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PHILOSOPHICAL COSMOLOGY IN JUDAISM*

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I. Introduction

In this paper I shall examine the philosophical cosmology of medieval Jewish thinkers as developed against the backdrop of their views on time and creation. Following Samuelson, I shall distinguish philosophical cosmology, a term used to describe that enterprise which describes what the universe looks like, from cosmogony, which is concerned more properly with its origin.¹ In this paper I shall be concerned primarily with the former, although the latter will become relevant when we turn to issues of temporality.

In general it can be argued that our thinkers are committed to reconciling traditional Jewish beliefs with what they feel are the strongest points in Aristotle. The problems of creation and the continuum are both good examples of this attempted synthesis. Aristotle posits an eternal universe in which time is potentially, if not actually, infinite.² That is, Aristotle argues that since there can be no “before” to time, time was not created; neither was the universe. Jewish philosophers, however, almost without exception are committed to the belief that God created the universe. At the same time they want to accept certain aspects of Aristotle’s theory of time and the universe. Hence each thinker must reconcile for himself a number of strands in Aristotelian thought. Most important, Jewish philosophers must explain the existence of the universe in time.

The ontological structure of time, then, plays an important role

* I would like to thank Professor Y. Tzvi Langermann for his valuable comments.

¹ Norbert Samuelson, *Judaism and the Doctrine of Creation* (Cambridge, 1994), 1.

² Aristotle’s discussion of the eternity of the universe is contained in several places, most notably *De Caelo*, 1, *Physics*, 8.1, and *Metaphysics*, 12.6. For a recent discussion of these and other relevant passages, see Richard Sorabji, *Time, Creation and the Continuum* (Ithaca, NY, 1983), 276ff.

in thinking about cosmology. Many scholars have echoed Yerushalmi in identifying the linear view of historical time as the most important and distinctive contribution of Jewish thought.³ Historical thinking, the very idea of human events following one another in chronological order, is linked with an awareness of linear temporality. Surprisingly little attention, however, has been paid to the underlying metaphysical structure of time in Jewish thought. And yet that temporality is essential to Jewish thinking should go without saying. One need only point to the importance of time in the Jewish law (*Halakhah*); many of the commandments, for example, are subject to rigorous time conditions which affect the moment and nature of their performance.⁴

In this paper, then, I will trace the development of certain cosmological motifs in Jewish thought against the backdrop of the concept of time. Of the major cosmologies found in Judaism, I shall concentrate upon the Neoplatonic and Aristotelian traditions, with a particular eye to the interweaving of astronomy, cosmology and temporality in these two systems.

II. Ancient Greek Astronomy and Cosmology

Scholars have been careful to distinguish philosophical cosmology from astronomy. Largely the work of natural philosophers and physicists, cosmologists followed Aristotle rather than Ptolemy in their quest to offer a theory of the universe as an ordered whole.⁵ The formative classical texts included Aristotle's *De Caelo*, supplemented by relevant passages from the *Metaphysics*, *Physics* and *De Generatione et Corruptione*. Plato's *Timaeus* and commentaries upon *Genesis* presented an additional dimension to this corpus.

In the Aristotelian cosmology, the universe is a finite sphere whose center is at the earth. Nine primary concentric spheres (in turn divided into subsidiary spheres) rotate around the earth; these spheres form a compact whole with no vacuum. The super-

³ See for example Steven Jay Gould, *Time's Arrow, Time's Cycle*, (Cambridge, Ma., 1987), 11, who argues that most other systems, both before and after the Jewish view, have favored the immanence of time's cycle over the chain of linear history.

⁴ See *Berachot*, 2b, 26a; *Megillah*, 20a; *Kedushin*, 29a; *Shabbath*, 34a; *Pesahim*, 94a for examples.

⁵ Edward Grant, "Cosmology," in *Science in the Middle Ages*, ed. David Lindberg (Chicago, 1978), 266.

lunar heavens differ in composition from the sublunar bodies in that the former are composed of a single incorruptible element, aether, while the earth is comprised of the four elements. The order of planetary spheres, mentioned often in Jewish as well as in scholastic texts, was taken ultimately from Ptolemy (who modified the earlier order of Aristotle): the moon, Mercury, Venus, Sun, Mars, Jupiter and Saturn.⁶

The ultimate source of motion in this system is God, or the unmoved first mover.⁷ But did God move the first moving sphere as an active, efficient cause, or as a passive, final cause? Aristotle had attributed to all the celestial spheres a mover, the ultimate source of motion being God. Medieval thinkers, however, introduced immobile created intelligences to explain celestial motion. These separate intelligences move the orbs with both intellect and will.⁸ Each sphere has a soul or internal moving source; Maimonides identifies these spheres with angels.⁹

And yet, although cosmology and astronomy represented separate disciplines, as it were, nevertheless they intersected in the area of theory formation. As Pedersen has argued, tensions centered around the metaphysical status of mathematical theories in science.¹⁰ For on the one hand the universe, as described by Aristotle in *De Caelo*, was a material entity based on the laws of physics. On the other hand, mathematical astronomy made use of geometrical devices that violated these very laws of physics.

More specifically, both Aristotle and Ptolemy agreed that there must be a plurality of spheres to account for the motion of each planet. These spheres, as we have seen, were nested contiguously. On Aristotle's model there was a series of concentric orbs, each moving in a natural, uniform, circular motion, all sharing the earth as a common center. Ptolemy, however, recognized that Aristotle could not account for variations in the observed distances of the planets. He therefore introduced eccentric and epicyclic circles to account for planetary motions.¹¹ Medieval philosophers

⁶ For the *locus classicus* of this ordering, see Ptolemy, *Almagest*.

⁷ Cf. *Metaphysics*, 7.7; Maimonides *Guide*, I.72; 2.1. Unless otherwise noted, page references to the *Guide* will be to Shlomo Pines' English translation, *The Guide of the Perplexed* (Chicago, 1963).

⁸ Cf. Grant, "Cosmology," 285.

⁹ Cf. *Guide*, 2.6.

¹⁰ Olaf Pedersen, "Astronomy" in *Science in the Middle Ages*, ed. David Lindberg (Chicago and London, 1978), 321.

¹¹ For a brief introduction to the vast secondary literature dealing with this is-

were faced, therefore, with a dilemma: they could either reject the earth's centrality and abandon a vital part of Aristotelian physics, or they could accept a cosmology that was untenable from the perspective of the astronomers.¹²

When we incorporate into this discussion the ontology of temporality, issues become even more complex. The majority of Greek thinkers examined the notion of time against the backdrop of motion and change. This tendency is noted early on in Presocratic thinkers such as Heraclitus and Parmenides, and is amplified by generations of Greek philosophers. Aristotle's theory of time is developed against the backdrop of these discussions, most notably that of Zeno's paradoxes of motion. Aristotle's well-known passage in *Physics* IV asks whether time exists, or is real. He argues that since none of its parts exist, time itself does not exist: the past and future do not now exist, and the present instant is not a part of time since it is what Aristotle calls sizeless. Paradoxes arise from this characterization of time as a boundless instant, for it may be asked whether the present is always different: If it is, when does the present instant cease to exist; and if it is not, are we confronted with a ceaseless instant? Aristotle's view is also relational in that time is not a quantity in itself. Time and motion are interrelated, in that time is defined in terms of what is countable in motion. What happens between two nows is the essence of time. Aristotle's picture, then, is of a continuous, infinitely divisible quantity, the now moving through various stages of a line. But how does Aristotle reconcile this picture with the denial of an actual infinite? In order to account for the eternity of time, Aristotle argues that one must accept the existence of the potential infinite, that is, entities which can be increased without limit. In this way he claims the infinite can be applied to time.

III. Theological Considerations

How do these paradigms affect Jewish discussions of cosmology and temporality? Once we superimpose a theological framework

sue, cf. Grant, "Cosmology," 280ff; Pierre Duhem, *Le Système Du Monde*, (Paris, 1913-1959).

¹² Cf. Grant "Cosmology," 281. Grant goes on to describe a third alternative as well, namely one in which additional orbs are introduced according to which the variation in planetary distances was incorporated into a system of concentric planetary spheres. In this way both Aristotelian and Ptolemaic systems are salvaged.

onto these issues, matters take on an additional complication. For example, can the universe be both eternal and created; can the universe be infinite and yet contain existent creatures; can there be a first instant of creation? Clearly an answer to these questions will depend upon the texts we examine. From the perspective of temporality perhaps the most important word of Scripture is *b'reishit*, "in the beginning." The very term *b'reishit* designates the fact that there was a beginning, i.e. temporality has been introduced if only in the weakest sense that this creative act occupies a period of time. That in itself raises questions having to do not only with the beginning of time, but with the issue of creation *ex nihilo* vs. the eternity of the universe as well.

Out of these passages emerge several key issues which will occupy medieval rabbinic commentators and philosophers. First is how to interpret the term *b'reishit*: does the term already imply temporality, that is, does creation occur in time, or is time created along with the creation of the universe. Second, how do we understand the word *yom*, day, on day one, if those astronomical markers most associated with measuring day and night have not been created until day four; and finally, what general metaphysical sense emerges from these questions about the nature of time in this cosmology?

With respect to the first question, some rabbis postulated the pre-existence of time before creation. The issue is crystallized in the following talmudic passage:

[And there was evening and there was morning,"(Gen 1.3)] Said R. Judah b. R. Simon, "Let there be evening" is not what is written here, but rather "and there was evening." On the basis of that formulation we learn that the sequence of time had already been laid out." Said R. Abbahu, "on the basis of that same formulation we learn that the Holy One, Blessed be he, had been engaged in creating worlds and destroying them prior to the moment at which he created this one." Then he said, "This is the one that pleases me, but those did not please me."¹³

The significance of this passage lies in its allowing not only for multiple acts of creation, but for the very preexistence of time. Nachmanides, however, disagrees and suggests that time itself was created in the first instant. Commenting upon the phrase "and God divided the light from the darkness," he says:

¹³ Jacob Neusner, *Genesis Rabbah: The Judaic Commentary to the Book of Genesis, Volume I*, (Atlanta, Georgia, 1985), 33.

It is also possible for us to explain that when the heavens and earth emerged from nothingness into the something which is mentioned in the first verse, time came into being. For although our time consists of minutes and hours which belong to light and darkness, yet from the moment when the "something" came into existence "time" was attached to it. On this assumption heaven and earth were created and remained as they were for the space of a night without light; and He said "let there be light" and there was light, and He decreed that it should remain for the same space of time as the preceding (night) and later should be removed from the elements and so "there was evening and there was morning."¹⁴

This point is reiterated when, commenting on the phrase "And God called the light day," Nachmanides claims that "He states here that time was created and He fixed the span of day and span of night."¹⁵ Other interpretations are given as well, contributing to an ongoing commentary tradition to *Genesis* which is incorporated into subsequent philosophical texts.

