travels through Islamic countries, and, after critical examination, selected only 7275 as true. One of the principles of this science was public opinion, which meant that when legal authority was silent, matters should be decided by public opinion. It is this democratic principle which helped the Muslims to decide matters arising out of new situations in this progressive world by consensus of opinion, each individual having the right to exercise his or her own judgment.

II

HISTORY AND SOCIOLOGY

This discipline of the science of testimony trained the Muslims in their study of history. After

Herodotus, the Muslims were the first great historians of the world. Some of them undertook long journeys to collect material. The name of the Muslim Globe-trotter, Ibne Battūṭah (d. 1377 A.D.), is well-known to the historians of this country. Though not an historian himself, the records of his travels are a gold mine of material for all workers on the history of Medieval India. One Muslim historian, al-Ṭabari (d. 923 A.D.), travelled from Persia to Egypt and on one occasion had to sell the sleeves of his shirt to buy bread. An abridged form of his universal history (upto 915 A.D.) has come down to us. It covers 2501 pages and is supposed to be one tenth of the original work. He is said to have written on an average 40 pages a day for 40 years. (Yaqut, vol. vi, p. 424). Another historian al-Mas'ūdi (d. 956 A.D.), known as the Herodotus of the Arabs, journeyed into almost every country in Asia, including perhaps China and Madagaskar. He has left a monumental work of 30 volumes on universal history upto 947 A.D. The works of these authors are taken to be remarkably elaborate and accurate both by Oriental and European writers. Yet another historian, Ibn-Ḥayyān (d. 1076 A.D.) wrote fifty works one of which was a history of Spain, entitled, *Al-Matīn*, covering 60 volumes. A history of Arab poetry set to music was written by Abu-al-Faraj (d. 967 A.D.) in 21 volumes. Al-Bīrūni (d. 1048 A.D.) laid down for the first time the

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principles of historical criticism and formulated the method by which exaggerated and inaccurate accounts could be tested. A Spanish historian ībn-al-Khaṭīb (d. 1376 A.D.) left 60 odd works on different subjects. Of these his history of Granada is the most famous. histories of science and philosophy were also written. The author of Kashfuz-Zunūn mentions 1300 historical works of value, including the five mentioned above. There were not a few works on biography. Ibn-i-'Asākir (1177 A.D.) wrote in 80 volumes the biographies of the distinguished men of Damascus. Ibn-Khalikān's biography of the most distinguished Muslims in history is regarded by Nicholson as the "the best general biography ever written". But of all those who worked in the historical field the man who holds the highest claim to enduring fame is Ibn-Khaldūn (d. 1406 A.D.). He was at once a writer on political theory, history of philosophy and sociology. Comparing him with Machiavelli as a writer on political science, Colosio observes : "If the great Florentine instructs us in the art of governing people, he makes this as a far-sighted politician, but the learned Tunisian was able to penetrate into the social phenomena, as a profound economist and philosopher, a fact which urges us to see in his work such a far-sightedness and critical art, as was totally unknown to his age." (Colosio : *Introduction a l' etude d' Ibn-Khaldūn*) As a philosopher of history Ibn-Khaldūn in his

Muqaddama “prescribed for the first time a theory of historical development which takes due cognizance of the physical facts of climate and geography as well as the moral and spiritual forces at work. As one who endeavours to find and formulate laws of natural progress and decay Ibn-Khaldūn may be considered the discoverer of the true scope and nature of history . . . By the concensus of all critical opinion Ibn-Khaldūn was the greatest historical philosopher Islam produced and one of the greatest of all times.” (Hitti, *History of the Arabs*, p. 568) Not only this, he was undoubtedly also “the real founder of the science of sociology.” (Hitti, *History of the Arabs*, p. 568); also Schmidt, *Ibn-Khaldun, Historian, Sociologist and Philosopher.*) He can also be justly said to be the father of political economy. “Ibn-Khaldūn”, says Colosio, “was an original economist who understood the principle of political economy, and applied it with intelligence and skill long before it was known to Western research. If the theories of Ibn-Khaldūn about the complex life of society place him foremost among the philosophers of history, his comprehension of the part played by labour, property, and wages, places him foremost among the masters of modern economy.”

III

GEOGRAPHY

In the field of geography in the first half of the 9th century at the instance of Caliph M'amūn,

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al-Khwārizmi and his ninety nine collaborators made a map of the heavens and the world. They also carried out the measurement of the length of a degree of the meridian on the plain of Sinjar and also near Palmyra. It came out to be $56\frac{2}{3}$ miles, 959 yards more than the real length—a remarkably accurate result. From this measurement the circumference of the earth was inferred to be 20,000 miles and its diameter 6,500 miles. All this activity was going on at a time when the whole of Europe believed in the flatness of the earth. In the middle of the 9th century al-Muqadasi, after twenty years travels in different parts of the world, wrote a geographical encyclopaedia giving an account of the places visited by him. In the third quarter of the same century and the beginning of the 10th century Ptolemy's geography was translated into Arabic independently by two different scholars and a number of notable works came out. One, for example, was historico-topographical, another topographical and economic, another on political geography of the caliphate, showing its divisions into provinces, the details of its postal system and taxation for each district, and yet another on general geography. There were also works on geography dealing with climates and minerology. In the middle of the 10th century al-Iṣṭakhri produced a geography of the Islamic world with coloured maps for each country. In the beginning of the 11th century, al-Bīrūni wrote the geography of Russia and Northern

Europe. In the 11th century Zarqāli estimated the approximately correct length of the Mediterranean sea (42°). In the middle of the 12th century al-Idrīsī, the most distinguished geographer and cartographer of the middle ages, made a celestial sphere and a disk-shaped map of the world both in silver for Roger II, King of Sicily. He also showed on map the sources of the Nile, which were discovered by the Europeans as late as the 19th century. In 1290 Quṭb-al-Dīn made a map of the Mediterranean Sea for the King of Iran. But the greatest of all Arab geographers was Yāqūt (1179-1229 A. D.) who in the beginning of the 13th century brought on a monumental encyclopaedia of geography in six volumes.

Out of their whole geographical literature which is still the delight of oriental researchers, the Muslims passed on to Europe the geographical conceptions of the Greek, the Indian idea of the world cupola, Ujjayinī (or Arīn as they called it), the doctrine of the roundness of the earth and the approximately correct theory of the causation of tides.

IV

ASTRONOMY

Now let us come to those studies in which the Muslims can justly be said to have laid the foundations of modern European thought. These are astronomy, mathematics, medicine, physical sciences

and philosophy. I have already mentioned the measurement of the length of a terrestrial degree taken by al-Ma'mūn's astronomers. In about 773 A. D. an Indian traveller introduced Sidhanta, the Indian tables, into the Islamic world. By the orders of the Caliph al-Manṣūr, this treatise was translated into Arabic by al-Fazāri (between 796 and 806 A. D.) who became the first astronomer of Islam. The leader of al-Ma'mūn's group of astronomers, al-Khwārizmi (850 A. D.) drew up his own astronomical tables, basing them on al-Fazāri's work. He also cyncretized the Indian and Greek systems of astronomy, adding his own valuable contributions. Besides al-Ma'mūn's observatory where al-Khwārizmi worked and the three observatories at Baghdād, there were observatories in Egypt, at Al-Rayy Shirāz, Naysapūr, Samarqand, Jundi Shapur, Delhi, Seville, Marāghah, Wasiṭ, Apamia and other places. At al-Rayy abu-Jafar al-Khāzin ascertained the obliquity of the ecliptic and solved an Archimedean problem, leading to a cubic equation. About the observatory at Seville Draper observes that "after the expulsion of the Moors it was turned into a belfry, the spaniards not knowing what else to do with it." Independent astronomical tables were compiled by al-Khwārizmi, Aḥmad of Nihāwand (d. 835 or 845), Ḥabash son of Ḥasib (d. 831 A. D.), Yaḥya son of Abi-Munṣūr (between 870 and 970), Nairīzi (d. 922 A. D.), al-Majrīṭi (1029-1087), Kushyar (d. 1029 A. D.), Zarqāli

(L. Arzachel, 1029-1089 A. D.), and Naṣīr-al-Dīn Ṭūsī (d. 1274 A. D.). In his explanation of the solar eclipses Zarqālī gave the world the first determination of time by an altitude. He made a new type of Astrolabe and was the first to prove the motion of the solar apogee with reference to the stars. According to him it measured 12·04", while its real measurement is 11·8".

The sons of Mūsa Ibn-Shākir ascertained the obliquity of the ecliptic, marked for the first time the equinoxes and the movement of the solar apogee, all unknown to the Greeks. Al-Kohi studied the summer solstice and autumnal equinoxes. Abu-Ma'shar (786-886 A.D.) gave to Europe the laws of the tides based on the movement of the moon in relation to the earth. Al-Battāni (d. 929) "made several amendations to Ptolemy, rectified the calculations for the orbit of the moon and certain planets. He proved the possibility of the annual eclipses of the sun and determined with greater accuracy the obliquity of the ecliptic, the length of the tropical year and the true and mean orbit of the sun." *Zī-ul-Akbar al-Hākimi*, a famous work by 'Āli Ibn-Yūnus (1009 A.D.), was also a decided advance on the work of Ptolemy. It was reproduced among the Persians by 'Umār al-Khayyām, a poet, philosopher and mathematician famous for his *Rubāiyyāt*, (11 century), among the Greeks, in the *Syntax of Chrysococca*, among the Mongols, by Nāṣīr-al-Dīn Ṭūsī and among

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the Chinese in the Astronomy of Co-Cheon-King in 1280. Send bin 'Ali, Yaḥya bin abi Manṣūr, and Khālid bin-Abdul Malik made important observations about the equinoxes, the comets, photometry of the stars and other celestial phenomena. Al-Bīrūni (d. 1048) who has been mentioned before discussed the theory of the rotation of the earth on its axis and made accurate determination of longitude and latitude. 'Umar al-Khayyām made a calender which is more accurate than the Georgian calender, for it leads to an error of one day in 5000 years as against the latter which leads to an error of one day in 3330 years. Besides works on geometry and arithmetic, he wrote a comprehensive treatise on astronomy.

Four works of abu-Ma'shar (L. Al-bumasar) and Al-Khwārizmi's tables were translated into Latin by John of Seville and Adelard of Bath. Plato of Trivoli and later Alfanso X translated al-Battāni's tables into Latin, and Gerard of Cremona translated Jabir's *Kitāb-al-Hay'ah*, a treatise on astronomy which was published in 1534 A.D. This book was a great improvement on Ptolemy's *Almagest*. Many other works on astronomy by Muslim authors, including those of abū-Bakar (L. Albubather) al-Qabisi (L. Alqabitus), al-Battāni (L. Albategnus), and al-Farghāni (L. Alfraganus), were translated into Latin, and they exercised a great influence on the development of this science in Europe. Alphonsine tables completed by Alphonso X were nothing but a

modified form of Muslim astronomy. The well-known Toledan tables are also based on observations made by the Muslims, chiefly by Zarqāli (L-Arzachel, 12th century A.D.). The works of Ramond of Marseilles were also drawn from the astronomical tables of Zarqāli. "Arab astronomical tables replaced all their Greek and Indian predecessors and came to be used even in China." Copernicus was well-acquainted with Arab astronomers, for he quotes two of them, al-Zarqāli and al-Battāni in his book *De revolutionibus orbium coelestium*. Besides such terms as azimuth (Ar. al-sumūt) "nadir" (Ar. nazīr), zenith (Ar. al-samt), the names of stars in European languages are mostly of Arabic origin and these testify to "the rich legacy of Islam to Christian Europe."

