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# Ghazali and Demonstrative Science

MICHAEL E. MARMURA

## I

MEDIEVAL ISLAMIC theologians subjected Aristotle's theory of the essential efficient cause to severe criticism and rejected it. This criticism and rejection finds its most forceful expression in the writings of Ghazali (al-Ghazālī) (d. 1111).<sup>1</sup> In his *Tahāfut al-Falāsifa* (*The Incoherence of the Philosophers*), he argues on logical and empirical grounds that the alleged necessary connection between what is habitually regarded as the natural efficient cause and its effect cannot be proven. He does not, however, take an agnostic stand on this question but proceeds to affirm two points: (1) that there is no causal agency in natural things; (2) that all natural events are the direct creation of God. Ghazali, moreover, does not confine such divine action to the realm of the inanimate and the irrational. In his *al-Iqtisād fi-l-ʿItiqād* (*The Golden Mean of Belief*), he affirms the doctrine that the individual human act, like any other occurrence in the world, is also the direct creation of God. Causal efficacy resides in God alone. But the divine act, for Ghazali, is not an essential act. It does not proceed as the necessary consequence of divine essence. It is the arbitrary decree of the divine will, an attribute coeternal, but not identical with divine essence. Ghazali thus denies essential action altogether. In all this, he gives expression to the occasionalism of the Islamic school of dogmatic theology (*kalām*) to which he belonged, the Ashʿarite school.

Ghazali had also a keen interest in logic. He wrote logical treatises for his fellow theologians, encouraging them to master this art as a tool to rebutt their doctrinal opponents. These treatises, in the main, sum up and explain the logic used by the Islamic philosophers—a logic that reflects the Stoic and Aristotelian traditions. Ghazali recognizes formal logic to be philosophically neutral, and hence in no way conflicting with his theology.<sup>2</sup> He does not confine himself to formal logic in these expositions, however, but discusses Aristotelian demonstration. And it is in his statements on demonstration that we seem to be confronted with paradox. Demonstrative science, as understood by the Islamic philosophers, rests on the theory of essential causes and functions in terms of it. Indeed, in his reply to Ghazali's rejection of essential efficient causes in nature, Averroes (Ibn Rushd) (d. 1198) argues

<sup>1</sup> Texts frequently referred to in the notes will be abbreviated as follows:

*Demonstration*: Ibn Sīnā, *Al-Shifāʾ*; *Logic V.*; *Demonstration*, ed. A. E. Affifi, revised by I. Madkur (Cairo, 1956).  
*Iqtisād*: Al-Ghazālī, *Al-Iqtisād fi-l-ʿItiqād* (Cairo: no date).  
*Metaphysics*: Ibn Sīnā, *Al-Shifāʾ*; *al-Ilāhiyyāt* (*Metaphysics*), ed. C. C. Anawati, S. Dunya, and S. Zayd, revised by I. Madkur (2 vols.; Cairo, 1960).  
*MI*: Al-Ghazālī, *Maʿyār al-ʿIlm*, ed. S. Dunya (Cairo, 1961).  
*TF*: Al-Ghazālī, *Tahāfut al-Falāsifa*, ed. M. Bouyges (Beirut, 1927).  
*TR*: Ibn Rushd (Averroes), *Tahāfut al-Tahāfut*, ed. M. Bouyges, Beirut, 1930).

<sup>2</sup> *TF*, pp. 15-17.

that such a rejection would render demonstrative science impossible. We would have no true knowledge; at best, only opinion.<sup>3</sup> For this staunch defender of Aristotle, the theory of natural efficient causality constitutes a necessary condition for demonstrative science. Yet Ghazali in his writings does not deny the claim that demonstration gives us certain knowledge about the natural order. On the contrary, he seems to be affirming this in both his *Tahāfut* and the logical treatise he appended to this work, *Mīyār al-ʿIlm* (*The Standard for Knowledge*). If Ghazali does in fact uphold this claim for demonstration, then he must either deny that the theory of essential efficient causality is a necessary condition for demonstrative science, or fall into contradiction.

At first glance, Ghazali's position in the *Mīyār*, where he gives his most comprehensive treatment of demonstration, is highly ambiguous and suggests contradiction. He seems for the most part to be reproducing the essentials of the Aristotelian demonstrative theory. Although in one section he reaffirms his rejection of necessary causal connection in nature, he nonetheless continues to use such terms as "cause," "effect," "necessity" and "certainty" in what appear to be purely Aristotelian contexts, giving the impression that he subscribes to such concepts in their original sense. In other words, he seems to be reverting to the Aristotelian theory of efficient causality, thereby affirming in the same breath what he denies.

Whether there is in fact such a reversion depends, as we shall try to show, on two considerations. We must first ascertain whether Ghazali is actually presenting a demonstrative theory to which he subscribes and is not merely expounding the views of others. If we find that he is presenting views he accepts, then we must consider whether he intended the causal language in the *Mīyār* to be taken at its face value, in the Aristotelian sense. We will, therefore, examine Ghazali's writings to see if we detect in them any conscious effort on his part to interpret Aristotelian scientific theory in occasionalist terms. We will approach these questions by directing attention in Part III of this paper to Ghazali's causal language in the *Mīyār* and the problems of interpretation it poses. We cannot fully appreciate this problem, however, without first saying something more definite about the causal theory in question and Ghazali's repudiation of it.

## II

Of the various Aristotelian causes, Ghazali in his *Tahāfut* is primarily concerned with the theory of the essential efficient cause as discussed by the Islamic philosophers, particularly Avicenna (Ibn Sīnā) (d. 1037). A detailed and often intricately argued discussion of this theory is to be found in various parts of Avicenna's *Demonstration* and *Metaphysics*. Here we can only attempt to extract what appear to us to be the very essentials of this theory. Before we turn to ontological considerations, it is convenient to begin by saying something about the more formal aspects of the theory. For Avicenna, when certain causal conditions obtain, the efficient cause and its effect are coextensive, the inferential relation between them, reciprocal. Some of these conditions may be summarized as follows:

<sup>3</sup> *TT*, p. 522.

(1) The efficient cause must be the proximate cause.<sup>4</sup> (2) It must be actual, and the effect in itself possible.<sup>5</sup> (3) It must be a natural cause, and for the effect to follow necessarily, the recipient of the action must exist. When the cause is not a natural cause, as for example, when it is a deliberative human faculty, the effect need not follow, even though the recipient of the action also exists.<sup>6</sup> (4) The efficient cause must be a free cause, i.e. there must be no impediment.<sup>7</sup> (5) It must be the sole efficient cause. The same effect may be produced by any one of a number of proximate efficient causes, but in this case the relation is not reciprocal. From the existence of any one of these proximate efficient causes (other causal conditions obtaining) we can infer the existence of the effect. But we cannot infer the existence of the cause from the existence of the effect. The relationship becomes reciprocal when the common element shared by these causes is ascertained and established as the one cause.<sup>8</sup>

These conditions, though necessary, are not always sufficient for the production of the effect. This is particularly the case with the events in the world of generation and corruption where all of the four Aristotelian causes are involved.<sup>9</sup> Any one of these four causes can be used as the middle term of a demonstrative syllogism, the other three, though not mentioned, are implicit and form the other necessary conditions. Properly speaking all four constitute the cause.<sup>10</sup> In his discussion of the ontological aspects of efficient causality in the *Metaphysics*, Avicenna simply speaks of the efficient cause without dwelling on these various conditions mentioned above, although he frequently alludes to some of them.

In the *Metaphysics*,<sup>11</sup> Avicenna states that the efficient cause, as distinct from the other Aristotelian causes, is that which brings about an existence other than itself. For the philosophers of nature (*al-ṭabīʿiyyūn*), this existence is motion in one of its forms. For the metaphysicians (*al-ʾilāhiyyūn*), however, and here we note Avicenna's emanative philosophy, the efficient cause is not confined to the production of motion, but—as with God in creating the universe—it also produces existence as such. Avicenna refers to the efficient cause as an essential attribute (*araḍ dhātīy*).<sup>12</sup> It is thus necessarily related to the agent's essential nature and is a specific kind of act determined by this nature. The action is also determined, however, by the essential nature of the recipient of the action.<sup>13</sup> Thus when both agent and recipient exist and the other causal conditions obtain, the effect proceeds by necessity.<sup>14</sup> This,

<sup>4</sup> *Demonstration*, pp. 299, 319-320.

