

## GHAZALI'S ATTITUDE TO THE SECULAR SCIENCES AND LOGIC

MICHAEL E. MARMURA (2)

### I

**T**he intellectual and religious career of Ghazali (d. A.D. 1111) represents, among other things, a turning point in the history of the Ash'arite school of dogmatic theology (*katām*), to which he belonged. This school was founded by Ash'arī (d. 935) who started his career as a member of the then leading school of *katām*, the Mu'tazilite, but rebelled against it, formulating a theology that reversed its basic tenets. With his successors, Ash'arism gradually gained ascendancy to become the dominant school of *katām*.

Ghazali's attitude toward science and logic<sup>1</sup> can only be understood against the background of the occasionalism and atomism this school endorsed and refined. The Ash'arites are noted for their denial of the concept of natural causation, that is, that there are acts that proceed from a thing's very nature or essence. Maintaining that action belongs only to a voluntary agent, they adopted the occasionalist view that causal efficacy resides exclusively with the divine will. They also denied Aristotle's theory of the eternity and potential infinite divisibility of matter, subscribing instead to a theory of contingent atoms and accidents. These, they maintained, are created *ex nihilo*, combined to form bodies, and sustained in temporally finite spans of existence by direct divine action. The orderly flow of these events, which constitutes nature's uniformity, has thus no inherent necessity: it is simply a habit (*'āda*) or custom (*sunna*) arbitrarily decreed by the divine will. Consequently, disruptions of this uniformity, that is, miraculous happenings, are not impossible.

It is not difficult to discern the primary theological motive of this metaphysics, namely, the defense of a concept of divine omnipotence. Here, however, we are not concerned with the particulars of Ash'arite theology, the specific doctrines relating to the nature of the divine attributes and to theodicy. To such doctrines Ghazali contributed little that was new, except, perhaps, a certain stylistic lucidity and verve in reexpressing them. His chief contribution to Ash'arism lay elsewhere. It lay in the task he undertook of defining the Ash'arite position in relation to the metaphysical and the other sciences expounded by the philosophers of medieval Islam.

This defining of position, from the Ash'arite point of view, was sorely needed. The tenth and eleventh centuries witnessed the rise of two related and imposing philosophical systems, those of Alfarabi (d. 950) and Avicenna (d. 1037). The metaphysics of these two philosophers was necessitarian and emanative, deriving ultimately from Aristotle and Plotinus. In their political philosophy, which was essentially Platonic, they identified the God of their metaphysical systems with the God of the Qur'ān by interpreting the latter's language metaphorically. This posed for the medieval Muslim the question: is this identification valid and legitimate? Moreover, the writings of these two philosophers included comprehensive treatments of logic, mathematics, and physics. Religious zealots were prone to condemn such secular, "foreign" sciences as contrary to Islamic teaching. What if these sciences were demonstrably true? Would not such condemnation result in detriment to religious principle? To what extent, if at all, did each of these sciences have an actual bearing on religion? It is to such questions that Ghazali in his *Tahāfut al-Falāsifa* (*The Incoherence of the Philosophers*) and other related writings addressed himself.

The criterion Ghazali employed in answering such questions was that of demonstrability. A science whose conclusions are not demonstrably true and which are in conflict with the literal assertions of scripture must be rejected. On the other hand, if what is demonstrably true contradicts the literal sense of scriptural language, then the latter must be interpreted metaphorically. Ghazali shared with the majority of medieval thinkers the rationalist view that God cannot enact what is self-contradictory. The Islamic philosophers' cardinal metaphysical doctrines, he tried to show in detail, failed to satisfy the conditions of demonstrative proof. Some, he argued, in fact were self-contradictory. Moreover, since these doctrines were not consistent with scriptural language, or its intent, as Ghazali understood it, he condemned many of them as heretical innovations (*bid'at*), some as constituting outright Islamic unbelief (*kufr*).

