

GUIDE 1:72 COSMOS AND MICROCOSMOS

“What a piece of work is a man, how noble in reason, how infinite in faculties, in form and moving how express and admirable, in action how like an angel, in apprehension how like a god! The beauty of the world, the paragon of animals—and yet, to me, what is this quintessence of dust?” *Hamlet*

INTRODUCTION

The ancients, including the ancient Jews, looked upon man as a microcosm of the universe. This means that there is a system of correspondences and affinities between the organs and elements of man, his mind, the universe and God. They opposed this notion against the irrational Epicurean universe of random accidental atomic events. In the medieval period, they used it against the Kalām occasionalism of random miraculous atomic events. (On the Jewish microcosm, the *olam katan*, see *Pirkei d’R. Natan* ch. 31; Halevi, *Kuzari* 2:26; Yosef Ibn Tzadik, *Olam Katan*. See note on R. Yosef below.)

The theory of the microcosm was a type of organicism, which viewed all things as part of an organic whole. Organicism, then and now, comes to answer the randomness that science frequently urges. (The idea of the microcosm is in Plato: *Timaeus*, 47b. Henri Bergson, in our day, revived organicism).

By accepting the concept of the microcosm we justify scientific inquiry, for then we assume that the correspondences are not random or accidental but comprehensible and systematic. If those correspondences really exist then science should be able to reveal them. God knew what He was doing when He made the universe, and, therefore, we can, at least in principle, come to understand what He was doing.

This optimistic view provides science the promise that its researches will succeed. Man lives in a friendly universe in which his place is central, with a loving God in control.

Maimonides subscribes to this doctrine. In this chapter, he reviews what his contemporaries knew of the system of correspondences between the microcosm and the macrocosm.

Our method will be to provide a brief portrayal of the system. We will then identify those aspects of it which are clearly outmoded, followed by those which may have some force nowadays, and, finally, those that we still can agree with and profitably assimilate. We will reflect on the nature of this grand analogy. We will then survey those aspects of the life of the macrocosm and the microcosm that Maimonides said could not be analogized to one another. We will then discuss whether we are asking the right questions when we debate the contemporary relevance of this grand analogy. This will lead us to how Maimonides changed the subject from the physical analogy to a purely intellectual analogy, at the end of the chapter. The analogy becomes, then, a spiritual exercise or meditational pathway. This presages a development in Jewish religious consciousness toward a more inward and mystical practice. We will close with brief discussions of the pervasive idea of eternal recurrence, and of Maimonides’ predecessors who stressed the grand microcosmic analogy.

ANCIENTS AND MODERNS

We should not view this chapter in sepia-toned nostalgia. The educated of Maimonides’ day considered it to be conventional wisdom. Moreover, these ideas are so interrelated that we cannot remove any of them without causing the structure to collapse.

We have a larger problem. We cannot merely remove some of these ideas and correct others. A very large part of this lore is simply wrong, seen in the light of contemporary understanding. With the coming of the enlightenment moderns merely laughed off this ancient baggage.

But having laughed off the whole system, what have we gained? Our modern thought project has left us with the carnage of Heideggerian irrationalism, with all its existentialist and postmodern progeny. It reduced man to Hamlet's mere quintessence of dust. The crisis of modern thought drives our reexamination of ancient rationalism.

What we most need now is to return to the ancients, to understand them as they understood themselves, and to reintegrate their positive contributions without doing violence to ourselves or to them (Leo Strauss, *Natural Right and History*, pp. 8-9, Chicago, 1950, 1965). Is this possible?

It is possible only if we recognize our frailties. We are not immune to dubious unified field theories. Santayana said that "Unity somehow exercises an evil spell over metaphysicians" (*Some Turns of Thought in Modern Philosophy*, ch. 4). Not just metaphysicians. We spend hundreds of millions each year because some are convinced that free radicals explain all disease and degeneration. Global warming and its older cousin, global cooling, are the new religions of the irreligious. And what have we gained in our flight from religion but a flight to its totalitarian substitutes, the gods that failed? It is hard to laugh at the ancients when we contemplate our follies.

Perhaps we should take a second look at Maimonides' ideas of elemental and psychical balance.

HOW SHOULD WE ACCEPT MAIMONIDES' GRAND ANALOGY?