<sup>5</sup> *Ibid.* *Metaphysics*, II, pp. 276-278; *MI.*, p. 293. This is a metaphysical condition that must be understood in terms of Avicenna's theory that every existent, other than God, is in its own essence only possible, but necessary through the essence of another (actual) existent. Avicenna also emphasizes the point that the efficient cause is the cause for making the potential actual, but is not the cause of a thing's non-actual existence, its potentiality. *Demonstration*, p. 297; *Metaphysics*, II, 260.

<sup>6</sup> *Demonstration*, p. 298.

<sup>7</sup> *Ibid.*, p. 96; *Metaphysics*, I, 180.

<sup>8</sup> *Demonstration*, pp. 322-324.

<sup>9</sup> *Ibid.*, pp. 181, 321.

<sup>10</sup> *Ibid.*, pp. 322-323.

<sup>11</sup> *Metaphysics*, II, 257.

<sup>12</sup> *Demonstration*, p. 140.

<sup>13</sup> *Metaphysics*, II, 271-272.

<sup>14</sup> *Metaphysics*, I, 166-167.

however, does not mean for Avicenna that there is any identity between the essential cause and its necessitated effect.<sup>15</sup>

The efficient cause gives from (*an*) its essence an existence to another thing which this latter does not possess. The existence's proceeding from that which is the agent is such that the essence of that agent is not receptive of the form of this existence, nor internally connected with it. Rather, each of the two essences remain external to the other, neither having the potentiality to receive the other.

Avicenna draws an important distinction between the accidental and the essential efficient cause. With the former, the priority of the cause to its effect is temporal as well as existential. With the latter, however, the priority is ontological, not temporal. The essential efficient cause and its effect coexist: the cause is necessary for both the production and the sustenance of the effect. Thus when the causal conditions obtain, the effect necessarily exists "with" (*ma'*) and "by" or "through" (*bi*) the cause, and when the causes cease to exist, the effect necessarily ceases to exist also.<sup>16</sup>

A proper understanding of Ghazali's rejection of the theory of essential efficient cause must take into account his theological motive. This motive pervades the *Tahāfut*. If God, as Avicenna holds, is the supreme essential efficient cause, then the world is the necessitated product of His essence. As such God cannot be a free agent. He cannot but create the world. It also suggests for Ghazali a more serious restriction on divine power. It denies God the attribute of life since it is only inanimate natural objects that are said to act by the necessity of their essence.<sup>17</sup> Moreover, if the order in the world consists of a chain of necessary connected causes and effects, such a chain cannot be disrupted without contradiction. Miracles become impossible, and the scriptural accounts of miracles cannot be accepted as literally true. The prophet through whom such scripture is revealed becomes a deceiver.<sup>18</sup>

Hence Ghazali concentrates his attack on the notion that action proceeds as the necessary consequence of a thing's essence or nature. Agency, he argues, relates to the will. Only a living, knowing, willing being can act.<sup>19</sup> And indeed, for Ghazali and the Ash'arites, the sole agent in the universe is ultimately the divine will.<sup>20</sup>

<sup>15</sup> *Metaphysics*, II, 259.

<sup>16</sup> *Metaphysics*, I, 184-189; *Metaphysics*, II, 264 ff.

<sup>17</sup> *TF*, pp. 96-97, 214-215, 221-222, *et passim*.

<sup>18</sup> *Ibid.*, p. 271 ff; *Iqtisād*, p. 111.

<sup>19</sup> See note 17.

<sup>20</sup> Thus Ghazali writes: "All temporal things, whether substances or accidents, those events that occur in both the animate and the inanimate, come into existence through the power of God, the Exalted. He alone creates them *ex nihilo* (*ikhtirā'an*). No created thing comes into existence through another; rather, all come into existence through divine power." *Iqtisād*, p. 47.

The Ash'arites hold that even the human acts are in reality the direct creation of the divine will. Those acts which we usually regard as voluntary are created by the divine will together with the *qudra* (power, ability) associated with them. What is normally regarded as acquired or achieved through man's action is in reality acquired for him by God. What we have, in effect, is the simultaneous creation of the act, the *qudra*, and whatever is said to be attained or acquired through such an act. This is the Ash'arite theory of *kasb*, usually translated as "acquisition."

In answer to the objection that if human acts are the direct creation of God, then there would be no difference between involuntary acts such as spasmodic movements and the deliberate acts, al-Ash'ari, and following him Ghazali, answer that in the case of the first type of

Divine action, moreover, is not conditioned by anything intrinsic to the divine essence or anything external to God. By definition, the divine will is that attribute that chooses between exactly similar alternatives when there is nothing to influence this choice.<sup>21</sup> And the effects produced by this will need not be simultaneous with such a cause. If simultaneity were a necessity, the world, which is the effect of the eternal will, would have to be eternal, as the Islamic philosophers hold. For Ghazali, the divine will decrees eternally the creation *ex nihilo* of temporal events, without this involving volitional effort simultaneous with the coming into existence of these events.<sup>22</sup>

The epistemological reasons for Ghazali's rejection of the theory of natural essential efficient causality and its corollary that the connection between the essential cause and its effect is a necessary one are given in the more familiar 17th discussion of the *Tahāfut*. Ghazali tries to show that a necessary causal connection can be proved neither logically nor empirically. As we have seen, Avicenna maintains that cause and effect are not identical. Ghazali does not dispute this, but points out its consequence. If cause and effect are not identical, then to affirm one and to deny the other cannot be contradictory.<sup>23</sup>

The connection between what is habitually believed to be the cause and what is habitually believed to be the effect is not necessary for us. But in the case of any two things, neither of which is the other and where neither the affirmation nor the negation of the one entails the affirmation or the negation of the other, the existence or non-existence of the one does not necessitate the existence or non-existence of the other; for example, the quenching of thirst and drinking, satiety and eating, burning and contact with fire, light and the appearance of the sun, death and decapitation, recovery and the taking of medicine, the bowels' movement and the taking of a laxative and so on to the inclusion of all observed connections in medicine, astronomy, arts and crafts.

act, the act is created without the *gudra* whereas in the case of the second type, it is created with this *gudra*. The difference between these two types of acts is something we actually experience. Ghazali adds that the knowledge of this difference is likewise created in us by God. Al-Ash'ari, *Kitāb al-Luma'* (*The Theology of al-Ash'ari*, ed. and trans. R. J. McCarthy, Beirut, 1953), pp. 41-42 (in Arabic text), pp. 59-60 (in English translation); *TF*, pp. 295-296.

The doctrine of the created *gudra* was an attempt to answer the problem of human responsibility, reward and punishment. Critics of Ash'arism argued that it evades the problem. See, for example, Averroes, *Kitāb al-Kashf 'an Manāḥij al-Adilla*, ed., M. J. Muller, in *Philosophie und Theologie von Averroes* (Munich, 1859), p. 105. See also Averroes' criticism of the Ash'arite definition of act, *TF*, p. 158.

<sup>21</sup> *TF*, pp. 37, 39-41.

<sup>22</sup> *Ibid.*, pp. 26-31.

<sup>23</sup> *Ibid.*, pp. 277-278. Some English translations give a different interpretation of the syntax and meaning of the second key sentence below that begins: "But in the case of two things. . . ." See S. A. Kamali's translation of al-Ghazālī's *Tahāfut al-Falāsifa* (Lahore, 1957), p. 185, and S. Van Den Bergh's, *Averroes' Incoherence of the Incoherence* (London, 1954), p. 316. Kamali translates *kullu shay'ayn laysa hādha dhāka wa la dhāka hādha* as follows: "Take any two things. This is not That; nor can That be This." Van Den Bergh translates it as follows: "each of two things has its own individuality and is not the other." Both translators take *laysa hādha dhāka* . . . as the predicate of *kullu shay'ayn*. This does not seem to us quite accurate and the sentence *laysa hādha dhāka* should be taken as a relative clause.