V

MATHEMATICS

The same Indian scholar who took the astronomical work, *Sidhānta*, to the court of al-Mansūr, is said to have taken with himself to Baghdād also a treatise on mathematics which laid the foundations of Arab mathematics. This work was translated into Arabic by ibn Ibrāhīm al-Fazāre (between 796 and 806 A.D.). It acquainted the Muslims with the use of the zero and the Hindu numerals. These numerals were justly named by the Muslims as Hindi numerals, but the Europeans who got them from the Arabs, not

knowing their true origin, called them the Arabic numerals or algorisms of al-Khwārizmi who was the first Muslim to use them. Al-Khwārizmi was the author of the oldest Arab treatise on arithmetic and algebra. His book on the Hindu method of calculation became the basis of the science of arithmetic as we have it today. He was followed by Ahmad al-Nasāwi (ca. 1040 A. D.) who “explained the division of fractions and the extraction of square roots in an almost modern manner.” The Spanish Muslims developed the figures called Ghubar numerals. These were slightly different from the Hindu figures. The figures used in the modern European languages are more like the Ghubar numerals than the Arabic numerals. Al-Khwārizmi was the founder of algebra. His work, *Hisab al-Jabr w-al-Muqābilah* (The Mathematics of Integration and Equations) which was translated into Latin by Gerald of Cremona, “introduced into Europe the science of algebra (al-Jabr) together with its name and was used until the 16th century as the principal mathematical text-book of European Universities.” He substituted sines for Ptolemy’s chords in trigonometry and invented a common method for the solution of quadratic equations and Ibn-Ibrāhīm al-Fazāri expanded it to the solution of cubic equations.

Al-Khayyām, advanced the science of algebra still further. His work (published in America in 1932) developed the method of solving trigonometrical

and algebraic equations of the second degree and gave an excellent classification of equations. Abu-Bakar Muhammad (d. 1029 A.D.) solved diophantine as well as quadratic equations. Thābit ibn-Qurrah (d. 901 A.D.), a ṣābian court astronomer of the caliph Mu'taḍid, investigated the properties of amicable number and the problem of trisecting an angle. He applied algebra to geometry and laid the foundations of analytic geometry, mechanics and astronomy. Archmedes' problem of dividing a sphere by a plain into two segments having a prescribed ratio was first expressed as a cubic equation by al-mahāni and the first solution was given by abu-Ja'far al-Khāzin (d. 971 A.D.).

The science of trigonometry, like those of algebra and analytical geometry, was largely founded by the Arabs. Al-Battāni (d. 930 A.D.), a Ṣābian under Muslim patronage, discovered most of the basic notions of trigonometrical ratios as they are used today. He was the first to calculate ϕ from the equation $\sin \phi / \cos \phi = k$ and to give the formulae $\cos a = \cos b \cos c + \sin b \sin c \cos A$ for a spherical triangle. Abu-al-Wafā (d. about 998 A.D.) was the first to find out the generality of the sin theorem in relation to spherical triangles. He was also the first to introduce the tangent, co-tangent, secant and co-secant in trigonometry and to show the relation between the six trigonometric livis. Al-Baghdādi wrote a book on spherical trigonometry and al-Khujandi (d. 1000

A.D.) discussed the five theorems in relation to spherical triangles. Ibn-Yūnus (d. 1008 A.D.) made further developments in spherical trigonometry and gave an improved formula for the calculation of sines. In Spain Jābir (11th century), or Geber as he was called by European writers, wrote a treatise on astronomy in nine books which was a considerable improvement on Ptolemy's *Almagest*. He was the first to give the formula $\cos B = \cos b \sin A$, $\cos c = \cos A \cos B$ in a triangle of which C is a right angle. Some wrongly suppose that the science is called algebra after his name and not after the name of al-Khwārizmi's book *Hisab al-Jabr w-al. Muqābilah* written about two centuries before.

The British scholars Adelard of Bath (11th century) and D. Morley of Norfolk (12th century) went to Muslim Spain to learn mathematics and physics and on their return began to teach the principles they had learnt from their Muslim teachers. Adelard also translated al-Kawārizmi's work on the Hindu method of calculation. Although the Arabic numerals were introduced into the West by this work, as were the Ghubar figures by the work of Gerbert who was also educated in Spain before he became Pope Silverster II (999-1003 A.D.), they were not put to any practical use till the middle of the 13th century. They were first employed for practical purposes in Christian Europe by Leonardo Febanocci of Pisa who was taught by a Muslim

teacher. His works which “marked the beginning of European mathematics” contained the six types of quadratic equations given by Muslim mathematicians and so did those of Jacob of Florence. The mathematical work of Georg Purbach, Professor of mathematics at Viena in the 15th century, was based chiefly on al-Zarqālī. Georg Purbach’s pupil Johannes Muller was Professor at Padua. His treatise on mathematics which was published and republished in the middle of the 16th century was the first complete European treatise on trigonometry, but “his methods were definitely behind those of the Arabs.”

VI

MUSIC

Closely connected with mathematics was the Muslim theory of music. The basic principle of measured songs or mensural music—that notes have exact time ratios between themselves—was well known to the Muslims centuries before the West became familiar with it through their influence. S‘aīd Ibn-Misjah (d. 683 A.D.) studied the Byzantine and Iranian music and blended them with Arab music. His pupil Ibn-Muḥriz (ca. 715 A.D.) further developed this synthesis. Yūnus Kātib (about 742 A.D.), a court musician of Walid II, wrote the earliest works on music, one of which was entitled *Kitāb-ul-Qiyān* (The Book of Melodies). In the time of the Caliphs Hārūn and Ma‘mūn (786-833 A.D.)

Greek works on music were translated into Arabic.

Ishāq, a court musician of Hārūn composed several works on music. Al-Kindi (d. 873 A.D.), a philosopher of whom more shall be said later, produced seven books in which he gave a full exposition of the principles of measured songs. One of his works which is now lost was "very much appreciated in the West." Al-Khwārizmi's mathematical treatise, the Latin translation of which was made by Adelard of Bath under the title *Leber Ysagogarum Alchorismi*, had an important section on music. Ibn-Abid Rabbihi (d. 940 A.D.) composed a biography of great musicians and Abul Faraj (d. 967 A.D.) wrote his famous work called *Aghāni*, a collection of songs set to music. About the same time, the writers of *Ikhwān-us-Ṣafā* also made important contributions to the subject. But the greatest writer on the theory of music in the middle ages was the renowned philosopher al-fārābi (950 A.D.) who wrote commentaries on the lost books of Euclid, advanced acute criticism against Greek writers and left three major works on music, besides his treatment of the subject in two of his compendiums of the sciences. One of these compendiums, *Ihsa-al-'Ulum* (L. De Scientiis), was the earliest work translated into Latin and it exercised "powerful influence" in the West. The musical writings of ibn-Sīna (1037 A.D.) and ibn-Rushd (1198 A.D.) were also translated into Latin and long served

as text books in Europe. Similarly other renowned philosophers, *e.g.*, al-Ghazzāli (1111 A.D.), ibn-Bājjah (1138 A.D.) Nāṣir-al-Dīn Tūsi (1310 A.D.) and Jalāl-al-Dīn Dawwāni (d. 1501 A.D.) made valuable contributions to the subject. Among non-philosophical writers mention may be made of al-Majrīṭi (1007 A.D.) Kirmāni (d. 1066 A.D.) Haddād (d. 1165 A.D.) Shams-al-Dīn Mohammad (1310 A.D.) Abd-ul-Qādir Ghaybi (1435 A.D.), Muhammad son of Murād (1481 A.D.) and Abd-al-Hamīd Ladiki (1512 A.D.).

By the end of the 12th century many of the chief philosophical works had become known to the West through their Latin translations made at Toledo. The present day Western notation is basically the same as was described by Franco of Cologne (ca 1190. A.D.), nearly three centuries after al-Kindi had given a similar exposition of it under the name *īqā'* (rhythm). Franco's work was followed by a treatise said to have been written by John of Garland dealing with *Ochetus* (rhythmic mode which term, as Hitti observes, is probably a Latinized form of *īqā'āt* (pl. of *īqā'*).

The West inherited from the Muslim world not only the basis of mensural music, but also several musical terms, *e.g.*, the lute (Ar. al-*'ūd*), the rebic (Ar. *rabāb*), the anafil (Ar. al-*naḥīr*), Pandero (colloq. Ar. *bandayr*) Sonajas (Ar. *Ṣunūj*), the guitar (Ar. *qitārāh*), the naker (Ar. *naqqārah*) and the kanoon (Ar. *qānūn*).

CHEMISTRY

The Muslims distinguished themselves in their study of the natural sciences. The encyclopaedia of the brethren of Purity¹ contains seventeen out of fifty two parts on natural sciences. In chemistry the first great Muslim worker was al-Rāzi (L. Rhazes, d. 923 A. D.). One of his chief works. *Kitāb-ul-Asrār* was rendered into Latin by Gerard of Cremona. It was the chief source of chemical knowledge till it was superseded by the works of Jābir (L. Gaber, 766 A.D.), which after the 14th century were the most influential treatise in the East and the West. Jābir made important advance to the science of chemistry. He described scientifically the processes of calcination and reduction; improved the methods of evaporation, sublimation, melting, and crystallisation; prepared acetic acid, sulphuric acid, nitric acid and the mixture of the last two, aqua regia, in which gold and silver could be dissolved; discovered several

1. Ar. *Ikhwān-al-Ṣafā*, according to Goldziher drawn from Kalilah-wa.-Damnah (Fables of Bidpai) in which a group of animals acting as sincere friends (*Ikhwān al-Safā*) to one another escaped the snare of the hunter. This was a secret society of scholars who, being opposed to the existing political order and afraid of oppression, wrote in collaboration under obscure names in the form of fifty two epistles (*Rasāil*) the first encyclopaedia of the world covering all branches of knowledge. They flourished in Baṣrāh in about the middle of the 10th century A.D.

chemical compounds, and separated antimony and arsenic from the sulphides. His theory of the constituents of metals superseded that of Aristotle and was with slight modifications accepted in the west till the 18th century. Al-Jāhiz (868-9 A.D.) obtained ammonia from the offals of animals by dry distillation. Al-Tifāshi (d. 1253 A.D.) composed a treatise in which he discussed the origin and nature of twenty four precious stones and al-Birāni in his works on physics described with almost complete exactitude the specific gravity of eighteen precious stones and metals.

VIII

PHYSICS

Muslim researches in physics were no less marked. Al-Kindi (9th Century), an Arab philosopher, wrote on optics. His chief work on geometrical and physiological optics was extensively used both in the East and the West. Its Latin version, *De aspectibus*, influenced even Roger Bacon. But al-Kindi's work was superseded by that of Ibn al-Haytham (L. Alhazen, 1039 A.D.) who, besides being one of the most important mathematicians and philosophers, was the chief Muslim physicist and student of optics. He was the author of about two hundred works on different subjects. In opposition to Euclid and Ptolemy he rightly held that vision

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did not result from the emission of rays from the eyes, but from the objects. He made experiments for testing the angles of incidence and reflection, especially of atmospheric refraction. He knew the principle of gravity, and discovered that a body would weigh differently in a rare and a dense atmosphere. He understood the weight of atmosphere five centuries before Torricelli and had a clear idea of capillary attraction. In some of his experiments he anticipated the theoretical discovery of the magnifying lenses which were actually made in Italy three centuries later. His treatise on optics was translated into Latin in 1572 and was very influential in the development of optics in the West. Almost all medieval writers in Europe based their works on this book. Even Leonardo de Vinci, Bacon and Kepler did not escape his influence. In the beginning of the 13th century Jazāri wrote a valuable work on mechanics and Riḍwān described a water clock made by his father. Muslim scientists improved the water-wheel and discovered the wind-mill and the glass mirror, and passed their use on to Europe. Ibn-Sīna's treatise on mineralogy became a source of geological knowledge in the West.