IV. *Cosmology and Emanation Ontology*

Medieval neoplatonism, which was largely based on the writings of Plotinus and Proclus, dates from the ninth century. It provided the philosophical context for the thought of many cultivated Jews of the eleventh and twelfth centuries, and during the Arabic period it was more or less complemented by elements stemming from Islamic religious traditions and some Aristotelian ideas. Serious Jewish thinkers had to deal with Jewish neoplatonism if only because they saw in the speculations of certain neoplatonist philosophies cosmological notions that were quite compatible with their own attempts to characterize the nature of God and God's nature and relation to humans. Although not all Jewish thinkers supported neoplatonism, it was extremely influential on the formation of Jewish thought during the late hellenistic, roman and medieval periods.¹⁶ The Islamic school of neoplatonism most clearly influenced medieval Jewish writers. The work of Plotinus was transmitted in a variety of ways, most notably through the *The-*

¹⁴ Nachmanides *Genesis commentary*, 39. Compare to the following text: Why did God create at one particular instant and not another: R. Tanhuma opened [discourse by citing the following verse of Scripture]: "He has made everything beautiful in its time." (*qoh.* 3:11). Said R. Tanhuma, "The world was created at the proper time. The world was not ready to be created prior to this time."

¹⁵ Nachmanides, *Genesis commentary*, 39.

¹⁶ R. B. Harris, "Preface," in *Neoplatonism and Jewish Thought*, ed. L. E. Goodman (Albany N.Y., 1992), xi.

ology of Aristotle (a paraphrase of books 4, 5 and 6 of the *Enneads*), and through doxographies, collections of sayings of Plotinus which were circulated among religious communities.¹⁷ As we shall see, Jewish neoplatonic cosmology tried to overcome what Feldman has termed the “terrestrial-celestial” dichotomy,¹⁸ by introducing a sophisticated theory of emanation to bridge the gap between superlunar and sublunar existents.

Isaac Israeli (c. 855-c. 955), a physician and philosopher, is considered to be the first Jewish neoplatonist. His works were widely circulated and translated into Arabic, Latin and Hebrew. Of his many surviving works, the *Book of Definitions* and the *Book of Substances* are the main sources of his philosophical ideas.¹⁹ In both these works Israeli develops his neoplatonic doctrine of emanation. The *Book on the Elements* is the most substantial, in bulk, of his extant philosophical writings.²⁰ The text is essentially an expo-

¹⁷ The *Theology of Aristotle* exists in two versions. The shorter (vulgate) version, belonging to a later period and found in many manuscripts, was the version first published by F. Dieterici. The second, longer version exists in three fragmentary manuscripts in Hebrew script, discovered by Borisov in Leningrad. For a recent scholarly study of the *Theology of Aristotle* and its impact upon Western thought, see Paul Fenton, “The Arabic and Hebrew Versions of the *Theology of Aristotle*,” in *Pseudo-Aristotle in the Middle Ages: The Theology of Aristotle and Other Texts*, (London: Warburg Institute, 1986), 241-264. Underlying the longer version of the *Theology of Aristotle* is an additional pseudographical work discovered by S.M. Stern and which he calls *Ibn Hasdai's Neoplatonist*. Stern has argued that the independent treatise *Ibn Hasdai's Neoplatonist* was incorporated into the long version of the *Theology of Aristotle*, that it strongly influenced Isaac Israeli's philosophy, and that it was preserved almost in its entirety in a Hebrew translation incorporated into Ibn Hasday's work *Ben hamelech vehanazir* (*The Prince and the Ascetic*). S.M. Stern traces the history and influence of this treatise, offering a reconstruction of the text, in his article “Ibn Hasdai's Neoplatonist—A Neoplatonic Treatise and his Influence on Isaac Israeli and the Longer Version of the *Theology of Aristotle*,” *Oriens* vol. 13-14 (1961), 58-120.

¹⁸ Seymour Feldman, “Cosmology,” in *Encyclopedia Judaica* I-XVI, Vol. V (Jerusalem, 1972), 982-3.

¹⁹ These were translated (or adapted) from the Arabic into Latin by Constantine the African (1087) and were thus introduced to Europe and included in the Salerno school. The entire treatise of the *Book of Definitions* exists in Hebrew and Latin translations; only a portion survives in the original Arabic. It opens with an account of Aristotle's four types of inquiry (whether, which, what, why) and an elaboration of al-Kindi's definitions of philosophy. Discovered by A. Borisov and edited by S.M. Stern, *The Book of Substances* seems to have been written in Arabic characters, though the extant manuscripts are in Hebrew script. See A. Altmann and S. M. Stern, *Isaac Israeli: A Neoplatonic Philosopher of the Tenth Century* (Oxford, 1958), 80.

²⁰ The Arabic original is lost, but it exists in two Hebrew translations, one of which was made by Abraham Ibn Hasdai at the request of David Kimchi and the second which exists in a Hebrew closer to that of the Tibbonists. The Latin translation is by Gerard of Cremona.

sition of the aristotelian doctrine of the elements, which the author identifies with that of Hippocrates and Galen, together with a criticism of differing conceptions regarding the idea of elements. Finally, the *Chapter on the Elements* (the *Mantua Text*) exists only in manuscript, at Mantua.²¹

The extant Israeli texts do not give a significant explanation of the concept of God or His creation. As a result, cosmological concepts must be pieced together from isolated discussions. God is described as a perpetually active creator who created the universe *ex nihilo* and in time, “and in acting is in no need of things outside Him.”²² He created the “first substance” and the “truly first genus” without mediator.²³ They came into being by His “power”²⁴ or by His “power and will.”²⁵ The simple substances and the sphere are generated from the power and will of the Creator, whereas the bodies are made by nature.²⁶ Israeli treats “power” and “will” as aspects of God identical with his essence or being—they are not hypostases as they are in the *Long Theology* and later neoplatonists such as Ibn Gabirol and Judah Ha-Levi.

In general Israeli’s cosmology describes the various stages of being as a series of emanations, or hypostases, from the intellect; the intellect itself is constituted by the union of first matter and first form, which are “created” by the power and will of God. Israeli thus upholds the notion of creation *ex nihilo* in the case of the first three hypostases, while adopting the Plotinian concept of emanation for the rest. Israeli distinguishes three cosmological processes. The first, creation *ex nihilo*, is used only for intellect which is created from matter and form, and is due to an act of power and

²¹ Attributed to Israeli by Altmann and Stern, this text is a commentary on a work by Aristotle. The *explicit* says that the aim of the text is to explain the words of the philosopher by way of arguments and proofs. See Altmann and Stern, *Isaac Israeli*, 118.

²² Isaac Israeli, *BSubst.* v. 12v: 91 (Altmann and Stern). As Altmann points out, Israeli appears to believe in creation *ex nihilo* and creation in time. This latter notion ill accords with the doctrine that God is “acting perpetually.” The passages relating to this view bear striking witness to Israeli’s neoplatonic background. The image behind them is that of emanation, of an eternal flow from the Divine source which is never exhausted and gives itself ungrudgingly. It also explains the motive of creation as stated by Israeli. Israeli does not solve this conflict. For further discussion, see Altmann and Stern, *Isaac Israeli*, 153.

²³ Isaac Israeli, *BDef.*, s 2, ll. 107-8; s 3, ll. 10-11: 27; 32 (Altmann and Stern).

²⁴ *Ibid.*

²⁵ Isaac Israeli, *BSubst.* iv. 5r: 85 (Altmann and Stern).

²⁶ Isaac Israeli, *BSubst.* v. 12v: 91 (Altmann and Stern). See Altmann and Stern, *Isaac Israeli*, 152.

will. The second, the process of emanation, is the logical and necessary order through which spiritual substances emanate. The third process accords with the causality of nature, or creation from something already existent and reflects the way corporeal substances are caused.²⁷ Hence the more perfect substances are created without the mediation of intervening stages—nothing stands between them and the creator. Only intellect is completely unmediated. Compared to the material world, the spiritual world is also unmediated.

Israeli shares the neoplatonic view that there is a common substratum or matter (absolute body which underlies the four elements).²⁸ The four elements come into being from the motion of the sphere.²⁹ They are simple, but this does not mean that Israeli rejects the view that they are composed of matter and form—spiritual substances, too, are simple, yet they are composed of matter and form.³⁰ Prime matter is the lowest grade of spiritual substance, both ontologically and morally. There is no ambiguity over the status of matter. The demonic function of matter is taken over by the force of darkness and shells which obscure human intellect. On this scheme shells represent the corporeal aspect of images.³¹

Whereas Plotinus describes intellect as emanating directly from the One, Israeli, following his pseudo-aristotelian source, interposes two simple substances—first matter and first form or wisdom—between the Creator and intellect as representing the first hypostatis.³² First matter is described as “the first substance which subsists in itself and is the substratum of diversity,”³³ whereas first form or substantial form is described as “impregnating first mat-

²⁷ This tripartite distinction is found in the *Theology of Aristotle* and Ibn Hasdai as well.

²⁸ Description of the origin of the elements in *Mantua s2* is based on *De Gen* ii.4. See Altmann and Stern, *Isaac Israeli*, 183.

²⁹ They owe their existence to the process of generation caused by the motion of the sphere.

³⁰ The natural qualities are said by him to be only “natural accidents” inherent in the substance of the elements because they do not constitute their essence. Heat, for example, does not constitute the essence of fire because there are hot things which are not fire. The statement “fire is hot” cannot be reversed. Fire is, however, properly defined as “a subtle, light, luminous body, tending to rise upward.” See Altmann and Stern, *Isaac Israeli*, 183.

³¹ This identification of matter with the demonic can be traced back to *Republic*. X. 611d. See Altmann and Stern, *Isaac Israeli*, 184.

³² Altmann and Stern, *Isaac Israeli*, 159.

³³ Isaac Israeli, *Mant.*, s1: 119 (Altmann and Stern).

ter,” and is identified with “the perfect wisdom, the pure radiance, and clear splendour.”³⁴ Like first matter, first form is created “by the action, without mediation, of the power and the will [of God].”³⁵

It is not entirely clear how Israeli distinguishes between wisdom and intellect. However, interposing first matter and form or wisdom between God and the intellect is a characteristic feature of Israeli’s metaphysical doctrine which Altmann claims can be traced back to his pseudo-aristotelian source. This interposition sets Israeli’s doctrine apart from the variant of neoplatonism based on the pseudo-empedoclean *Book of Five Substances*, where matter alone is interposed between God and intellect.³⁶ This introduction of an hypostasis of matter and form prior to intellect, foreign to the *Theology of Aristotle* and Plotinus, may have been motivated by theological considerations and a desire to allow for creation in time within the framework of neoplatonic cosmology.