A passage in the *Iqtisād* where Ghazali uses the same construction and gives expression to substantially the same thought sheds light on this: "In the case of two things which have no connection with each other and which are then (*thumma*) associated in existence, it is not necessary that from positing the negation of the one, the negation of the other should follow," (*kullu shay'ayni la irtidāfa li ahadihimā bi-l-ākharī thumma-giarand fi-l-wujūdī, fa laysa yalzamu min taqdīri nafsi ahadihimā intifā'a-l-ākharī*). *Iqtisād*, p. 99.

The connection of these things is due to the prior decree of God, who creates them side by side, not to any inherent necessity in these things that would render their separation from each other impossible. On the contrary, it is within God's power to create satiety without eating, death without decapitation, to prolong life after decapitation and so on in the case of all concomitant things.

Nor is a necessary causal nexus observable in nature. Ghazali illustrates this by taking as his example a piece of cotton that burns when in contact with fire. Observation, he argues, only shows the occurrence of burning "with" (*ma'*) the contact of the cotton and fire, not the burning of the cotton "by" or "through" (*bi'*) the fire.<sup>24</sup> The burning, he maintains, is created by God: "The one who enacts the burning, by creating blackness in the cotton, disintegration in its parts and by making it tinder or ashes, is God, the exalted, either with or without the mediation of His angels."<sup>25</sup>

### III

This, then, is Ghazali's unqualified rejection of essential efficient causality in nature. Just as unqualified, however, is his defense of demonstrative science, which for the Aristotelians involves the causal theory he rejects. Hence the paradox. The paradox has its roots in the *Tahāful* itself. In the four short prefaces to this work, Ghazali makes it plain that his purpose is to refute the Islamic philosophers' metaphysical theories and not their natural science.<sup>26</sup> It is their metaphysical theories, he maintains, that are both undemonstrable and opposed to the principles of religion. Science involves no such opposition. Indeed, the misguided zealot who attacks science in the mistaken belief that he is defending religion, inflicts damage, not on science, but on religion. He inflicts this damage, Ghazali argues, precisely because science is demonstrable and certain. If it does, in fact, contradict religion, then it is the latter that becomes suspect and not science. He takes as his example a science that explains and predicts the eclipse:<sup>27</sup>

An example of this is the philosophers' statement: "The lunar eclipse consists in the obliteration of the moon's light due to the interposition of the earth, inasmuch as it derives its light from the sun, the earth being a sphere surrounded by the sky on all sides. Thus when the moon falls in the earth's shadow, the sun's light is cut off from it." Another example is their statement: "The solar eclipse means the presence of the lunar orb between the observer and the sun. This happens when the sun and the moon are both at their nodes at one degree."

We shall also refrain from attempting to refute such a theory, since this would be to no purpose. Whoever thinks that to enter into argument for the sake of refuting such a theory is a religious duty, inflicts harm on religion and weakens it. For such matters rest on demonstrations, geometrical and arithmetical that leave no room for doubt. Thus when one who studies these demonstrations and ascertains their proofs, deriving thereby information about the times of the two eclipses, their extent and duration, is told that this is contrary to religion, he will not suspect this science, but only religion.

To see why for Ghazali such demonstrations "leave no room for doubt," we must turn to his discussion in the *Mi'yār*. In this work he argues that a science can only

<sup>24</sup> *TF*, p. 279.

<sup>25</sup> *Ibid.*, pp. 278-279.

<sup>26</sup> *Ibid.*, p. 9 ff.

<sup>27</sup> *Ibid.*, pp. 10-11.

be demonstrative if its premises are certain. Hence a demonstration that gives us the universal explanation of the eclipse (or on the basis of such an explanation predicts for us individual eclipses) must rest on premises that are certain. These, as one would expect, include for Ghazali causal premises relating to the astronomical bodies in question. These are mentioned in the *Mi'yār* where he again uses the example of the eclipse to illustrate the relation between definition and demonstration. The example itself, however, is Aristotelian, as is the whole context, so that at first sight one is apt to conclude that the certainty of these premises derive for Ghazali from the Aristotelian causal theory. This brings us to the problem of Ghazali's Aristotelian language in the *Mi'yār*, which can perhaps be best conveyed by presenting those of his views that seem to be identical with Aristotelian theory.

Indeed, much of the account of demonstration in the *Mi'yār* seems to be a faithful summary of Avicenna's *Demonstration* which in turn is an exposition and an enlargement of Aristotle's *Posterior Analytics*. Thus, Ghazali tells us that the premises of a demonstration must be certain. The conclusion derived from such premises is likewise certain.<sup>22</sup>

True demonstration is that which yields something that cannot be conceived to alter; this, in accordance with the premises of demonstration. For these are certain and eternal, never altering nor changing. By this I mean that a thing does not change even when one is not aware of it, such, for example, as our saying, "the whole is greater than the part," "things equal to the same thing are equal to one another" and the like. The conclusion of such premises is also certain.

Certain knowledge consists in the knowledge that a thing is of such and such a nature, together with the assent that it cannot but be of such a nature. Thus when you attempt to entertain to your mind the possibility of error or to see it otherwise, you are initially incapable of so doing. For, if the possibility of error is attached to it, it is not certain.

Again, he writes: "Know that true demonstration is that which yields certainty which is necessary, permanent and eternal, whose alteration is impossible."<sup>23</sup>

From these statements one is apt to conclude that Ghazali identifies certain knowledge with necessary knowledge. At this stage, however, we shall anticipate and point out that his discussion of empirical premises is an indication to the contrary. It will become apparent that he holds the view that all necessary knowledge is certain, but not the converse, that all certain knowledge is necessary. Nonetheless, in the above examples he does not qualify his statements, and this illustrates and heightens the ambiguity of his language.

This failure to qualify can be seen in the causal language he employs in his discussion of the different types of scientific inference.<sup>24</sup> He discusses the two types of demonstrative syllogism that convey the Aristotelian distinction between knowledge of the reasoned fact and knowledge of the fact.<sup>25</sup> The first of these, *burhān lima*, literally, "demonstration of 'why?'," explains why a thing has a certain attribute. In this type of demonstration, the middle term is the cause of the major term. Ghazali distinguishes between two main kinds of *burhān lima*. With one kind, the

<sup>22</sup> *MT.*, pp. 245-246. Cf. *Demonstration*, pp. 78, 120.

<sup>23</sup> *MT.*, p. 255.

<sup>24</sup> *Ibid.*, pp. 243-245.

<sup>25</sup> *Posterior Analytics*, I, 13, 78a22-79a15.



middle term "is the cause of the conclusion and is not the cause of the existence of the major term itself."<sup>22</sup> Ghazali illustrates this with the following example: "Every man is an animal; and every animal is a body; therefore, every man is a body." In this case, he continues, "'animal' is the cause of predicating 'body' of 'man', not for the existence of corporeality." In the other kind, Ghazali tells us, the middle term is the cause of the *existence* of the major term as well as the cause of the conclusion. He gives an example of this second kind: "This piece of wood is burned because fire touched it."<sup>23</sup> This is a syllogism in compressed form which can be expanded as follows: Whenever fire touches wood, wood is burned; this piece of wood is touched by fire, therefore, this piece of wood is burned. Clearly it is this second kind of *burhān lima* that involves the causal question with which we are concerned. Henceforth, whenever we use the expression *burhān lima*, we will be referring only to this second kind.

