

# Classification of Sciences in Islamic Thought: Between Imitation and Originality

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The classification of sciences is not a purely descriptive science, for its aim is not limited to providing a statistical survey of existing human knowledge and to arranging the sciences in order to present a report describing what is already there so that it can be built upon in the framework of general epistemological growth. This science, rather, carries under its descriptive appearance an evaluative standard that views the description of existing sciences as a foundation for what should take place in the mind's orientations toward subjects of knowledge. This can occur on an educational level, by pointing toward the manner of comprehending and assimilating sciences, or on a creative level, by pointing toward new areas of intellectual discovery in accordance with what is necessary for the advancement of human life. Thus, this science bears some similarity to history, in its descriptive appearance of what is there in the field of human knowledge, and to logic, in its defining of what should take place in the processes of the intellect. As a result, it is called the "logic of sciences" and is simultaneously descriptive and evaluative.

However its descriptive aspect, which likens it to history, and its evaluative aspect, which draws it toward logic, does not mean that it is "objective," as are history and logic. This is because its evaluative aim is not based on the primeval issues of the intellect, as are logic and other objective sciences, but on the existential situation of humanity, in what the individual perceives of the reality of existence and his/her own position in that reality. Upon this perception is based the formulation of a science classification method that is in harmony with the situation that is subservient to the destiny drawn for itself by humanity.

As a result, this science has carried certain ideological dimensions throughout its history and in the folds of its descriptive aspect. In addition, it has reflected the intellectual and cultural characteristics of its sustaining environments and the leading scholars who were well-known for writing in it, particularly in relation to a certain stage of renovation.<sup>1</sup> Moreover, the logical feature of this science allows it to assume its place in explaining intellectual and cultural traits for those dealing with research and writing on specific subjects, for it serves as a methodological tool for what human knowledge should become. This function makes it a semidirect expression of intellectual and cultural characteristics, bearing in mind that *culture* means one's methodology in realizing his/her intellectual and practical life<sup>2</sup> and that *thought* means the mind's movement in the epistemological process to reach truth.<sup>3</sup>

These meanings feature clearly in the Aristotelian classification of sciences, which is considered to have influenced and directed classification thought for many centuries within the context of Aristotelian thought's general influence and orientation.

Aristotle divided sciences into two main sections, each of which had a further host of subsets. The first is theoretical science, which aims at pure knowledge and consists of metaphysics, the initial philosophy or knowledge of the divine, which is an investigation of existence in the absolute sense of the term; mathematics, the investigation of existence in its quantitative and numerical aspects; and natural science, the investigation of existence in its tangible and mobile aspects. The second is practical science, which seeks to acquire knowledge for the sake of managing humanity's daily activities, and consists of ethics, home management, politics, and arts and poetry. Logic, which has a purely mental object and is considered the instrument for all sciences,<sup>4</sup> is beyond the scope of this division.

In this classification, the description of contemporary sciences is tinted with Aristotle's subjective perception. This, in turn, is based on his philosophy of the hierarchy of existence, of what method human knowledge should follow. This hierarchy reflects his arrangement of beings in descending order, from the abstract to the concrete, according to their share of nobility. Thus, it matches his hierarchical image of the place of cosmic beings within the universe: The highest is the self-sufficient self-existent prime mover and the lowest is the organless substancelike beings passing by the ultralunar world, inclusive of noble incorruptible planets and the infralunar world, which is corruptible due to its mixing with matter.<sup>5</sup>

Moreover, it reflects the intellectual structure characteristic of the Greek mentality in general—that of abstraction. This can be seen in the differentiation among sciences according to their share of abstraction and the allocation of honor to them based on this consideration. It is also reflected in formulating the hierarchical division more in accordance with a theoretical perception emanating from a mental image of existence rather



than from a practical following of the reality of human knowledge and its resulting sciences.

This division, furthermore, reflects the characteristic of comparison and distancing in Aristotelian thought. Theoretical science is considered as completely separate from practical sciences, for its sole aim—the acquisition of pure knowledge—has no relation to human conduct. Attaining knowledge through reasoning is a goal in itself; it is, in fact, the noblest of all human goals. It is as if humanity lives in a dualistic environment of two completely separated extremes: reasoning, which draws one to the world of the abstract, and action, which draws one to the world of the concrete. This characteristic is probably a reflection of the Aristotelian perception of existence: The self-existent prime mover set the world in motion and then left it to run by itself, keeping a distance from it, not interfering in its affairs, and not even knowing about it except in the form of the knowledge of absolute truths.

This pattern of interaction between the science of classifying sciences, the characteristics of the perception of the cosmos, and the intellectual traits of classifiers is found in the classifications that have come down to our own time. The question now is: How was the classification of sciences dealt with by Muslim scholars, bearing in mind the relation of such classification to the new, perhaps unique, elements introduced by the Muslim intellect's adherence to Islam as regards the perception of existence and humanity's role in it?

## Muslims and the Science of Classifying Sciences

The science of classifying sciences in Islamic scholarship has not received sufficient study and analysis from Muslim scholars or from those interested in Islamic culture generally. The weakness of Muslim scholarly interest in this science reflects a lack of interest in methodological sciences. Other scholars view this science's history as a philosophical and methodological science reporting ancient classifications influenced by Aristotle, jumping over Muslim scholarly classifications, and going directly to those of Roger Bacon (1214–68) and Francis Bacon (1561–1626).

*Major Works in the Field.* This lack of interest in Muslim scholarly accomplishments in this field stands in contrast to the Muslim contribution to it, which is characterized by innovativeness in the structure of classification. This cannot be seen as a mere passing contribution, but should be viewed as a real Islamic school in the science of classification. This significant input finds embodiment in a wide collection of works, some of which were devoted entirely to this science, and others of which included whole chapters on it alongside many other fields of knowledge in accordance with the traditional Muslim scholarly habit of encyclopaedic writing. As a comprehensive statistical study of scholarly Muslim contributions is not possible here, we will present a chronological list of the most impor-

tant extant Islamic works dealing with this field. This body of writings has contributed to the maturation of this field of knowledge, and this list will enable researchers to see the characteristics of Islamic classification thought: *Ihsā' al 'Ulūm* (Enumeration of Sciences) by al Fārābī (Abū Naṣr Muḥammad ibn Muḥammad, d. 339 A.H.); *Rasā'il Ikhwān al Ṣafā' wa Khillan al Wafā'* (The Epistles of the Brethren of Purity and the Companions of Fidelity), (mid-fourth century A.H.); *Mafātīḥ al 'Ulūm* (Keys to Sciences) by al Khawarizmī (Muḥammad ibn Aḥmad ibn Yūsuf, d. 387 A.H.); *al Fihrist* (The Book of Indices) by Ibn al Nadīm (Muḥammad ibn Ishāq, d. 438 A.H.); *Aqsām al 'Ulūm al 'Aqlīyah* (Divisions of Rational Sciences) by Ibn Sīnā (Avicenna), (d. 428 A.H.); *Marātib al 'Ulūm* (Ranks of Sciences) by Ibn Hazm (d. 456 A.H.); *Ṭabaqāt al 'Ulūm* (Levels of Sciences) by al Abyūrī (Abū al Muzaffar Muḥammad ibn Muḥammad, d. 507 A.H.); *al Muqaddimah* (The Introduction) by Ibn Khaldūn (d. 808 A.H.); *Miftāḥ al Sa'ādah wa Mishāḥ al Siyādah fī Mawdū'āt al 'Ulūm* (Key to Happiness and Lantern to Sovereignty in the Fields of Science) by Tāsh Kubrā Zādah (d. 968 A.H.); *Kashf al Ḍunūn 'an Asmā' al Kutub wa al Funūn* (The Unravelling of Intents in the Titles of Books and Arts) by Ḥājjī Khalīfah (d. 1067 A.H.); *Kashshāf Iṣtilāḥāt al 'Ulūm* (Index of Scientific Terms) by al Tahanāwī (Muḥammad ibn 'Alī, d. after 1158 A.H.); and *Abjad al 'Ulūm* (The Alphabet of Sciences) by Siddīq ibn Ḥasan al Qunūjī (d. 1307 A.H.).<sup>6</sup>

These works are not of equal value as classifications or as representing the original characteristics of Islamic thought. However, they demonstrate the continuous care of Muslim scholars and the increasing growth and maturity of its form and content within the context of the reality of Islamic sciences as regards their growth, development, and expansion.

If we bypass the reported humble classification attempt of al Kindī (d. 252 AH),<sup>7</sup> we find that al Fārābī undertook a pioneer classification work. It was grounded so much within the framework of Islamic thought that it can be seen more as a sudden mutation rather than as a result of the natural growth and development of Islamic thought. But even if we explain this phenomenon by saying that he was influenced by the Aristotelian classification heritage, already more than one thousand years old at that time, there are later works influenced by the same heritage but of lesser value, particularly as regards the works of Ibn Sīnā and the Ikhwān al Ṣafā'.