IX

NATURAL HISTORY

The Muslims made equally valuable researches

in the field of natural history, more particularly in pure and applied botany. They laid out botanical gardens in Baghdād, Fez, Cairo, and Cordova for botanical studies. They observed and described sexual differences in plants. They also classified the plants according as they grow wild, from seeds, or cuttings. On agriculture abu-Zakarīyā Yahya's work al-Filāḥah is an outstanding work of the Medieval Ages. Al-Ghāfiqi of Cordova collected the plants of Spain and Africa, gave their names in Berber, Arabic and Latin and described them in a most accurate manner. The most famous botanist of Islam was Ibn-al Bayṭār. He travelled extensively in search of herbs and left two celebrated works. One of these in which he describes two hundred plants unknown to his predecessors is the foremost work of its kind. Some parts of its Latin translation were printed at Cremona as late as 1759. On the whole the Arabs made an addition of about two thousand plants to botanical knowledge.

In zoology al-Jaḥiẓ's *Kitāb-al-Ḥayawān* (book of animals) contains the germs of the theory of evolution by adaptation and animal psychology. But al-Damīri of Egypt (d. 1405 A.D.) was the greatest zoologist of Islam. His book, *Ḥayāt-al-Ḥayawān*, saw several editions. The work of Frederick II on falconry is supposed to be the first natural history, but it is really based entirely on the Latin translations of an Arabic and of a Persian treatise on falconry.

MEDICINE

The Muslims developed the science of medicine as extensively as any other study and their medicine influenced Europe equally deeply. As learning began to flourish, hospitals and colleges of medicine arose in all the principal Islamic centres. The first of these was established by Harūn al-Rashīd at Baghdād in the beginning of the 9th century. In course of time hundreds of books appeared, some of which were later translated into European languages and printed. ‘Ali al-Ṭabari, the court physician to the Caliph al-Mutawakkil wrote a treatise in 850 A.D. based on Greek and Indian sources. Ahmad al-Ṭabari, another writer of the same century, was the first to describe the itch mite. Even non-Muslim scholars did remarkable work under the patronage of Muslim rulers. Yaḥya Ibn-Masāwayh (d. 858 A.D.) was a renowned Nestorian physician of Baghdad under the rule of Harūn al-Rashīd. From his pen and also from that of his pupil and co-religionist Ḥunayn ibn Ishāq al-‘Ibādi (L. Joannitius, d. 873 A.D.) private physician to al-Mutawakkil, we have the earliest existing text books on ophthalmology. Ḥunayn also translated and wrote commentaries on Hyppocrates and Galen. Some of his works were translated into Latin. They were very popular in Europe in the middle ages and were published in the

16th century. These were followed by 30 other works by Arab writers on this subject. But the great period of Muslim medicine began with the philosopher and physician al-Rāzi (L. Rhazes d. 923 A.D.) who practised at Baghdād. He was an encyclopaedic writer that is said to have surpassed even Galen in the voluminousness of his writings. He produced more than two hundred medical works. Edw. G. Brown considers him to be "the greatest and most original of all the Muslim physicians and one of the most prolific as an author" (Arabian Medicine, 1921, p. 44.) His *Kitāb al-Mansūri* (L. *Liber Almansoris*) is a monumental work in ten volumes. It was translated in Milan towards the end of the 15th century and some parts of it have been recently rendered into French and German. His monograph *al-Judari w-Ḥaṣbah* was the first to give a clinical account of smallpox and measles accurately. It was first translated into Latin in 1565 and then in several European languages and it established his reputation as one of the greatest clinicians of the Middle Ages. Its English version was published as late as 1847. His encyclopaedic work, *al-Ḥāwi*, which welded into one system the Greek, Persian and Hindi medicine in 20 volumes, was translated, into Latin by a Jewish physician of Sicily in 1279 and printed repeatedly from 1486 onwards. Al-Rāzi's works exercised remarkable influence on the Latin West for centuries. 'Ali Ibn al-'Abbās (L. Haly, 994 A.D.)

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wrote a standard work entitled *Kitāb-al-Maliki* (the Royal Book) which was more than once translated into Latin and printed. The best parts of this work consist of *materia medica* and diatetics. He contributed an early conception of the capillary system and proved that in parturition the child does not come out itself, but is pushed out by the muscular contraction of the womb. 'Ali of Baghdād and Ammār of Mosal composed valuable works on the diseases and treatment of the eye. These were translated into Latin and used as the best text-books in ophthalmology till the middle of the 18th century. Al-Haythem (L. Alhazen, 965 A.D.) left a treatise on optics which still survives in Latin. It became the basis of western optics. De Boer regards him as superior to Vittelo (13th century A.D.) in keenness of observation. Ibn al-Bayṭar of Damāscus (d. 1248 A.D.) was the author of *al-Adwiysh al-Mufradah*, a collection of simple medicines which in Europe held the position of a standard *materia medica* for centuries. Its translation into Latin, *Simplicibus*, was printed in twenty-six editions during and after the 15th century and was used in the formation of the first London pharmacopœia issued by the College of Physicians in the reign of James I. Some parts of its Latin version were printed as late as 1758 at Cremona. Abu-al-Qāsim al-Zahrāwi (L. Abulcasis, 10th or 11th century A.D.) of Cordova wrote *al-Taṣrif*, a medical encyclopaedia a part of which was translated into Latin

in the 16th century by Gerald of Cremona passed through various editions, the last being that of Oxford in 1778, and was for centuries a standard if not the only standard authority on surgery in Europe. (Sir Thomas Clifford Albutt, *Encyclopaedia Britannica*, 11th edition). It illustrated surgical instruments and helped in laying the foundation of western surgery. It introduced new ideas such as cauterization of wounds, the need for vivisection and dissection and crushing the stone in the bladder. Ibn-Rushd in his encyclopaedic work, *al-Kullīyyāt fi al-Tibb* (corrupted into L. Colliget) for the first time states the fact that no one is taken ill twice with small pox and describes the true function of the retina.

But the Muslim writer of the highest fame was Ibn-Sīna (L. Avicenne d. 1037 A.D.). "In Europe his works even eclipsed and superseded those of Hippocrates and Galen" (Sir Thomas Clifford Albutt, *Encyclopaedia Britannica*, 11th edition), and his works were used as text-books of medicine in the universities of Europe. His treatise *Qānūn* is a singularly complete encyclopaedia of medicine and surgery. "From the 12th to the 17th century it served as the chief guide to medical science in the West" (Hitti, *History of the Arabs*, p. 368). In the last thirty years of the 15th century it passed through fifteen Latin editions and one Hebrew edition ; and an English translation of some of its parts was published

in London in 1930. It "remained," says William Osler in *The Evolution of Medical Science*, "a medical bible for a longer period than any other work." Ibn-Zuhr (L. Avenzoar or Abumeron, 12th century) developed a system of his own. His works were also translated into Latin. The chief of these, *al-Taysir*, was printed more than once. He was the first to discuss the question of feelings in bones. Ibn-Rushd, the great Spanish philosopher, also wrote on medicine and was "widely read" in Europe. Ibn-al-Khaṭīb wrote a book in defence of the theory of infection through "contact with the afflicted" and their "garments, vessels and earings." Of the Arab works on ophthalmology thirty-two survive in their original form. The work of Ya'qūb Ibn-Akhi-Ḥizām (d. 902 A.D.) on horsemanship contains the rudiments of the veterinary art. Ibn-Jazlah (L. Benghezla, 1100 A.D.) made tables of diseases like the astronomical tables. This book was printed in Latin at Strassburg in 1532.

The Arabs knew a process by which blood could be infused into veins and used silver tubes for rectal feeding. They employed opium for the purposes of dentifrice and tare for inducing sleep for operational purposes. They produced the first pharmacopoeia and established the first apothecary shops and mobile hospitals and were the first to introduce the system of daily medical visits to jails and medical examinations. Owing to their advanced knowledge of

chemistry, they prepared new medicines and discovered new compounds. Some of their remedies hold the field even today. "Many of the names such as rob (Ar. Rubb) julep (Ar. Julāb), syrup (Ar. Sharāb), soda (Ar. Ṣudā') alchocol (Ar. Al-Kuḥl), alembic (Ar. al-imbīq) alkali (Ar. al-qali) antimony (Ar.ithmid from Gr.) aludel (Ar. al- uthāl) realgar (Ar. rahj al-ghār) tutty (Ar. Tūtiyā' from Skt) Many forms of medicine now used, in fact the general outline of modern pharmacy except so far as modified by modern chemistry started with the Arabs (Sir Thomas Clifford Albutt in the Encyclopaedia Britannica, 11th edition). Although Arab medicine began to influence Europe from the middle of the 11th century, yet it was after the 13th century that it reigned supreme in its medical circles. At this time under the influence of Muslim learning many of the older European universities were started. Among these are those of Montpellier, Bologna and Padua which were the earliest to distinguish themselves in medicine. The portraits of al-Rāzi and ibn-Sīna are today hung in the Hall of the School of Medicine in the University of Paris.

THE SCIENTIFIC METHOD

Referring to Muslim contribution to the scientific method in the *Making of Humanity* Brillault observes, "Roger Bacon learned Arabic Science. Neither Roger Bacon nor his later namesake has any title to be credited with having introduced the

experimental method. Roger Bacon was no more than one of the apostles of Muslim science and method to Christian Europe; and he never wearied of declaring that knowledge of Arabic Science was for his contemporaries the only way to true knowledge. Discussions as to who was the originator of the experimental method are part of the colossal misrepresentation of the origins of European civilization. The experimental method of Arabic science was in Bacon's time widespread and eagerly cultivated throughout Europe.

"Although there is not a single aspect of European growth in which the decisive influence of Islamic culture is not traceable, nowhere is it so clear and momentous as in...natural science and the scientific spirit.

"Science owes its very existence to Arabic culture. The ancient world was pre-scientific. The Greeks systematized, generalized and theorized, but the patient ways of investigation, the accumulation of positive knowledge, the minute methods of science, detailed and prolonged observation and experimental inquiry were altogether alien to the Greek temperament. What we call science arose in Europe as a result of 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."

CHAPTER IV

ADVANCEMENT OF LEARNING: PHILOSOPHY

Although the Muslims did not originate philosophical thought as they originated scientific enquiry, some of their achievements in this field were most remarkable. They were acquainted with Hindu philosophy, were masters of Greek thought, and their speculation was deep and extensive. Their problems were the same as philosophy has had to solve in all ages. Their solutions of these problems were as little final as those of any other people in any other age. Nevertheless they satisfied their own times, the medieval ages, and paved the way for further speculation and opened the door for the European Renaissance. This indeed is their chief claim to fame in philosophy. From the point of view of their attitude towards reason and revelation, Muslim philosophers can be classified into three main groups: (1) The scholastics, (2) the mystics, and (3) the rationalists. The scholastics again fall into two groups: (a) the rationalist scholastics and (b) the orthodox scholastics.

I

THE RATIONALIST SCHOLASTICS

Muslim philosophical thought began with the rationalist scholastics or Mu'tazalites as they were

called. Broadly speaking they held the following positions:—Both revelation and reason are the sources and criteria of knowledge and therefore they must be in perfect harmony. If there is any inconsistency between them, revelation must be tested by reason. The universe is not eternal. It had a beginning in time. A thing is an essence that can be known or of which something can be said. Existence is only a quality which can be there or not. With it a thing is an entity, without it a non-entity, and yet possessing substance, accidents, genus and species. By God's adding one quality—existence—things enter the sphere of existence and become material things for us. Existence is the only quality that makes things material. God is one. He is eternal. He is not anthropomorphic. Human qualities, like justice, mercy, wisdom, power, cannot be attributed to Him. His attributes are identical with His essence. The world is created by God and is not co-eternal with Him. God knows things by His essence and not, like us human beings, by any of His qualities or states. He cannot will evil and His power is confined only to the doing of good. Nor can He create the impossible.