The second type of demonstration, *burhān inna*,<sup>24</sup> literally, "demonstration of 'that'," gives us the fact, not the reason for it. Here, Ghazali tells us, the middle term is not the cause of the major term. Again, there are two kinds of *burhān inna*. The first involves the inference of the cause from the effect. (Whenever wood is burned, it has been touched by fire; this piece of wood is burned; therefore, it has been touched by fire). The second kind involves no such inference. Indeed, there is no direct causal relation at all between the facts referred to by middle and major terms. These facts in relation to each other are mere concomitants, whose constant association allowing us the inference of the existence of the one from the other is due to another single, direct cause, already established. In other words, these are the simultaneous effects of one cause already established, though not mentioned in this type of demonstration.<sup>25</sup>

*Burhān lima* and the two types of *burhān inna*, henceforth referred to as *burhān inna* (1) and *burhān inna* (2), can be illustrated by the following scheme where C stands for "cause," E, for "effect" and where E<sub>1</sub> and E<sub>2</sub> represent two constantly conjoined but not directly related facts, the simultaneous effects of one direct cause already established:

*Burhān lima*:

Whenever C, then E

C  
—  
E

*Burhān inna* (1):

Whenever E, then C

E  
—  
C

*Burhān inna* (2): Whenever E<sub>1</sub>, then E<sub>1</sub>

Whenever E<sub>2</sub>, then E<sub>1</sub>

E<sub>1</sub>  
—  
E<sub>2</sub>

and

E<sub>2</sub>  
—  
E<sub>1</sub>

The distinction between *burhān inna* (2) and the others becomes important when we attempt to reconstruct what Ghazali means by "cause" in his discussions of

<sup>22</sup> *MI.*, pp. 244-245.

<sup>23</sup> *Ibid.*, p. 243; *Demonstration*, p. 80.

<sup>24</sup> Sometimes called *burhān anna*.

<sup>25</sup> Ghazali does not give a scientific example to illustrate this but an analogous example from legal reasoning. Avicenna gives a medical example where two simultaneous symptoms or effects are due to the same cause. *Demonstration*, pp. 79-80.

demonstration. A critic may argue that in Ghazali's occasionalist scheme, where God or His angels are the only real causes of natural happenings, all purely scientific demonstration would have to reduce to the type *burhān inna* (2). We shall return to this point in Part V.

For the moment, however, it is significant that Ghazali seems to uphold *burhān lima* and *burhān inna* (1) in which we infer with certainty effect from cause and cause from effect, respectively. In other words, he seems to subscribe to a causal theory where the relation between cause and effect is reciprocal. Moreover, he seems to subscribe to all four Aristotelian causes and gives individual examples to show how each can form the middle term of *burhān lima*: "Know that each of the four causes can form the middle term in demonstration since each can be stated in the answer to the question 'why?'"<sup>38</sup> He gives an example to show how all four causes can be present in one definition:<sup>39</sup>

Whatever has a cause, must have its essential cause stated in the definition so that its essential form becomes complete. All four causes may enter the definition of one thing that has all these four causes. An example of this is his<sup>40</sup> statement concerning the definition of the Adz as a tool of craft, made of iron, of such and such a shape, by which wood is cut by chiselling.

It is in his discussion of the relation of demonstration to definition that Ghazali gives the example of the eclipse. He agrees with the Aristotelians that definition cannot be demonstrated, but he also agrees with them that we can arrive at a definition through the help of demonstration.<sup>41</sup> The demonstration can be compressed into a definition. He expresses this by stating that essential definition can appear in the premise, in the conclusion, or in both:<sup>42</sup>

An example of this is when you ask about the definition of the eclipse and say: "It is the obliteration of the moon's light due to the intervention of the earth between it and the sun." Thus, "the light's obliteration" is the conclusion of the demonstration and "the earth's intervention," the premise. For, in the exposition of the demonstration you say: "when the earth intervenes, light is obliterated." "Intervention" becomes the middle term of the demonstration, while "obliteration" is a major term and hence the conclusion of the demonstration.

In another place he speaks of the lunar eclipse as "necessary (*ḍarūrī*) at the time of the earth's intervention between it and the sun."<sup>43</sup>

We have given sufficient examples of the language used in the *Mi'yār* to indicate the problem of interpretation it poses. We can perhaps make the problem more concrete if we focus attention on the statements concerning the eclipse quoted above and read them in the light of Ghazali's discussion of the different types of demonstrative argument. The first of these statements is given, following Aristotle, to illustrate the relation between demonstration and definition. But if we examine the demonstration in question, we find that it is of the type *burhān lima* where the

<sup>38</sup> *MI.*, p. 258.

<sup>39</sup> *Ibid.*, p. 273.

<sup>40</sup> The reference is probably to Avicenna who uses the same example in the *Najāt* (Cairo, 1938), p. 85. He also uses a similar example in defining the sword in *Demonstration*, p. 300.

<sup>41</sup> *MI.*, pp. 275-277.

<sup>42</sup> *Ibid.*, p. 273.

<sup>43</sup> *Ibid.*, p. 344.

middle term is the cause of the major term. In other words, here it is asserted that the intervention of the earth between sun and moon is the cause of the eclipse. But in what sense of cause? The most natural way to read this is in the Aristotelian sense. That is, the *direct* efficient, essential cause is a natural cause, and not God or His angels. It is the intervention of an opaque body, the earth, between sun and moon. Moreover, the second statement above suggests that such an eclipse is the necessary consequence of such a natural cause. And such an interpretation would render these statements in manifest contradiction to Ghazali's denial of causal efficacy in nature.

Is this then a real contradiction, or can it be resolved? Two solutions to which we have already alluded in Part I suggest themselves. To begin with, there seems to be circumstantial evidence which suggests that Ghazali is not discussing a demonstrative theory to which he himself subscribes, but is simply explaining this theory to his fellow theologians. In support of this view, one may point out that such purely explanatory writing is not uncommon with Ghazali. The work which he wrote as a prelude to the *Tahāfut*, *Maqāṣid al-Falāsifa* (*The Aims of the Philosophers*), though mistakenly taken by some in the Medieval Latin West as an exposition of Ghazali's own philosophy, was simply an exposition of the Islamic philosophers' theories, many of which he attacks and rejects in the *Tahāfut*. Moreover, one of the motives for writing the *Mi'yār*, as Ghazali tells us in both the introduction to this work and in the *Tahāfut*, is to explain the technical logical vocabulary of the philosophers to his fellow theologians, to enable the latter to have a better understanding of the arguments of the *Tahāfut*.<sup>44</sup> And indeed, in the final sections of the *Mi'yār*, devoted to explaining philosophical definitions, Ghazali states explicitly that he is merely explaining these definitions, not asserting that they are true.<sup>45</sup>

The evidence for such a thesis, however, is far from conclusive. We are specifically concerned with the discussion of demonstration, and here there is nothing in Ghazali's language to suggest that he is merely explaining a theory to which he does not commit himself. In the introduction to the *Mi'yār*, he states that although one of his aims is to explain the philosophers' logical vocabulary, this is not his primary aim: his primary aim is to set down the correct rules of reasoning.<sup>46</sup> His statements that demonstration gives us certain knowledge are quite explicit.<sup>47</sup> There is, moreover, his defence of demonstration in the *Tahāfut*, and there is no evidence to indicate that in the *Mi'yār* he reverses his position on this question. It should also be added that the *Mi'yār*, though primarily a manual of logic, is not entirely such a work. Ghazali uses logical discussion (in the section on demonstration, for that matter) as a means to voice and defend his theological dogma.<sup>48</sup> Hence, we have little reason to suppose that Ghazali does not subscribe to the demonstrative theory he discusses.

The second solution is to interpret Ghazali as accepting the formal conditions for demonstration set down by Aristotle, but not the metaphysical justification of

<sup>44</sup> *TF.*, pp. 213, 1, 12, n. 8; *MI.*, pp. 60, 284.

<sup>45</sup> *Ibid.*, p. 285.

<sup>46</sup> *Ibid.*, p. 60.

<sup>47</sup> *Ibid.*, pp. 193-197.