Unlike metaphysics, Ghazali held mathematics to be demonstrably true. But, he argued, it has no bearing on religious matters, nor, for that matter, is the study of it necessary for understanding metaphysics, contrary to what the philosophers claim.<sup>2</sup>

The two sciences that concern us most are logic and physics. As we shall see, Ghazali insisted that the philosophers' logic is a doctrinally neutral tool of knowledge and can be used to advantage in the defense of religion.<sup>3</sup> To understand his attitude to natural science, one must distinguish psychology, included in the Aristotelian scheme of things among the sciences of nature, from the purely physical sciences. In the *Tahāfut*, Ghazali undertook to refute Avicenna's psychology, condemning his doctrine of the soul's individual immortality that denies bodily resurrection, as constituting *kufr*.<sup>4</sup> (It should

be added in passing, however, that in other writings Ghazali betrays less aversion to this doctrine and that in general Avicenna's psychology had considerable influence on him.) Turning to Ghazali's attitude to the physical sciences, it is here that we are at once confronted with what appears to be a glaring inconsistency. He maintained that these are demonstrable and certain, and yet, in the seventeenth discussion of the *Tahāfut*, he criticises and rejects the principle of necessary causal connection, the cornerstone of Aristotelian demonstrative science. As we shall see, Ghazali attempted a resolution of this problem; an accommodation between the then current canons of scientific method and the occasionalism to which he was committed. This attempt is largely included in his logical writings, to which we must now turn. These writings, more than anything else, reveal his attitude to the philosophers' secular sciences.

## II

Ghazali wrote a number of logical treatises, some as independent tracts, others as parts of larger works.<sup>5</sup> These consist by and large of expositions of the fundamentals of Avicenna's logic. They are works of popularization of a high order, in which Ghazali strove to render this logic relevant to Islamic religious scholars by informing it with examples of legal and theological reasoning. For Ghazali endorsed Avicenna's logic and wrote these treatises urging his fellow theologians to accept it. There are also indications that Ghazali wrote some of these works partly for himself, as an exercise in self-instruction while he was mastering the subject. Whatever the theological motives that prompted his acceptance of this logic, he showed genuine interest in it. This preoccupation suggests that logic was the discipline of the philosophers that impressed him most.

These treatises reveal that Ghazali adopted a variety of means to render this logic acceptable and attractive to the Ash'arites. Some of these we have discussed elsewhere,<sup>6</sup> but here we are mainly concerned with two fundamental theses that underlie Ghazali's endeavor to promote this logic. Before we turn to them, however, something must be said about a third and most drastic effort of Ghazali's, namely, the argument he adopted in his *al-Qisṭas al-Mustaqīm* (*The Just Balance*). This independent tract, written in the form of a lively dialogue between Ghazali and a Shī'ite *ta'limī*—one who holds that the only source of true knowledge is the infallible *imām*—argues for the divine origin of logic. Here Ghazali maintains that the Qur'anic "balance" (*al-mīzān*) is the balance of knowledge, the criterion for testing the validity of arguments and identifies it with the three Aristotelian figures of the syllogism and the two Stoic conjunctive and disjunctive syllogisms. In explaining these he analyzes Qur'anic arguments, and shows that they possess the forms of these syllogisms. In brief, Ghazali sanctifies the philosophers' logic. But

this does not mean a rejection of logic's doctrinal neutrality. It remains a mere tool of knowledge, "the balance," and the balance by its very nature must remain impartial. But this impartiality, the accuracy of the balance, is now guaranteed by revelation.<sup>7</sup>

How sincere was Ghazali in all this? There is this much that one can say in his defense. The doctrine that the ultimate principles of all knowledge are first intuited by "the masters of intuition" (*arḥāb al-ḥudūs*) and then taught to others is a philosophical view expressed by Avicenna. It is, moreover, expressed in the same context in which Avicenna identifies intellectual prophecy with the direct intuition of all or most of the intelligibles.<sup>8</sup> Thus, while it is true that Ghazali has fundamental disagreements with Avicenna's theory of prophecy,<sup>9</sup> he does not object to this aspect of it, but in fact endorses it.<sup>10</sup> Hence it would be natural for him to seek the principles and basic patterns of logical argument in the revealed word. But whether or not this argument exonerates Ghazali, some of his critics remained unimpressed with the view he expressed in *al-Qisṭas*. Hence the wry remark of the Hanbalite lawyer Ibn Taymiyya (d. 1328):<sup>11</sup> "Stranger than this, [Ghazali] wrote a book he called *al-Qisṭas al-Mustaqīm*, attributing [in it logic] to the teachings of the prophets. He only learned it from Avicenna who learned it from the books of Aristotle."