God does not predestinate human action. Man has free will and is responsible for his doings. A sinner is eternally damned. The most comprehensive ethical law is justice. Even God is limited by its exigencies. It is a categorical imperative which

binds God Himself. There is no intercession of prophets and saints on behalf of their guilty followers. Divine justice requires that sinners must be punished for their sins. The distinguished philosophers of this school of thought were Wāṣil bin 'Ata, (748 A.D.) Naẓẓām (845 A.D.), Jāḥiẓ (868 A.D.) and the Brethren of Purity (middle of the 10th century A.D.). Of these Naẓẓām made doubt the first absolute requirement of knowledge.

II

THE ORTHODOX SCHOLASTICS

The orthodox scholasticism began as a reaction against rationalist scholasticism. Its adherents belonged to several schools which arose simultaneously in different Islamic lands. These were Ibn-Ḥazm's school in Spain, Al-Ṭaḥawī's school in Egypt, Abu-Mansūr's Mataridīyya school of Matarid near Samaraqand, and al-Asha'ri's school in Irāq. Of these the last one was the most renowned both for its influence and its originality of thought. Those who belonged to this school, the Asha'rites, in spite of individual differences, generally held that revelation, intuition or inspiration is the only source of knowledge and reason has to submit to its pronouncements. They followed the dialectic method only to refute the philosophy of the Greeks with their own weapons. Knowledge is cognition of a thing as it is in itself

and not as it appears. But what is a thing-in-itself? In raising this question they anticipated Kant, but as Macdonald observes, in answering it they were much more thorough than he. To perceive a thing is not to know it, for things are perceived in space and time. They seem to possess quality and quantity and are viewed as causes and effects; but the Aristotelian categories like space, time, quantity, action, passion and so forth are mere relations and relations are all subjective. If objective, a relation must exist in something. It cannot however exist in either of the two things it brings together. It must therefore be in a third thing. But to bring this third thing and the first two together, other relations must be needed, and these other relations must require still other things in which to exist, and so on till infinity. This would lead to an infinite regress which is inadmissible. Relations therefore have no existence. They are mere appearances. Like all relations the Aristotelian relation between matter and form is also a mere phantom. Nature which implies these relations is also a subjective appearance, and has no independent existence. Things as we see them are non-entities. There is nothing objective except qualities and substances. But substances without qualities cannot exist. Qualities, however, are mere accidents. They are fleeting; they come and go. Therefore substances also come and go. Both qualities and substances have only a moment's

existence, *i.e.*, they are atomic. The world consists of atomic substances. The basis of all phenomena in the mental and physical world in space and time is a multitude of monads. These monads do not touch one another, for in order to be separate they must have absolute void between them. They are not extended but have only position. There are not only space monads but also time monads. Just as space is a series of atoms, so time is a series of untouching moments. These time and space monads leap across the void between them with a jerk. All change is due to their coming into existence and dropping out again. In themselves they are changeless. We see clearly how far these orthodox scholastics were from the Greeks and how close they came to modern physicists, and to Leibnitz. There are two main differences between Leibnitz's view and theirs. First, his monads are capable of development, but theirs are changeless. Secondly, to explain order in the monads he has to fall back upon the idea of pre-established harmony, while they fall back upon God. God, according to them, has absolute free-will. He creates and destroys the monads and brings them into relations. We only seem to speak and listen to one another. Actually God has brought about by creation and annihilation and by pushing of atoms their necessary combinations to produce these appearances. Fire does not burn and a knife does not cut. God creates in a substance a being

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burned when he makes the fire touch it and a being cut when he makes the knife approach it. All order is in the will of God and all order in the appearances is bestowed upon them by His acts. So all changes in the universe are divine miracles. There are no causal laws, for all causality lies in the Divine will. Existence is not a quality of things, but is the very essence of reality and God alone exists. The rest are all phenomena, in the last analysis based on atomic substances created and annihilated and brought into different combinations to give different appearances by the will of God. God and His essence are identical and His word is co-eternal with Him. His attributes are distinct from His essence. From Him both good and evil proceed and He can command even impossibilities. No law can limit His action. An interesting discussion on this question is reported to have taken place between al-Asha'ri (935-6 A.D.), the founder of the school of orthodox scholastics and al-Jubbā'i (915-16 A.D.), a rationalist scholastic teacher of his. Al-Asha'ri opened the discussion with this question : "Suppose the case of three brothers ; one being God-fearing, the other godless and the third dies as a child. What of them in the world to come?" To this al-Jubbā'i replies, "The first will be rewarded in Paradise ; the second punished in Hell ; and the third will be neither rewarded nor punished." Al-Asha'ri's further question was, "But if the third said, 'Lord, Thou mightest have granted

me life, and then I would have been pious and entered Paradise like my brother,' what then?" al-Jubbā'i replied, "God would say, 'I knew that if thou wert granted life, thou wouldst be godless and unbelieving and enter Hell.'" On this al-Asha'ri asked, "But what if the second said, 'Lord, why didst Thou not make me die as a child? Then I would have escaped Hell.'" Al-Jubbā'i was silenced and al-Asha'ri went away in triumph. The Asha'rites relate this dialogue to disprove the rationalist scholastics' doctrine that God is constrained to do only that which is good and to prove their own position that God is free to do good or evil as he likes and further to show that reason cannot understand the ways of God.

Man, according to this school, is determined and all his actions flow from the Divine will. God creates in his creature power and choice and then he creates in him the action corresponding to his power and choice. So all his actions are created by God. He himself is only the *locus* or subject of his action. He is so made by the Divine will that he can acquire grace by his own efforts. In the general position of this school one can readily see how delicately, besides other elements, the philosophies of Leibnitz, Berkeley, Kant and the conceptions of modern physics are poised.

The chief thinkers of the school were al-Asha'ri (935-6 A.D.), Abu-Bakr Bāqilāni (d. 1025 A.D.),

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Imām-al-Ḥarmayn (d. 1100 A.D.), Shahrastāni (d. 1190 A.D.), al-Rāzi (d. 1222 A.D.) and al-Ghazzāli (L. Algazel, d. 1111 A.D.)

The last named philosopher, al-Ghazzāli, though not the greatest, was certainly the most original of all Muslim thinkers. I should like to add a few words on his position, partly because he is a link between the orthodox scholastics and the mystics and partly because of his importance in Muslim thought. He was so great that like the sun that kills the stars when it rises, he gave a death-blow to Muslim speculation in the East. The rays of his thought also penetrated the West. But that part of the world saw the rise of another sun that brought speculative daylight to it. Of this latter thinker, Ibn Rushd, I shall speak later. Al-Ghazzāli was the head of the Nizāmiyya College of Baghdād from 1092 to 1096 A.D. His search for truth made him quietly leave that office and wander from place to place till he retired to Tus, his native place, and 11 years after his flight from Baghdād was commanded by the Sulṭān to teach at Nayshāpūr. He remained there for a while and returned home where he lived in retirement with his disciples in an academy for students and a monastery for mystics.

Al-Ghazzāli's greatness can be judged by the fact that his thought anticipated the main features of the entire philosophy of the West from Descartes to Bergson. About his work, *The Revivification of the*

Science of Religion, George Henry Lewis in his *History of Philosophy* observes: "This work . . . bears so remarkable a resemblance to the *Discourse sur la Methode* of Descartes, that had any translation of it existed in the days of Descartes, every one would have cried out against the plagiarism." But Lewis forgets that Arab philosophy had penetrated deep into the West much before Descartes' time, and that most of his works had been partly translated into Latin before the middle of the 12th century and were exercising a considerable influence on Jewish and Christian scholasticism. Much before Descartes, his scepticism had been taken up by Jehuda hal-Levi (d. 1145 A. D.) in his work *Chosari* and it had showed its mark on Crescas (d. 1410 A.D.). The Dominican Raymond Martini had freely used the Hebrew translation of *Destruction of the Philosophers*, another of al-Ghazzāli's works. Pascal had been deeply affected by his thoughts. St. Thomas who had received his education from the Dominican order in the University of Naples, had known Ghazzāli's philosophy well, and in his *Summa* had used his arguments in attacks on Aristotelianism. It is difficult to believe that Descartes did not know al-Ghazzāli's general position and was not influenced by it through the Latin Scholastics, whom beyond question he must have read. This conclusion forces itself upon the mind all the more strongly when we realise that Descartes was not only a scholar of Latin, but had

himself written two of his most important works—*Meditationes de prima Philosophia* and *Principia Philosphaie*—in Latin. Exactly like Descartes he begins with describing how in vain he interrogated in his mind every sect for an answer to the problems that disturbed his mind and how he finally resolved to discard all authority. Exactly like Descartes he comes to his conclusions by a study of his own self. Only Descartes' starting formula is, "I think, therefore, I am," while his formula is, "I will, therefore, I am." Descartes falls into the pitfalls of innate ideas, but al-Ghazzāli manages to escape them. To him no innate ideas or universal concepts can yield any knowledge of the external world or the world of inner experience. Both Descartes and Spinoza follow al-Ghazzāli's derivation of the negative and positive attributes of God from the concept of necessary existence.¹ Again the distinction made by Descartes, Spinoza and Galileo between the infinite (that the parts of which cannot be expressed by any number or measurement) and the indefinite (that which has no limit) is exactly the same as given by al-Ghazzāli and Ibn-Sīna and, following them, by Crescas and Bruno. Spinoza's idea of substance is the same as al-Ghazzāli's idea of God—simple, having no accidental qualities, no distinction of genus and species and no separation of essence and existence.

1. Necessary existence—that whose essence involves existence.

Besides, his idea of freedom is identical with al-Ghazzāli's idea of necessity (non-dependence upon any thing else), and of necessity is identical with the latter's idea of possibility (dependence upon a cause). Again Spinoza's definitions of the forms of imagination more or less conform to the distinction between retentive and composite memory made by Maimonides following al-Ghazzāli. In all these cases there is merely a difference of terminology. Like the empiricists from Locke to Hume, he bases knowledge on experience rather than intellectual concepts, though he does not confine the meaning of the term to sensuous experience, but extends it so as to include within it the intuitive experience of the prophet, the mystic and the saint, and thus escapes scepticism to which the European empirical thought inevitably led. This latter experience is, according to him, far more important than sense experience, since this alone yields the knowledge of ultimate reality. Like Hume, al-Ghazzāli proclaims that we can have no knowledge of cause and effect in the realm of phenomena. All we can know is that one event succeeds another. His *description* of empirical laws and induction is the same as Mill's. We perceive by the senses that the same thing repeatedly passed the same way, (*e.g.* fire burns), we conclude that it will always pass the same way (fire will always burn); or we notice that certain things pass for the most part the same way (*e.g.* taking scammony is followed by diarrhoea or

wine by intoxication), we judge that the one will probably follow the other in future cases as well. But his *explanation* of induction is not based on the fallacy of *petio principii* as Mill's. According to him, it is reason which judges that this sequence of events must come to pass by necessity, for if it came by mere chance it could not have occurred always or in most cases in the past. It is, he says, by this argument alone that induction of empirical laws can be rationally justified. Like Kant he distinguishes between phenomena and noumena and regards the physical world of which alone the scientific knowledge is true as the world of phenomena to which alone the categories, which to him are equally subjective, are applicable, causality, substance and attribute being excepted. I may incidentally remark that in making these exceptions he escapes many of Kant's inconsistencies. Like him he demonstrates that theoretical reason can analyse only what the senses yield, and it cannot solve the basic and more important questions of philosophy and religion such as the existence of God, the nature of His attributes, the immortality of the soul and the eternity of the universe. Kant finds the key to the solution of these questions in the practical reason of man; while he discovers it in the religious experience of the prophet and the mystic, which in its turn is to be tested by moral certitude and the moral influence which it exercises upon the soul. He anticipates Schopenhauer

and the other voluntarists in holding that not thought but will is the fundamental reality, but he steers clear of Schopenhauer's pessimism. God according to him is will and the world flows from Him like a river. Like Bergson, even more like Jacobi and Schleiermacher, he makes intuition or immediate consciousness the source of knowledge. Al-Ghazzāli exerted a great influence over the East and the West. It was the Protestant revolt that freed the West from the grip of this great man's intellect, and in the East, having conquered all rival thought, it has even to this day a hold too tight to allow any fresh movement.