<sup>48</sup> *Ibid.*

some of these conditions. Thus, according to this interpretation, Ghazali would accept the condition that the premises of a demonstration must be certain and its conclusion valid, but would reject the Aristotelian explanation of how some of these premises derive their certainty, substituting another explanation that accords with his occasionalist world view. In other words, he may hold that demonstrative science can be reinterpreted on occasionalist lines without this affecting either the formal conditions this science must satisfy, or its claims for attaining certainty. On these grounds, it may be possible to read the causal language used in the *Mi'yār* in occasionalist terms, thereby absolving him from the charge that he reverts to the Aristotelian causal theory. Does the text provide evidence for such an interpretation?

The answer is in the affirmative. Ghazali in both the *Tahāfut* and the *Mi'yār* not only shows complete awareness of the seeming discrepancy between his denial of necessary causal connection and his advocacy of the claims of demonstrative science, but gives us a clear indication of how he would resolve this by interpreting causal sequences on occasionalist lines. To say this, however, does not mean that he offers us anything like a systematic formulation of scientific theory in terms of his occasionalism. His statements, though explicit and concrete, are sparse and emerge in the form of answers to possible objections to his arguments. At best, we have no more than the basic elements of a theory of world order devised to account for demonstrative science. We also have the elements of an occasionalist epistemology that asserts that human cognitions are the direct creation of the divine will. It should be added here that we find in Ghazali's writings neither the detail nor the sophisticated discussion encountered in the treatment of related epistemological questions by Ockham and his contemporaries.<sup>47</sup> And it is here that we find difficulties, not only in ascertaining Ghazali's exact position on human knowledge, but also difficulties that seem inherent to his position, however it is interpreted.

In Part IV, we shall retrace some of Ghazali's views on demonstration in the *Mi'yār* in an attempt to extract his theory of world order. On the basis of this, we shall attempt in Part V to reconstruct more fully what he means by "cause" in his discussion of demonstration. In Part VI, we will consider his occasionalist epistemology in its relation to the question of miracles, and indicate some of the difficulties it poses.

#### IV

We must return once again to Ghazali's discussion of demonstration in the *Mi'yār* to determine what he means by world order. In this work, as we have said, he seems for the most part to be following Avicenna's exposition, giving us in effect, a clear summary of the latter's more exhaustive treatment of demonstration. He does not deviate from Avicenna in describing the methods of demonstration and setting forth the conditions it must satisfy. But when it comes to the philosophical justification of induction, he makes the all important departure from Avicenna: for it is here that the theory of causality is involved. As we shall point out, Ghazali

<sup>47</sup> See, for example, J. R. Weinberg, *Nicolaus of Autrecourt* (Princeton, 1948), ch. I, p. 9 ff.

uses Avicenna's argument to justify induction, but draws from it a totally different metaphysical conclusion.

The problem appears in the chapter on the substance or matter of the syllogism, *māddat al-qiyaṣ*.<sup>41</sup> The substance of the syllogism consists of its premises. If the syllogism in question is demonstrative, then its premises must be certain and its conclusion valid. At this point, Ghazali makes an observation that gives us an indication of his occasionalist epistemology. He states that when the premises of a demonstration "are presented to the mind in a certain order, the soul becomes prepared for the creation in it of the conclusion, from God, the Exalted."<sup>42</sup> He does not elaborate, however, and proceeds to discuss the central question for demonstrative science, the kind of premises that can be certain and how we arrive at them.

Ghazali enumerates four kinds of premises that can be certain, two of which are rational, the other two, empirical.<sup>43</sup> The first of the rational premises are the self-evident logical truths,<sup>44</sup> while the second are inferences involving the presence of a middle term correctly drawn from premises known to be certain.<sup>45</sup> These may include the conclusion of one demonstration that can be used as the premise of another. In this section, Ghazali does not tell us whether these two types of rational premises are created in us by God. His statement that the conclusion of a demonstration is created suggests that he holds that all rational knowledge is created knowledge.

The empirical premises consist, to begin with, of truths arrived at immediately by the senses (*al-mahsūṣāt*).<sup>46</sup> He gives as examples of this, our knowledge that the moon is spherical and that the stars are numerous. Ghazali also includes with this type of empirical knowledge our direct perception through the inner senses of our own psychological states. Here again, he uses Avicenna's psychological terminology. Ghazali refers to this type of knowledge, whether of external objects or of our inner states, as judgement. Thus reason is not denied a role in arriving at such empirical premises. However, he neither discusses this role, nor touches upon the causal question involved. He simply states that such immediate empirical knowledge is certain when the following conditions obtain: when the sense organ is sound; when the object known is within reach of the senses; when the medium between knower and object is not dense.

The second type of empirical premises<sup>47</sup> subdivide, in turn, into two kinds. Ghazali, again like Avicenna, refers to the first of these two kinds as *al-mujarrabāt*, "the empirically tested premises." The second are called *al-hadistiyāt*, "the intuited premises." In both kinds of premises, it is our knowledge of regular occurrences in the past that gives us the certainty that such regularities will continue in the future.

<sup>41</sup> *MI.*, pp. 182-193.

<sup>42</sup> *Ibid.*, pp. 183-184. This has parallels in Avicenna where the conclusion is an emanation from the active intelligence, the last of the celestial intelligences emanating from God.

<sup>43</sup> For the sake of convenience we have discussed these two together. Ghazali discusses self-evident truths, then empirical truths and finally inferences made through the presence of a middle term.

<sup>44</sup> *Ibid.*, pp. 186-187.

<sup>45</sup> *Ibid.*, pp. 192-193.

<sup>46</sup> *Ibid.*, pp. 187-188.

<sup>47</sup> *Ibid.*, pp. 188-192.

In the case of *al-mujarrabât*, however, the events regularly associated with each other are directly experienced by us. Thus, for example, we have direct experience of fire and the burning associated with it, the drinking of water and the quenching of thirst associated with it. In the case of *al-hadâthât*, the association is intuited. It is not directly experienced. Thus, we do not experience directly that the moon derives its light from the sun. What we experience is the regular behavior of the sun and moon. The inference based on this experience that the moon derives its light from the sun is ultimately intuitive. What is important, however, is that in both cases the experience of past regularities is a necessary—though not a sufficient—condition for acquiring the certainty that the regularities will continue in the future.

Ghazali's use of the term "certainty" in connection with this last type of empirical premise is somewhat ambiguous. At first sight he seems to be speaking of the psychological conviction that past regularities will continue in the future. But we can infer from the argument he uses to justify this belief that the certainty is not only psychological but is also epistemological. He states that it is not observation alone that gives us this certainty. Here, like Avicenna, he argues that in addition to observation there is a hidden argument, or, as he puts it, "a hidden syllogistic power," *qûwa qiyâsiya khafiya*, to the effect that if the orderly course of nature had been "coincidental or accidental, it would not have continued always or for the most part without deviation."<sup>55</sup> Thus far, Ghazali is in full agreement with Avicenna and with Aristotle who is the source of this argument.<sup>56</sup> But while Avicenna concludes that such uniformity is due to the inherent nature of things and events in question—to the fact that these have essential natures that connect them causally and necessarily to each other<sup>57</sup>—Ghazali denies this and arrives at a different conclusion. Events, he argues (with the specific and important exception of miracles) are always conjoined with other events in the same way, and it is this fact that allows us to derive this class of empirical premises. But this is not due to the existence of permanent natures inherent in things and necessary causal connections between things. There is order, to be sure; indeed, there is a connection. But the source of this order and of the connection is elsewhere. Immediately following his argument for the certainty of *al-mujarrabât* he writes:<sup>58</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 depths and true nature of this problem in the book, *Tahâfut al-Falâsifa*. It is sufficient 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, impos-

<sup>55</sup> *Ibid.*, p. 189; *Demonstration*, pp. 95, 96, 223.

<sup>56</sup> Aristotle, *Physics*, ii, 5, 196b, 10-16.

<sup>57</sup> *Demonstration*, p. 95.

<sup>58</sup> *MI.*, p. 58.

sible 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. Let this be understood and let it be known that to doubt the death of someone whose head has been severed is nothing but seductive suggestion [of the devil] and that belief in the death of such a person cannot be doubted.