We must now turn to the two main theses which Ghazali advocated in his logical writings. The first is that the philosophers' logic only differs from the logic already in use by the theologians in the terms it uses and in details. The second is that the philosophers' logic is simply a tool of knowledge, not committed to any philosophical view or doctrine. Both these views are expressed in the introductions to the *Tahāfut*, and the *Tahāfut* was intended in part to prove the second thesis, since Ghazali intentionally uses the terminology of the philosophers' logic and their patterns of reasoning to refute their own doctrines. But the theses are perhaps best expressed in *al-Munqidh min al-Dalāl* (*The Deliverer from Error*) where Ghazali writes:<sup>12</sup>

As for their logical sciences, none of these relates to religion either by way of denial or affirmation. They are no more than the study of the methods of proof and standards for reasoning, the conditions of the premises of demonstration and the manner of their ordering, the conditions of correct definition and the manner of its construction.

They simply affirm that knowledge is either conception, arrived at through definition, or assent, arrived at through demonstration. Nothing of this ought to be denied. It is the same kind of thing the theologians and religious speculative thinkers mention in their treatments of proofs. The philosophers differ from them only in their expressions and idioms and their more exhaustive definitions and classifications.

To what extent then was Ghazali justified in maintaining both these theses?

A consideration of the first—the thesis that the differences between the logics of *kalām* and philosophy are not essential—requires a brief review of the Ash‘arite doctrine of created knowledge of which their logic is an essential part. For the Ash‘arites, knowledge is either divine and eternal or human and created. Our concern is with the latter. Created knowledge, in turn, divides into two categories: (1) compulsory (*idtirāri*) or necessary (*darūrī*); (2) reflective (*naẓarī*), also termed “acquired” (*muktasab*).<sup>13</sup>

The first type of knowledge is created directly in us by God and we are compelled to accept it. It includes (a) self-evident truths, such as the law of excluded middle; (b) knowledge of the world around us attained immediately from the various senses; (c) self-knowledge, that is, knowledge of our own existence and our own physical and psychological states; (d) *tawātū*, “wide transmission,” that is, knowledge of particular events or geographical places obtained through numerous mutually corroborative reports.

Reflective, or acquired knowledge, on the other hand, is knowledge inferred from necessary knowledge. It is also created in us by God, but differs from necessary knowledge in that it is created together with the “power” that accompanies the acquisition. Whether this power plays a part in the process of acquiring this type of knowledge or whether it is a mere concomitant of the acquisition is a moot point in the interpretation of the notoriously ambiguous Ash‘arite doctrine of *kash*, “acquisition.” Whatever the metaphysical interpretation of this activity of *naẓar*, the important thing is that on the ordinary, common-sense level, it represents inferential knowledge. It includes, to begin with, the inference from effect to cause. The Ash‘arites, it must be remembered, denied the theory that there are natural or essential causes that necessitate their effects, but not the principle, which is quite different, that every temporal event must have a cause. On this principle they based their argument to prove God’s existence. There was, however, another sense of cause (*‘illa*, sometimes, *sabab*) used in *naẓar* that has a parallel in Islamic legal reasoning, namely, the ground or reason in analogical argument. This form of argument, sometimes termed, “reducing the unobserved to the observed,” *radd al-ghā’ib ilā al-shāhid*, involves transferring a judgment from one particular to another that resembles it in some respect.<sup>14</sup>

But what about Aristotelian and Stoic syllogistic inference? The fact that one may chance in Ash‘arite writings upon arguments that fit the Aristotelian syllogistic form does not mean much. For the question here is whether they consciously used such forms of inference with full knowledge of the rules and the answer to this is negative. The same seems to be true, although we are less positive about this, with respect to the Stoic hypothetical conjunctive syllogism, corresponding in its two modes to the *modus ponens* and *modus tollens*. Significantly, this is the one form of reasoning that Ghazali in his

*Tahāfut* goes out of his way to explain.<sup>15</sup> The situation is quite different<sup>15</sup> with the second type of Stoic syllogism, the disjunctive, where the connective “or” was used in the exclusive sense. This is the most common use of argument found in *kalām* literature and the theologians seem to have used it with full awareness of the rules. In fact, they had a technical name for it, *al-sabr wa al-tuqūm*, “probing and dividing.”<sup>16</sup>

What is striking about the division of knowledge into compulsory and reflective is that it parallels the philosophers’ distinction between the syllogism’s “matter,” *mādda*, and its “form,” *ṣura*. The matter of the syllogism involves the epistemological status of its premises; the form, the rules for valid inference. To take the formal aspect first, the philosophers’ logic is the more comprehensive as it includes, for example, the Aristotelian figures which, prior to Ghazali, were not included in *naẓar*. It also includes a more precise formulation of analogical reasoning which, for example, Alfarabi reduced to the first Aristotelian figure and which, probably following him, Ghazali urged his fellow theologians to adopt.<sup>17</sup> But there is nothing in the philosophers’ logic that conflicts with *naẓar*, so that Ghazali is at least justified in maintaining that the differences between the two are not essential.