Ibn al Nadīm's work is the first classification attempt emerging from actual Islamic thought as opposed to the influences of other cultures. It grows naturally and gradually to a more mature level with Ibn Hazm and al Abyūrī and reaches a high level of development with Ibn Khaldūn, whose work demonstrates clearly the characteristics of Islamic classification thought. Following this is the work of Tāsh Kubrā Zādah, whose classification represents the epitome of Islamic classification thought and a profoundly significant summary of the Islamic scholarly heritage at a time



of stability when it had almost ceased to grow. His *Miftāḥ al Sa'ādah* is a methodological recording of the sciences encountered in Islamic culture in the widest and most comprehensive attempt ever found in the Islamic science of classification. All classifiers who came after Ibn Khaldūn and Ṭāsh Kubrā Zādah mainly imitated and followed in their footsteps.

*The Objective of the Classification of Sciences.* Most of these works defined, in their introductions, the science of the classification of sciences or, as it was sometimes called, the science of the divisions of sciences. These definitions explained its nature and its objective in delineating the general framework of this science. This is what al Fārābī meant when he said in his preface: "In this book, I propose to give a survey of the known sciences one by one and to try to know the contents in general of each one of them, then to know the divisions where this applies and what comes under each division."<sup>7</sup> The same meaning is expressed by Ṭāsh Kubrā Zādah's definition of the science of classification when he said: "This is a science that investigates the general subjects and their particular divisions to attain knowledge of the specific sciences under the general titles."<sup>8</sup>

It is clear that these two definitions have been designed to signify that this science has been structured in such a way that it can be used as a methodological statistical tool within the fields of knowledge in order to facilitate comprehension. This, in essence, explains why the two definitions are based on the idea of the particularity of sciences and why the specific is located under the general. This concept has a clear educational aim, which, as expressed accurately by al Fārābī in his explanation of the benefits of his *Iḥṣā' al 'Ulūm*, is:

This book is beneficial because when the individual wishes to learn and look into one of these sciences, one will know what lies ahead and into what one is looking, and what benefit one will obtain and what use this will be, and what virtue is hoped to be attained by it, so that one will be clear about what one is attempting with clear knowledge and not with blindness and illusion. With this book, one can compare the sciences to know which is better and more beneficial, which is stronger, more accurate and more reliable, and which is weaker and less reliable.<sup>10</sup>

The same meaning is alluded to by Ṭāsh Kubrā Zādah:

Arts are great in number, and it is difficult to obtain all or most of them with the short span of one's life. Even obtaining tools for getting knowledge of these arts is difficult in itself, so what can one do to get out of this deadlock? Then, reflect on what I have presented to you of the sciences in their names, forms, and con-

tents, and what benefit you can get in the details I have provided in way of attaining knowledge.<sup>11</sup>

Based on the above, we see that this science was invented by Muslim scholars in a methodological, epistemological, and educational context. Its invention within this framework and within an Islamic cultural domain can have no other objective than to serve as a factor in establishing an Islamic thought structure based on the truth of the comprehensive Islamic doctrine, as illustrated in the many sciences classified according to this discipline. This does not contradict the formation of thought on the basis of cultural methodological characteristics of knowledge in general. Rather, it enhances this formation by giving it the proper orientation, one in which the intellectual and cultural attributes emanating from the Islamic ideological factor are given prominence. At the same time, it enables one to comprehend the Islamic truth explained by those sciences.

If the introductions of the works in question do not clarify this concept in the way we have determined, the supposed reason is that it was taken for granted by the intellectual circles of the day and so did not need to be illustrated. This is different from the modern situation, where building knowledge on religious truth has become the subject of controversy between those who accept this way of thought and those who reject it. To clarify this, it should be enough to refer to what Muslim scholars, despite differences in their views, said in explaining the reality of sciences (of which classification is but a part), their objectives, and their expected benefit. What we will find after such an exercise is that the practice of the sciences is only a way to achieve religious truth and attain happiness. This is what al Fārābī meant when he wrote that "science is really a buried treasure that is won by him whom God has made it easy to attain."<sup>12</sup>

Given the particular genesis and objectives of this science in the Islamic cultural environment, what form did it take in its endeavor to attain its goal, and what were the methods and trends used to reach its goal?

This warrants a closer look into the previously mentioned classifications in order to grasp their structures, classification characteristics, internal buildup, and relationship with the reality of sciences in the Islamic cultural environment. This should show how these classifications can help create an Islamic thought able to comprehend Islamic religious truth in all its aspects. Such a reflective look would show two distinct orientations, each one distinguished by overall structure, classification characteristics, and internal buildup. This leads, consequently, to a difference in the anticipated outcome. The first orientation/method betrays clearly its Aristotelian influence and thus is called "traditional." The second tried to derive new origins or principles from Islamic cultural attributes based on the Islamic ideological factor, and so we call it "original" (or "innova-



tive"). Presented below is a delineation of the reality and characteristics of each orientation via an analysis of samples taken from the classifications deemed the most representative of their kind.

## The Traditional or Imitative Method

We find no difficulty in assigning classifications belonging to this method, as a careful investigation of the classification's structure will determine whether or not it is related to Aristotle's classification. From the historical point of view, the traditional method preceded the original orientation. Furthermore, it coincided with the movement of Islamic thought toward Greek philosophy, which began with al Kindī and gained strength with al Fārābī and Ibn Sīnā. As this was an imitative tendency, we notice that classification works using this method reached a level of maturity signifying that while this was a new stage in the overall classification effort, their structure was to be considered an extension of ancient works. This can be illustrated through a brief exposition of representative works.

*The Reality of Classification in the Imitative Method.* Here we propose to discuss three classification works that, in our opinion, present a comprehensive picture of this method's structure and characteristics: al Fārābī's *Iḥṣā' al 'Ulūm*, the *Rasā'il* of the Ikhwān al Safā', and Ibn Sīnā's *Aqsām al 'Ulūm al 'Aqlīyah*. Taken into consideration were the comprehensiveness and maturity of these classifications, their representation of various tendencies within this method, and what these classifications provide in the way of demonstrations and theoretical comments of potential use in assessing this tendency after exposing its reality.

**Al Fārābī's Classification.**<sup>13</sup> Al Fārābī devoted his *Iḥṣā' al 'Ulūm* to the classification of sciences. In its introduction, he explains his classification's structure as delineated and divided in the book's chapters:

We propose in the book to give a survey of the known sciences one by one, to try to know the contents in general of each one of them, then to know the divisions where this applies, and what comes under each division. We propose to divide the book into five chapters: the first deals with the science of the tongue (language) and its divisions; the second with the science of logic and its divisions; the third with the sciences of *al ta'ālīm* (instructions), which are numbers, geometry, optics, instructional astronomy, music, weights, and ingenious devices (i.e., mechanics); the fourth with natural science and its divisions and with the science of divinity (theology) and its divisions; and the fifth with civic science and its divisions and on the science of *fiqh* (jurisprudence) and the science of *kalām* (dialectic theology).<sup>14</sup>

In the context of this division, natural science is defined as the science that “looks into natural objects and the phenomena and appearances of these objects. It also purports to know things about these objects and by what and for which these objects exist and the appearances of these things.”<sup>15</sup> Civic science “investigates classes of actions and voluntary ways or laws, the talents, characters and manners that produce these actions and ways as well as the goals of these actions.”<sup>16</sup> The science of jurisprudence is the “endeavor by which one is able to deduce judgements on things not explicitly mentioned in Islamic law from rules mentioned explicitly with accuracy in the Shari’ah. It should look for correct judgments in line with the objectives of the Law-Giver in the religion sent to the nation for which that law is meant.”<sup>17</sup> *Kalām* is “the endeavor by which one can support specific judgments, opinions, and actions prescribed explicitly by the giver of religion and demonstrate the falsehood of all other opinions that differ from it in statement.”<sup>18</sup>

**The Ikhwān al Safā’s Classification.**<sup>19</sup> Based on the distribution used in their fifty-two *rasā’il* (epistles) and from what some of them, most notably the *Risālat al Sanā’i’ al ‘Ilmīyah*, discussed concerning the classification of sciences, we can deduce the following comprehensive picture. Sciences are divided into three major categories and subgroupings: 1) mathematical sciences or the science of literature, most of which were meant for earning a living, e.g., reading and writing, grammar and language, poetry and prosody, arithmetic and transactions, superstitious beliefs and omens, the art of talismans, alchemy and mechanics, professions and trades, agriculture and breeding, and the science of biographies and histories; 2) religious sciences dealing with one’s soul and well-being in the hereafter, e.g., the science of revelation, interpretation, histories, jurisprudence, laws and judgments, sermons, and dream interpretation; and 3) real philosophical sciences, subdivided into a) mathematics: the science of numbers, geometry, astronomy, and music; b) logic: prosody, oratory and debate, and demonstration and rebuttal; c) natural sciences: the principles of organisms, space, cosmology, being and corruption, the events of the atmosphere, metals, plants, medicine, and veterinary sciences; and d) divinities, subdivided further into knowledge of the Creator, knowledge of the spiritual world, psychology, the science of the hereafter, and politics. The last science includes prophetic government, monarchy, public administration, and private and subjective administration.<sup>20</sup>

**Ibn Sīnā’s Classification.**<sup>21</sup> Ibn Sīnā discussed this topic in several works. However, the most comprehensive and clearest classification is found in his *Risālah fī Aqsām al ‘Ulūm al ‘Aqlīyah*, an epistle devoted to this science and upon which we will depend to explain his classification.