Soul follows intellect in this triad of hypostases and is divided into a higher phase and a lower one, which Israeli calls nature.³⁷ The *Book of Substances* describes the three souls (rational, animal, vegetative) as the forms (specificities) of the three stages of living beings (humans, animals, plants).³⁸ The sphere, or heaven, is

³⁴ Isaac Israeli, *Mant.*, s1: 119 (Altmann and Stern). Altmann and Stern, *Isaac Israeli*, 159.

³⁵ Isaac Israeli, *BSubst.* iv 5r: 85 (Altmann and Stern). *The Book of Substances* says it is “the perfect wisdom, pure science and unmixed knowledge” (*ibid.*). Paraphrasing the Neoplatonic source, Israeli refers to it as “the absolute brilliance, i.e. the perfect wisdom,” *Book on Spirit and Soul*, s9: 111 (Altmann and Stern), while the *Book of Definitions* (s2, l. 59: 25 (Altmann and Stern)) refers to “the beauty and splendor of wisdom” as something distinct from “the light of intellect.” “The light created by the power of God without mediator” mentioned in *B Def.* (s2: 27 (Altmann and Stern, p 61 - 62)), is identical with wisdom. *Ibid.*, 159.

³⁶ *Ibid.*, 162.

³⁷ Other neoplatonic sources also equate the sphere with nature. There is no warrant for this in Plotinus—he only identifies nature with the vegetative soul. Following his pseudo-Aristotelian source, Israeli transfers Aristotle’s divisions of the individual soul (rational, animal, vegetative) to the universal soul, giving us three hypostases of soul, to which he adds as a final quasi-spiritual substance the “sphere” or heaven, representing the Plotinian hypostasis of nature.

³⁸ Isaac Israeli, *BSubst.* v. 12r: 91 (Altmann and Stern). They are analogous to intellect which is the “specificity of all things,” the “intelligibilia of the Creator” (*ibid.*, 12v), the archetypes, as it were, of all living souls which must be assumed to draw their life from them. Strangely enough, Israeli does not shed much light on the nature of the three universal souls beyond making them mere replicas, on a macrocosmic scale, of the tripartite division of the particular souls familiar from Aristotle’s *De Anima*. For further discussion, see Altmann and Stern, *Isaac Israeli*, 165.

the last of the “simple substances” and is an addition to the three souls. It holds an intermediate position, acting as a bridge between the spiritual and corporeal worlds. It has a lasting existence, but is not purely spiritual because its light is the least in brightness and it has matter in it. Its function is equated with that of nature. Composed of the fifth element, it is “unaffected by growth and decrease, coming to be and passing away,” and has a “lasting existence.”³⁹

V. *Philosophical Cosmology: The Aristotelian Challenge*

By the twelfth century, the influence of Aristotle had taken hold among Jewish philosophers. Maimonides’ major philosophical work *The Guide of the Perplexed* gave eloquent testimony to the tension apparent in trying to reconcile Aristotelian cosmology and physics with traditional Jewish belief. In the Introduction to the *Guide* Maimonides distinguishes two levels of interpretation, exoteric and esoteric, and suggests that it is sometimes incumbent upon a philosopher to conceal his own esoteric position behind the veil of exoteric doctrine.⁴⁰ Maimonides therefore introduced an ambiguity into the very reading and understanding of his texts, an ambiguity which has persisted to this day. The tensions surrounding how to read the *Guide*, and how to reconcile the *Guide* with more religiously focused works such as the *Mishneh Torah*, come to the forefront in his discussion of issues pertinent to philosophical cosmology. These issues comprise the relation between astronomy and cosmology, between astrology and astronomy, as well as his well-known discussion of creation.

³⁹ Altmann and Stern, *Isaac Israeli*, 166-167. This simple, perfect, circular movement also appears in the *Mantua Text* and *Book of Substances*.

⁴⁰ Note the following passages in the Introduction to the *Guide*: “For my purpose is that the truths be glimpsed and then again be concealed, so as not to oppose that divine purpose which one cannot possibly oppose and which has concealed from the vulgar among the people those truths especially requisite for His apprehension.” Also, “God, may He be exalted, knows that I have never ceased to be exceedingly apprehensive about setting down those things that I wish to set down in this treatise. For they are concealed things; none of them has been set down in any book...” Maimonides further describes seven sorts of contradictions commonly found in philosophical works and suggests that two of these (#5 and #7) may be used specifically to conceal potentially controversial or even heretical doctrines from the masses. He then states that any contradictions found in the *Guide* itself are intentional and are of type #5 or #7. Finally, Maimonides characterizes the doctrine of creation as a potentially volatile, and certainly an extremely challenging, topic.

Maimonides' analysis of astronomy and its relation to cosmology occurs in two works, in *Mishneh Torah* III-IV and in *Guide* I:72 and II:19-24. These two sets of texts present what recent scholars have presented as conflicting accounts. Unraveling the source of conflict will enable us to determine more fully Maimonides' attitude toward astronomy. In *Mishneh Torah* Maimonides offers the following description of the universe. The finite universe, comprising the four heavens, (*Shamayim*; *Rakiah*; *Zevul*; and *Araboth*), contains nine concentric spheres which circle the earth: the moon, Mercury, Venus, the sun, Mars, Jupiter, Saturn, the stars, and the sphere which moves from east to west. This ninth and largest sphere "includes and encircles all things."⁴¹ Each of the eight other spheres is divided into subspheres "like the several layers of onions."⁴² These spheres are "clear and transparent" and are contiguous, where "no vacuum intervenes." There are eighteen such spheres all of which revolve around the earth. In addition there are eight "small spheres" which do not revolve around the earth, but which are fixed in the larger spheres which do so revolve. These small spheres correspond to the epicycles introduced by Ptolemy. Ascertaining the science of these eighteen spheres, including their number, lines of movement, and courses in the heavens is what Maimonides terms the "science of mathematical astronomy (*hokhmat heshbon tekufot u-mazalot*), on which the Greeks composed many treatises."⁴³ The ninth sphere, divided into the twelve constellations, has no division or stars but reflects the stars in the eighth sphere. Each sphere and star has a soul which is "endowed with knowledge and intelligence."⁴⁴ Situated half-way between humans and angels, their knowledge is "less than that of angels and greater than that of human beings."⁴⁵ The sublunar realm contains the four elements, fire air, water and earth, again in contiguity to one another with no intervening vacuum. These four bodies have no soul, no knowledge, and hence are lifeless. They have a governing unalterable principle (*minhag*) and they form the basic elements of all created things.⁴⁶ The sub-

⁴¹ Maimonides, *Mishneh Torah: The Book of Knowledge*, trans. Moses Hyamson (Jerusalem, 1962), 37a.

⁴² *Ibid.*

⁴³ *Mishneh Torah* 37a-37b.

⁴⁴ *Mishneh Torah* 37b.

⁴⁵ *Ibid.*

⁴⁶ *Mishneh Torah* 38a.

stances formed by combinations of these four elements are called "individuals."

On the face of it, this extended description in *Mishneh Torah* captures the current Ptolemaic cosmology: the spheres are organized in an orderly fashion, with no vacuum obtaining between spheres; epicycles are introduced to account for variation in revolution; and spheres are endowed with intelligible souls responsible for their orderly motion. And yet, what complicates matters is that Maimonides offers a decidedly anti-Ptolemaic account in the *Guide* which appears incompatible with the *Mishneh Torah* account. Let us turn, then, to those passages in the *Guide* which contravene the account given in the *Mishneh Torah*.

In *Guide* I.72 Maimonides presents a cosmological scheme which shares some affinities with the picture found in *Mishneh Torah*. The sphere of the outermost heaven is comprised of the heavens, the four elements, and their composites. In this sphere there is no vacuum: it contains many spheres, "one contained within the other, with no hollows between them and no vacuum in any way whatever."⁴⁷ These spheres are spherical and all move in a "circular uniform motion," with some spheres moving more rapidly than others. The heaven itself (which encompasses the universe) moves all the other heavens "simultaneously with itself."⁴⁸ Maimonides goes on to point out that the heavens have different centers: "The center of some of them is identical with the center of the world, while the center of others is eccentric to the center of the world."⁴⁹ It is here that he clearly acknowledges the existence of eccentric orbits. The total number of spheres is at least eighteen. It is a matter of speculation, Maimonides avers, "whether there are epicycles, that is, spheres that do not encompass the world."⁵⁰

This cosmological picture is then amplified in *Guide* II:19-24. Maimonides argues, following Aristotle, that both the matter and the form of the spheres differ from that of the four elements, as reflected in the different types of motion exhibited by them. But he then points to several problems with Aristotle's attempts to explain why the sphere moves from the East and not from the West, and why some spheres move faster than others. Maimonides re-

⁴⁷ *Guide* I.72, 184.

⁴⁸ *Ibid.*

⁴⁹ *Ibid.*

⁵⁰ *Ibid.*, 185.

jects Aristotle's explanations on the grounds that "the science of astronomy was not in his [Aristotle's] time what it is today."⁵¹

Having rejected Aristotle's analysis, Maimonides presents his own version in *Guide* II.24. His main thesis is that the underlying premise of Ptolemy's *Almagest*, namely that "everything depends on two principles; either that of the epicycles or that of the eccentric spheres or on both of them,"⁵² is untenable. Maimonides' own contention is that these two principles are "entirely outside the bounds of reasoning and opposed to all that has been made clear in natural science."⁵³ In other words, Maimonides rejects Ptolemaic astronomy on the grounds that it conflicts with Aristotelian physics. The first principle is rejected on the grounds that the existence of epicycles implies that the "epicycle rolls and changes its place completely," hence undermining the Aristotelian dictum that things in the heavens are immovable.⁵⁴ He then offers other considerations, in the name of Abu Bakr, against accepting the doctrine of epicycles.⁵⁵

Following this analysis, Maimonides presents the following theoretical perplexity:

If what Aristotle has stated with regard to natural science is true, there are no epicycles or eccentric circles and everything revolves round the center of the earth. But in that case how can the various motions of the stars come about? Is it in any way possible that motion should be on the one hand circular, uniform, and perfect, and that on the other hand the things that are observable should be observed in consequence of it, unless this be accounted for by making use of one of the two principles, or of both of them? This consideration is all the stronger because of the fact that if one accepts everything stated by Ptolemy concerning the epicycle of the moon and its deviation toward a point outside the center of the world and also outside the center of the eccentric circle, it will be found that what is calculated on the hypothesis of the two principles is not at fault by even a minute...This is the true perplexity.⁵⁶

That Maimonides characterizes an astronomical conundrum as

⁵¹ *Guide* II.19, 308. Cf. also the comment in II.24 to the effect that in Aristotle's time "mathematics had not been brought to perfection."