As to the status of the premises of argument, it appears at first that Ghazali is even more justified in his thesis. For we find that all the types of knowledge included in the Ash‘arite category of compulsory or necessary, not excluding *tawātū*, are included in Avicenna’s category of demonstrative premises.<sup>18</sup> The converse, however, is not the case. This makes all the difference. For Avicenna also includes among demonstrative premises the class of tested propositions, *al-mujarrabāt*, and the related class of intuited propositions, *al-hadsīyāt*. Now, as we shall see, these are the premises in Avicenna’s logic whose certainty derives from the theory of natural necessary efficient causation, in other words, from the very theory to which Ash‘arite occasionalism is totally opposed. Here, not only Ghazali’s first thesis becomes questionable, but also his second.

### III

Ghazali’s second thesis, proclaiming the neutrality of the philosophers’ logic, also proclaims, in effect, the neutrality of Aristotelian demonstrative science, because it involves the premises of argument. Can one subscribe to Aristotelian science without subscribing to Aristotelian causal metaphysics? This causal question relates most obviously to the class of tested and intuited premises mentioned above and to which we shall later turn. But it also relates to an epistemologically prior class of empirical premises. These, termed by Avicenna, *al-mahsūsāt*, “the sensory premises,” relate to knowledge of particulars in the world around us attained immediately by our senses.

In Avicenna’s Aristotelian demonstrative logic, this class of premises is

based on a common sense causal theory of perception. For Avicenna, when the proper conditions obtain, man attains through his senses indubitable knowledge of particulars external to him. In visual perception, for example, these conditions would include the proper functioning of the visual organ, the presence of light, the proximity of the object and the absence of impediments in the intervening medium. A fundamental necessary condition is the natural causal power of the object to influence the sense organ.

The significant point here in comparing Avicenna's logic with that of the Ash'arites is that the Ash'arites also acknowledge the certainty of knowledge derived from sense perception. How can they do this while denying any natural causal power in the things that are said to affect our senses? If we press the logic of their position, drawing also on some explicit assertions of Ghazali,<sup>19</sup> their account of indubitable knowledge derived from perception would run something as follows: God, being benevolent, not malevolent, and hence not a deceiver, has so ordained the habitual course of nature that when He creates conditions corresponding to those in Avicenna's account, with the exclusion, however, of any causal property in natural things, He creates simultaneously in man indubitable knowledge of the object. In other words, knowledge and its object are two concomitant events with no direct causal connection. They are only indirectly connected in that both are caused by God.

This Ash'arite account of perception is really the key to Ghazali's treatment of the tested and intuited premises which he reinterprets on similar occasionalist lines. In Avicenna's logic, this latter class of premises relates to regularly associated events in nature. In the case of the tested premises, the association is fully observable. Thus, for example, we arrive at the certainty of the premise, "whenever fire touches cotton, cotton burns," by having repeatedly observed the contact of fire with cotton and the latter's conflagration. In the case of the intuited premises, the association is not fully observable, although it is dependent on the observation of regularities. Thus, Avicenna argues, from the observation of the regular behavior of the sun and the moon we intuit the fact that the moon derives its light from the sun.<sup>20</sup> This derivation we do not observe directly. In both these premises, however, the observation of regular sequences is a necessary condition for acquiring the certainty that these premises are true. But it is not a sufficient condition. Avicenna, no less than Ghazali, insists that mere observation only proves concomitance, not necessary causal connection. Along with observation, he argues, there is an implicit rational argument, "a hidden syllogism," to the effect that if in the past regularity had been coincidental or accidental it would not always have continued. From this he concludes that the regularity is essential and derives from the inherent causal properties in natural things.<sup>21</sup>