He divided the sciences of wisdom into two main divisions, with various sections and parts under each division.

The first category is the theoretical abstract sciences. The goal of these sciences is to obtain indubitable belief in the existence of beings not related to humanity's action, and their real objective is to form an opinion, as in the sciences of monotheism (*tawhīd*) and of physiognomy (*al hay'ah*). This category is divided into three sections: a) base or natural science; b) middle or mathematical science; and c) sublime science or the science of divinity. Each science has its fundamental and branch parts. For example, under sublime science (divinity) are grouped sciences that investigate general concepts of all beings; origins and principles, as in natural, mathematical, and logical sciences; ways to prove the Creator's existence and oneness; the reality of spiritual essential beings, the angels; the reality of celestial and earthly organisms subservient to essential beings; the manner of revelation; and the science of the Hereafter, which investigates the conditions of resurrection with spiritual happiness or misery, which are to be known through the mind, and the physical conditions, which are to be known through Islamic law.

The second category consists of the practical sciences. These sciences, which seek to form an opinion for the sake of action, are divided into a) ethics, which gives one knowledge of one's character and conduct and is included in Aristotle's book on ethics; b) home management, found in Aronis's book on house management; c) civil political science, which Plato and Aristotle discuss in their works on politics and to which is attached matters related to prophethood and religious law. Through this science, prophethood's existence and humanity's need for its existence, survival, and well-being in the Hereafter are shown. It allows one to acquire knowledge of common absolute boundaries of crafts, which are related to specific laws applicable to specific peoples in specific times, as well as knowledge of the differences of real divine prophethood and false claims.<sup>22</sup>

*Characteristics of the Imitative Method.* The composers of these classifications were influenced culturally by Greek philosophy. Both al Fārābī and Ibn Sīnā were influenced by Aristotelian philosophy, while the Ikhwān al Safā' were influenced by streaks of Platonic philosophy. This influence extended to the area of classification, which is traceable to the Aristotelian classification. While these three classifications differ in terms of the amounts of imitated Greek thought and of innovativeness present, their common characteristics are mainly due to their indebtedness to Greek classification thought. However, they differ among themselves as regards the relative profusion of these characteristics, as illustrated below.

**Imitating Aristotelian Structure.** If we analyze the overall structure of these three classifications, we notice that they benefit from the Aristo-

telian classification structure. This influence ranges from incorporating certain Aristotelian classification elements into a seemingly new structure to complete imitation. Ibn Sīnā follows Aristotle completely in his division of the sciences into theoretical (subdivided into divine, mathematical, and natural) and practical (subdivided into ethics, home management, and politics) categories. Despite al Fārābī's basing the structure of his classification on five divisions, provided we consider the first two divisions (language and logic) as sciences of instrument rather than integral divisions of the overall structure, the three remaining divisions include theoretical science (the third division concerns itself with mathematics), natural science and divinity (the fourth division), and practical science (the fifth division). He seems to be distributing the Aristotelian theoretical division into two parts, which form the third and fourth parts of his classification.

The Ikhwān al Safā' seem to have done the opposite, for they devoted the first and second divisions to practical sciences (by separating the sciences of literature and the sciences of the Shari'ah) and the third division to theoretical sciences, which is exactly like Aristotle's theoretical division, with the exception that they added the logical sciences, which were excluded by Aristotle as sciences of instrument.

In these structures, all classifications concur on the principles of separating theoretical and practical sciences; making the theoretical revolve around divinity, mathematics, and natural sciences; and making the practical revolve around ethics, civic politics, and home management. Thus, their overall structures match the Aristotelian one.

The numerous Islamic sciences developed by Islamic scholars did not usher in any significant modification to the structure on which these classifications were based. Moreover, those Islamic sciences considered in the classifications were incorporated into the already-existing structure. For example, al Fārābī attached the sciences of jurisprudence and dialectic theology to the civic sciences, a subdivision of the practical sciences. The Ikhwān al Safā's classification devoted one of the two parts of the practical sciences to such newly conceived sciences as interpretation, narrations, jurisprudence and *sunan* ways, and sermons. Ibn Sīnā disregarded completely the Islamic sciences and ignored them in his classification.

**Abstraction.** These classifications seem to be characterized by abstraction, whether on the level of the epistemological starting point or that of their end structure and the substance on which this structure is based. It seems clear that these classifications were not started from a practical statistical survey of actually existent sciences of the day, for they seem to have sprung from an abstract mental perception of what and how human knowledge should be. This is reflected in the fact that the structural framework was laid down according to the writers' perception of existence: beings not related to organisms, beings related to organ-



isms, natural organisms, and human beings possessing a social aspect. The classes of sciences were then arranged to agree with these aspects of existence.

This does not mean that all of the sciences included in the classifications are only potential sciences, for some actual sciences were mentioned. What it means is that the preconceived mental perception of the science classification structure resulted in a selective methodology that attached certain sciences, based on their suitability, to the preconceived structure and dropped other sciences that did not fit into that structure. One example of the latter case is the Islamic sciences, which developed after the conception of the Aristotelian structure. The title of al Fārābī's work, *Ihṣā' al 'Ulūm*, implied that he would provide a statistical survey of sciences. He even stated explicitly in the introduction: "In this book I propose to give a survey of the known sciences one by one."<sup>23</sup> However, he only cited sciences in a generalized manner and included those that were common to different nations and cultures. Thus, he limited himself to mentioning general classes of sciences and ignored the actual sciences known in his day. For example, while discussing the science of the tongue (language), he did not mention the actual sciences of syntax, grammar, and linguistics, but rather gave a generalized statement starting from the fact that "the science of the tongue in each nation is divided into seven major divisions: the science of single utterances, compound utterances, laws of single utterances and laws of compound utterances, laws of correction of composition, laws of correction of reading and laws of poetry."<sup>24</sup> Then he discussed each science in like-mannered generalizations. The same observation holds true of his study of jurisprudence, which he discussed as a general science occurring in different nations and cultures. He did not pay specific attention to any aspect of Islamic jurisprudence.

The Ikhwān al Safā's classification followed that of al Fārābī. They introduced their discussion of science classes by saying, "Know, brother, that sciences dealt with by human beings are of three classes: mathematical, man-made laws, and real philosophical."<sup>25</sup> This shows that their classification starts more from an abstractive viewpoint than from a realistic survey. Ibn Sīnā was more abstractionist in this sense than al Fārābī and the Ikhwān al Safā', so much so that he did not even include the actual Islamic sciences of his day under the category of general human knowledge.

This selectiveness in science classification, imposed by the theoretical starting point, resulted in the neglect of numerous Islamic sciences and has resulted in their failure to handle actual sciences and to explain the reality of their origins, subject matter and objectives, the details of their branches and parts, as well as their interrelationships. Had the starting point been the reality of the sciences in their environment and then extended to other sciences, the result would have been a comprehensive structure able to embrace all of those sciences. The reality would then

impose its deductive logic—the original Islamic logic—instead of the formalistic analogical logic based on abstraction, which is the logic of the Greeks.

**The Tendency to Set Apart.** An investigative look into the sciences of these three classifications discloses that, in terms of interrelationships, they are somehow disconnected and compartmentalized. It sometimes appears that there is no real or clear connection among them and that they run parallel to each other. This compartmentalization probably appears clearly in the distinction between “theoretical” and “practical” in the classified sciences. This is illustrated in Ibn Sīnā’s assumption that theoretical sciences only seek to form an opinion (exemplifying this with the science of *tawhīd* [monotheism]) and that practical sciences seek to form an opinion for the sake of action. He therefore distinguishes between closely connected sciences, sciences that were so connected that it was believed they could not be separated. Practical sciences, in the Islamic concept, are but an aspect of theoretical sciences, as can be seen from the relation between the sciences of jurisprudence and monotheism: jurisprudence is but a practical extension of monotheism.

Likewise, in their view of practical sciences, the Ikhwān al Safā’ distinguish between those meant for earning a living and those meant for seeking success in the hereafter. This distinction cannot be endorsed by the truth of the Islamic sciences. The science of jurisprudence, for instance, which is included in the hereafter-oriented sciences, is in reality a science meant to organize life on earth. Only on this basis can it be considered as hereafter-oriented. The sciences of language and syntax, which are included in the livelihood-gaining-oriented sciences, are, in the actual context of Islamic culture, meant to facilitate the understanding the Qur’an and exploring its objectives so that individuals can attain success in this life as well as in the hereafter.

Al Fārābī also distinguished between theoretical (chapters three and four) and practical (chapter five) sciences. Nevertheless, he was more aware of the interaction and internal communication among different sciences, for he listed the science of dialectic theology among the practical sciences based on its practical goal. Such insight is also apparent in his claim that its function extends beyond helping mere ideological systems and involves supporting actual conduct and actions. In his words, dialectic theology (*kalām*) is a “craft by which one can support the specific opinions and actions prescribed by the law and giver of religion and show the falsehood of all [that are] against it in statement.”<sup>26</sup> This definition has a practical dimension that is absent in the writings of other Muslim scholars. There is a great difference between this statement and what Ibn Sīnā said—that monotheism is a science meant solely for obtaining opinions.