III

THE MYSTICS

The third school of Muslim thought is that of the mystics. They fall under two groups: (a) the theistic mystics and (b) the pantheistic mystics. Although Islamic mysticism had its original source in the *Qurān* and the life of the Prophet, in the earliest Muslim mystics the influence of Neo-Platonism, Neo-Pythagoreanism and Christian Gnosticism is marked. Many pantheists were definitely under the influence of the Zoroastrian, Manist, Hindu and Budhistic thought. The Muslim mystics agreed with the Asharites that inspiration was the only source of knowledge, but they laid great stress on inner purity. Al-Ghazzāli is said to be a link between the orthodox

scholastics and the mystics because he also held the same view. Like the mystics all over the world they believed that inner purity can be achieved only by the love and contemplation of God and renunciation of every thing else, and that without a pure heart even good deeds have no value. The most celebrated mystics were 'Ali (d. 661 A.D.) Rabia'h of Basrah (717-801 A.D.) Ma'rūf-al-Karkhi (d, 821 A.D.), Bāyazīd of Bistām (d. 874 A.D.), Ibrāhīm ibn-Adham (d. 875 A.D.), Junayd (d. 910 A.D.), Ḥusayn bin-Manṣūr al-Ḥallāj (Executed 922 A.D.), Abu-Bakr Shibli (d. 946 A.D.), Qushayri (d. 1072 A.D.) 'Abd-al-Qādir Gīlāni (d. 1166 A.D.) Shahāb-al-Din Suharawardi (Executed 1191 A.D.), Farīd-al-Dīn 'Aṭṭar (d. 1229 A.D.), Ibn-'Arabi (d. 1240 A.D.), Rūmi (d. 1273 A.D.), Shahbistri (d. 1320 A.D.), Khwāja Bahā-al-Dīn (d. 1388 A.D.), 'Abd-al-Karīm Jīli (d. 1406 A.D.) Jāmi (d. 1492 A.D.). Chief among the Indian mystics were Abu al-Hasan 'Ali Hajweri Ganj Bakhsh (d. 1072. A.D.) Mu'īn-al-Dīn Chishti (d. 1234 A.D.) Bakhtyār-e-Kaki (d. 1236 A.D.) Farīd-al-Dīn Shakar Ganj (d. 1265 A.D.), Nizām-al-Dīn Auliā (d. 1324 A.D.) and Ahmad Sarhindi (d. 1624 A.D.) All the early mystics were theists, but from the time of Bāyazīd of Bistām there was a definite tendency towards pantheism. Bāyazīd himself, Ḥallāj, Qushayri, Shahāb-al-Dīn Suharawardi, ibn-'Arabi and 'Abd-al-Karīm Jīli were full-fledged pantheists; and these were the real system-builders of Islamic mysticism. Rūmi was the greatest poet-

philosopher of Islam. Professor Nicholson has translated his great poem, *the Mathnawi*, into English and Professor Hakīm has written a monograph on it. Hegel called him "the great Rumi", and Iqbal regarded him as his spiritual leader. The chief works of the mystic school are these: *Kitāb al-Lūma fil-Taṣawwuf* by Abu-Nasr Sarrāj (d. 988 A.D.) *Kashf al-Mahjūb* by Abu-al-Ḥasan 'Alī Hajwīri (d. 1072 A.D.), *Risāla e-Qushayrīyya* by Qushayri, *Ihyā al-'Ulūm* by al-Ghazzālī, *'Awārif al-Ma'ārif* by Shahāb-al-Dīn Suharawardi, *Mantaq al-Ṭair* by Farīd-al-Dīn Attār, *Fatuhāt al-Makkiyah* and *Faṣuṣ al-Hikam* by ibn-'Arabi, *Hadīqa* by Sināi, *Mathnawi* by Rūmi, *Gulshan-e-Rāz* by Shabistri, *Insān-e-Kāmil* by Abd-al-Karīm Jīli, *Lama'āt*, and *Lawame' Lawāih* by Jāmi.

The following is a broad outline of the mystic position :—

The Ultimate Reality that remains the same amidst the changes of appearances, which are predicated of it as its attributes, is God. For all mystics He is an indefinable, indivisible, incomprehensible Unity. For most of them, however, His essence is beauty, which is defined as perfection; for some it is will; for some light, and for some others Knowledge. To the first school belong Shaqīq Balkhi, Ibrāhīm ibn-Adham, Rabi'ah Basri and others. The chief of the second school was al-Ḥallāj, of the third Shahāb-al-Dīn Suharawardi and of the last ibn-'Arabi.

God's attributes are other than His essence.

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They are the modes of His Unity; or rather they are the reflections, emanations or self-manifestations of the Divine Unity and their sum-total makes up the phenomenal world.

In so far as the world is a *reflection* of Reality and consists of the attributes of God as distinct from His essence it is an illusion. On the other hand all things being reflections, emanations or self-manifestations of His *Perfection or Beauty* in an ascending scale of clearness, they are themselves beautiful and lovable in different degrees according as they are near or distant from their source.

The human soul is also an emanation from God as a ray is an emanation from the sun. Before the ray became a ray, it was one with the sun. Even so the human soul, before it became a soul, was one with God. Its unnatural union with matter—like the union of the ray of light with the particles of dust—gave it a distinct appearance. Man is a microcosm in which all the Divine attributes are manifest in an imperfect form. Hence he has a unique position.

But like everything else he is restless for reunion with his source. This restlessness, this desire to be free from the want of perfection and to be one with Perfect Beauty, is love. Love is the essence of all religions; therefore, God is not to be found in the temple, the church or the mosque, but in the heart.

The only true object of love—the real beloved—

is Divine Beauty. But to reach that the mystic must love and contemplate first the beauties of the world—Divine manifestations in their ascending scale—and do such deeds as please the Beloved. In the course of his ascent, he must pass through several stages and several states till his love, from which would naturally and spontaneously begin to flow all good deeds, takes him to the Perfect Beauty of the Beloved till all attributes disappear and he becomes one with the Beloved.

Heaven is the ecstasy of union or closeness, Hell the pain of separation. But for the mystic all misfortune is welcome, for it comes from the Beloved.

To be one with the Beloved a man must imitate Him, and for that he needs a guide whom he must implicitly obey. The path of love is not the path of logic and therefore he is not to reason why. But a bad guide will lead one astray. Therefore one should take extreme care and use all one's intellect to find a true guide.

The more a man gains perfection, the nearer is he to God. When he absorbs by imitation all the attributes of God, he becomes His perfect manifestation. Then all the attributes get dissolved in God's absolute unity and with that he becomes one.

The Theist mystics do not speak of union with God, but illumination from God or closeness to God. They hold that even when the mystic passes away from his individual will and enters into the Divine

Will so that all his life is devoted entirely to God, his ego still remains intact. Even when in ecstasy he loses his senses, he is aware of this loss of senses as a distinct ego. There are moments when the ego-consciousness also seems to disappear, but actually it is still there; it is only momentarily outshone by the Divine vision, as the light of the stars is outshone by the light of the sun. These moments rapidly pass away and the ego-consciousness appears again.

That Islamic mysticism was influenced by Buddhism and Hinduism has already been mentioned. As Goldziher points out, certain conceptions, e.g., *Fanā*, *Tariqā*, *Marāqaba* and *Karāmat*, came from these sources. But as far as Hinduism is concerned, the debt was not one-sided. Very much more fundamental ideas passed consciously or unconsciously from Muslim mystics to Hindu philosophers and saints and through them to the Hindu masses. "The sweet, subtle and gentle influence of Sufism," says Ramaswami Sastri, "was . . . noteworthy because it went into the warp and woof of the mind of the people. Further the great doctrines of the unity and majesty and glory of God and the brotherhood of man—which are the most vital doctrines of Islam—indelibly impressed Hindu religious thought." Dr. Tara Chand's observations in his *Influence of Islam on Indian Culture* are more detailed and comprehensive. Although there is no evidence of direct borrowing, the establishment of a monotheistical

tendency in Southern India, says he, "received a powerful impetus from the appearance of so uncompromisingly monotheistic a religion as Islam. Sankara was born at a time when Muslims were beginning their activities in India, and, if tradition is correct, when they had gained a notable success in the extension of their faith by converting the king of the land. He was born and brought up at a place where many ships from Arabia and the Persian Gulf touched. If his extreme monism, his stripping of the One of all semblances of duality, his attempt to establish this monism on the authority of revealed scriptures, his desire to purge the cult of many abuses, had even a faint echo of the new noises that were abroad, it would not be a matter for great surprise or utter incredulity.

"His successors, Rāmanuja, Viṣṇuswāmī, Mādhava and Nimbāraka, and the hymn-makers, in their speculation and religious tone, show closer parallelism.

"In Rāmānuja's time Muslims were to be found in the ports of the Coromondel coast. Muslim saints like Nathad Vali were preaching Islam to the people and converting numbers of them, and Hindu kings like Kun-Pāndya were giving grants of land for the erection of mosques.

"Rāmanuja's philosophy recognised a god with good attributes and inculcates His worship with faith and devotion. He exhibits a desire to open the doors of religion to the classes which had so far been

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shut out from it. Love finds a place not only in the relations of man and God but also of man and man, although in the latter case the advance is timid. Visnuswāmī, Nimbāraka and Mādhava's metaphysical discussions regarding the nature of God and man almost recall the debates of Naẓẓām, Ash'ari and Ghazzālī.

“Certain other characteristics of South Indian thought from the ninth century onwards, however, strongly point to Islamic influence. These are the increasing emphasis on monotheism, emotional worship, self-surrender (parapatti) and adoration of the teacher (Guru Bhakti) and in addition to them laxity in the rigours of the caste system and indifference towards mere ritual.” (Tara Chand, *Influence of Islam on Indian Culture*, pp. 111-12.)

The far-reaching influence of Islamic mysticism on Rāmanānda, Kabīr, Nānak, Dādu, Bīrbhān Lāldās, Bābā Lāl and others in North India, on Nāmdev in Mahārās'tra and of Chaitanya in Bengal is too well known to be mentioned.

European mysticism was also very much influenced by the mysticism of Islam. The Spanish orientalist Miguel Asin Y Palacios writes in his book *Islam and the Divine Comedy*, that Dante owed many details of his picture of the next world in *the Divine Comedy* to Ibn Arabi. Arthur J. Arberry observes in *The History of Sufism* that “it is impossible, for example, to read the poems of the Spanish mystic

St. John of the Cross without concluding that his entire process of thinking and imaginative apparatus owed much to those Muslim mystics who had also been natives of Spain." In the beginning of the 14th century Raymond Hull wrote on mysticism. He was an accomplished Arabic scholar and founder of a school of oriental languages at Rome. His mystical writings are "beyond question" influenced by Sufi speculation. These are only a few examples of what Arberry regards as "unquestionably a general process". In later times the influence of Persian mystical poetry on so great a genius as Goethe is too well-known to be mentioned.