This argument, which represents an epistemological justification of the principle of nature's uniformity, has its genesis in Aristotle's *Physics*.<sup>22</sup> But from Avicenna's writings we can extract a more pervasive metaphysical justification. This we find in his discussion of contingent existents, the existents that in themselves are possible, not necessary.<sup>23</sup> Avicenna argues, in effect, that the existence of these possibles is not sufficiently explained by simply maintaining that they are caused by something else. One must maintain that they are caused necessarily, that is, that they are necessitated by something else. It is on this premise that he builds his proof for God's existence, since it is the chain of necessitated and necessitating existents that must be finite, requiring a first necessitating cause that is not necessitated. For Avicenna, the world proceeds from God as a chain of necessitated and necessitating existents. It is the immutability and eternity of this prime necessitating principle, God, that in the final analysis guarantees the perpetual regularity of the natural order.

Since this concept of a necessitating God is fundamentally opposed to Ash'arism, Ghazali does not accept it. On the other hand, he accepts the premises of Avicenna's epistemological argument but draws from them a different metaphysical conclusion. To see this in its proper context, a brief review of Ghazali's critique of natural causation is necessary.

In the *Tahafut's* seventeenth discussion, Ghazali argued that if any two events, habitually regarded as cause and effect, are two distinct things—a point, incidentally, the philosophers insist on—then the affirmation of the one and the negation of the other would not constitute contradiction. Hence neither the appeal to logic nor the appeal to empirical observation, which only shows concomitance, would prove necessary causal connection. For Ghazali this does not mean that the concomitance itself is not caused. When cotton, for example, is brought in contact with fire and the cotton burns, these events are all caused. But it is not the fire that enacts the burning. It is God who enacts this on the occasion of the contact of fire and cotton.

With this in mind, we turn now to Ghazali's discussion of the tested and intuited premises in his logical treatise, *Ma'yar al-'Ilm* (*The Standard for Knowledge*). He repeats the premises of Avicenna's epistemological justification of the principle of nature's uniformity. Since observation of regularity only shows concomitance, it does not suffice to prove universality. There is in addition the hidden argument that the observed invariance could not have been accidental or coincidental. The conclusion Ghazali draws from these premises, however, differs from Avicenna's. The invariance is not due to the natural causal properties in things. For Ghazali, these causal properties do not exist. The invariance, he holds, is due to divine voluntary action.

After discussing the tested premises, he writes:<sup>24</sup>

Someone may say: How do you consider this certain when the theologians

have doubted this, maintaining that it is not decapitation that causes death, nor eating, satiation, nor fire, burning, but that it is God, the Exalted, who causes burning, death and satiation at the occurrence of their concomitant events, and not through them?

We answer: We have already directed attention to the depth and true nature of this problem in the book, *Tahāfut al-Falāsifa*. Suffice it here to say that when the theologian informs the questioner that his son has been decapitated, the theologian does not doubt his death—no rational man would doubt this. The theologian admits the fact of death, but inquires about the manner of connection between decapitation and death.

As for the inquiry as to whether this is a necessary consequence of the thing itself, impossible to change, or whether this is in accordance with the passage of the custom (*sunna*) of God, the Exalted, due to the fulfilment of His will that can undergo neither substitution nor change, this is an inquiry into the mode of connection, not into the connection itself.

This passage speaks for itself. One should add, however, that just as in the case of perceptual knowledge of particulars, the knowledge is created in us by God, so too is the knowledge of uniform sequences. God creates both the natural regularities and the knowledge of these regularities. Moreover, God creates in man the knowledge that these regularities are not in themselves necessary, but can be disrupted without contradiction. When a disruption, that is, a miracle, occurs, God removes from our hearts knowledge of the past regularities and the anticipation of their continuity, creating instead knowledge of the miracle.

As we have tried to show in detail elsewhere,<sup>25</sup> Ghazali's occasionalist interpretation of the empirical premises of demonstration is capable in principle of giving a new account of Avicenna's highly sophisticated theory of natural efficient causality. In sum, Ghazali divests the Avicennian concept of efficient causes of the ideas of power and of necessity. He retains, however, the relational aspects of priority and posteriority, whether temporal or ontological, to enable him to maintain the distinction between what we habitually regard as causes and effects. Ghazali does not object to our using causal language with respect to natural inanimate things. He argues that verbs of action are correctly used in connection with inanimate natural things, but, he insists, this is correct metaphorical usage only.<sup>26</sup>

Our main concern here, however, is with Ghazali's attitude towards logic and demonstrative science as embodied in the two theses underlying his logical writings. (1) In the light of his occasionalist interpretation of the empirical premises of demonstrative science, can he still maintain that there are no essential differences between the logics of *kalām* and philosophy? (2) Moreover, can he still maintain that demonstrative logic is philosophically neutral?