One aspect of this separation is a gap between the sciences that originally grew in the Islamic environment and those acquired from other



cultures. Classifications were built mainly on the latter, onto which some Islamically conceived sciences were grafted, for classifiers were unaware of the new nature and position of many ancient sciences after their incorporation into Islamic cultural life. In this new situation, close ties developed between ancient sciences and Islamic fields of knowledge, as in the cases of jurisprudence and mathematics (a development that resulted in the growth of *'ilm al farā'id* [inheritance]) and astronomy and jurisprudence (to help specify times of acts of worship). This broad dialogue that developed between Islamically grown sciences and acquired sciences, which resulted in great interaction,<sup>27</sup> is not reflected clearly in those classifications. This is all the more strange when we learn that those classifiers combined sciences from both streams in their intellectual life; al Fārābī, for one, was simultaneously a judge and a philosopher. The question is likely to arise as to why the interaction between those sciences showed up in their minds but not in their classifications.

It appears that this compartmentalization originated primarily with the idea that investigating sciences in order to classify them did not come from within the Islamic cultural circle. In their reality, these sciences appeared to serve the single aim of emphasizing religious truth. It did not matter if they developed with an Islamic nature, like jurisprudence, Qur'anic interpretation, hadith, and others, or if they were acquired from foreign cultures: They were all integrated and met to realize the common goal. However, those classifiers looked at the sciences from outside the Islamic cultural circle and were influenced by the Greek and Illuminist cultures. This resulted in confusion when assigning slots and hesitation as to whether to cite them according to slots already existing in those foreign cultures or according to the actual reality of Islamic sciences. Such duality helped create an image of mutually exclusive sciences.

It is certain that one of the reasons that gave rise to this tendency was the predilection, mentioned earlier, to base these classifications on a mental conception of the potential scope of sciences rather than on the actual existing sciences. This led to the classifications falling short of describing the growth and development of actual sciences, since such a description would demonstrate inevitably the close ties between the sciences. Indeed, a good number of sciences had been generated mostly from each other through the epistemological extension in the Muslim environment. This is illustrated clearly in those Islamic sciences that originated from looking into the Qur'an and the hadith. Following that, they generated from each other in a movement of intellectual growth that, at different stages, attracted sciences that had originated in other cultures, as in the case of medicine, logic, and others. Such acquired sciences were to be integrated in the context of the Islamically grown sciences.

However, the perspective from which these classifications started and upon which the potentiality of sciences depends precluded mutual communication or interconnectedness. They were subjected to the dry

preconceived mental classification beginning with the topic of science itself, as stipulated by Ibn Sīnā when he stated that the fundamental classification criterion were whether the investigated item was matter itself, its appearances, or unrelated to the matter. This starting point meant that the sciences would be classified as mathematical, natural, and divinity-related.<sup>28</sup> In addition, its consideration of the sciences' subject matter rather than their actual genesis and development led to separation and compartmentalization and obscured their actual interrelatedness within the Islamic environment.

**The Tendency to Generalize.** Clearly the authors of these classifications were trying to classify general human knowledge. This is why these sciences were discussed along with categories of those sciences common among nations and cultures rather than with actual sciences, where the characteristics of each nation appear. This tendency was expressed by the Ikhwān al Safā's statement: "We propose to mention kinds of sciences and classes of these kinds so as to provide a guide for knowledge seekers in their pursuits of their goals."<sup>29</sup>

This generalized objective of classifying human knowledge might be useful in comprehending the starting point of sciences in general, in understanding the philosophy of human knowledge in terms of the relationship between the process of perception and the perceived object, and in arranging perceptions. However, it has led to a clear inability to describe, arrange, and observe the characteristics of Islamic sciences.

In general, actual Islamic sciences were absent from these classifications, particularly from Ibn Sīnā's. This was compounded by the shortcoming in perceiving the Islamic particularity in the growth of newly conceived sciences and in the process of acquiring foreign sciences. Sciences were cited without any mention of these characteristics and were severed from their epistemological context in the Islamic cultural environment.

Probably the most important factor neglected in these classifications was the Islamic commitment to serving religious truth both in the newly conceived and the acquired sciences. It is to be noticed that Muslims only initiated or acquired a science to serve, directly or indirectly, an ideological or practical religious truth. Thus, we find that al Fārābī distinguishes between civil knowledge and the science of jurisprudence. While he cites jurisprudence as a science which serves the purposes of Islamic law, he quotes civil knowledge in a context completely alien to that purpose. He sees the issues of this science (politics of government) as running in accordance with the rulings of the human mind outside the teachings of Islamic law. In Islamic culture, however, these issues should come under jurisprudence in what is known as *al siyāsah al shar'īyah* (the Islamic law of politics). Thus, according to Islamic sciences, there is no justification for making a distinction between civil knowledge and jurisprudence, unless one thinks that governmental and



administrative affairs are not the business of Islamic law and that they should be run according to the rulings of the human mind. This is clearly contrary to the reality of Islam as a comprehensive way of life that encompasses all aspects of human conduct.

Ibn Sīnā was clearer in his generalized classification and in ignoring the Islamic sciences. He classifies one's moral conduct as a branch of the practical science included in Aristotle's book on ethics and home management as a branch of that science included in Aronis's book on the topic. Moreover, he omits any mention of the Islamic sciences that chart the course of human life in these two domains.

The Ikhwān al Safā' followed the same methodology. In their first category, that of mathematics, they listed business transactions. In their second category, that of religious sciences, they listed those sciences connected with Islamic law (including jurisprudence). Such a listing led to the conclusion that transactions could be conducted either according to the rulings of Islamic laws or to the rulings of the mind.

This tendency to generalize was not an attempt to provide a general description of the fields of human knowledge whereby sciences could be seen as trying to define human conduct in life from the perspective of those nations in which they had developed. Rather, it was a judgmental generalization that, as Ibn Sīnā stated, necessitated that certain Greek sciences become the sources of one's conduct even in an Islamic environment, despite the development of Islamic oriented sciences committed to charting one's life according to religious teachings. This clearly falls short of understanding the epistemological Islamic environment that ascertains religious truth, as can be seen in the various Islamic and acquired sciences.

*The Role of the Imitative Method in Shaping Islamic Thought.* A re-examination of the traditional classification method shows that it has played an undeniably important role, mainly in introducing into the sphere of Islamic culture classification thought, as a method of organizing learning in a logical pattern by arranging sciences in a manner designed to provide optimum learning. In addition to this benefit on the philosophical methodological level, the traditional method also was of use in translating the Greek experience in classification. Regardless of its context, this experience was based, in its inception, on logical methods that were sure to lead to intellectual training in exploring the ways of learning based on reason and on the exclusion of illuminist ways. This, no doubt, encouraged Islamic thought to acquire the classification talents as a method of organizing learning. It was up to later Muslim thinkers to direct that method in an orientation that suited the Islamic intellectual environment.

Looking at this method from another angle, however, we can see that it fell short of its set goals. This is particularly obvious when we bear in mind its various characteristics (abstraction, compartmentalization, and

generalization) and what Islamic cultural activity required of a pattern of thought that would respond to the purpose of religious truth, which was the axis around which Islamic life in its entirety revolved. The Islamic intellectual environment provided the conditions for the birth of numerous sciences as well as making it possible to acquire many foreign sciences. As these sciences were designed to serve religious truth in all its aspects, we find them settled comfortably in the sphere of Islamic culture, where they cooperate and interact to realize the above-mentioned ultimate goal.

For Islamic thought to find its way through these sciences and attain the assimilation of religious truth—its ultimate goal—it needed a classification methodology to categorize these sciences. This categorization was based on matching their realities in interaction, coordination, and commitment and applied to sciences originating within the Islamic sphere and those acquired from foreign sources of general human knowledge. The traditional method could not achieve this, due to the compartmentalization, abstraction, and generalization in its classification methodology. This is probably due to, among other things, the fact that this method represents the first stage of classification in Islamic cultural history and took place at a time when the Islamic sciences were still growing and had not become firmly established. In such a situation, imitation was probably a necessary step toward originality. The question now is: Was this orientation toward originality able to accomplish the expected task?

## The Innovative Orientation

We do not find works with this orientation until the end of the fourth century A.H. Those philosophers engaged in *kalām* (Islamic dialectic) made no attempt in this field, for they were pioneers of an ideological philosophical endeavor within the Islamic environment, e.g., the Mu'tazili philosophers in the ideological arena of the early second century A.H. Although qualified to be pioneers in developing the innovative orientation in science classification, which is characterized by its intellectual philosophical pursuit, they did not assume this role. This may be due to the fact that the question of classification did not touch the ideological issues and thus did not represent a challenge that the *kalām* philosophers had prepared themselves to undertake.