This statement interposed in an otherwise Aristotelian discussion of demonstration makes all the difference to our understanding of Ghazali. Causal premises arrived at through the observation of nature's uniformity and through reason are certain, but not necessary. Although Ghazali does not elaborate, this statement—brief as it is—is sufficient to indicate the direction of his thinking: Nature proceeds in an orderly fashion and this fact enables us to obtain certain knowledge about it. But nature's uniformity is not due to any causal qualities inherent in natural things. The uniformity is decreed by the divine will "that can undergo neither substitution nor change."

## V

To say this about the divine will does not mean that what the divine will decrees is always uniform: it also decrees exceptions to the uniform pattern, the miracles. We will discuss this aspect of the theory in Part VI of this paper. For the moment we will consider what Ghazali says about the orderly sequence of events. At best, he has asserted that there is an orderly sequence and that this order derives not from the events themselves, but from God. But he did not indicate what sort of order this is. What is the relation between those *simultaneous* events which we normally regard as cause and effect? In Ghazali's scheme these are all the direct effects of God's action. How then can we call some of them causes? The difficulty is perhaps best illustrated by the criticism to which we alluded in Part III, directed against Ghazali's discussion of the different types of scientific inference.

As we have seen, he distinguishes *burhān lima* from two kinds of *burhān inna*. With *burhān lima* we infer the existence of the effect from the existence of the cause, whereas with *burhān inna* (1) we infer the cause from the effect. *Burhān inna* (2) involves a different type of inference. Here we have two constantly conjoined facts, the simultaneous effects of a single cause, already established: from the existence of either one of these facts we can infer the existence of the other. Now, as we know, Ghazali denies that there is agency in natural things, attributing all direct action to the eternal will. The real cause is this will. Thus a critic may well argue that the only kind of scientific inference open to Ghazali is of the kind *burhān inna* (2). The one direct real cause for Ghazali is this divine will, and the events which we normally regard as causes and effects are mere concomitants—the direct effects of this will. Ghazali can use the other forms of inference in theological arguments, as for example, in proving the existence of the Creator from the evidence of His creation (*burhān inna* (1)), but not in scientific arguments. Hence Ghazali appears to have failed to give a complete account of demonstrative inference.

We shall try to show that although Ghazali does not make himself explicit on this point, his position in fact does not reduce his field of inference to *burhān inna*

(2) alone. What he means by "cause" in this discussion can be reconstructed from his general position and sundry of his statements. One of the first indications that Ghazali recognizes in the word "cause" a meaning identical neither with "the divine will" nor with "the efficient natural cause" of the philosophers appears in the third discussion of the *Tahāfut*.<sup>22</sup> In this discussion, he insists that the term "agent" cannot be applied to inanimate things, except in a metaphorical sense. In the real sense, "agent" only applies to one who is living, knowing and willing. He argues that although every agent is a cause, not every cause is an agent. It is clear from the examples he gives denying agency to inanimate objects that when he maintains that not every cause is an agent, he is not referring to the other Aristotelian causes. He is speaking about a sense in which, for example, it can be said that fire is the cause of burning, without intending by this that the fire is the real agent. What then is this cause which is not an agent?

It is not difficult to see that what Ghazali is referring to is the occasional cause, or, to formulate a term more concordant with Ghazali's usage, "the habitual cause." The problem here is to set down some condition whereby we can differentiate the habitual cause from the habitual effect when both these are simultaneous events. But before we discuss this problem to see whether Ghazali's position allows us to make such a distinction, we must say something more about the term "habitual cause."

To begin with, this is not a term employed by Ghazali, but is suggested by his language. In his critique of causality in the *Tahāfut* he speaks of those things which are "habitually (*fi-l-āda*) believed to be the cause" and "habitually believed to be the effect."<sup>23</sup> He also speaks about the orderly course of nature as the custom (*sunna*) or habit (*āda*) of the divine will.<sup>24</sup> His language, however, can be misleading since he speaks at times as if the natural events themselves have the habit of occurring in a certain order. And Averroes in his interesting criticism of Ghazali's use of the term "habit" points out that if this term refers to the events themselves, then it should be changed to "nature" since "habit" is only applicable to animate things.<sup>25</sup> The implication of this criticism is that Ghazali would then be admitting that things have intrinsic natures that determine their action, a tacit admission of natural agency. But although Averroes is justified in taking Ghazali to task for not always being clear, his very criticism shows that Ghazali could not have intended that things have intrinsic "habits" that determine their course of action. For this is what Ghazali constantly denies.

What seems to be a just interpretation of Ghazali is that for him "habit" refers to two things: (a) the habit of God of creating events according to a certain order and (b) the habit in us of regarding this order as consisting of natural causes and effects. For although this order can be regarded as subjective from the divine standpoint, from the human standpoint it is something objective. What is it then in this order that corresponds to our habitual way of regarding one event as the cause of another?

<sup>22</sup> *TF*, pp. 96-103.

<sup>23</sup> *Ibid.*, p. 277.

<sup>24</sup> *Ibid.*, pp. 272, 285, 286, 296, 316; *MI*, p. 191.

<sup>25</sup> *TT*, pp. 523, 531-532.



In the case of the causes which the philosophers regard as accidental, where the cause antecedes its effect in time, one necessary aspect of this order is the temporal priority of the cause to the effect. Demonstration, however, is primarily concerned with the causes which the philosophers regard as essential, where the priority of cause to effect is ontological, not temporal. If Ghazali wants to subscribe to the different types of demonstrative argument in natural science, he must point to a non-temporal priority of one event, habitually regarded as the cause, to another, habitually regarded as the effect. He must do so, however, without committing himself to the philosophers' concept of ontological priority. This latter concept, as we shall see, entails the necessary existential dependence of one event upon another, which Ghazali denies. To put the problem in its proper historical context, we must dwell for a moment on the philosophers' concept of ontological priority and see its relevance to Ghazali. Once again we turn to Avicenna.

In the *Metaphysics*,<sup>66</sup> Avicenna discusses two types of ontological priority. In the first type, that which is ontologically prior is a necessary, but not a necessitating condition, for what is posterior. Number furnishes a good example of this. The number one is a necessary condition for the existence of a plurality of numbers. The number one, however, can exist without the existence of such a plurality, while the plurality cannot exist without the number one. In the second type, what is ontologically prior is both necessary and necessitating. And this is the case with the priority of the essential efficient cause to its effect. Without the cause the effect cannot exist and with the cause (other causal conditions obtaining) the effect must exist. Thus we can infer the existence of the cause from the effect and the effect from the cause. Avicenna reports and attempts to answer an objection to this theory of the ontological priority of the cause to its effect. That the theory presupposes for Avicenna his theory of the essential, efficient cause, is evident from his answer to this objection. The objection he reports is as follows:<sup>67</sup>

Someone may say: If each of the two things are such that if one exists, the other exists, and if one is raised from existence, the other is raised, then one is not the cause, nor the other, the effect, since neither has the better claim to be the cause than the other.<sup>68</sup>

In answering this objection,<sup>69</sup> Avicenna holds that the argument is ambiguous and sophistical. He distinguishes between the existence of cause and effect in reality (*fi-l-wujūd*) and their existence in the mind (*fi-l-aql*). He further distinguishes

<sup>66</sup> *Metaphysics*, I, 164-65.

<sup>67</sup> *Ibid.*, 167.

<sup>68</sup> The wording of this argument is clear. It is not the argument of someone who accepts essential efficient causality but is puzzled by the problem of determining the cause when both cause and effect are simultaneous in time and when the existence of either can be inferred from the existence of the other. Rather, it is the argument of someone who rejects the notion of essential causal efficacy. That is, of someone who concludes in this argument that in the case of two such existents, "one is not the cause, nor the other, the effect." One strongly suspects that Avicenna is reporting the argument of an occasionalist, in all probability an Ash'arite. At least, we do know that the Ash'arite al-Bāqillānī (d. 1013) uses a very similar argument against the theory that there is natural agency. See, al-Bāqillānī, *Kitāb al-Tamkīd*, ed. R. J. McCarthy (Beirut, 1957), p. 38, par. 67.