⁵² *Guide* II.24, 322.

⁵³ *Ibid.*

⁵⁴ *Ibid.*, 322-3.

⁵⁵ Langermann points out that it is not all clear whether Maimonides himself subscribes to all these arguments. See Tzvi Langermann "The True Perplexity: *The Guide of the Perplexed* Part II, ch 24," in *Perspectives on Maimonides*, ed. Joel L. Kraemer (Oxford, 1991). Maimonides does, however, lay claim to an original point in *Guide* II.24, 323.

⁵⁶ *Guide* II.24, 326-7.

the “true perplexity” in his work devoted to defusing perplexities has not escaped scholars.⁵⁷ Maimonides responds to this perplexity by defining the function of the astronomer fairly precisely. This characterization forms an extended argument which I have reformulated as follows⁵⁸:

1.1. The purpose of the astronomer is not to “tell us in which way the spheres truly are, but to posit an astronomical system in which it would be possible for the motions to be circular and uniform and to correspond to what is apprehended through sight, regardless of whether or not things are thus in fact.”⁵⁹

1.2. Aristotle himself never mentioned the eccentricity of the sun because he did not know about it. Had he known the thesis to be true, he himself “would have become most perplexed about all his assumptions on the subject.”

1.3. Maimonides agrees that what Aristotle has to say about sublunar existence “is in accordance with reasoning.”

1.4. However, regarding knowledge of superlunar existence, “man grasps nothing but a small measure of what is mathematical; and you know what is in it.”⁶⁰

1.5. Maimonides supports this epistemological insight concerning mathematical rigor with “poetical preciousness”, that is, with a quotation from scripture.

1.6. Maimonides then asserts that only God knows the true reality of the heavens while humans do have knowledge of sublunar existence.

1.7. The heavens are “too far away from us and too high in place and in rank” for humans to know.

1.8. Even God’s existence cannot be concluded and known on the basis of superlunar events and knowledge.

⁵⁷ Surely that is one of the bases of Langermann’s point in his article “The True Perplexity.” The intriguing question, of course, is whether Maimonides thought that all the issues in the *Guide of the Perplexed* could ultimately be traced back to this basic perplexity.

⁵⁸ The original text is found in *Guide* II.24, 326-7.

⁵⁹ *Ibid.* Compare this characterization with *Guide* II.11: “Now the master of astronomy does not mind this [that there has been no demonstration whether the sun has an eccentric sphere or an epicycle], for the object of that science is to suppose as a hypothesis an arrangement that renders it possible for the motion of the star to be uniform and circular...” On the basis of this and similar passages, Goldstein has concluded that “Maimonides has compartmentalized physics and astronomy, such that the astronomer is seemingly free to base his calculations on any mathematical model he invents that can produce agreement with the observations.” Cf. Bernard R. Goldstein, *The Astronomy of Levi ben Gerson (1288-1344): A Critical Edition of Chapters 1-20* (New York, 1985), 6.

⁶⁰ This sentence is ambiguous in that it is not clear whether this is Maimonides’ own perspective, or his understanding of what Aristotle thought.

1.9. To fatigue the mind with matters that “cannot be grasped by them” is a defect in ones inborn disposition.

1.10. Let us therefore leave such matters that “cannot be grasped by reasoning” to one who has been “reached by the divine overflow”.

1.11. It is possible that somebody else may “find a demonstration by means of which the true reality of what is obscure for me will become clear to him.”

1.12. At this point Maimonides avers that he has not heard “a demonstration as to anything concerning them [these perplexities].”

Can we conclude on the basis of this extended argument that Maimonides denies that the heavens can be configured by humans? And if so, how does this reading correlate with the implication of the *Mishneh Torah* that the heavens *can* be configured? In other words, we must determine which of these accounts more accurately represents Maimonides’ mature understanding of current astronomy. Does the *Mishneh Torah* account summarized earlier represent the absolute codification of physical and metaphysical truth or is it a provisional account of cosmology, subject to change?⁶¹ Kellner has argued that the *Mishneh Torah* “does not represent the most perfect possible exposition of that science available to him and most certainly does not represent the highest stage that astronomy can reach.”⁶² On this reading the *Mishneh Torah* represents the conventional Ptolemaic wisdom of the time, as contrasted with the anti-Ptolemaic account given in the *Guide*.

Underlying Kellner’s query lie two deeper, related issues. The first has to do with Maimonides’ attitude toward the alleged incompatibility of astronomical models with Aristotelian physics. For the epicycles utilized by astronomers violate Aristotle’s principles that the motions of the heavens be uniform, circular, and around a fixed center. Nevertheless as Langermann has pointed out, the results they achieve are quite precise.⁶³ The second issue raises a broader epistemological concern, namely whether Maimonides believes that the heavens can be configured. The description provided in *Mishneh Torah* would imply that human beings can have the sort of astronomical sophistication required to

⁶¹ Menachem Kellner, “On the Status of the Astronomy and Physics in Maimonides’ *Mishneh Torah* and *Guide of the Perplexed*: a chapter in the History of Science,” *British Journal for the History of Science* 24 (1991), 454; and also M. Kellner, “Maimonides on the Science of the *Mishneh Torah*: Provisional or Permanent?,” *AJS Review* (1993) 169-194.

⁶² Kellner, “Status,” 461.

⁶³ Langermann, “True Perplexity,” 161.

achieve knowledge of the celestial order; on the other hand, (1.1), (1.4), (1.6), (1.7) and (1.11) appear to undercut these implications. My own reading is an amplification of Langermann's point that in contradistinction to implicit suggestions in II.24, "Maimonides does regard the true configuration of the heavens as something humanly attainable."⁶⁴ On this reading, Maimonides' point is epistemological rather than ontological: it is not that the heavenly spheres are *per se* inaccessible to the human intellect, but rather that nobody yet has determined their true configuration.⁶⁵ The key passages for this interpretation are (1.7), (1.9) and (1.11), all of which emphasize the epistemological limits of human intellect: (1.7) tells us that the heavens are ontologically beyond human knowledge; (1.9) warns against pushing human intellect beyond its dispositional limits; and (1.11) suggests that it is not inconceivable that *some* mind may find a demonstration of these matters.

In order to appreciate these points more fully, let us distinguish four different ways in which humans can be said *not to know* an entity x.⁶⁶

2.1 There are certain *per se* features of X such that humans cannot know x.

2.2 There are certain *accidental* features of X such that humans cannot know x.

2.3 There are certain *per se* features of the knower such that s/he cannot know x.

2.4 There are certain *accidental* features of the knower such that s/he cannot know x.

The real question, then, is in which of these senses the heavens can be said to be unknowable. (2.1) and (2.3) support the contention that the heavens are *per se* unknowable, either because of the essential configuration of the heavens, or because of certain inherent features of all humans *qua* human being. (2.2) and (2.4), on the other hand, emphasize the accidental nature of this lack of

⁶⁴ Langermann, "True Perplexity," 165.

⁶⁵ On Langermann's reading, Maimonides is alluding to our inability to understand the nature of the fifth element of which the heavens are formed, and not to the actual physical configuration of the heavens as a whole.

⁶⁶ My student Sarah Pessin has distinguished twelve such modes of knowing. These distinctions, as well as her subsequent discussion, upon which I draw heavily in my own interpretation, can be found in her unpublished paper "Maimonides' View on Astrology: Inconclusive Evidence, Unconvincing Arguments."

knowledge; presumably this lack can be surmounted with requisite training, etc. When we return to Maimonides' passage, we see that only (1.6) comes close to reflecting (2.3), namely that the heavens are "too far away," and unknowable to humans (but not to God). The very recognition that the heavens are knowable to God suggests that it is only due to human limitation that we don't have full knowledge of the heavens. The other statements all are compatible with (2.2) or (2.4): (1.4) and (1.7) are entirely ambiguous, whereas (1.10), (1.11), and (1.12) clearly are compatible with (2.4). That is, these latter support a reading whereby it is only due to the *accidental* features of *some* knowers that the heavens are not fully known and comprehended. There is nothing in the nature of heavenly configurations *per se* which precludes their being known. In other words, (2.1) is not satisfied by any of Maimonides' statements, and hence there is nothing in the science of astronomy which is *per se* beyond human grasp.

We have seen that Maimonides tended to compartmentalize physics and astronomy, a major implication being that the astronomer is free to use any mathematical model which best suits his theoretical purposes. Gersonides, however, draws a clear connection between the two. Writing in fourteenth-century France, Gersonides spent several years in the papal court in Avignon, and may at that time have come into contact with the views of Ockham and other fourteenth-century scholastics. His major work *Milhamot Hashem* is a sustained examination of the major philosophical issues of the day.⁶⁷ In contradistinction to Maimonides, for Gersonides natural philosophy and mathematics are mutually reinforcing disciplines which come together in astronomy: "In its perfection the investigation [astronomy] belongs to both sciences—to mathematics because of the geometric proofs, and to natural

⁶⁷ The questions raised by Levi ben Gerson (Gersonides, 1288-1344) are contained in his major work *Milhamot Hashem*. Reference to Book V.2-3, and Book VI will be made primarily to the Hebrew edition, which was reprinted in Leipzig in 1866 (*Milhamot*). In addition, the following recent English translations of portions of *Milhamot Hashem* should be noted: Seymour Feldman, trans. and ed., *The Wars of the Lord (Book 1)* (Philadelphia, 1984); *The Wars of the Lord (Books 2-4)*, 1987; Jacob Staub, *The Creation of the World According to Gersonides* (Chico, California, 1982). Unless otherwise noted, references to books I - IV of the work will be to Feldman's translation (*Wars*). For an extensive bibliography of scholarly works on Gersonides, see the recent bibliography compiled by Menachem Kellner, *Bibliographia Gersonideana. An Annotated List of Writings by and about R. Levi ben Gershom*, in *Studies on Gersonides*, ed. Gad Freudenthal (Leiden, 1992), 368-410.

philosophy because of the physics and philosophical proofs.”⁶⁸ As Freudenthal has cogently stated, all the sciences for Gersonides ultimately form a coherent whole. Adhering to the ability of human beings to attain to an overarching truth comprising all of reality, Gersonides presents a unified cosmology rooted in a thorough-going epistemological realism.⁶⁹

This realist stance is stated in the context of examining al-Bitruji’s astronomical proposals. Gersonides’ contention is that “no argument can nullify the reality that is perceived by the senses, for true opinion must follow reality but reality need not conform to opinion.”⁷⁰ That Gersonides clearly considered his own observations to be the ultimate test of his system is explicit from his attitude towards Ptolemy. The importance of empirical observation cannot be underestimated, he claims, and he values his own observations over those of others. “We did not find among our predecessors from Ptolemy to the present day observations that are helpful for this investigation except our own,”⁷¹ he says in describing his method of collecting astronomical data. Often his observations do not agree with those of Ptolemy, and in those cases he tells us explicitly that he prefers his own. Gersonides lists the many inaccuracies he has found trying to follow Ptolemy’s calculations.⁷² Having investigated the positions of the planets, for example, Gersonides encountered “confusion and disorder” which led him to deny several of Ptolemy’s planetary principles.⁷³ He does warn his colleagues, however, to dissent from Ptolemy only after great diligence and scrutiny.