In citing relevant works, I shall consider the extent to which they departed from the Greek science classification and the extent of their independence based on an exploration of the characteristics of sciences in the reality of the Islamic intellectual environment. I will then attempt to derive from it bases for classification that would go back to the ideological origins of which that environment was an extension and a dimension.

With this in mind, we can include a host of earlier cited works and other less important (and uncited) works.<sup>30</sup> These classifications differ in



degree of maturity, originality, and comprehensiveness. In general, we find that, over time, they acquired more maturity and comprehensiveness. In the following section, we present a survey of classifications following this orientation and an explanation of the characteristics of their originality.

*The Reality of Classification.* In this section, we have chosen four classifications that have this orientation and that are considered to represent its general characteristics. In chronological order, these classifications are Ibn al Nadīm's *al Fihrist*, Ibn Hazm's *al Risālah*, Ibn Khaldūn's *Muqaddimah*, and Ṭāsh Kubrā Zādah's *Miftāḥ al Sa'ādah*.

**Ibn al Nadīm's Classification.**<sup>31</sup> The *Fihrist* was not devoted wholly to science classification, for it sought to record the history of the fields of knowledge in the Muslim community as represented in sciences, ideological parties, and writings. However, the structure of the book and the various remarks related to classification scattered in it make it an important document for the epistemological buildup of sciences. We can see its importance in what Ibn al Nadīm had to say about it:

This book is a *fihrist* (catalogue, list) of books of all nations, Arab as well as non-Arab: those of them that are available in the language of the Arabs and it deals with categories of sciences, histories of the compilers, the ranks and genealogies of the writers since the beginning of each invented science up to our own age.<sup>32</sup>

The *Fihrist* was structured into ten essays or chapters, each of which is devoted to one specific fundamental science and contains an explanation of its origin, whether it is to be found in translation or adaptation, and a list of its most important works. The chapters are arranged in the following order: 1) languages of nations, books of law, the Qur'an and related sciences; 2) grammar and grammarians; 3) histories, literatures, biographies, and genealogies; 4) poetics and poets; 5) *kalām* (dialectic theology) and theologians; 6) jurisprudence and its scholars and the science of hadith and its scholars; 7) philosophy and ancient sciences; 8) evening conversations, legends, talismans, magic and legerdemain; 9) statements of ideological parties; and 10) stories of alchemists and craftsmen.

**Ibn Hazm's Classification.**<sup>33</sup> Ibn Hazm devoted two epistles to science classification: *Risālat al Tawqīf* and *Risālat Marātib al 'Ulūm*. He based his classification on the distinctions he made between two major categories: a commendable category inside the sphere of the teachings of religious law and reason and a blameworthy category located outside that sphere. The first category is subdivided into Islamic law (e.g., those sciences related to the Qur'an, the hadith, jurisprudence, grammar, language, and histories) and sciences common to various nations (e.g., astronomy,

mathematics, philosophy, medicine, poetics, oratory, and rhetoric). These two parts form a single entity that, in turn, is organized into seven categories: Shari'ah sciences, language sciences, histories, astronomy, numericals, medicine, and philosophy. The second category includes the sciences of magic, talismans, alchemy, and astrology.<sup>34</sup>

**Ibn Khaldūn's Classification.**<sup>35</sup> Ibn Khaldūn, who devoted a chapter of his *Muqaddimah* to science classification, introduced the subject as "a chapter on categories of sciences known in civilized areas up to this day." He divides sciences into two categories. The first one consists of that to which one is guided by his/her mind or innate abilities. It is not restricted to one group of people, but rather is common to everyone. It consists of four essential sciences, as well as the sciences of wisdom and philosophy, namely, logic, natural science (i.e., medicine, agriculture, magic, talismans and alchemy, divinity, and numbers (*al ta'ālīm*; i.e., the branch sciences of numerals, geometry, astronomy, and music).

Sciences of the second category, which originate in the Qur'an and the Sunnah, are acquired by imitation, depend on revealed knowledge, and allow the mind no role other than finding links between branch and radical sciences. It includes the sciences of Qur'anic interpretation or commentary, methods of Qur'anic recitation, hadith, the fundamentals of jurisprudence, controversial issues, dialectics and jurisprudence, dialectic theology, and mysticism and dream interpretation. We can attach to these sciences, by way of introduction, those of the Arabic language, such as grammar, rhetoric, and literature. After commenting upon these sciences, Ibn Khaldūn rejected some, such as philosophy, astrology, and alchemy. It should be noticed, however, that both the classification and the critical chapters were part of a section of the *Muqaddimah* devoted to an educational investigation of teaching, its principles, and methods.

**Tāsh Kubrā Zādah's Classification.**<sup>36</sup> *Kitāb Miftāḥ al Sa'ādah wa Mishbāḥ al Siyādah fī Mawḍū'āt al 'Ulūm* by Tāsh Kubrā Zādah, is considered the greatest Islamic encyclopaedic work on science classification. His classification is based on the arrangement of material things within existence and is arranged in four ranks: writing, expression, minds, and essences. Sciences are all tied to these ranks. Those related to the first three ranks are instrumental, while those related to the fourth are either revealed law (*shar'*) or reason (*'aql*).

There are seven divisions, known as "trees" (*dawḥah*), and many "branches." These are, in order, the sciences of writing (two branches: sciences related to the writing craft and to individual letters); sciences related to utterances (three branches: sciences related to single words, to compound expressions and to Arabic); sciences investigating secondary mental concepts (two branches: instrumental sciences that protect from error in action [logic] and those that protect from error in debate and dis-



cussions, i.e., investigation, argument, and controversy); mental sciences (most important branches: divinity, natural sciences, and mathematical sciences); practical sciences (most important branches: ethics, home management, political sciences); revealed sciences (most important branches: Qur'anic recitation, hadith narration, Qur'anic interpretation, knowledge of hadith, fundamentals of religion, the fundamentals of jurisprudence, jurisprudence); esoteric sciences and sciences of character and *tasawwuf* (mysticism; most important branches: worship, manners and customs, perils, and deeds leading to salvation).

## Characteristics of the Innovative Orientation

Even a casual review of these classifications will show that they have broken free, as regards their general structures and internal connections, from the Aristotelian model. No longer do we find the duality "theoretical" and "practical" or the hierarchical arrangement that considers the more abstract sciences to be more advanced.

These classifications are based on principles that differ from those of the Aristotelian archetype: similarities and proximity of sciences, as we see in the works of Ibn al Nadīm and Ṭāsh Kubrā Zādah, and in the duality of the commendable and the blameworthy, as we see in Ibn Hazm, or in the duality of the sciences of the mind and the sciences of tradition, as in Ibn Khaldūn. Despite differences in appearances, these relationships have caused these classifications to possess a host of attributes that mark a clear tendency to formulate an original Islamic classification methodology. We shall now explore these attributes by analyzing the classification structure along with some illuminating lists and observations on theory that occur in these classifications.

*Realism.* This characteristic appears clearly in these classifications, whether in their starting point, structure, or objective. Its first aspect can be seen in their subject matter, namely, the sciences cited. These sciences have been gathered from the actual cultural and intellectual activity of the Islamic environment by means of a survey of existing sciences, regardless of whether they were used in the general educational system, in private circles of the Muslim and non-Muslim intellectual elites, or recorded in books and epistles.

Ibn al Nadīm was a bookseller who started in his classification of sciences from the reality of the various books in his possession. This can be gathered from his introduction, in which he says: "This book is a survey of books of all nations, Arab and non-Arab, written in the Arabic language on classes of sciences." Ibn Khaldūn struck a realistic note when he wrote in his work that this is a "chapter on categories of sciences known in civilization up to this day." Ṭāsh Kubrā Zādah followed the same methodology in his survey of sciences known to his generation in Turkey, then the centerpoint of the Ottoman caliphate and inheritor of the Muslim intellec-

tual legacy. Books on various sciences and fields of knowledge were available to him and formed the basis of his survey of sciences, as can be seen in his comments on every science, where he mentions the most important works written in every discipline.

Realism also appears in the fact that the sciences cited were not arranged according to the existence of their subject matter (e.g., elements of matter, states of matter, and immaterial beings). Rather, arrangement was governed by the reality of the sciences in their origins, development, their intergeneration, and their actual status in the epistemological awareness within the Islamic environment.

This concept is evident in the way sciences were arranged in directly or indirectly parallel circles. Ibn al Nadīm reflected this by presenting six chapters for religious Shari'ah sciences and four for ancient sciences and the like. It appears in the classifications of Ibn Hazm and Ibn Khaldūn as portions devoted to religious Shari'ah sciences and others for mental pursuits and in the decision to devote separate circles to commendable and blameworthy sciences. As for Ṭāsh Kubrā Zādah's classification, realism is seen in his devoting the first three trees to the sciences of instruments and the last four trees to those of objectives.

Within the framework of these circles, sciences were arranged according to closeness of ties, interconnectedness, and intergeneration. This was reflected by giving priority, in the circle of religious knowledge, to the Qur'an and its sciences, the hadith and its sciences, and only then the sciences of jurisprudence, creed, and language. This conforms to the reality of sciences in their originating from looking into the Qur'an and the hadith and in using these sciences to clarify matters in those two sources that are related to form and content.