IV

THE RATIONALISTS

So much about the mystics. Now let us come to the last school of Muslim thought—the School of Rationalists. It is these rationalists of whom it can be truly said that they "raised up the wisdom and knowledge of Hellas from the dead" and passed them on to the West as to the East. The most renowned among them were al-Kindi (L. Alchendus, d. 873 A.D.) Fārābi (L. Alfarabius, d. 950 A.D.), ibn-Maskawayh (d. 1030 A.D.), ibn-Sīna (L. Avicenna, d. 1037 A.D.), ibn Haytham (L. Alhazen, d. 1039 A.D.), ibn Bājjah (L. Avenpace d. 1138 A.D.) ibn-Tufayl (L. Abubacer, d. 1185 A.D.) and ibn-Rushd (L. Averroes d. 1198 A.D.). Most of them, like most

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of the leading scholastics, wrote books on several subjects besides philosophy. For example al-Kindi wrote on astronomy, geometry, astrology, arithmetic, music, physics, psychology, meteorology and politics; al-Fārābi on mathematics, astronomy, logic, politics, physics and music; ibn-Sīna on theology, mathematics, astronomy, medicine, politics, zoology and botany; and ibn-Rushd on jurisprudence, physics, grammar, astronomy and medicine.

Roughly speaking, the school moved from a synthesis of Neo-Platonism, Aristotelianism and Islam to Aristotelianism pure and simple. Al-Kindi, Farabi and Ibn Sina attempted to produce Muslim-Platonic-Aristotelian philosophy, only Farabi was more Aristotelian and Ibn Sina more Neo-Platonic. The later thinkers of the school gave up the attempt at synthesis as hopeless and became avowed peripatetics and managed to keep theology and philosophy apart. According to this school both reason and revelation are the sources of knowledge, but where they do not agree, they must be kept apart.

A

AL-KINDI

Al-Kindi was an encyclopaedist. He wrote 263 works. It was he and not Descartes who first held that the mathematical method was essential for philosophical enquiry. He wrote a whole book to prove this but unfortunately his own use of this

method was vitiated by Pythagorean influences. His principal work on optics was widely read both in the West and in the East. Roger Bacon and Cardanus held him in high esteem, the latter for his assertion of the unity and universality of the world, on account of which the complete knowledge of a part contained the knowledge of the whole, the fundamental principle of the English absolutists of today. According to al-Kindi knowledge is conveyed either by the senses or by reason or by imagination which last is a mediating faculty that lies between the two. The senses give knowledge of the particular and reason of the universal and imagination of the universal-particular. Up to very recent times Kant (d. 1804) was supposed to be the first to have made imagination a mediator between the other two faculties—sense perception and reason. But now some question Kant's originality in this distinction and take it back to Lord Kames (d. 1782), to the Italian Renaissance critic Muratori (d. 1750 A. D.) and in the end to Addison (d. 1719 A.D.). But, as we have seen, the credit of this distinction actually goes back to al-Kindi who had made it in a clear-cut form more than nine centuries before Kant and eight centuries before Addison.

B

AL-FĀRĀBĪ

Al-Fārābī is said to be the greatest Muslim

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philosopher, and his importance cannot be over-estimated. He was universally regarded in the history of Muslim thought as the "second teacher," the first being Aristotle. All later thinkers acknowledge their indebtedness to him. On ibn-Sīna (L. Avicenna) and ibn-Rushd (L. Averroes) his influence is apparent. According to M. Carra de Voux, his Logic produced a permanent effect on the logical thought of the Latin scholars. He wrote more than a hundred books, about half of which were criticisms and commentaries of past thinkers, chiefly Aristotle, and the rest were original works. Twenty five of his works are still extant in fragmentary form. His chief subject was Logic which like the modern idealists he identified with epistemology. The logical process is for him not the methodology of knowledge, but the morphology of knowledge. It is not *the way to finding the truth*; but is itself finding of the truth. Al-Fārābi and following him ibn-Sīna, added the third form of the famous cosmological proof of God based on the conception of possibility and necessity, the first two being based on the idea of motion and potentiality formulated by Aristotle. It was taken up from ibn-Sīna by the Jewish philosopher Maimonides and from him by St. Thomas Aquinas, and it was this proof that Kant criticised as the model cosmological proof. Al-Fārābi was the first to hold against Aristotle that the body contained in itself the principle of movement, an idea which brought him

very close to the position of modern science and if pursued would have proved most fruitful. He emphasised the distinction between essence and existence which played such an important role in later Eastern and Western philosophy. Existence of a thing according to him is nothing but the thing itself. Being the thing itself, it cannot be truly predicated of a thing, for all predicates are universal and existence is not a universal. It is distinct from essence. The subject and the predicate of a Judgment, therefore, cannot change places.

C

IBN-MASKAWAYH

Ibn Maskawayh was a physician, philosopher and historian. He held that the soul of man is spiritual as distinguished from the corporeal, because a body cannot have opposite qualities, e.g., black and white, while the soul grasps systems of contradiction at once; similarly it apprehends both the bodily and the spiritual, e.g., length and rationality; therefore the range of its knowledge and endeavour goes far beyond its own body. The greatest spiritual unity for him is that of self-consciousness—the knowing of one's own knowing—for in that thinking, that which thinks and that which is thought are all united. He is noted for his system of ethics and for his formulation of the theory of evolution.

In his ethics ibn-Maskawayh defines good by

reference to natural dispositions and their development as that by which a being possessed of will can attain to the perfection of its nature. Since an individual left to himself cannot realise all the good things that he might otherwise obtain, therefore he must live and work with others. But society is not possible without sympathy and love; therefore the primary virtue which it is the duty of every one to develop is love for mankind. Love of others or friendship is not, as Aristotle held, an expansion of self-love, but a limitation of it and love for *another*. The primary function of religion is to make people moral, and that is not possible unless it gives training in the cultivation of love for humanity. The ascetic life of a recluse is not therefore moral. The chief function of pilgrimage to sacred places is the development of mutual love. From the metaphysical point of view the particular goods of individuals are finally directed to the Absolute Good which is identical with the Highest Being.

In their theory of evolution ibn-Maskawayh and his contemporary ibn Sina further developed the views that had been held by the Brethren of Purity and in this theory were followed by the great philosopher of history, ibn-Khaldūn, and the well-known philosopher-poet, Rūmi.

Ibn-Maskawayh's description of the process of evolution is in general outline the same as given by Darwin nine hundred years later. Shibli in his

‘Ilm al-Kalām summarises it as follows :—

“The combination of primary substances produced the mineral kingdom, the lowest form of life. A higher stage of evolution is reached in the vegetable kingdom. The first to appear is spontaneous grass; then plants and various kinds of trees, some of which touch the borderland of animal kingdom, in so far as they manifest certain animal characteristics. Intermediary between the vegetable kingdom and the animal kingdom there is a certain form of life which is neither animal nor vegetable, but shares the characteristics of both (*e.g.* coral). The first step beyond this intermediary stage of life, is the development of the power of movement, and the sense of touch in tiny worms which crawl upon the earth. The sense of touch, owing to the process of differentiation, develops into other forms of sense, until we reach the plane of higher animals in which intelligence begins to manifest itself in an ascending scale. Humanity is touched in the ape which undergoes further development, and gradually develops erect stature and power of understanding similar to man. Here animality ends and humanity begins.”

In his *Mathnawi* Rūmi describes the evolutionary process in these lines :

“First man appeared in the class of inorganic things,

Next he passed therefrom into that of plants.

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For years he lived as one of the plants,
Remembering nought of his inorganic state so
different ;
And when he passed from the vegetative to the
animal state,
He had no remembrance of his state as a plant,
Except the inclination he felt to the world of
plants,
Especially at the time of spring and sweet
flowers ;
Like the inclination of infants towards their
mothers
Which know not the cause of their inclination
to the breast.
Again the great creator as you know,
Drew man out of the animal into the human
state.
Thus man passed from one order of nature to
another,
Till he became wise and knowing and strong as
he is now.
Of his first soul he has now no remembrance,
And he will be again changed from his present
soul."

D

IBN-SINA

Ibn-Sina attempted to give an *explanation* of the process of evolution in his cosmology. This

explanation was universally accepted by the mystics including Rumi. It was based not, as in the case of Darwin, on the principle of struggle for existence leading to the survival of the fittest by adaptation to environment, but on the principle of struggle for self-development by reference to an ideal. Everything in the world is imperfect. Being imperfect, it strives for its completion, for its perfection. This willing or striving for perfection is the secret of growth and is named love. The perfection it aims at is called beauty. The entire universe is moving by the power of love towards the One Supreme Beauty—the most perfect and the best. Matter serves the purpose of love and in its service of love, it takes different forms in an ascending scale, stones, plants, animals, man. At still higher stages of development it will take even more perfect forms of which we know nothing. If we ignore his terminology, this theory of Ibn-Sina is an anticipation of the recent theory of emergent evolution with a strong idealistic flavour.

Ibn-Sina was one of Islam's greatest thinkers. He produced a synthesis of Aristotelian and Neo-Platonic philosophies. One of his works, *Al-Shifā'*, an encyclopaedia of physics, metaphysics, and mathematics, was written in eighteen volumes. It was edited by Forget in Leiden in 1892.

According to ibn-Sina's metaphysics, everything that depends on a cause is only possible, for if the

cause were not there, it would not be. Its existence becomes *necessary* only when its cause is there. This basically possible character of all that has been caused and has thus become necessary leads us to the conception of the existence of a Necessary Principle or Necessary Cause which introduces necessity into the possible. This Necessary Cause is God. As mentioned before, in formulating this proof ibn-Sīna followed al-Fārābi and was followed by Maimonides and Spinoza. In God there is identity of *essence* and *existence* and so of *knowing*, the *knower* and the *known*.

As a logician ibn-Sīna regards all universals—all ideas of things—as abstracted from experience by comparison of individuals and observation of resemblances, and therefore existing only in the mind. As pure universals or essences, they exist in the mind of God whose knowledge consists only of these. Individuals make up the objective universe. They are universals combined with matter—universal-particulars—that eternally flow out of the Necessary Existence—God—as water of a river consisting of drops gushes out of a spring. The existence of everything in the universe is momentary, but the constant flow of existence from its source makes it appear continuous.

The essences of pure universals eternally existing in the mind of God are the subject matter of metaphysics; as eternally combined with matter in the

material objects they constitute the subject matter of physics; and as universals abstracted from experience by comparison of individuals and observation of resemblances and existing only in the mind as ideas, they form the subject matter of logic.

But as the human intellect is defective, the abstracted universals are not as pure as the universals in the mind of God. The human effort should be directed to grasp true knowledge, to apprehend the true essences of things by the help of logic. Logic is as useful for the acquisition of true knowledge as the rules of grammar are for correct speech. But though very useful, logical rules are not indispensable. As Fārābi also held, a Divinely inspired man can do without them even as a Bedouin can do without an Arabic grammar.

For ibn-Sīna, as for al-Ghāzzālī after him and for Kant in the modern age, the categories are subjective. Indeed the Kantian position that the categories are subjective and the knowledge, of objects is due to a synthesis of sense perception and logical intelligence was a commonplace of Muslim philosophy in the 12th century. It was expounded not only by al-Ghāzzālī and Ibn-Sīna, but also by the latter's contemporaries, ibn-Haytham, famous for his optics, and al-Bīrūnī (d. 1048 A.D.), well-known for his studies in mathematics, astronomy, geography and ethnology.