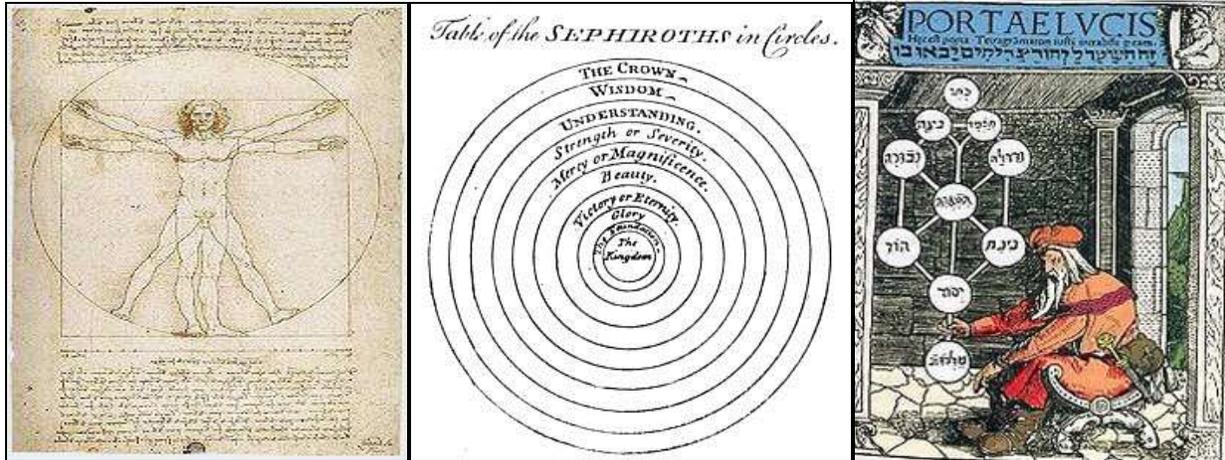
In examining this chapter, I think some of Maimonides' scientific points, a small number, to be sure, retain their force, especially those of a more general nature. Some others might work in an intuitional or poetic sense. We nod approvingly of other ideas. Some seem timeless, especially his commitment to organicism and design in nature.

Maimonides called the universal macrocosm an individual living being, like you or me. On a higher level, this implies that man himself is, primordially, the universe. This is the idea of the *adam kadmon*, primordial man, suggested, but not explicitly articulated, throughout the chapter. It is also the *shiuur koma*, i.e., the contemplation of "the dimensions of divine stature." Both are systems of correspondences between man and the universe, which portray man as somehow holding the levers of this universe. (Shem Tov reports that his contemporaries called this chapter the *Shiuur Koma*. See, on this idea, Gershom Scholem, *Major Trends in Jewish Mysticism*, 67, *et seq.*, and below "Judaism after the Collapse of the Cosmos.")

From what is one and simple only one can come to be, that is, from one God comes one universe. Man corresponds to that universe.

If that is true, the reverse could also be true. Consider the power of that notion: that we could, in principle, retrace the path back from man to the universe to God. (See my essay in 1:53 "From One Single Simple Thing Only One Thing Comes?" and the one just before it. Also, my notes below on the "Grand Analogy as Grand Meditation").

God creates only one thing, the universe, and in some unutterable way man is that universe. Think of the images of Da Vinci's *Vitruvian Man* as related to the tree of life, the *sefirot* of Jewish esotericism. The *sefirot*, were, in one view, nothing other than the powers behind Maimonides' cosmic spheres.



R. Yosef Gikatilla, 1248 –c.1325, an important bridge figure between Maimonides and Zoharic Cabala, defined the *sefirot* as “intelligences.” The *sefirot* were originally regarded intradecidally. Later they were linked to the spheres, but after Maimonides, they were only viewed as modes of divine unfolding.

(On sefirot, Scholem, *Kabbalah*, 96 – 116, esp. 109; Idel, *Kabbalah, New Perspectives*, ch. 6. For Maimonides’ list of ten intelligences, “Angels,” with no obvious connection to spheres, *Mishneh Torah, Ysodei Ha-Torah* 2:7.)

What can it all mean for us? We are not random alienated accidents lost in meaningless space, but significantly related to the very purpose of being.

Let’s take look at Maimonides’ world.

THE MUSIC OF THE SPHERES

This universe is dense with substance, containing no spaces and no vacuum. Shem Tov, at 110b, explains that if there were a vacuum the world would not be solid through. The world would just be an agglomeration of things, and therefore could not be a single being, “like Said and Omar.” It follows that if there were a vacuum, in either man or the world, there could be no analogy between the unity of the microcosm and the macrocosm.

The cosmos is a series of spheres, at least nine in number. These are like ever turning crystal globes successively surrounding us, one contiguous to the other, a glass onion. The planets and stars do not move, but adhere to the surface of these spheres.

There are two types of matter in this universe: 1) the hylic matter that forms the four basic elements of earth, air, fire and water; and, 2) the mysterious matter that forms the bodies in outer space, called aether or quintessence (fifth element).

The four sublunar non-intelligent elements in the cosmic macrocosm correspond to the four humours in the human microcosm, and to a series of other forces and arrays that come in fours.