Gersonides’ attitude toward previous astronomers, coupled with his faith in human reason, are reflected in his discussion of creation. Maimonides, as we have seen, goes to great length to

⁶⁸ *Milhamot* V.1.1, 23 (in Goldstein, *Astronomy*).

⁶⁹ Cf. Gad Freudenthal, “Épistémologie, Astronomie et astrologie chez Gersonide,” *Revue des Études Juives* CXLVI (1987), 360, for a discussion of the implications of this realism.

⁷⁰ This passage is quoted in Bernard R. Goldstein, *The Astronomical Tables of Levi ben Gerson* (New Haven, Conn., 1974), 24. Goldstein claims that Gersonides is almost unique among medieval philosophers for his effort to base a new system of astronomy on his own observations rather than on those of his predecessors.

⁷¹ *Milhamot* V.1.3, 27, (in Goldstein, *Astronomy*).

⁷² See examples of these inaccuracies in *Milhamot* V.1.14, 93ff (in Goldstein, *Astronomy*).

⁷³ *Milhamot* V.1.46 in Bernard R. Goldstein, “A New Set of Fourteenth Century Planetary Observations,” *Proceedings of the American Philosophical Society* 132 (1988), 386.

maintain that the topic of creation is beyond rational demonstration. Gersonides, on the other hand, devotes many chapters in *Milhamot* VI to proving that the Platonic theory of creation out of an eternal formless matter is rationally demonstrable. Further, the two disagree over the relation between the superlunar and sublunar spheres. As we have seen, Maimonides has claimed that no valid inference can be drawn from the nature of the sublunar sphere to that of the superlunar sphere. Gersonides, however, rejects the metaphysical bite to the distinction, and argues that inasmuch as both spheres contain material elements, what we know about creation is based on astronomy, and astronomy is fundamentally no different a human science than physics.⁷⁴ Astronomy can only be pursued as a science by “one who is both a mathematician and a natural philosopher, for he can be aided by both of these sciences and take from them whatever is needed to perfect his work.”⁷⁵ Gersonides sees the ultimate function of astronomy to understand God. Astronomy, he tells us, is instructive not only by virtue of its exalted subject matter, but also because of its utility to the other sciences. By studying the orbs and stars, we are led ineluctably to a fuller knowledge and appreciation of God.⁷⁶

VI. *Cosmological Implications of Creation*

Underlying Maimonides' discussion, as we have seen, has been the tension between the exoteric and esoteric dimensions to his writings. Nowhere is this tension felt more keenly than in the context of Maimonides' discussion of creation of the universe. Recent discussion has centered around Maimonides' taxonomy of creation and prophecy theories, both of which appear, at least on the basis of Maimonides' analysis, to be related. So that when readers of the *Guide* turn to chapters II.13-30 devoted to creation, they have already been forewarned by the author to expect at least a modicum of ambiguity at best, or outright deception at worst.

In II.13 Maimonides summarizes what he considers to be the three standard views on creation as the scriptural, Platonic and

⁷⁴ Norbert Samuelson, “Elements and Matter in Gersonides' Cosmogony,” in *Gersonide en son Temps* ed. Gilbert Dahan (Louvain-Paris, 1991), 213.

⁷⁵ *Milhamot* V.1.1, 23 (in Goldstein, *Astronomy*).

⁷⁶ See *Milhamot* V.1. 2, 24 (in Goldstein, *Astronomy*). Langermann emphasizes this point in his appendix “Gersonides on Astrology,” in Gersonides, *The Wars of the Lord (Books V-VI)* ed. and trans. Seymour Feldman, forthcoming.

Aristotelian views.⁷⁷ The main elements of each theory, as depicted by Maimonides, can be summarized as follows:

3.1 The scriptural view: that the universe was brought into existence by God after “having been purely and absolutely nonexistent”; through His will and His volition, God brought into “existence out of nothing all the beings as they are, time itself being one of the created things.”⁷⁸

3.2 The Platonic view: that inasmuch as even God cannot create matter and form out of absolute nonexistence (since this constitutes an ontological impossibility and does not impute impotence to God), there “exists a certain matter that is eternal as the deity is eternal...He is the cause of its existence...and that He creates in it whatever He wishes.”⁷⁹

3.3 The Aristotelian view: that matter cannot be created from absolute nonexistence, but concludes that the heaven is not subject to generation/corruption; that “time and motion are perpetual and everlasting and not subject to generation and passing-away.”⁸⁰

Several observations can be made concerning the relations among these three characterizations. First, contrary to those who “imagine that our opinion and his [Plato’s] opinion are identical,”⁸¹ Maimonides is quick to disabuse those who are tempted to posit a connection between [3.1] and [3.2]. The Platonic view, he states, cannot be substituted for Mosaic doctrine, even though there appear to be superficial similarities between the two. Secondly, Maimonides’ attitude toward the relation between [3.2] and [3.3] is ambiguous. He first contrasts them on the grounds that the Platonists believe that the entire heaven is subject to generation and passing-away, whereas the Aristotelians believe that only the sublunar sphere is subject to such generation and passing-away.⁸² He then dismisses [3.2] as not worthy of serious consideration on the grounds that

⁷⁷ In *Guide* II.13 Maimonides describes three opinions on creation, and then in II.32, he describes three opinions on prophecy, stating that “the opinions of people concerning prophecy are like their opinions concerning the eternity of the world or its creation in time.” Is the word “like” supposed to posit a one-to-one correspondence between the two sets of opinions? If so, can Maimonides’ own position be linked with any one set of correspondences, or is his allegiance split? In answer to these questions, interpreters have suggested every possible combination, and have offered almost every possible strategy for determining which is Maimonides’ own view. I shall not enter the Maimonidean taxonomy controversy. My main concern, rather, is to elucidate the theory of temporality which evolves out of his discussion of creation.

⁷⁸ *Guide* II.13, 281.

⁷⁹ *Guide* II.13, 283.

⁸⁰ *Guide* II.13, 284.

⁸¹ *Guide* II.13, 284.

⁸² *Guide* II.13, 285.

[both] believe in eternity; and there is, in our opinion, no difference between those who believe that heaven must of necessity be generated from and pass away into a thing or the belief of Aristotle who believed that it is not subject to generation and corruption.⁸³

In other words, he dismisses the original grounds for contrast between [3.2] and [3.3] and then argues that if the latter can be refuted, so too can the former be disqualified as a justifiable creation theory. In short, Maimonides appears to equate the positing of eternal pre-existent matter with the positing of an eternally beginningless universe. But, as we discussed earlier, clearly there is a difference between the two.

Which of these three views is espoused by Maimonides himself? Ostensibly, at least, Maimonides supports [3.1]. Having dismissed [3.2] as a weaker version of [3.3], he argues that [3.1] is no more flawed than is [3.3]. Then, pointing to the possibility of [3.1], coupled with its Mosaic (and Abrahamic) sanction, Maimonides argues that the very plausibility of [3.1] suggests the non-necessity of [3.3]. In other words, Maimonides employs the stance of the “bold” philosopher by claiming that on the basis of the veridical nature of Scripture [3.3] must be abandoned. In Chapter 25 Maimonides lays out several pragmatic reasons as well for supporting [3.1] over [3.3]. The most important of these is that [3.3] would destroy belief not only in the Law but in miracles and prophecy as well:

the belief in the way Aristotle sees it—that is, the belief according to which the world exists in virtue of necessity, that no nature changes at all, and that the customary course of events cannot be modified with regard to anything—destroys the Law in its principle, necessarily gives the lie to every miracle, and reduces to inanity all the hopes and threats that the Law has held out.⁸⁴

[3.2], on the other hand, is not nearly as devastating: for the opinion of Plato would “not destroy the foundations of the Law and would be followed not by the lie being given to miracles, but by their becoming admissible.”⁸⁵ Why, then, does Maimonides not accept [3.2]? The main reason, as he tells us, is that the Platonic view has not been demonstrated: “In view of the fact that it has not been demonstrated, we shall not favor this [Plato’s] opinion,

⁸³ *Guide* II.13, 285.

⁸⁴ *Guide* II.25, 328.

⁸⁵ *Guide* II.25, 328.

nor shall we at all heed that other opinion [Aristotle's], but rather shall take the texts according to their external sense..."⁸⁶

If we take Maimonides at his word, then, it is clear that [3.1], creation in time of the universe out of absolute nonexistence, is his view. If however, we are inclined to take seriously Maimonides' original demarcation between an exoteric and esoteric reading of controversial issues, then it is tempting to dismiss his espousal of [3.1] as an exoteric position and to search for the underlying, or concealed, interpretation which is Maimonides' real view of creation. And as commentators working through the text have demonstrated, there is certainly ample evidence to support either [3.2] or [3.3] as Maimonides' esoteric view.

In fact, there is so much conflicting evidence, all of which can be supported with plausible argument, that S. Klein-Braslavy has recently suggested in a provocative article that Maimonides ultimately upheld a skeptical stance in light of the evidence and did not take to heart either of the three positions. Inasmuch as Maimonides has clearly questioned the demonstrability of each of these views, it is not unreasonable to postulate, she avers, that the true esoteric view of Maimonides is skepticism.⁸⁷ This is not to say that the problem of creation can never be resolved; such metaphysical skepticism is not what Maimonides has in mind. Rather his position can be characterized as a form of epistemological skepticism, namely that human intellect is unable to resolve the matter. Although I am inclined to agree with the spirit of Klein-Braslavy's assessment, my own strategy has been slightly different. I have argued that, based on considerations of the nature of time, Maimonides recognizes that [3.1] is untenable. He is inclined to accept [3.2] on the grounds that it offers the possibility of recon-

⁸⁶ *Guide* II.25, 329.