<sup>69</sup> *Metaphysics*, I, 167-179.

between the existence of cause and effect in the mind and the *indication to the mind* of their existence in reality. His reply may be paraphrased as follows:

It is true that when the existence of either cause or effect is in the mind, then the other must necessarily exist in the mind. It is also true that when the existence of either cause or effect in reality is present to the mind, the mind infers necessarily the existence of the other in reality. But this is not the same as saying that the existence of either cause or effect in reality results in the existence of the other. This is only true in the case of the cause, not the effect which can only exist when the cause exists. Again, it is not true that the existence of either cause or effect in reality means that the other must have existed in reality. This is only true in the case of the effect. The same applies when either of these existents is raised. The effect can only be raised when the cause is raised. However, when we know that the effect no longer exists, we know necessarily that this is because the cause has been raised. He then concludes:<sup>67</sup>

It is not conjunction that rendered one of the two existents necessarily the cause so that neither has the better claim to be the cause than the other, since with respect to conjunction they are at par. Rather, they differ because we supposed that the existence of the one is not rendered necessary through (bi) the other, but with (ma') the other, whereas in the case of the second, just as we supposed its existence to be with the other, likewise, we supposed it to be through the other.

From this we see clearly that Avicenna presupposes the theory of essential efficient causality. It should be observed, however, that his purpose here is not to prove this theory, but to point out the ambiguity of the objection to the theory of the ontological priority of the cause to the effect. In an earlier passage he gives a more graphic illustration of what he means:<sup>68</sup>

The mind is not at all repelled by the statement, "when Zayd moved his hand, the key moved," or "Zayd moved his hand, then the key moved." The mind is repelled, however, by the statement, "when the key moved, Zayd moved his hand," even though it is [rightly] said, "when the key moved, we knew that Zayd moved his hand." The mind, with respect to the temporal coexistence of the two movements, assigns a priority for one, a posteriority for the other. For it is not the existence of the second movement that causes the existence of the first; it is the first movement that causes the second.

This example and the assertion that the effect can only be raised when the cause is raised may suggest that Avicenna in these passages is making an appeal to an experimental criterion to determine the cause. This, however, does not seem to be his purpose. The discussion is more in the nature of a theoretical explanation, illustrated from an everyday experience. It is true, however, that the experimental criterion (when applicable) is not inconsistent with Avicenna's position.

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To return to Ghazali, then, if he is to maintain without inconsistency the different types of demonstrative syllogism within an occasionalist framework, he must be able to set down some condition whereby the habitual cause is in some sense prior

<sup>67</sup> *Ibid.*, 169.

<sup>68</sup> *Ibid.*, 165.

to the simultaneous habitual effect. He must set down a condition which does not commit him to Avicenna's theory of ontological priority.

This he can do by reinterpreting Avicenna's concept of ontological priority in occasionalist terms, divesting it of the notion of necessity. Thus he can argue that two simultaneous events, C and E, representing the habitual cause and the habitual effect, respectively, are so created by the eternal will, that whenever C occurs, E occurs with it, and whenever C does not occur, E does not occur. Furthermore, he can argue that the divine will has so decreed it that it is only when C is raised that E is raised, and not the converse. (Experiment, when feasible, can show this.) It is in this sense that C is prior to E. Such a priority, however, is not in itself necessary. The events as well as their order are in themselves utterly contingent. The divine will could have created the priority of E to C and it can create either C or E without the other. It so happens that it decrees (with certain exceptions) the constant conjunction of C and E and the constant priority of C to E.

Since, for Ghazali, we do have the certainty that there is such conjunction and such order, we can make inferences that are certain of E from C and C from E in accordance with *burhān lima* and *burhān inna* (1). Moreover, *burhān inna* (2) when used in science, not theology, would represent the case where E<sub>1</sub> and E<sub>2</sub> are simultaneous habitual effects of another single habitual cause, C, already determined. C in this case would not represent the real cause, the divine will, but the habitual cause.

## VI

Ghazali's occasionalism, however, was not primarily designed to justify demonstrative science, but rather to uphold the utter omnipotence of God and to account for miracles. Can Ghazali accept without inconsistency the existence of miracles and the claims of demonstrative science?

As we have seen, he holds that the uniformity of nature is decreed by the divine will "that undergoes neither substitution nor change." We have also indicated that to say this about the divine will does not mean for Ghazali that what this will decrees is always uniform. The eternal will that has decreed the uniform pattern has also decreed disruptions of this order at specific historical moments. These disruptions are the miracles. But the miracles do not occur at regular intervals and do not conform to any regularly experienced pattern. They cannot be known through the methods of science. Indeed, if they were, they would not be miracles. This latter point is not discussed by Ghazali, but is an Ash'arite position suggested by his teacher, the eminent jurisconsult and theologian, al-Juwaynī (d. 1085).<sup>68</sup>

From what we have seen of Ghazali's views, science in the strict demonstrative sense is premised by the theory that the orderly course of nature does not alter and we have the certain knowledge that it does not alter. This seems to be for Ghazali a necessary condition if science is to yield certain, not probable knowledge. But to maintain that there are disruptions of the natural order is to deny this premise. It would thus seem that if miracles occur, scientific knowledge cannot be

<sup>68</sup> Al-Juwaynī, *al-Irshād* (Cairo, 1959), p. 309 ff.

certain and if scientific knowledge is certain, miracles do not occur. This is the difficulty posed by Ghazali's insistence, despite his acceptance of miracles, that scientific knowledge is certain.

It is true that in his justification of induction, he argued that if the orderly course of nature had been accidental, "it would not have continued always or for the most part (*fi-l-akthar*)."<sup>70</sup> This latter disjunct might be taken as the saving clause for Ghazali's views on miracles. It could be interpreted as offering a probabilistic account of scientific knowledge, meant to accommodate miracles. But the text does not warrant such an interpretation. To be sure, Ghazali has a theory of probable knowledge. This, however, does not represent a shift from his position that science gives us certainty. His theory of probable knowledge parallels that of Avicenna. Both discuss syllogistic arguments where the premises are "true for the most part."<sup>71</sup> Whether such arguments are to be regarded as demonstrative, Ghazali tells us, depends on how strictly we wish to define "demonstration." Avicenna inclines to accept them as demonstrative.

What is significant about Ghazali's discussion of this type of syllogism is that it is totally unrelated to the question of miracles. He seems to be concerned with the problem of the complexity of the causal circumstances. When our knowledge of these circumstances is not complete, we rely on probabilities. Probable premises yield probable conclusions. When our expectations are not realized, this is due to a natural cause, an impediment. Ghazali does not say this in so many words,<sup>72</sup> but one of the examples he gives is illustrative: when one marries a healthy young woman and has relations with her, it is highly probable that she will bear a child. He does not suggest that if the woman fails to have a child, this is a miracle. The miracle is not an improbable event in this sense—indeed, if it were, it would not be a miracle. For the miracle is an actual disruption of the orderly sequence of events, not an unexpected event that in principle can be explained along natural causal lines. In brief, there is nothing in Ghazali's discussion of probable knowledge that suggests an attempt to resolve the conflict between belief in miracles and the theory that demonstration gives us certitude about the natural order. Does Ghazali then deal with this problem?

He does not tackle the question directly. An answer, however, is suggested in a related discussion where he is actually defending the view that things in themselves are utterly contingent against the objection that this would lead to absurdities. It is in this debate that he gives explicit, though brief, expression to his theory that knowledge is created in us by God. The context in which this answer is given is worth summarizing since it states some of the issues on causation and knowledge that concern us.

The problem appears in the seventeenth discussion of the *Tahāfut* where Ghazali reports and rejects two causal theories.<sup>73</sup> The first of these attributes changes in the world of generation and corruption to the causal action of one natural thing on

<sup>70</sup> *MI*, pp. 256–258; *Demonstration*, p. 122, 248–249, 305; *Metaphysics*, I, 180; Ibn Sīnā, *Kitāb al-Ishārāt wa-t-Tanbihāt*, ed. J. Forger (Leyden, 1892), pp. 80–81.