As to the first thesis, what Ghazali has really shown—if we grant his theological presuppositions—is that the differences between the philosophers and the Ash'arites need not pertain to the epistemological claims of the empirical premises of demonstration, but that they only pertain to the philosophical justification of these claims. This thesis, then, would have to be modified accordingly. Regarding the second thesis, what Ghazali seems to have shown is not that demonstrative logic is philosophically uncommitted, but only that its philosophical commitment is not necessarily to an Aristotelian causal metaphysics. With such modifications of his theses Ghazali would probably have been satisfied, his chief concern in his logical writings being pragmatic—to induce the theologians to accept Avicennian logic.

The matter cannot rest here, however, for Ghazali's position, if pursued, destroys his second thesis. He holds that the Aristotelian theory of natural efficient causation is false. Needless to say, if the epistemological claims of natural science are true and if the Aristotelian causal theory justifying these claims is false, then natural science cannot be committed to this theory. The corollary to this seems obvious: If Ash'arite causal theory is the true one, then it alone can justify the epistemological claims of natural science. Thus demonstrative natural science becomes doctrinally committed and astounding as this may appear—committed to Ash'arite occasionalism.

Ghazali, in effect, has offered a theological justification of the principle of nature's uniformity. This uniformity is not necessary in itself, but is created by God who is powerful and good, who creates in us the assurance that, with the rare exception of miraculous happenings, this uniformity will go on uninterrupted. Ghazali's is ultimately a justification by faith, not Santayana's animal faith, but religious faith buttressed by rational arguments, often ingenious, at points cogent and incisive.

## NOTES

<sup>1</sup> For general expressions of this attitude, see al-Ghazali, *Tahāfut al-Falāsifa*, ed. M. Bouyges (Beirut, 1929), pp. 9, 13, 14, 17, 268, 71. This work will be abbreviated in the notes as *TF*.

<sup>2</sup> *TF*, pp. 14, 15.

<sup>3</sup> *TF*, pp. 15, 16.

<sup>4</sup> *TF*, pp. 297, 376.

<sup>5</sup> These include: 1) the first part of *Maqāyid al-Falāsifa*; 2) *Miṣṣāb al-Ilm*; 3) *Mihākik al-Nazar*; 4) *al-Qiyās al-Mustaḥḥim*; 5) the first part of the legal work, *al-Mustaḥḥim min 'Ilm al-Uṣūl*. One should also draw attention to the brief, but telling, discussion of logic in *al-Iqtisād*: al-Ghazali, *al-Iqtisād fi al-'Ulūm*, ed. I. A. Çubukçu and H. Atay (Ankara, 1962), pp. 15, 20. For the chronology of these works, see G. F. Hourani, "The Chronology of Ghazali's Writings," *JOS* 79, no. 1 (Oct. Dec., 1959): 225, 33.

<sup>6</sup> See the author's, "Ghazali on Ethical Premises," *The Philosophical Forum*, 1, no. 3 (1969): 393, 403.

<sup>7</sup> Al-Ghazali, *al-Qisfās al-Mustaqīm*, ed. V. Chelhot (Beirut, 1959), pp. 45-46.

<sup>8</sup> Avicenna's *De Anima*, ed. F. Rahman (Oxford, 1958), pp. 249.

<sup>9</sup> See the author's "Avicenna's Theory of Prophecy in the Light of Ash'arite Theology," *The Seed of Wisdom*, ed. W.S. McCollough (Toronto, 1964), pp. 159-78.

<sup>10</sup> *TF*, pp. 272-76; al-Ghazali, *Miẓān al-Amal*, ed. S. Dunya (Cairo, 1964), p. 207. W. Montgomery Watt, who in his "The Authenticity of the Works Attributed to al-Ghazali," *JRAS* 1952: 24-45, has argued that parts of the *Miẓān* are spurious, on p. 38 uses Ghazali's statement on prophecy as part of an argument relating to the dating of the work. Admittedly, the *Miẓān* is problematic, particularly as Ghazali in it seems to be shifting from an Ash'arite to an Aristotelian ethical theory. Nonetheless, to our mind Watt's arguments that parts of this work are not authentic are inconclusive.