⁸⁷ Sarah Klein-Braslavy makes her case for a skeptical interpretation of Maimonides in her recent article "Interpretation of Maimonides of the Term 'create' and the Question of the Creation of the Universe," (Heb), *Da'at* 16 (1986), 39-55. For additional discussions of epistemological and metaphysical skepticism in Maimonides, see the essay by Shlomo Pines "The Limits of Human Knowledge according to Al-Farabi, Ibn Bajja and Maimonides," in *Studies in Medieval Jewish History and Literature Vol I*, ed. Isadore Twersky (Cambridge, Ma., 1979), 82-109; cf. Also Herbert A. Davidson, "Maimonides on Metaphysical Knowledge," *Maimonidean Studies* 3 (1993) 49-103. Barry Kogan summarizes some of the other interpretations regarding Maimonides' own view of creation in his essay "Creation and Time in Maimonides and Gersonides: A Response to Tamar Rudavsky," in *God and Creation: An Ecumenical Symposium*, eds. David Burrell and Bernard McGinn (Indianapolis, 1990), 147-153.

ciling theories of creation and eternity. However, Maimonides has already argued that a stringent reading of [3.2] is tantamount to an acceptance of [3.3]. [3.3] would accord with Maimonides' own views on time; it would, however, greatly reduce the need for a Creator of the universe. Maimonides is certainly aware of eternal creation as a compromise position, but is uncomfortable with the Islamic formulation of this view.⁸⁸ There are, however, other plausible versions of this doctrine, as Maimonides himself will suggest in later chapters. Such a position would best serve his purposes, however, with respect to reconciling a theory of creation with an Aristotelian theory of time. Hence, Maimonides reserves opinion with respect to both [3.2] and [3.3], and is clearly uncomfortable with [3.1]. This position, while similar to [3.2], employs aspects of [3.3] as well; it is closest in temperament to a Neoplatonic version of eternal creation.⁸⁹

Gersonides' philosophical cosmology is contained primarily in *Milhamot* VI.1, within the context of his theory of creation. Like Maimonides, Gersonides is concerned with whether time is finite or infinite, as well as with whether the creation of the world can be said to have occurred at an instant. He first lists a number of views of his predecessors (among whom he mentions Aristotle) who propounded the eternity of the universe.⁹⁰ Having posited that the world was created at an initial instant of time by a freely willing agent, Gersonides must decide whether the world was engendered out of absolute nothing or out of a pre-existent matter.

⁸⁸ Maimonides' discussion of the Islamic necessitarian formulation of eternal creation is contained in *Guide* II.19, in which he reduces the doctrine to an improbable version.

⁸⁹ Cf. T.M. Rudavsky "Creation and Time in Maimonides and Gersonides" in *God and Creation*, 122-146. For a similar interpretation of Maimonides' position on creation, but one drawn from different evidence, see Alfred Ivry's recent article "Maimonides on Creation," in *Creation and the End of Days*, eds. David Novak and Norbert Samuelson, (Maryland, 1986), 185-214. See, for example, Ivry's comment on p. 198: "He [Maimonides] has, accordingly been viewed as either a closet Aristotelian on creation, or a more revealing Platonist. The view which I have adduced [...] puts him in neither camp completely, though brings him closer to that of the Platonists."

⁹⁰ *Milhamot* VI.2.2, 294. In addition to the view of Aristotle, Gersonides lists the following views as well: that the world comes into existence and passes away an infinite number of times; the view attributed to Plato that the world was created one time out of some thing (*nithadesh midavar*) and the view attributed to the Kalam and to Maimonides, that the world was created out of absolute nothing (*nithadesh milo' davar bemuhlat*). It is interesting to note that Maimonides' view is characterized by Gersonides as a version of Plato's theory in that, according to Gersonides, neither one advocates creation *ex nihilo*.

Arguing that creation out of nothing is incompatible with the facts of physical reality, he adopts a Platonic model of matter drawn ultimately from the *Timaeus*. The opening verses of Genesis I are used to distinguish two types of material reality: *geshem* and *homer rishon*.⁹¹ Totally devoid of form, *geshem* is the primordial matter out of which the universe was created. Since it is not informed, it is not capable of motion or rest; and since it is characterized by negation, *geshem* is inert and chaotic⁹². This primordial matter is identified with the "primeval waters" described in *Genesis* I.2 (*tohu, tehom* and *mayim*). However, Gersonides points out that *geshem* does not itself exemplify absolute non-being, but rather is an intermediary between being and non-being.⁹³

In contrast to *geshem*, *homer rishon* is the second type of reality. *Homer rishon* is understood in the Aristotelian sense as a substratum which is allied to form. *Homer rishon*, or matter, is inferior to form and hence cannot be known in itself. It contains within itself the potentiality to receive forms, yet has no actuality of its own.⁹⁴ Inasmuch as it does not contain its own actuality, *homer rishon* is not an ontologically independent entity. In *Milhamot* VI.2.7 Gersonides compares this matter to darkness, for just as darkness is the absence of light, so too this matter represents the absence of form or shape.

Homer rishon plays a crucial role in Gersonides' astronomy as well. Gersonides agrees with his predecessors that each of the astral bodies occupies its own celestial sphere, with the stars all residing in one sphere.⁹⁵ He further rejects as untenable the view that there exists a diurnal sphere deprived of stars which carries the world in one simple movement.⁹⁶ But how do we account for the interaction between these spheres? The celestial spheres are concentric and contiguous, and in principle we might expect that

⁹¹ *Milhamot* VI.1.17, 267-271. In *Milhamot* V.22, 193-4 Gersonides argues that this formless matter accounts for various astronomical phenomena. For general discussions of Gersonides' theory of creation and matter, see Seymour Feldman "Gersonides' Proofs for the Creation of the Universe," *Proceedings of the American Academy for Jewish Research* volume 35 (1967), 113-137; Seymour Feldman "Platonic Themes in Gersonides' Cosmology," in *Salo Whitmayer Baron Jubilee Volume* (Jerusalem, 1975), 383-405.

⁹² *Milhamot* VI.1.17, 367-8; 374. For further elaboration of these arguments, see Feldman, "Platonic Themes," 394-5.

⁹³ *Milhamot* VI.1.18, 372.

⁹⁴ *Milhamot* VI.1.17, 367.

⁹⁵ *Milhamot* V.2.5, 200.

⁹⁶ *Milhamot* V.2.4, 197.

they move in unison. However, as Gersonides has already pointed out, each has its own proper movement, and often these movements are in conflict. In order to account for the independence of each sphere, Gersonides argues that between each sphere there exists a fluid body which determines the movements of the spheres.⁹⁷ This body, uninformed and without movement of its own, is described as “the matter that does not keep its shape” (*hageshem habilti shomer temunato*) and lies between the spheres of the astral bodies.⁹⁸ It is the very same *homer rishon* described above. Its function is to assure the motion of the celestial bodies and precludes the possibility of one planetary motion affecting another: “it is clearly appropriate that there be [enough] fluid between the spheres of one planet and the spheres of another such that a motionless layer may remain in its midst to make sure that the motions are not confused.”⁹⁹ Gersonides compares this diaphanous body to the bones of an organic animal which make possible movement of the animal.¹⁰⁰ In *Milhamot* V.1.130-31 Gersonides tries to compute the thickness of these fluid layers.¹⁰¹

VII. Astronomy, Astrological Determinism and Human Freedom

Most Jewish philosophers supported natural astrology, the view that the celestial bodies affect sublunar life and existence to some extent. Aristotle had laid the groundwork for the theory that these bodies were responsible for the growth and sustenance of sublunar entities. That the sun and moon both affect natural cycles and events on earth is unequivocal and represents a classic paradigm of natural astrology.¹⁰² The calculations of natural as-

⁹⁷ Goldstein remarks that Gersonides may have had in mind discussions in Ptolemy's *Planetary Hypotheses Book II*, or more certainly Maimonides' remarks in *Guide* II.24 which intimate the existence of bodies between the spheres to account for the motion of one sphere not affecting that of another. Cf. Bernard R. Goldstein "Levi ben Gerson's Theory of Planetary Distances," *Centaurus* 29 (1986), 277.

⁹⁸ *Milhamot* V.2.2, 193.

⁹⁹ *Milhamot* V.1.130, in Goldstein, "Theories of Planetary Motion," 288.

¹⁰⁰ *Milhamot* V.2.2, 194.

¹⁰¹ Detailed discussion of this computational exercise are provided in Goldstein, "Theory of Planetary Distance," 272-313.

¹⁰² See Aristotle *De Gen. et Cor.* II.10.336b 10ff; *De Gen. Animal.* IV.10.777b 24-32 for discussions of natural astrology. Cf. Ptolemy, *Tetrabiblos* I.2. These issues are discussed by Gad Freudenthal in "Maimonides' Stance on Astrology in Context: Cosmology, Physics, Medicine and Providence," in *Moses Maimonides: Physi-*

trology overlapped those of astronomy, and could be utilized for practical purposes such as fixing the calendar. The real question, then, concerned the coherence of judicial astrology, that is, the extent to which the stars and planets exerted an influence over human events in general, or more particularly, over those actions which entail human choice.

In Rabbinic texts, there are passing references to divination by means of planets. Charlesworth, and more recently Kiener, have argued that inasmuch as Rabbinic Judaism became a repository for mathematical astronomy developed by the Babylonians, so too did the science of astrology develop, albeit in a benign form, among the Rabbis.¹⁰³ On occasion, natural events can be traced to astrological signs, as evidenced in the following passage:

Samuel said: A vernal equinox which falls in [the hour of] Jupiter will surely cause trees to break, and a winter solstice which falls in [the hour of] Jupiter will surely dry out the seedlings...provided that the [previous] New Moon took place in [the hour of] the moon or in [the hour of] Jupiter.¹⁰⁴

Further, individuals born under a specific planet, are said to exhibit the qualities popularly assigned to that planet.¹⁰⁵ But most questionable is the status of Israel. In contradistinction to those who maintain that Israel, like other nations, is subject to celestial influence, a well-known rabbinic dictum asserts that “over Israel there is no sign (*ein mazal le-Yisrael*).”¹⁰⁶ The rabbinic examples in the text suggest that with sufficient prayer, Jews can counteract their astrological fate. Hence, ironically, the notion that a person’s fate (*goral*) was determined by his constellation (*mazzal*) led to the idea that this fate could be averted by attention to prayer and good deeds. As argued succinctly by Kiener, though, judicial astrology did not intrude into the decisions of Jewish law, nor was it to become “part of the arsenal of apologia in defense of Ju-

cian, Scientist and Philosopher, ed. Fred Rosner and Samuel Kottke (Northvale, N.J. and London, 1993), 78-79.

¹⁰³ For an extensive discussion of this issue, cf. R.C. Kiener, “The Status of Astrology in the Early Kabbalah,” *Jerusalem Studies in Jewish Thought* 6 (1987), 2; E.E. Urbach, *The Sages—Their Concepts and Beliefs* (Jerusalem, 1975), 277ff.