<sup>71</sup> This point is more explicit in Avicenna, *Metaphysics*, I, 180.

<sup>72</sup> *TF*, pp. 278–286.

another. The second denies this, maintaining that such changes are caused "by the giver of forms," one of the celestial principles regarded as an angel. According to this second theory, the sight of things is caused in us by such a celestial principle, not by the object itself. "The impression of colored forms in the eye," *intibā' suwar al-ahwān fi-l-'ayn* is given by this angel. The existence of light, of a sound pupil and of the colored object are necessary only in that they prepare the soul for the reception of the colored form from the angel.<sup>73</sup> This theory is closer to Ghazali's own view that explains all changes as caused by God either directly or through the mediation of His angels. He does not deny that sight in us is created by God; and although here he says little about the other conditions for sight, the presence of an object, of light and of a sense organ, these would be for him no more than the occasional or habitual causes. But the above theory differs from Ghazali's view in two important respects. It postulates that the celestial principle causes events in the sublunary sphere by the necessity of its nature. Moreover, the existents in this world have intrinsic potentialities and properties that determine the kind of action received. Thus, to use an example suggested, though not actually given by Ghazali, cotton differs from water in that it has the potentiality to burn whereas water has no such potentiality. The celestial principle cannot, therefore, cause water to burn. On the other hand, since the celestial principle acts by necessity and since the type of action it is capable of is conditioned by the potentialities in the recipient of the action, the celestial principle must, when the causal conditions obtain, produce fire in the cotton. This theory thus denies the literal truth of certain scriptural accounts of the miraculous escape of prophets from fire.

Ghazali denies both these points and argues for the utter contingency of things and the absolute freedom of God's direct action. He then reports and answers an objection to the position he has taken.<sup>74</sup> If the theory of the utter contingency of things is true, opponents may argue, then absurd consequences will ensue. For example, a man might be confronted with ferocious beasts or armed enemies bent on his destruction and yet he would not see them if God does not create for him sight of such dangers. One may leave a book at home to return and find it changed into a boy or an animal. It is in his answer to this objection that Ghazali expresses the view that human knowledge is a creation of God. He also deals with the problem posed by the acceptance of miracles. He writes:<sup>75</sup>

If it were established that the nature of the possible is such that there cannot be created for man the knowledge that it does not exist, then these absurdities will necessarily ensue. We are not left in a state of doubt by the illustrations you give because God creates for us knowledge that He did not bring about such possibilities.

<sup>73</sup> *TF.*, p. 281. As far as we know, this theory is not found in Alfarabi and Avicenna, the two philosophers Ghazali is concerned with. In Avicenna, for example, sensation, imagination and cogitation are necessary in that they prepare the soul for the reception of the intelligibles from the active intellect. It is thus the intelligible and not the image of the object that is received. One type of prophetic revelation involves the reception of images from the celestial souls (as distinct from the celestial intelligences). But this is not the case with ordinary perception. See M. E. Marmura, "Avicenna's Psychological Proof of Prophecy," *Journal of Near Eastern Studies*, XXII:1 (Jan., 1963), 51-52. See also *TT.*, p. 256, for Averroes' comments on the theory Ghazali attributes to certain philosophers who denied direct natural causal agency.

<sup>74</sup> *TF.*, pp. 283-284.

<sup>75</sup> *Ibid.*, pp. 285-286.

We did not claim that such things are necessary, but that they are possibilities that may or may not occur. The continuous habit of the occurrence of possibilities one time after another in a certain order, fixes in our minds the unshakable belief that they will occur according to past habit. . . . When God disrupts the orderly course of nature at the times [preordained] for such disruptions, this knowledge disappears from the heart and God does not create it.

Thus there is nothing to prevent there being something which is possible in terms of God's power, that God has the foreknowledge that although such a thing is possible He will not do it at certain times, and that He creates in us the knowledge that He will not do it at such a time.<sup>76</sup>

Ghazali does not elaborate. Although he gives us in this brief statement some indication of how he thinks the conflict between scientific knowledge and belief in miracles can be resolved, his position is not entirely clear. He suggests that "when God disrupts the orderly course of nature," knowledge of this order "disappears from the heart and God does not create it." In other words, just as the contingent order in the world can be disrupted, knowledge of this order can be abrogated and a new knowledge created instead. Much of our understanding of this argument depends on what Ghazali means in this context by our knowledge of the orderly course of nature. If this is the knowledge that such an order never changes, then the contradiction not only remains but involves further confusion.

An instance of our knowledge of such an orderly course may be represented by a causal premise of the form, "whenever C then E." One type of miracle, a disruption of this law, may be represented by the proposition, "C but not E," when it is understood that there is no other habitual cause, a natural impediment, to account for this. Clearly, the second proposition contradicts the first regardless of whether or not the first "disappears from the heart and God does not create it." Thus interpreted, Ghazali would be confusing knowledge as a psychological occurrence which, like any other event in the world, God may or may not create, with the assertive content of such knowledge. It also seems that he subscribes to the view that the truth of a proposition depends on whether or not one is aware of it.

This, however, is not the only possible interpretation of Ghazali. The last sentence of the passage quoted above is open to two interpretations.<sup>77</sup> It may be asserting that when God creates the miracle, he creates in us knowledge of this event at the time (or after) its creation. Read in this way, the statement simply repeats what has been said before. On the other hand, it may be making the additional assertion that God creates in us the knowledge that there are times when the orderly course of nature is disrupted (without specifying these times). This, at any rate, is how Averroes understands it, as is evident from the following statement introducing some of his criticisms of Ghazali:<sup>78</sup>

Ghazali's attempt to dissociate himself from these contradictions by stating that God creates for us knowledge that these possibilities will only occur at specific times, that is, at the time of the miracle, is not a true dissociation.

<sup>76</sup> *Fi dhālika-l-waqt*, literally, "at that time." It is not entirely clear whether Ghazali wants to say (1) that God creates in us knowledge that there are times when there will be disruptions, (2) that God creates in us knowledge of the disruption at the time of the disruption, or (3) both of these things.

<sup>77</sup> See note above.

<sup>78</sup> *TT.*, p. 531.

If we accept Averroes' interpretation, then we must read the passage as a whole as maintaining not only that God creates for us knowledge of the miracle at the time of its occurrence, but also that God creates for us the knowledge that there are specific times in history when the orderly course of history is disrupted. The knowledge that such an order does not change is provisional. Such knowledge has, as it were, the provision that this order will be temporarily interrupted at specific points in history, known to God, but known to us only at the time of their occurrence. The orderly course of nature, in other words, holds in the intervals between miracles. It is as though we are permitted to derive scientific certain knowledge on the basis of such an order, "unless told otherwise." A law of the form "whenever C then E" holds for interrupted periods.

Whether this second interpretation represents Ghazali's intention in the passage quoted remains an open question. It does, however, seem to be in harmony with his position as a whole, though it does not solve all difficulties. Some of these are inherent in the very occasionalism to which Ghazali subscribes. The fact of disbelief in miracles would have to be accounted for in a theology that attributes all human activity to the direct workings of the divine will. Disbelief, according to the Ash'arites, though forbidden by God, is nonetheless created by Him. It is not our purpose here to go into the theological and ethical controversy that raged in Medieval Islam around this question, except to point out that the one aspect of the problem that concerns us here, the epistemological, received least attention. Thus, for example when the founder of the Ash'arite school, al-Ash'ari (d. 935) argues that untrue beliefs are created in us by God,<sup>19</sup> he is concerned to show that such a thing does not imply the attribution of falsehood to God. He says very little about the epistemological issue involved; nor does Ghazali. If all beliefs, true and false, are created in us by God, then there is no criterion to establish which of these beliefs are true and which are false. Both the believer and the disbeliever in miracles may claim that what he holds is certain knowledge created in him by God.

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<sup>19</sup> Al-Ash'ari, *Kitab al-Luma'*, p. 52 (Arabic text), pp. 73-74 (translation), and n. 39 of the translation.