The realism of these classifications also shows in their arranging sciences in accordance with the reality of Muslim intellectual needs. Furthermore, the arrangement is based on pedagogical considerations that seek to facilitate the pursuit of learning and education for Muslims in line with the higher aims of life as stated by the Islamic faith. This is why we see these classifications drawing closer to serving as a complete educational program for the Muslim ummah and being geared to meeting its needs rather than to serving as a philosophical classification of general human knowledge.

In pursuance of this goal, these classifications invariably make the Qur'an and the hadith pivotal to various religious sciences. This serves to stress the point that investigation in these sciences should be tied to the Qur'an and the hadith, the two original reference and source material fields for those sciences or indispensable tools for understanding, as is the case with linguistic sciences.

The realistic bent also shows in the distinction made by these classifications between commendable and blameworthy, as well as useful and harmful, sciences. This distinction can be seen explicitly in Ibn Hazm's classification and implicitly in those of Ibn al Nadīm and Ibn Khaldūn. In



either case, it is to be regarded as an educational guidance designed to encourage the quest of useful commendable learning and the avoidance of harmful and blameworthy learning.

This tendency is also illustrated by the additional explanations pertaining to the sciences' origins and development and listing the most important historical works in different sciences. This is clearly apparent in the works of Ibn al Nadīm, Ibn Khaldūn, and Ṭāsh Kubrā Zādah. The aim of these explanations is to make it easier for the student to acquire knowledge by indicating the sciences' historical development and major sources.

*Integration and Harmonization.* If we exclude those sciences considered blameworthy, then the remaining sciences, despite their differences, resemble a unified and harmonious pattern, just like the pearls of a pearl necklace, which differ only in location and size. This applies to the overall classification structure and the interrelatedness of the sciences, whether newly conceived or acquired.

Looking at the overall general structure, we find that the major divisions conform to an intellect favoring intercommunication and interconnectedness and not disjunction or discontinuity. This is why we do not find sharp divisions based on separating joints between divisions of sciences, as was the case with classifications influenced by Aristotelian thought.

Realism appears in the work of Ibn al Nadīm, whose chapters give top priority to the Qur'an and its sciences, and continues by citing sciences that can be seen as tools for understanding the Qur'an: grammar, literature, and poetry. These are followed by sciences related to standardizing Qur'anic interpretations, such as dialectic theology (*kalām*), jurisprudence, and hadith. As for philosophical sciences, he gives prominence to the reasons for translating three sciences into Arabic, suggesting that the caliph al Ma'mūn commanded this to serve the sciences of *tawhīd* and the Qur'an.<sup>37</sup> Thus, his divisions appear in a unified and harmonious manner.

Ibn Hazm's and Ibn Khaldūn's division of sciences into mental (*'aqlī*) and religious/revealed (*shar'ī*) should not be taken to mean that the division was based on a perceived contradiction between the two classes in content or objective. Rather, it was based on epistemological instruments and methodology, as indicated by the authors' statements. Thus, we find each one, as we shall see later, illustrating in several places the aspects of integration and inter-connectedness between mental and religious fields of knowledge. In addition to this, Ibn Hazm cites mental and religious sciences in another unified classification amounting to seven integrated parallel divisions, as we have seen. However, Ibn Khaldūn, in his division of mental and religious sciences, seems to apply rigorous dividing lines. But this applies only on the level of formal expression.

By moving from the general structure to the placement of individual sciences within the classification frameworks, we can discern the aspect of interconnectedness and unity among various sciences, whether religious or acquired. Moreover, this interconnectedness was used as a principle in placing different sciences in the general structure's framework, as seen in Ibn Hazm's statement that "sciences are all interrelated . . . They need each other and their sole aim is to attain knowledge of what leads to success in the Hereafter."<sup>38</sup>

Both Ibn Khaldūn and Ṭāsh Kubrā Zādah demonstrate the reality of intergeneration among sciences in preparation for their proper arrangement in the classifications. Ibn Khaldūn says that

There are many classes of traditionary (*naqlī*) sciences. This is because the accountable (Muslim) has an obligation to know the commandments God prescribed on him and his fellow humans. These are taken from the Book (Qur'an) and the Sunnah (the Prophet's way) through text or unanimity (*ijmā'*) or analogy (*ilhāq*). This is why it is incumbent (on us) to look into the Book by first explaining its utterances, and this is the science of interpretation (*tafsīr*), then by referring its reporting and narration to the Prophet, who relayed the revelation from God, and studying the differences in various versions in reading and reciting the Qur'an, and this is the science of recitation (*qirā'ah*). This is followed by studying the Sunnah, its ways of reference and looking into the reporters and narrators of hadiths, scrutinizing their circumstances and share of truthfulness so as to attain confidence in their reporting to know what should be done according to their reporting. These are the sciences of hadith. It follows from this that one needs to have knowledge of legal aspects in deducing commandments and judgements from the source texts. This is the science of fundamentals of jurisprudence. The end product is knowledge of God's commandments addressed to accountable people, and this is jurisprudence (*fiqh*). Then, commandments are of two categories: bodily and spiritual. The latter are concerned with faith (*īmān*) and what should be believed and what should not be believed. These are the articles of faith concerning the divine self and the attributes of God, things pertaining to fate, the Day of Resurrection, heavenly bliss, or chastisement.

Arguing for these articles through mental evidences constitutes dialectic theology (*kalām*). A prerequisite to studying the Qur'an and Sunnah is having knowledge of linguistic sciences as looking into the holy texts depends on these sciences which are divided into several categories: language, grammar and literature as we shall see.<sup>39</sup>



In the same vein, Ṭāsh Kubrā Zādah says:

Know that doctrinal sciences are of several classes: those related to traditionary sciences; understanding the traditions; arranging, clarifying, and supporting traditions with evidence or deducing commandments. Traditional sciences are concerned with one of two modes of revelation: if it is about the revelation from God relayed by the Messenger, then it is the science of Qur'an recitations; and if it is about traditions coming directly from the infallible Messenger, then it is the science of hadith reporting. As for understanding the traditions, it is also of two categories: if it is understanding God's speech, then it is the science of Qur'anic interpretation; if it is about understanding the Messenger's speech, it is the science of understanding hadith. Arranging and supporting hadiths are of two kinds: pertaining to opinions, or the fundamentals of religion, and concerned with actions, or the fundamentals of jurisprudence. Deducing commandments from source texts by evidence is the science of jurisprudence.<sup>40</sup>

Mental sciences acquired and adopted from other cultures were also arranged in the general structure's framework in such a way that they were integrated with religious sciences. Thus, Ibn Khaldūn does not hesitate to classify the science of inheritance distribution as a branch of jurisprudence involving numerical sciences, an acquired science, and treats it as an aspect of the meeting point between jurisprudence and arithmetic: "This craft or science (inheritance distribution) consists of a part of jurisprudence, that is judgments of inheritance in their various details, and a part of arithmetic, comprising the allocating of shares."<sup>41</sup> Ṭāsh Kubrā Zādah considers all mental sciences as branches of dialectic theology and uses their issues as premises for evincing doctrinal matters. In this context, he says, "it has been established in its proper place that the relationship between source and branch sciences is such that the subject matter of the branch science should be of the same kind of the subject matter of the source. Based on this, all sciences are considered branches of dialectic theology as its subject matter is the most general of all sciences."<sup>42</sup>

The drive for harmony between sciences, as can be seen in these classifications, stems from the perceived unity of their aim: serving religious truth. All sciences, therefore, were arranged in a single integrated pattern in order to realize this aim. Sciences considered as contradictory (i.e., that did not serve the common aim) to the mind and religious rulings were placed in a separate division and made the subject of critical comments designed to reveal their shortcomings. Such a classification of sciences within this critical context fit in perfectly with the objective of the overall classification, namely, that the commendable sciences serve the aim of fulfilling religious teachings and the blameworthy sciences should be avoided to protect people from their harm.

*Ideological Commitment.* It has already been stated that these classifications were formed in a pedagogical and educational manner; they certainly were not abstract classifications of general human knowledge. This means that they were committed to a certain goal, in this case the fulfilling religious teachings on the level of intellectual conviction or of actual behavior. This aim was the philosophical basis that determined their overall structure and in placement of different sciences within that structure.

Perhaps the most obvious demonstration of the general structure's commitment is the above-mentioned distribution between commendable and blameworthy sciences. This distinction was made explicitly in Ibn Hazm's work and implicitly in Ibn al Nadīm's and Ibn Khaldūn's. The blameworthy sciences are those that do not follow the teachings of the intellect or the faith and thus do not serve the objectives of religion (e.g., magic, legerdemain, and astrology). This is why analyses of them were followed by criticism revealing their falsehoods and their potential for serious harm. These analyses were of great clarity and stressed in all four classifications, which reflects the classifiers' profound awareness of the issue of commitment. Ibn Hazm expresses this in his commentary on astrology and alchemy:

Let everybody who has interest in science and who is sincere with himself know that changing of kinds and turning of innate natures are impossible; so anyone who occupies himself with these two sciences is a failure who is deprived of success and who seeks something that can never be.<sup>43</sup>

The same meaning is reflected in Ibn Khaldūn's statement that "religious law (Shari'ah) has placed the sciences of magic, talisman-making and legerdemain in one category and made it specifically illegal."<sup>44</sup> Nevertheless, despite the fact that the Shari'ah considers astrology and other blameworthy sciences to be harmful, a seeker after truth should not be totally ignorant of them, for he/she needs to know their practitioners' objectives and to be freed of the intense curiosity to understand them by seeing through their nonsensical claims and becoming assured of the impotence of their pursuits.<sup>45</sup> In this way, an examination of these sciences will change from a potentially harmful activity into an avoidance of harm.