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As a psychologist ibn-Sīna forestalled the early twentieth century hypothesis of brain localisation and as an ethicist, in opposition to Aristotle, he gave a higher place to moral virtues than to intellectual virtues.

Ibn-Sīna's reputation both as a philosopher and writer of medicine lasted in the West for many centuries and most of his works were translated into Hebrew and Latin before the close of the 12th century. With his treatise, "Oriental Philosophy", now lost, Roger Bacon was well acquainted. Ibn-Sīna's classification of the philosophical sciences was widely accepted in Europe in the Middle Ages and was preferred by the Scholastics of the 13th century to any other. The Jewish philosopher, Maimonides, was a follower of Ibn-Sīna. Albert the Great, who was a contemporary of St. Thomas, and his disciple Ulrich of Strasburg were also influenced by him. The former followed his method and regarded him as the greatest commentator of Aristotle. St. Thomas himself followed ibn-Sīna's position with regard to the nature of universals. In the Muslim East perhaps no philosopher after al-Ghazzālī has been read more widely than ibn-Sīna. In the West his influence on Christian scholastics was very great. Dante placed him between Hippocrates and Galen and Scaliger held him to be Galen's equal in medicine and much his superior in philosophy.

Spinoza's view that in God intellect, intelligent

and intelligible are identical, and so are essence and existence, while in created beings existence is an accident superadded to essence, has been traced by many to ibn-Sīna through Maimonides.

E

IBN-HAYTHAM

Ibn Haytham who has been mentioned before as a great ophthalmologist, was also a renowned philosopher of the Aristotelian school. He, like his contemporaries ibn-Sīna and al-Bīrūni, anticipated Kant by nearly seven hundred years in his theory that the sense materials receive their form from the understanding and that an object is a logically elaborated perception. Besides he saw clearly what was realised in the West only in the last century that apperception plays an important role in perception and that comparison and recognition are among the several forms of logical inference. He was the first to discover the psychological law that momentary impressions in succession give a continuous impression—a law the rediscovery of which in our own time has brought the cinema into existence. If the chemical processes of making or developing photographic plates were then known, the world would have seen cinematography nearly nine centuries earlier.

F

IBN-BĀIJAH

In al-Fārābi and ibn-Sīna (L. Avicenna) a mystic

strain was also prominent. But ibn-Bājjah (L. Avempace) though a close follower of al-Fārābi, gradually shed this strain. He made an open revolt against mysticism and declared that the sensuous imagery of mysticism conceals rather than reveals the truth and therefore in spite of the joy it affords must be renounced in favour of pure thought. He raised the problem how in a world mostly composed of the philosophically ignorant and the religiously fanatical, the philosopher can rise to heights and know reality as it is and how he can present his views and adapt his life to a world so composed. He held that man could reach the highest peaks of knowledge by the natural advance from sense experience to thought. He believed in a spirit of humanity—a pan-psyche—and regarded personal immortality possible in the case of some souls. Reality for him is divisible into (1) the cause of movement, (2) that which is moved, the natural order and (3) the self-moved, the individual soul. Body cannot live without the form but form may live without the body. The soul, being the form of the body, may live after the dissolution of the body, by progress in knowledge to higher and still higher forms. Those who see only the sensuous presentations will, like these presentations, pass away; but those whose action is directed by reason will reach the stage of knowledge and attain to eternal life. The soul is mortal, but the spirit, the rational part of the soul, being universal,

is eternal. Only those who develop the spirit achieve immortality. Those who reach knowledge by pure thought reach the Truth which is another name for God. They do not only reach God; they become one with God.

Ibn Bājjah's philosophy was well-known to the Latin schoolmen, especially to Albertus Magnus and St. Thomas Aquinas.

G

IBN-TUFAYL

Another Muslim thinker, ibn-Tufayl, is famous for his masterpiece *Ḥayy ibn-Yaḳẓān*, a philosophical romance, in which he shows that without the help of tradition and revelation man can attain to the knowledge of nature and through that to the knowledge of God. This remarkable work was first translated into Latin by Edward Pocock Junior and published with the Arabic text at Oxford in 1671 and then its translations appeared in most of the European languages. In Paul Brönnle's words, "in a comparatively short time it caught the fancy of the public—in fact it took the world by storm and for a long time it remained greatly in vogue." The world's interest in it has not yet ceased, for it was translated into Russian in 1920 and Spanish in 1934. It was first translated into English by George Keith in 1674, then by George Ashwell in 1686 and Simon Ockley in

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1708. Eleven years after the publication of Ockley's version Daniel Defoe produced his *Robinson Crusoe*. It has therefore been justly concluded that Daniel Defoe was indebted to the great Muslim philosopher for the conception of his work.

Ibn-Tufayl was vazir and chief royal physician to the caliph Muwahhid abu-Y'qūb Yūsuf. He was succeeded to that office on his own recommendation by his young contemporary, ibn-Rushd who was the last of the most illustrious philosophers of Islam and the one destined to become the supreme teacher of Europe for centuries to come.

H

IBN-RUSHD

Ibn-Rushd (L. Averroes, Aven Rois, Abenruth, Liveroys, Benroyst, Membucius, Mauvitiis, etc.) was the purest and greatest of all peripatetics.

According to ibn-Rushd, truth exists and is knowable, for the love and longing for it that we have in our hearts would be all in vain, if it were not so. Like Aristotle, he holds that all becoming is transition from potentiality to actuality and back to potentiality. This eternal process of becoming pre-supposes movement and movement pre-supposes an Eternal Mover. God is the Eternal Mover. He is the origin and the goal of all things. Divine essence transcends both universals and particulars

(both form and matter), but Divine thought which is identical with its objects produces every thing. For ibn-Rushd as for Kant centuries latter, the proof of the existence of God from the notions of possibility and necessity given by al-Fārābi, ibn-Sīna and others makes no stand against the scientific criterion.

The main ideas for which he was vehemently opposed by the scholastics of the East and the West and most enthusiastically welcomed by the radicals in thought from the 12th to the 14th century and which opened the door to the European Renaissance were : (1) Allegorical interpretation of the scriptures, (2) The theory of two truths, which, in the words of Macdonald, "ran like wild-fire through the schools of Europe", (3) Pan-psychism which implied immortality of the universal soul of humanity and mortality of the individual soul, (4) Eternity and potentiality of matter, and (5) Emancipation of women. A word or two may be said about each of these ideas by way of explanation.

1. Like his predecessors ibn-Bājjah and ibn-Tufayl, ibn-Rushd holds that religion gives the truth, but only in an allegorical and pictorial representation. The scriptures use allegorical imagery so that the truth which is abstract should be apprehended by the common man. And that is inevitable, for religion is practical and has to keep in view the capacity of the masses to understand. They should be told only so

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much and in such form as they are capable of apprehending, i.e., only the literal meaning of the scriptures. For the same reason religion has to induce morality in the multitude by promise of punishment and reward, though true morality is above these considerations. True morality is an affair of reason, and that alone is right which is in conformity with reason.

2. These ideas lead ibn-Rushd to what is called his theory of two truths. He held that religion and philosophy differed, if not in their content, at least in the expression of the common truth. The images of the scriptural descriptions suitable for the common man are not taken to be the full truth by the philosophers and the conceptions of the philosophers of perhaps the same truth are not comprehensible to the common man. Therefore it is best to keep them apart as two truths, and accept the position that something may be true theologically but not philosophically, and *vice versa*. Thus the realm of Grace was separated from the realm of Nature, the one for the theologian to pursue and the other for the scientist and the philosopher to know.

3. In order to understand ibn-Rushd's panpsychism, we have for a moment to go back to Aristotle. In discussing the nature of the soul Aristotle, in a rather obscure passage, distinguishes between the passive intellect which begins with the body and disappears with it, and the active intellect which

is a Divine principle coming into the human soul from outside. He also makes another distinction and that between the potential intellect and the actual intellect, one being the state of intellect when it is a mere capacity and the other intellect in the act of thinking, when it is an actuality.

Later, Alexander of Aphrodesias identified the active intellect with God. Al-Fārābi, after al-Kindi gave a fourfold distinction :— (a) the Passive, latent or potential Intellect as the *capacity* man has of apprehending the essence of things by abstracting them from the various accidents with which it is associated in perception, more or less equivalent to the “common-sense” of Aristotle. (b) Active intellect which is the same intellect aroused to *activity* and actually abstracting forms or universals from perceptions. (c) The agent intellect as *an external power* emanating from God and *arousing the intellect* from passivity to *activity*. (d) Acquired intellect as the intellect not only aroused to activity but also *developed* under the inspiration of the agent intellect.

Ibn-Sina, owing to his Neo-platonic bias, gives a hierarchy of intellects. The first of these, the agent intellect, is an emanation from God—same as al-Fārābi’s agent intellect—and the last, the human intellect, reason or the rational soul in man (as distinguished from the soul of other creatures), which ultimately comes from the agent intellect at the time

the body is generated. It is independent of the body and is immortal.

Ibn-Rushd makes important modifications in these ideas. The distinction in the intelligence of man between the passive intellect and the active intellect of man is of no consequence for Ibn-Rushd, for the latter is the same as the former roused to a state of activity. In the earlier systems the passive intellect is regarded as a seat of all latent and potential faculties, directly or indirectly aroused to activity by the agent intellect. Not so for Ibn-Rushd. For him the passive intellect is a portion of the agent intellect itself temporarily occupying the individual body. But what is the agent intellect? It is the universal intellect of *humanity*. Intellect is not of persons but of the whole of the human race. It is the impersonal, objective, eternal and universal soul of humanity—a Pan-psyche—which like a torch illumines the individual souls and enables them to participate in the eternal truth. It is by a contact with this universal soul that individual souls get illuminated. This contact or union of the universal soul with an individual soul or the participation by personal beings of the universal reason comes off according to the capacities of each man in several ways. It comes off either (a) by way of abstract essence (*i.e.*, a priori knowledge of universals), or (b) in the form of mystical and prophetic illumination, or (c) by its action on the

sense-images in abstracting universals from them (in which last case it becomes the acquired intellect). The human intelligence is thus eternal in essence, but transitory (like the individual soul itself) in its function.

By death the individual soul or the personal intellect as such (whether passive or active), being a portion of the universal intellect *temporarily* occupying the individual body, perishes even as the body perishes, but the universal soul remains even as matter remains. Therefore while the soul of humanity is eternal, the individual soul is mortal. There is no personal immortality, but men live impersonally in the universal soul of humanity through the propagation of thought. Men die as persons, but they live eternally in their progeny and their doctrines. According to ibn-Rushd those who think that this view strikes at the root of morality are wrong. On the other hand, it protects one from servility to punishments and rewards. The truly moral man is impelled to action by the love of virtue alone.

4. In discussing the origin of things, ibn-Rushd says that matter is not non-being as the Neo-platonists think. It is not mere void, but universal and eternal potency containing the germs of all forms. Creation is only a transition from potentiality to actuality. God's essence transcends both form and matter, but matter is co-eternal with His thought. His thought

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consists of forms (universals) which are the moving forces *inherent* in matter. No form is without matter and no matter without form. Lower forms are called forth by the higher forms and the graded series of forms or universal principles finds its termination in the Prime Mover. The Prime Mover (*extractor*) does not arbitrarily introduce form into matter, as Ibn-Sīna held, but converts them from potentialities into actualities by drawing them (*extractio*) out of primordial matter, and thus making active the forces of the latter.

In the process of the actualisation of the forms potential in matter, nothing new is added and therefore no increase of being takes place. The potential must *some time* become actual. In fact it is already actual for the philosopher who views eternity including all time,—past, present and future—and for the eternal mover (*extractor*) who comprehends in a single glance (*subito*) whatever he regards. The extraction (*extractio*) or actual things from potentialities is in the nature of the case and therefore cannot be regarded, with ibn-Sīna, as an arbitrary act of the Prime Mover.