<sup>11</sup> Ibn Taymiyya, *al-Radd alā al-Mantiqiyīn*, ed. S. Nadwi (Bombay, 1919), p. 15.

<sup>12</sup> Al-Ghazālī, *al-Munqidh min al-Dalāl*, ed. F. Jabre (Beirut, 1959), p. 22.

<sup>13</sup> See al-Bāqillānī, *K. al-Tamhūd*, ed. R.J. McCarthy (Beirut, 1957); W. Montgomery Watt, "The Logical Basis of Early Kalam," *Islamic Quarterly* 6, no. 1-2 (Jan. April, 1961): 2-10; 7, no. 1-2 (Jan. June, 1963): 31-39. For the sake of clarity, in what follows we have changed the Ash'arite ordering of the classification of necessary knowledge. Bāqillānī, for example, maintains that necessary knowledge is attained in six ways, five in association with the five senses. These we have classified under one category (b) below. Bāqillānī's sixth way includes what we have listed as categories (a), (c), and (d).

<sup>14</sup> Al-Ghazālī, *Miẓār al-'Ilm*, ed. S. Dunya (Cairo, 1961), pp. 165 ff. This work will be abbreviated as *MI*.

<sup>15</sup> *TF*, pp. 82-83; 304-305.

<sup>16</sup> *MI*, p. 156; al-Ghazālī, *al-Mustasfa min 'Ilm al-Uṣūl*, 2 vols. (Cairo, 1937), 1: 27.

<sup>17</sup> See note 14 above. For Alfarabi's formulation, see N. Rescher, *Al-Fārābī's Short Commentary on Aristotle's Prior Analytics* (Pittsburgh, 1963), pp. 36-37, 43-44, 93-95.

<sup>18</sup> Ibn Sīnā (Avicenna), *al-Ishārāt wa al-Tanbīhāt: I. Logic*, ed. S. Dunya (Cairo, 1953), pp. 389 ff.

<sup>19</sup> *TF*, 280 ff. See also al-Bāqillānī, *K. al-Tamhūd*, 11, par. 15.

<sup>20</sup> Avicenna defines intuition (*al-ḥads*) as an action of the mind that grasps by itself the middle term of a syllogism. See for example Avicenna's *De Anima*, 249. In the *Logic* he speaks of intuition as "an excellence of movement of this faculty [of mind] for snatching by itself the middle term." He goes on to write: "an example of this would be for a person to observe the moon and that it gives light according to its various shapes only from the side facing the sun. The mind then, seizes a middle term, namely that the cause of its light is from the sun." Ibn Sīnā (Avicenna), *al-Shifā': Logic V; Demonstration*, ed. A.E. Afifi (Cairo, 1955), p. 259; see also p. 64 where the mental power for grasping by itself the middle term is referred to as natural intelligence (*al-fiṭra*).

In the *Ishārāt* he writes: Among the [premises] that follow the same course as the tested premises are the intuited premises. These are propositions where the basis of judgment concerning them is a very strong intuition of the soul with which doubt is dispelled and to which the mind acquiesces. . . . An example of this is our judgment that the moon's light derives from the sun by reason of the varied forms of light in it [the moon]. In these [premises] there is also a syllogistic power and they are very similar to the tested [premises]." Ibn Sīnā (Avicenna), *al-Ishārāt wa al-Tanbīhāt*, vol. 1, *Logic*, ed. S. Dunya (Cairo, 1953), pp. 396-97. Ghazali's discussion of these premises in *MI*, 191-92, seems to be an expansion on Avicenna's statement in the *Ishārāt*.

<sup>21</sup> *Logic V; Demonstration*, 95, 96, 223.

<sup>22</sup> Aristotle, *Physics*, ii.5, 196b, 10-16.

<sup>23</sup> Ibn Sīnā (Avicenna), *al-Shifā': al-Ilahiyāt (Metaphysics)*, ed. G.C. Anawati, S. Dunya, M.Y. Musa, and S. Zayd, 2 vols. (Cairo, 1960), 1: 37 ff.

<sup>24</sup> *MI*, 190-91.

<sup>25</sup> Michael E. Marmura, "Ghazali and Demonstrative Science," *Journal of the History of Philosophy*, 3, no. 2 (Oct., 1965): 183-204.

<sup>26</sup> *TF*, 98-102.