The sense of commitment shows not only in the overall classification structure but also in the placement of individual sciences in proper places, whereby an individual science will be given priority depending on its goals. Ṭāsh Kubrā Zādah did this in his entire work, and Ibn Hazm and Ibn Khaldūn did so in several places.

This characteristic appears more clearly in the arrangement of the mental and acquired sciences than it does in the early ones. Later classifiers have given these sciences a status that represents a marked departure from their status in their original cultural contexts. This is reflected in reorient-



ing these sciences until they harmonize with the religious sciences and until they lead to the realization of religious truth. Sufficient evidence was given to establish the new status of the mental sciences.

In his classification, Ibn Hazm states that

the substance, fruit and proposed aim of philosophy is nothing but the reforming of the soul by resorting to virtues and good conduct in life which would lead to success in the hereafter, and good management at home and among people. This, and nothing else, is the aim of the religious law (Shari'ah).<sup>46</sup>

The same principle applies to arithmetic and geometry

as it is necessary to acquire enough knowledge of these sciences to determine the direction of the Ka'bah (for prayers) and the times of prayers. This is only possible with knowledge of the geographical nature of the terrain and astronomy. The truth of this statement is known only to those who know the essentials of dialectic theology. Arithmetic also provides necessary knowledge for distributing inheritance and war booty. Thus we see that acquiring this kind of knowledge is incumbent on Muslims.<sup>47</sup>

In the same vein, Ibn Khaldūn has this to say about the science of agriculture:

The ancients studied this science in a very generalized manner by looking at plants, the process of planting and growth, and at the special characteristics of plants and the similarity they bore to characteristics of planets as used in the field of magic. When Muslims looked into the contents of this book (Nabati farming), they omitted all references to magic.<sup>48</sup>

This observation about agriculture's status after being acquired and adapted by Islamic culture illustrates the characteristic of commitment. At the same time, it points out that all acquired sciences were supposed to be integrated in the Islamic view of science classification in such a way that they would be conducive to the general objective of the Islamic sciences, mainly, the service of religious truth.

*The Role of the Innovative Trend in Serving Islamic Thought.* If we observe this trend's development, we notice that its role has increased over time and has also achieved a greater comprehensiveness and maturity. Ibn al Nadīm's work, for example, was a kind of survey of sciences that placed sciences with similar natures or features together without the guidance of a clear classification principle. However, his survey was significant material for later classifiers, for it helped them to construct their

classifications on more logical bases. Thus, while Ibn Hazm uses the differentiation between commendable and blameworthy as the basis of his division, Ibn Khaldūn bases his on the differentiation between mental (*'aqlī*) and traditional (*naqlī*). Ṭāsh Kubrā Zādah, who began with existential considerations, was able to develop a more comprehensive classification.

The innovative tendency is apparent in the classification principles of these writers, who designed them with the overall aim of serving religious truth. It is reflected in Ibn Hazm's commendable–blameworthy classification and, more indirectly, in Ibn Khaldūn's mental–traditional differentiation. This shows that traditional sciences reveal religious truth, while mental ones are prone to error, and that the latter have to be reviewed and criticized constantly in order to lead to the expected result. The tendency is also manifested clearly in the numerous comments made by such people as Ibn Khaldūn and Ṭāsh Kubrā Zādah, who draw attention to the optimal direction of sciences in the service of faith.

The classification systems developed within these frameworks were able to encompass human knowledge as represented in different sciences acquired from different cultures. This was done while taking into account the new status of these sciences in the Islamic intellectual sphere, where they were in harmony with other sciences and used to highlight religious truths. A case in point is Ibn Khaldūn's valuable comment on the changes that occurred in the sciences of logic and agriculture after they were introduced into the Islamic environment: the un-Islamic topics of sophistry and magic were discarded. Mention may also be made of Ibn Hazm's censure of what he called "blameworthy" sciences, as well as Ibn al Nadīm's critical remarks on certain aspects of philosophy and antiquarian sciences in addition to myths, talismans, magic, and legerdemain.

We can see from the above that these classifications were based on a clear awareness of the differences between sciences that served the faith and those that did not. A strong educational and didactic motive is also noticeable. Such an orientation gave these classifications a clear ideological dimension and caused them to resemble a general educational system, the understanding of which would ultimately lead to an elucidation of religious truth in all its aspects.

There was also the added benefit of facilitating learning and the beneficent application of a wide spectrum of human sciences. This was achieved through a largely realistic arrangement and description of the sciences in their interrelated status. Such a classification was diffused in Islamic culture and had a great influence on Islamic thought. One aspect of this influence was probably the comprehensiveness of the scientific and practical tendency that characterized Islamic thought in general. More particularly, it helped create numerous scholars of prodigious encyclopaedic talent and knowledge who were able to assimilate seemingly



unrelated sciences and harness them for the benefit of the present life and the hereafter. Examples of such scholars are Ibn Rushd (Averroes), who joined jurisprudence, medicine, and wisdom; al Rāzī (Rhazes), who used most fields of contemporaneous knowledge to elucidate divine expressions in his great interpretation of the Qur'an; and al Suyūṭī, the author of massive compilations and classifications of all fields of contemporaneous human knowledge. The sciences used by these leading scholars, among others, were interconnected and coordinated in order to reveal the various facets of religious truth and to serve as a true (and inspiring) register of human achievement.

These classifications, or at least some of them, at times tend to show a certain confusion in their placement of sciences, in their arrangement of classes of sciences together, and in their arrangement of the branches of these classes. The reason for this is that the classifications were based on the actual reality of sciences' genesis and interaction rather than the purely abstract mental investigation of their logical status as they are supposed to be from a certain viewpoint. This latter method was used with borrowed classifications, which enjoyed more orderly divisions in appearance. Naturally, there is a great difference between a mental image of what should be and the arrangement of what actually is on the ground.

Such untidiness, when it occurs, is compensated for by a coherent internal logic, which is illustrated abundantly by the valuable comments and remarks punctuating and illuminating the classification process and helping to generate a better understanding of its internal structure. Thus, Ibn Khaldūn's mental-traditional separation and Ṭāsh Kubrā Zādah's mental-practical-religious separation, to choose two obvious examples, can be seen within a larger, integrative context. Be that as it may, the confusion remains a shortcoming, albeit one only on the surface.

While science classification in Islamic thought in its first (imitative) phase was more logical as regards overall structure and the placement of sciences, in its second (innovative) phase it was more logical in its internal pattern as it endeavored to establish interconnectedness between sciences, anchoring them to their reality, and directing them toward serving religious truth, which, in Islam, has been the driving force behind the development of many sciences.

## Endnotes

1. Probably one of the most obvious examples of this trend is Auguste Comte's classification, which he based on selecting positivist sciences of the post theological and metaphysical eras. See Muḥammad Waqīdī, *Mā Hiya al Epestimolojia* (Beirut: Dār al Hada-thah, 1983), 124.

2. For a Muslim view of culture see, Mālik ibn Nabī, *Mushkilat al Thaḳāfah* (Beirut: Dār al Fikr, n.d.), 57 ff.

3. Classical Islamic thinkers defined thought as "arranging known data to reach something heretofore unknown." See al Jurjānī, *al Ta'rifat*, 90. Also see Ibn Sīnā, *al Ishārāt* (Signs), 1:22; al Qāḍī 'Abd al Jabbār, *al Mughnī* (The Consummate Reference),

12:4; Aḥmad Fikrī, *Dustūr al 'Ulamā'* (The Constitution of Scholars), 3:23; Jamīl Saḥībāh, *al Mu'jam al Falsafī* (Dictionary of Philosophy), 2:155.

4. See Yūsuf Karam, *Tārīkh al Falsafah al Yūnāniyah* (Cairo: Maṭba'at al Ta'lif wa al Tarjamah wa al Nashr, 1936), 150-51.

5. See for example 'Abdu al Shimālī, *Dirāsāt fī Tārīkh al Falsafah al 'Arabīyah al Islāmīyah*, 4th ed. (Beirut: Dār al Ṣadr, 1965), 54 ff.