¹⁰⁴ *BT Eruvin* 56a.

¹⁰⁵ Cf. for example *BT Shabbat* 156a: “Not the constellation of the day but that of the hour is the determining influence.” Numerous examples are given to connect a person’s overall propensities to the position of the celestial bodies at the time of his birth.

¹⁰⁶ *BT Shabbat* 156a; *BT Yebamot* 21b

daism against paganism. Astrology was a belief system foreign to the sacred realm of *halakhah*.¹⁰⁷

As we move into the Jewish medieval period, however, astrological references proliferate. Abraham Ibn Ezra, for example, translated the text *The Book on Eclipses* into Hebrew, which contains a theory of planetary conjunctions.¹⁰⁸ By the time, then, that Maimonides addressed the topic in his famous *Letter on Astrology*, there was already a textual tradition which, at least *prima facie* did not eliminate either natural or judicial astrology from theoretical considerations.¹⁰⁹ In his *Letter on Astrology*, addressed to the Rabbis of southern France, the following sorts of considerations are adduced in opposition to astrology:

4.1 *Argument from error*. The Temple was destroyed because our fathers “erred and were drawn after them [books dealing with these themes of the stargazers, these things being the root of idolatry], imagining them to be glorious science and to be of great utility. They did not busy themselves with the art of war or with the conquest of lands, but imagined that those studies would help them.”¹¹⁰

4.2 *Argument from Stupidity*: “All these assertions [of judicial astrology] are far from being scientific; they are stupidity.”¹¹¹

4.2 *Argument from Falsity*: Astrology is identified with idolatry, star-worship of the Kasdim, Chaldeans, Egyptians and Caananites, which is seen by the wise men of Greece to be “falsity and a lie (*sheker v'chazav*).”¹¹²

4.4 *Free will Argument*: “There is no influence or constellation under which one is born that will draw him in any manner toward any of these ways.”¹¹³

4.5 *Argument from Utility*: If astrology were true, “of what utility would the Torah and the commandment and the Talmud be to a particular individual?”¹¹⁴

¹⁰⁷ Kiener, “Status of Astrology,” 4.

¹⁰⁸ For a detailed analysis of ibn Ezra’s astrological tendencies, cf. Y. Tzvi Langermann, “Some Astrological Themes in the Thought of Abraham ibn Ezra,” in *Rabbi Abraham Ibn Ezra: Studies in the Writings of a Twelfth-Century Jewish Polymath*, eds. I. Twersky and J.M. Harris (Cambridge, Ma., 1993), 28-85.

¹⁰⁹ Additional background material on the status of astrology in the time of Maimonides can be found in Alexander Marx, “The Correspondence Between the Rabbis of Southern France and Maimonides about Astrology,” *Hebrew Union College Annual* 3 (1926), 311-358.

¹¹⁰ Maimonides, “Letter on Astrology,” in *A Maimonides Reader*, ed. Isadore Twersky (New York, 1972), 465. The Hebrew text can be found in Marx, “Correspondence”.

¹¹¹ *Ibid.*, 466.

¹¹² *Ibid.*

¹¹³ *Ibid.*, 470.

¹¹⁴ *Ibid.*, 471.

Of these considerations, only (4.4) and (4.5) have any philosophical bite. In the case of (4.1), surely Maimonides has said nothing about the truth or falsity of astrology *per se*, but simply that our forefathers did a bad job of utilizing the discipline. Both (4.2) and (4.3) are *ad hominem* arguments, addressed at the practitioners of astrology, not at the discipline itself. The most we can conclude is that in the early period, astrology was not esteemed by the Greeks, but this tells us nothing about whether astrology is *per se* esteemable. What Maimonides has not offered us are the “lucid, faultless proofs” to which he himself alludes which supposedly refute astrology.¹¹⁵ The real philosophical concern, then, and the one to which Maimonides devotes the most attention both in the *Letter* and in the *Guide*, concerns the relation between judicial and natural astrology. In other words, from the very real influence of the celestial beings upon sublunar reality, the question is whether judicial astrology can be postulated. It is this issue which directly affects theories of divine providence, retribution, and free will.¹¹⁶

In the *Guide* Maimonides suggests that what leads people to believe in astrology is their confusion of the difference between overflow and powers of the celestial bodies. Philosophers all agree that the governance of the lower world is “brought about through the forces overflowing from the spheres.”¹¹⁷ Maimonides extends this dictum to include the notion that sublunar entities have a *mazzal* associated with them: “even individuals subject to generation have forces of the stars that are specially assigned to them.”¹¹⁸ Powers of the stars, however, obey the laws of physics and, being corporeal, should not be confused with overflow. Astral forces, in obeying the laws of physics, decrease over time and distance. Maimonides repeatedly states that stars exert their influence only as bodies acting upon other bodies.¹¹⁹ This position reflects Aristotle’s dictum that bodies alone can set other bodies in motion.¹²⁰

¹¹⁵ Maimonides alludes to the fact that there are such lucid counterarguments to astrology, but does not utilize them in his own attack. Cf. Twersky, *Maimonides Reader*, 467. A similar point is made in the *Epistle to Yemen*, in Twersky, *Maimonides Reader*, 453: “Its postulates [of astrology] can be refuted by real proofs on rational grounds. But this is not the place to enter into a discussion of them.”

¹¹⁶ Cf. Pessin, “Maimonides on Astrology,” for more extensive discussion of these issues.

¹¹⁷ *Guide* II.10, 269.

¹¹⁸ *Guide* II.10, 270. Maimonides quotes *Genesis Rabbah* X in support of this contention.

¹¹⁹ Cf. *Guide* I.72; 2.12; 2.6

¹²⁰ Cf. Y. Tzvi Langermann, “Maimonides’ Repudiation of Astrology,” *Maimonidean Studies* 2 (1991), 141 for discussion of this crucial point.

Furthermore, Maimonides follows the Aristotelian scheme of assigning intelligences to the orbs.¹²¹ But what powers do these orbs have? While accepting the metaphysical importance of these celestial beings in his cosmology, nevertheless he limits their power to the physical realm, thus eschewing the inference to astrology. As Langermann states, Maimonides totally rejects the attribution to the stars of any capacity in the realm of overflow.¹²²

At stake are two issues. The first has to do with the relation of astrology to human freedom. Maimonides repeatedly points to the strong connection between the two. Free will, he tells us, is bestowed upon all humans. If God had decreed human character, or "if there were some force inherent in his nature which irresistibly drew him to a particular course...as the foolish astrologers out of their own fancy pretend," what then would be the force of the prophetic exhortations to improve ones way; what would be the point of the Torah, or of reward and punishment?¹²³ Based on these passages, it follows that if Maimonides upholds human freedom, he will necessarily have to reject astrological determinism. If actions traceable to human will and intention differ from events resulting from natural causes alone, it might be that those causes which motivate rational choice cannot be traced back to the stars. But whether Maimonides is in fact a proponent of human freedom is an open question. In recent years scholars have argued that Maimonides' esoteric doctrine upholds a version of determinism which precludes the ontological uniqueness of human will and intention.¹²⁴ A general examination of Maimonides' views on human freedom is beyond the scope of this paper. Suffice it to say, however, that Maimonides' apparent rejection of astrology on the grounds that it rules out human freedom is suspicious at best.

A second, more general issue has to do with general teleology,

¹²¹ See for example his discussion in *Guide* II.10, 271.

¹²² Langermann, "Maimonides' Repudiation," 150.

¹²³ *Mishneh Torah* I.5, quoted in Twersky, *Maimonides Reader*, 78. A similar point is made in *Shemonah Perakim*: Maimonides asserts that humans are not born endowed with either vice or virtue, in an attempt to reject the "absurd idea of astrologers who falsely assert that the constellation at the time of ones birth determines whether one is to be virtuous or vicious, the individual being thus necessarily compelled to follow out a certain line of conduct." In Twersky, *Maimonides Reader*, 379. Cf. also 4.4 above.

¹²⁴ See for example Alexander Altmann, "The Religion of the Thinkers: Free Will and Predestination in Saadia, Bahya, and Maimonides," in *Religion in a Religious Age*, ed. S.D. Goitein (Cambridge, Ma. 1974), 25-52.

or more pointedly, the final cause of the heavenly bodies. Maimonides clearly asserts that “governance overflows from the deity, may he be exalted, to the intellects according to their rank.”¹²⁵ From this general overflow, however, it should not be concluded that the more perfect entity exists for the sake of the less perfect entity. Freudenthal argues, for example, that Maimonides’ theological cosmology precludes astrology, largely on the grounds that for Maimonides, celestial beings do not exist for the sake of humans, but rather for their own sake.¹²⁶ As Freudenthal argues, Maimonides’ world view is unfavorable to a science predicting the effects upon humans of the celestial bodies. Rather astrology is much more embedded in a world view in which the heavenly bodies exist for the sake of sublunar entities.¹²⁷

In contradistinction to Maimonides, Gersonides accepts both of these assumptions. His astral determinism is explicitly developed in two contexts: in book II of *Milhamot* he interweaves astrological motifs into his discussion of divine providence and prophecy, while in Book V astrology occupies a central role in the context of his cosmological speculations. Let us look first at the discussions in *Milhamot* II, since they set the tone for the subsequent investigations of Book V.

In *Milhamot* II Gersonides is concerned to explain how divine knowledge operates, and to what extent divine foreknowledge of future contingents affects human choice.¹²⁸ His major thesis is that divine knowledge is predicated to a great extent upon knowledge of the heavenly bodies, which bodies are in turn “systematically directed toward his [man’s] preservation and guidance so that all his activities and thoughts are ordered by them.”¹²⁹ Because of the major role played by the heavenly bodies, it turns out that often astrologers, whose function it is to study these bodies, are able to predict human events correctly.

The technical aspects of this system will be described more fully by Gersonides in *Milhamot* V, which is devoted to the workings of the heavens. However, in *Milhamot* II he does allude to the role of

¹²⁵ *Guide* II.11, 275.

¹²⁶ Cf. *Guide* 3.15

¹²⁷ See Freudenthal, “Maimonides’ Stance,” 89.

¹²⁸ For a systematic study of these issues, cf. T.M. Rudavsky “Divine Omniscience, Contingency and Prophecy in Gersonides,” in *Divine Omniscience and Omnipotence in Medieval Philosophy*, ed. T.M. Rudavsky (Dordrecht, 1985), 161-184.