Thus there is no free arbitrary creation by Providence, but a necessary causal nexus in all that happens in the world, God being the first cause—the Prime Mover—and not the immediate cause of things.

5. In the social ideas, particularly with regard to the status of women, ibn-Rushd was as radical as

in his philosophy. Women, he said, were kept in his time like domestic animals and plants only for personal gratification and were far from being treated as human beings. In his opinion "women differ from men not in quality, but in degree...Sometimes they surpass them...the example of certain African States show their aptitude for war, and there would be nothing extraordinary in their attaining to the government of the State. Among sheep-dogs, does not the female guard the flock just as well as the male?" Such ideas were first expressed in Europe by men like Dubois in France and Ockham in England two centuries after ibn-Rushd.

Ibn-Rushd's theory of two truths, combined with the doctrine that matter is eternal and potent to produce all forms from within itself, was a godsend for the scientifically-minded people in the west who were as a rule condemned and persecuted by the orthodox church and the state. They found in the above theses which passed as Averroism their best support. For this reason De Wulf calls ibn-Rushd the Doctor of Anti-Scholastics.

Just as the Jewish and Christian writers had translated pre-Islamic works for the Muslim world, even so did they translate the works of Muslim writers for the Western world. In this transmission of Muslim thought to the non-Muslim West, the Jews took the lead. During the long Muslim rule in Spain the Jews like all non-Muslims enjoyed what historians

call "unparalleled religious toleration". The portals of colleges and Universities were open to them and important University chairs were held by them. They spoke and wrote in Arabic, used the Arab dress and followed the same manners. During the short fanatical rule of the Berbers of Morocco, the Muwahhids, one of whom, abu-Usuf Ya'qub al-Manşūr (1184-99 A.D.) had banished from Morocco even ibn-Rushd for a time to appease the orthodox, they were persecuted and forced to migrate to the neighbouring countries, viz., to Leon and Castile (the Christian part of Spain) and to France across the Pyrenees and to Sicily. They were welcomed by Alfonso VI who was himself educated among the Arabs and did the work of initiating the Christians into Muslim thought. His successors Ferdinand III and Alfonso the Wise maintained the tradition and engaged Jewish scholars for translation work. Those Jewish scholars who settled down in the country adjacent to the Pyrenees were rich and held Averroist ideas. Their riches aroused the jealousy of their Christian neighbours and their Averroism the hatred of Pope Innocent III, under whose orders hundreds of thousands of them were massacred in these parts. Many of them fled to other parts of Europe, carrying with them the learning of the Mussalmans. Wherever they settled down they translated the works of Muslim thinkers especially of ibn-Rushd, whom they universally admired, from Arabic into Hebrew and

from Hebrew into Latin. The family of Tibbonides established at Lunel undertook the translation almost exclusively of ibn-Rushd and his commentaries. Some of their own writings are nothing more than encyclopaedias of ibn-Rushd's teachings. Such were e.g., Samuel ibn-Tibbon's *The Opinions of the Philosophers*, Juda ben Solomon Cohen's *The Search for Wisdom* and Gerson ben Solomon's *Gate of Heaven*. Among Jewish philosophers, while hel-Mevi followed al-Ghazzāli, and Maimonides, ibn-Sīna, Gersonide was a disciple of ibn-Rushd. Besides Jewish scholars, Jewish statesmen and travellers were instrumental in spreading Averroism in France, Italy and Central Europe.

In christendom, Raymond, Archbishop of Toledo (from 1130 to 1150 A.D.) founded a college at Toledo. At this college some of the most important works of Muslim writers on philosophy and science, including Arabic versions of Aristotle and commentaries and abridgments by al-Fārābi, ibn-Sīna and ibn-Rushd, were translated into Latin. One of the well-known translators working in Toledo was a German Hermann by name, but his renderings of Aristotle's works were considered by Roger Bacon as barbarous and unintelligible.

It is noteworthy that Arabic was the written and the court language of Toledo even two centuries after the Christian conquest by Alfonso VI in 1085. Even the coins of Alfonso VI and several

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of his successors bore Arabic inscriptions.

By the end of the 12th century Averroism, i.e., the philosophy of ibn-Rushd, became so popular, particularly among the whole school of philosophers represented first by the Faculty of Arts at Paris, and became such a menace to Orthodox Christianity that in 1210 the council of Paris forbade all teachings of Aristotle's natural history and ibn-Rushd's commentaries on it, while this prohibition was confirmed by the Legate Robert of Courcon, Cardinal at Paris in 1215 and renewed by the Popes in 1231 and 1245. The Physics and Metaphysics of Aristotle were *forbidden* at the University of Toulouse by Urban IV in 1263. In 1269 the Bishop of Paris condemned thirteen of Averroes' basic doctrines, and in 1277 he condemned the prominent Averroist, Barban. Yet the strength of Averroism was irresistible. No force could suppress it.

In 1215 Frederick II became the Emperor of Rome. Having been educated at Palermo under Arab teachers and having come into close contact with the Muslims of Sicily and also in the Crusades with those of Syria, he had become a great admirer of Muslim thought in general, and of ibn-Rushd in particular. In 1224 he established a University at Naples chiefly with the object of introducing Muslim philosophy and science to the people of the West. St. Thomas received his education at this

University. Here both Christian and Jewish translators were engaged for rendering Arabic works into Latin and Hebrew. The works of Aristotle and ibn-Rushd in their Latin translations were not only used in the curriculum of this University, but were also sent to the Universities of Paris and Bologna.

By the middle of the 13th century almost all the works of ibn-Rushd had been translated from Arabic into Hebrew and Latin. Ibn-Rushd's commentaries were translated into Latin by Michael Scottus, Hermanous and others, and had currency throughout Europe. In spreading his doctrines the Friars took the lead and under their influence were translated Aristotle's works from the original Greek as well as ibn-Rushd's commentaries.

Nowhere did Averroism strike deeper roots than in the Universities of Bologna and Padua. Of these two centres of learning Padua became the "hot-bed of Averroism".

Averroism became rapidly the ruling mode of thought in the West. As Hitti writes, "Though using in most instances a Latin translation of Hebrew rendition of an Arabic commentary upon an Arabic translation of a Syriac translation of a Greek original the minds of the Christian schoolmen and scholars of medieval Europe were agitated by ibn-Rushd's Aristotle as by no other author. From the end of the 12th to the end of the 16th century Averroism remained the dominant school of thought, and that

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in spite of the orthodox reaction it created first among the Muslims in Spain, then among the Talmudists and finally among the Christian clergy.” “His writings . . . after being purged of objectionable matter by ecclesiastic authorities, became prescribed studies in the University of Paris and other institutions of higher learning.”

By the 16th century ibn-Rushd's philosophy became, in the words of Renan, “almost the official philosophy of Italy in general.” Thus for over four centuries this remarkable man held sway over the intellect of Europe and laid the foundations of the Italian Renaissance. Coulton compares his influence with that of Darwin in our time; but for the comparison to be true Darwinism has yet to live for three more centuries.

V

CONCLUSION

As we have seen in this brief survey, from the 8th to the 13th century was the period of phenomenal rise and remarkable achievements in Muslim thought. From the 13th century onwards, however, there was a rapid decline. The conditions that led to this decline were many, but one of them was the extreme philosophies of al-Ghazzāli and ibn-Rushd—extreme intuitionism of the one and extreme rationalism of the other. Under the influence of the former, Muslim thought was lost in the clouds of

mysticism; under the influence of the latter, Western thought ran into the abyss of materialism. The West ignored what the East monopolised, and the East ignored what the West monopolised, and for that both have come to grief. For true knowledge both intuition and reason are needed. Intuition cannot ignore the laws of logic. Even the enjoyment of Divine Vision cannot be known to be so, unless it passes into a rational judgment. And reason has to depend for its knowledge of the basic and the ultimate on intuition. It was a mistake of Muslim philosophy to depend wholly on the one or the other or to keep them apart. Reason and intuition must supplement each other. The upward movement of Muslim thought will depend mostly on the recognition of this truth.

The second condition that contributed to the downfall of Muslim thought was that the later rulers gave no encouragement to learning. If anything, they definitely checked its progress. Learning is a luxury for the individual, but it is a necessity for the State. This truth, well-known to the early Arab rulers as much as to the great nations of today, was hardly known to them. Before the fall of Baghdād most of the great thinkers of Islam held high offices in the state or received its patronage in other ways. To mention only a few, al-Rāzi resided at several princely courts, including that of Sāmānid Maṣṣūr ibn-Ishāq, ibn-Sīna was under the patronage of

‘Alā’ al-Dawlah of Ispahān and ibn-Maskawayh was treasurer and friend of Sultān Aḍud-al-Dawlah. Similarly ibn-Tufayl was one of the wazirs of Abu Ya‘qūb Yūsuf, ibn-Bājjah, a minister of ‘Ali, Governor of Saragossa, ibn-Rushd, a physician to abu-Ya‘qūb Yūsuf and ibn-Khaldūn a secretary and ambassador at several courts. After the fall of that city no such encouragement to learning came from any of the Muslim States.

Thirdly, great political upheavals led to the destruction of towns, wholesale massacres of populations, burning of libraries, closing of colleges and universities and gradual enslavement of nations. As a result great social evils crept into Muslim society. There was a complete loss of independent thought and action. The pious and the wise went into mystic seclusion and their descendants degenerated into dancing dervishes and keepers and worshippers of shrines. A great empire got split up into parts and these parts into petty states and petty states into classes and clans. In course of time the spirit chilled into cold ritual and life froze into ruts, and the torch of learning passed from the Muslim East to the Christian West. The pseudo-mystic trend made the East bankrupt of science; and with science went trade and industry and with these all prosperity. No doubt the philosophical tradition was kept alive for centuries to come by such thinkers as Kātibi, Sherzori, Hīlli, Ispahāni, Sadr-al-dīn Shīrāzi, Abd-al-

Karīm Jīli, Jurjāni, Taftazāni, Sharāni, Jalāl-al-Din Dawwāni, Mullah Sabzwāri, and a host of others in Irān and central Asia; Tash Koprizādeh in Turkey; and Sheikh Ahmad Sirhindi, Siālkoti, Mīr Zāhid, Hasan Behāri, Shah Wali Ullah and Fazl-e-Haq Khairābādi in India. But none of these thinkers except Abd-al-Karīm Jīli rose to any great height, for none except him could compare with the great masters of Muslim thought between the 8th and the 13th century. Although the downward tendency had begun in the 13th century, the 17th, 18th and 19th centuries have justly been described as the dark ages of Asia. Decline in thought and culture went parallel with the decline in political power.

Towards the end of the 19th century, however, a vigorous intellectual movement was started by Jamal-al-Din Afghāni in the Near East and Sir Syed Ahmad Khan in India, and that movement opened the door to an Islamic renaissance. Since their time, there has been a definite revival of learning. In the realm of philosophy, this upward trend has been more manifest in India than elsewhere. A lead has been given by Iqbal who, though himself a poet-philosopher, never wearied of stressing the importance of scientific study. Philosophy and science both aim at impartial and systematic knowledge; but while philosophy has as its goal a comprehensive knowledge of the ultimate nature of things and of the significance of values, science advances

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knowledge of the physical world and gives its votaries unlimited power over the forces of nature for good or ill. It is the combination of religion, philosophy and science which can harness these forces for the true service of man. No nation without these three can rise to any great height.

Let us hope that the awakening now noticeable in the world of Islam will enable the Muslims not only to overtake those who have gone far ahead, but also to regain their old leadership in all spheres of life and thought. To do so it is already very late, but it is hardly ever too late.

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