6. For more views on Muslim contributions to classification of sciences, see Kamāl Bakrī and 'Abd al Wahhāb Abū al Nūr, "Introduction" to the edition of *Miftāḥ al Sa'ādah* (Cairo: Dār al Kutub al Ḥadīthah, 1968), 38 ff; Ḥusām al Ālūsī, *Dirāsāt fī al Fikr al Falsafī al Islāmī*, 199; Jalāl al Dīn Mūsā, "Tasnīf al 'Ulūm 'ind al 'Ulamā' al Mus-limī," *al Muslim al Mu'āṣir* 11, no. 41 (Muḥarram/Ṣafar/Rabī' al Awwal 1405); 41; Louis Gordier and G. Qanawāfī, *Falsafat al Fikr al Dīnī bayn al Islām wa al Masīḥīyah*, trans. from French by Subḥī al Ṣāliḥ and Farīd Jabr (Beirut: Dār al 'Ilm li al Malayīn, 1967), 1:186 ff.

7. See al Kindī, *al Rasā'il al Kindī al Falsafīyah*, ed. Muḥammad 'Abd al Ḥādī Abū Riḍā (Cairo: n.p., 1952), 2:10; also Ja'far al Yāsīn, *Faylasufān Rā'idān: Al Kindī wa al Fārābī* (Beirut: Dār al Andalūs, 1980), 30.

8. Abū Naṣr Muḥammad al Fārābī, *Iḥṣā' al 'Ulūm*, ed. 'Uthmān Amīn, 2d ed. (Cairo: Anjilū-Miṣrīyah, 1968), 53.

9. Tāsh Kubrā Zādah, *Miftāḥ al Sa'ādah* (Cairo: Dār al Kutub al Ḥadīthah, n.d.), 1:324.

10. Al Fārābī, *Iḥṣā'*, 53-54.

11. Kubrā Zādah, *Miftāḥ*, 1:3

12. See al Fārābī, *Taḥsīl al Sa'ādah* (Hyderabad: n.p., 1346 a.h.), 44 (Quoted in al Yāsīn, *Faylasufān*, 82); and for Muslim views of science and its aims, see al Ghazālī, *Iḥyā' 'Ulūm al Dīn* (Revival of Religious Sciences), 1:8; Tāsh Kubrā Zādah, *Miftāḥ*, 1:19; and Ḥājji Khalīfah, *Kashf al Zunūn* (Unravelling of Intents), 1:3.

13. Abū Naṣr Muḥammad ibn Turkhān al Fārābī, known as the "Second Master" (Aristotle was the "First Master"), was born in Fārāb (modern Kazakhstān), but later moved to Baghdad, where he wrote most of his books. He traveled to Egypt and Syria and died in Damascus in 339 A.H. It was said he was fluent in Greek and most oriental languages known in his day. The following are some of his more celebrated books: *al Fuṣūṣ* (Gems [of Wisdom]), *Iḥṣā' al 'Ulūm* (Enumeration of Sciences), *Arā' Ahl al Madīnah al Faḍīlah* (Views of the People of the Righteous City), and *Jawāmi' al Siyāsah* (Maxims of Politics). For his biography, see al Yāsīn, *Faylasufān Ra'idān*, 55 ff, and al Shimālī, *Dirāsāt fī Tārīkh*, 225 ff.

14. Al Fārābī, *Iḥṣā'*, 53.

15. *Ibid.*, 111.

16. *Ibid.*, 120-21.

17. *Ibid.*, 130-31.

18. *Ibid.*, 131.

19. A clandestine organization that operated under the name of Ikhwān al Safā' wa Khillan al Wafā' wa Ahl al 'Adl wa Abnā' al Ḥamd (The Brethren of Purity etc.) in the city of Baṣrah in the middle of the fourth century A.H. Though declaring allegiance to Islam, the group was a religious-political organization that was very much influenced by philosophical and illuminist doctrines and derived its ideological standpoint from various sources. The group may well have been an Ismā'īlī sect. See Ikhwān al Safā', *Dā'irat al Ma'ārif al Islāmīyah*.

20. See *Rasā'il* (Epistles) of Ikhwān al Safā', 1:266 ff.

21. Abū 'Alī al Ḥusayn ibn 'Abd Allāh, known as Ibn Sīnā (Avicenna), was born in a village near Bukhārā (modern Uzbekistan), where he was brought up and educated. He traveled widely, but spent most of his time in Isfahān and Hamadān (modern Iran). He was essentially an Aristotelian philosopher with some illuminist tendencies. He was accused of being a member of the Bāṭinīyah (religious groups, often extreme Shi'ites, seeing hidden meanings in the Revelation). A few of his more famous works are *al Shifā'* (Healing), *al Qānūn* (Canon), and *al Ishārāt wa al Tanbīhāt* (Signs and Exhortations). He died in 428 A.H.



22. Ibn Sīnā, *Aqsām al 'Ulūm al 'Aqliyah*, 71 ff. See also al Ālūsī, *Dirāsāt*, 224 ff.
23. al Fārābī, *Iḥyā'*, 53.
24. *Ibid.*, 59.
25. Ikhwān al Safā', *Rasā'il*, 1:266.
26. al Fārābī, *Iḥyā'*, 131.
27. On the interconnectedness of Islamic sciences, see Muḥammad al Faḍīl ibn 'Ashūr, "Rūḥ al Ḥaḍārah al Islāmīyah," *Journal of al Zaytuniyah College* 1, no. 1, 7.
28. See Ibn Sīnā, *Aqsām*, 72.
29. Ikhwan al Safa, *Rasa'il*, 1:266.
30. See, for example, al Ghazālī's attempts at classification in *Ihya' 'Ulūm al Dīn*, 1:24 ff, and Ibn Tūmārt, *Risālah fī al 'Ilm*, 191 ff. For a detailed account, see 'Abd al Maḥdī al Najjār, *al Maḥdī ibn Tūmārt* (Tunis: Dār al Gharb al Islāmī, 1983), 105.
31. Abū al Faraj Muḥammad ibn Ishāq ibn Muḥammad al Naḍīm (d. 438 A.H.) was a bookseller in Baghdad. Most likely he was a Mu'tazili with Shi'i tendencies. His *al Fihrist* is considered among the most important books that dealt with the history of Islamic science and scientific writings up to his day. See Ibn Hajar, *Lisān al Mizān* (Hyderabad), 5:72.
32. Ibn al Naḍīm, *al Fihrist*, 2.
33. 'Aḥī ibn Aḥmad ibn Sa'īd ibn Hazm al Zāhiri (d. 456 A.H.), the renowned scholar of Muslim Spain, was born in Cordova. He served as a minister but later devoted himself to scholarship and writing and attained a high rank in the sciences, among others, of jurisprudence, hadith, and Islamic ideological parties. His *al Muhalla* (on jurisprudence), *al Aḥkām li Uṣūl al Iḥkām* (on the fundamentals of jurisprudence), and *al Faṣl fī al Milal wa al Ahwā' wa al Niḥal* (on religious and ideological parties) are some of his better known works. See Ibn Khallikān, *al Waḥyāt* (Beirut: Dār al Sadr, 1972), 3:234.
34. See Ibn Hazm, *Risālat al Tawfiq* and *Risālat Marātib al 'Ulūm*, in *Rasā'il Ibn Hazm al Andalūsī*, 1:43 ff. For a description of this classification, see Sālim Yāfūt, *Tasnīf al 'Ulūm 'ind Ibn Hazm*, 73 ff.
35. The celebrated historian, philosopher, and sociologist 'Abd al Raḥmān ibn Muḥammad Ibn Khaldūn (d. 808 A.H.) was born and brought up in Tunisia. His travels took him to al Andalūs (his family was originally from Seville) and Egypt, where he was appointed judge. His famous *al Muqaddimah* is the introduction to his history *al Ibrār wa Dirān al Muḥtadā' wa al Khabar fī Tārīkh al 'Arab wa al 'Ajam wa al Barbar*.
36. See Ibn Khaldūn, *al Muqaddimah* (Tunis: al Dār al Tunīsiyah, 1984), 527.
37. Aḥmad ibn Khalīl ibn Muṣṭafā Abū al Khayr 'Iṣām al Dīn (d. 968 A.H.) was a historian of Turkish descent. He worked as a teacher, a judge, and developed a considerable knowledge of the sciences of his day. His *Miftāḥ al Sa'adah* became a major book in its field.
38. For the reason behind al Ma'mūn's call for the translation of philosophical sciences, see Ibn al Naḍīm, *al Fihrist*, 339.
39. Ṭāsh Kubrā Zādah, *Miftāḥ*, 90.
40. *Ibid.*, 401.
41. *Ibid.*, 2:5.
42. *Ibid.*, 457.
43. *Ibid.*, 2:598. For further information on the integration of mental and religious sciences, see Yāfūt, *Tasnīf*, 82.
44. Ibn Khaldūn, *al Muqaddimah*, 68.
45. *Ibid.*, 473.
46. Ibn Hazm, *Risālat*, 20. For further criticism of harmful sciences (magic, talismans, and alchemy), see Ibn al Naḍīm, *al Fihrist*, 430; Ibn Khaldūn, *al Muqaddimah*, 486 ff; and Ṭāsh Kubrā Zādah, *Miftāḥ*, 338 ff.
47. Ibn Hazm, *al Faṣl*, 1:94.
48. Ibn Khaldūn, *al Muqaddimah*, 82, 465-866.