¹²⁹ *Wars* II.2, 33.

the Active Intellect which imparts much of this information to the informed astrologer. And yet, as we all know, astrologers often err in their predictions. Astrological errors can be due to several factors. First, because of the “difficulty of obtaining the necessary positions of these bodies by observation,”¹³⁰ astrologers are often unable to verify their data. Furthermore, since the zodiacal position of a heavenly body at any given time is only repeated once in many thousands of years, astrologers have no access to the repeatability of those events which would be required to verify their knowledge. As a result, Gersonides claims, we know very little of the order of the heavenly bodies. Nevertheless, he assures us that whatever happens by chance is “determined and ordered according to this type of determinateness and order.”¹³¹ Outdoing even Plato’s hierarchical structuring in *Republic IV*, Gersonides argues that the ultimate perfection and ordering of society is due to astrological influence. People turn to particular crafts as a result of the “order emanating from the heavenly bodies.”¹³²

Having articulated the ordering power of the astral bodies, Gersonides describes in *Milhamot V.3* the separate intellects and the spheres that they move. The movers emanate from God who is construed as the “First Separate Intellect.”¹³³ They are ordered in a rational system which governs the sublunar domain. If there were no one first intellect, Gersonides argues, the rational order we see in the heavens would be the result of chance, which is unacceptable. The agent intellect thus functions as the link between these celestial bodies and human affairs. The kinds of information it transmits are of an astronomical type, as evidenced in the following example:

it [the agent intellect] knows how many revolutions of the sun, or of the diurnal sphere, or of any other sphere [have transpired] from the time at which someone, who falls under a particular pattern, had a particular level of good or ill fortune...¹³⁴

The agent intellect, then, serve as the repository for informa-

¹³⁰ *Wars II.2*, 33. Cf. also *Wars I.12*.

¹³¹ *Wars II.2*, 34.

¹³² *Wars II.2*, 36.

¹³³ *Milhamot V.3.8*, 272

¹³⁴ *Wars II.6*, 53. Gersonides goes on to explain that the information transmitted is of a general nature and does not pertain to the individual qua particular. For the theological implications of this point, cf. T.M. Rudavsky, “Divine Omniscience.”

tion communicated by the heavenly bodies. The patterns revealed in this communication between agent intellect and diviner (astrologer, prophet) are from the heavenly bodies which themselves are endowed with intellects and so “apprehend the pattern that derives from them.”¹³⁵ Each mover apprehends the order deriving from the heavenly body it moves, and not patterns which emanate from other heavenly bodies. As a result, the imaginative faculty receives the “pattern inherent in the intellects of the heavenly bodies from the influence deriving from them.”¹³⁶ This influence derives from the position of the heavenly bodies “by the ascendent degree or the dominant planet [in a particular zodiacal position].”¹³⁷ However, inasmuch as the heavenly bodies do not jointly cooperate with one another (*lo yishtatfu*) in this process, it is possible for the communication to be misconstrued.¹³⁸

Why is it that certain communications are received more clearly than others? A constitutionally perfect imaginative faculty receives information from both dominant and weak heavenly bodies. By ‘weak’, Gersonides means that certain bodies are too weak both to bring about events on earth as well as to transmit information about these events. Hence he concludes that information about the future emanate “from the dominant body in the particular proper face (*panim*) in which it has dominance but not from any of the attending planets (*ha-meshartim*).”¹³⁹ But to constitutionally imperfect imaginative faculties, the information received is only from the dominant heavenly bodies. Hence the overall quality of the information received will differ in the two cases.

Gersonides does admit that on occasion human choice is able to contravene the celestial bodies: “[our intellect and choice] have the power to move us contrary to that which is determined by the heavenly bodies.”¹⁴⁰ Nevertheless this intervention is rare, and true contingency is a rare state of affairs indeed in Gersonides’ ontology.¹⁴¹ Gersonides presents an argument to show

¹³⁵ The separate intellects which attach to each body are described in more detail in *Milhamot* V.3.6-7.

¹³⁶ *Wars* II.6, 64.

¹³⁷ *Wars* II.6, 64.

¹³⁸ See Feldman’s comments, *Wars* 64, note 33 on the astrological force of the term *yishtatfu*, which connotes the “the joint participation of various heavenly bodies to bring about some event on earth.”

¹³⁹ *Wars* II.7, 69-70.

¹⁴⁰ *Wars* II.2, 34.

¹⁴¹ For further discussion of Gersonides’ theory of contingency, see Sarah

that human choice guided by reason can subvert the celestial bodies despite their general ordering of our lives. The heavenly bodies can order human affairs either by virtue of their difference of position in the heavens, or from the difference of the bodies among themselves.¹⁴² Astral bodies, however, will affect different individuals in different ways; they can also affect an individual differently at different times; and finally, two or more bodies can affect a single individual, resulting in multiple influences which can have contrary effects. Having noted these various ways that the astral bodies can affect human behavior, Gersonides notes that humans can contravene these effects: God has provided humans with “the intellectual capacity (*sekhel ba'al takhlit*) that enables us both to act contrary to what has been ordered by the heavenly bodies and to correct, as far as possible, the [astrally ordained] misfortunes that befall us.”¹⁴³

Both Maimonides and Gersonides disagree over the ultimate purpose of the celestial bodies. For Maimonides, let us recall, it was not possible that a greater entity, the heavens, would exist for the sake of the sublunar universe. As we saw earlier, this point constituted one of the arguments proffered against the acceptance of astrology. Gersonides disagrees, maintaining that it is not inappropriate that the more noble exist for the less noble. The stars, he argues, exist for the sake of things in the sublunar world.¹⁴⁴ More explicitly, they are designed for the benefit of sublunar existence, and they guarantee the perpetuation of life on earth.

The main characteristic of the astral bodies is their luminosity (*nitzutz*). This luminosity affects their actions and effects.¹⁴⁵ Gersonides is very much aware of the problem of accounting for how the astral bodies can affect actions at a distance. The sun, for example, functions as a paradigm for action at a distance. Once

Klein-Braslavy, “Determinism, Possibility, Choice and Foreknowledge in Ralbag’s Works,” (Heb) *Daat* 22 (1989), 5-53; T.M. Rudavsky, “Divine Omniscience.”

¹⁴² In the first case Gersonides gives the example of the sun which, when in the northern and southern regions of the zodiac will affect sublunar elements differently. For a discussion of this passage, see Gad Freudenthal’s review of Feldman’s translation in *Révue des Études Juives*, CXLVIII 1989 (3-4), 381. In the second case he gives the example of Mars and Moon which dominate different elements, and therefore will affect individual temperaments differently depending upon their mutual positions.

¹⁴³ *Wars* II.2, 35.

¹⁴⁴ *Milhamot* V.2.3, 194

¹⁴⁵ Cf. *Milhamot* V.2.3, 196.

we understand, Gersonides claims, how the activity of heating reaches earth from the sun, we can understand how the particular activities of the other stars reach the sublunar realm as well. By explaining the efficient cause as the light or radiation of the stars, Gersonides can account for weak or strong effects. As Langerman has pointed out, Gersonides' account furnishes the basis for the introduction of astrological causation into natural philosophy.¹⁴⁶

In *Milhamot* V.2.8 Gersonides lays out six astrological principles which affect his general cosmological scheme. These can be summarized as follows. First, each astral body exercises a different influence specific to it. Second, astral influence depends upon its position in the zodiac (*galgal hamazalot*). Third, the longer a star stays in one place in the zodiac, the greater its effect because of the strength of its luminosity. Fourth, astral influence is dependent upon its inclination to the north or to the south; its effect will be strongest when it is in the middle, as evidenced by the sun, whose heat is strongest when it is at the Tropic of Cancer as opposed to being at the Tropic of Capricorn. Fifth, the greater the radiation or luminosity of a star, the stronger will be its influence. And finally, the closer to earth a star is, the stronger will be its influence.¹⁴⁷ These principles function as the underpinnings of his general astronomy as well.

V. Concluding Comments

We are now in a position to summarize our findings. Working within a framework which upheld the infinity of time, Aristotle posited an eternal universe which had no temporal beginning. Jewish philosophers, however, are committed to a cosmology in which the Deity willed the universe to exist. Unwilling to reject Aristotle's ontology of time altogether, Jewish philosophers posit a resolution which can be construed as a version of eternal creation. Neoplatonists such as Isaac Israeli (and others) introduce a

¹⁴⁶ *Milhamot* V.2.6, 201. For an excellent examination of action at a distance in Gersonides' works, including the effects of magnetism as well as the sun's heating the earth's atmosphere, cf. Y. Tzvi Langermann, "Gersonides on the Magnet and the Heat of the Sun," in *Studies on Gersonides*, ed. Gad Freudenthal (Leiden, 1992), 267-284. Langermann notes the importance of the *koah elohi* which functions in this process, and is mentioned by Gersonides in *Milhamot* V.2.6, 203.

¹⁴⁷ *Milhamot* V.2.8, 207-8. For a brief discussion of these principles, see Bernard R. Goldstein, *Theory and Observation in Ancient and Medieval Astronomy* (London, 1985), 222. Cf. also Langermann, "Gersonides on Astrology."

cosmology which incorporates elements of creation along with necessary emanation. We have seen that Maimonides is sympathetic to an Aristotelian theory of time. Much of his effort, moreover, has been aimed at showing that the Scriptural view of creation is inconsistent with this theory. And yet, unwilling to support Aristotle's denial of creation altogether, Maimonides supports an eternally existing world which has been sustained by a Creator, but not in a temporal context. Gersonides is less willing ostensibly to compromise the temporal beginning of the universe, and so he creatively reinterprets Aristotle's notion of the instant in such a way as to allow for a temporal beginning to creation out of a pre-existent matter. In this way he has retained a first instant to the act of creation in light of the notion of an eternally beginningless substance whose existence ontologically proceeds that of created composites.

Against the backdrop of these cosmological discussions, issues of astrology and astronomy acquire a particular urgency. We have noted the theological implications of judicial astrology, particularly with respect to issues of providence, fatalism and human freedom. But the interrelations between astrology and astronomy raise broader epistemological questions, especially concerning the limits of human knowledge. Do the heavens represent the "final frontier" which human intellect cannot penetrate, or is the science of astronomy simply one more topic in the arsenal of human understanding? These questions, which continue to challenge scientists to this very day, constitute the intellectual agenda for medieval Jewish philosophers.

ABSTRACT

In this paper I shall examine the philosophical cosmology of medieval Jewish thinkers as developed against the backdrop of their views on time and creation. I shall concentrate upon the Neoplatonic and Aristotelian traditions, with a particular eye to the interweaving of astronomy, cosmology and temporality. This interweaving occurs in part because of the influence of Greek cosmological and astronomical texts upon Jewish philosophers. The tension between astronomy and cosmology is best seen in Maimonides' discussion of creation. Gersonides, on the other hand, is more willing to incorporate astronomical material into his cosmological thinking. By examining these motifs, we shall arrive at a greater understanding of the dimension of temporality within Jewish philosophy.