The five elements come from the two eternal substances, matter and form (eternal *a parte post*). They have their “proper places,” one above the other, the earth at the bottom or center, surrounded by the sphere of water, then air, then fire, and above that the aether. The lower four elements remain in their places until forced to move by the rotating spheres above them. After having been displaced, those four elements return to their proper places in a straight line, up in the case of air and fire, down in the case of earth and water. The proper place, or rather, position, of the fifth element is in the cosmos, above the sublunar elements of earth, water, air and fire. This

quintessence constantly rotates, at unvarying speed (although each sphere has its own unchanging speed and rotational path).

The lower four elements lack intelligence. Maimonides actually says that the elements are “dead bodies” (*nakhim metim* / אגסומ מיתה), which means that, in and of themselves, they have no life force. They have only a sort of natural gravity that makes them return to their proper places. Since they have no principle of independent movement, they have no life. By contrast, the spheres made of ever-turning aether have souls, for only an intelligent soul produces circular motion (Guide 2:4). The soul of the outer sphere *rules* the rest of the universe, giving each entity its properties. It is the ultimate cause of every motion. It is also the ultimate cause of souls.

The soul that enlivens every living being, including animals and vegetables, derives its origin from the soul that moves the outer sphere. It is also the ultimate source of the human soul, called the rational faculty, *koakh ha-divri*, a natural human attribute. Without it, man could not prepare his food, nor could he organize communities. He needs to form communities to divide the work required to make the tools, clothes and lodging that he, unlike other animals, needs. (See below, “Three Disharmonies” and “Maimonides Changes the Subject.”)

Superior to all is God, the “soul” of the universe, without whom nothing could endure.

Once every cosmic year all the stars return to their places in the night sky. This also has its analogue in the sublunar world and the microcosm. According to the same principle of eternal recurrence, all things subject to generation and corruption cycle through the successive forms of their elemental matter to the form that they once had (See “The Eternal Recurrence,” below).

Certain types of creatures in the universe change by way of alteration, not through the process of generation and corruption, and their alteration follows no fixed rule, but is necessarily dependent upon their elemental blend of substance. This is the case in both the microcosm and the macrocosm. These include creatures that Maimonides thought were spontaneously generated in rotting organic matter. Likewise, the stomach supposedly generates such worms and parasites. These all correspond to the various patterns of the constellations, which also follow no discernible rule. The only explanation for such stellar anomalies is the divine *will*.

WHY WAS THE MUSIC OF THE SPHERES SILENCED?

The march of science destroyed Maimonides’ charming picture of the universe. The spheres are now merely orbiting planets. They are composed of the same type of matter we have on earth, not a radically different aether.

If there are no spheres, ensouled or otherwise, the souls of living creatures could not have stemmed from them.

While there are elements, the periodic table shows that they are more numerous than the magic number four.

Our sense of stellar motion is now more mechanical, so that while there could hypothetically be an ensouled something somehow stirring the pot, or giving an initial push, any galactic motion we are aware of is just the result of cause and effect, not due to souls.

Maimonides and his predecessors knew that their elegant picture of the cosmos did not conform to observation. (See below: “Judaism after the Collapse of the Cosmos” on the crisis caused by Ptolemaic cosmology).

The Talmud turns out to be more right than Maimonides when it says that the spheres are stationary and the stars move. (*Pesakhim*, 94b, but see Guide 2:8, where Maimonides’ version of that Talmudic text has the Rabbis admitting defeat by gentile astronomy, as also related by Shem Tov, 111a).

Even the ancients realized that the cosmic year was much longer than the apparent return of the stars. That is because through minute positional shifts, the whole sky moving over great periods reveals stars that we could not see before (equinoctial precession). Though there seems to be a cycle to this, the truth is that over eons there is drift and entropy, not recurrence.

There are no spontaneously generated living creatures in rotting organic matter or anywhere else, with the possible exception of mitotic generation in the very simplest creatures (not really an exception, since there is no spontaneity involved).

Where is the harmonious music of the spheres?

We lost Maimonides' beautiful cosmos, but we retain a sense of order. To the extent that there is a rational natural order in man, there is correspondence between the orderliness of the microcosm and the macrocosm. Indeed, by junking the aethereal spheres we see that the elemental composition of the universe and man is closer than was thought. But this universal order seems to lack the animating soul that concerned Maimonides. Could this be the *élan vital*, as in Henri Bergson?

Man does have soul and mind, and we do want to accept that the universe has a God, but we seem to have abandoned the quest to discover any specific physical mechanism relating them.

SOMEWHAT LESS DUBIOUS

While the idea of spontaneously generated worms is ridiculous, it is true that there are substances that have no purpose. This class has expanded since we no longer retain much sense of the Aristotelian belief that all things have a purposive cause, that is to say, a *telos*.

The idea of an initial cause of motion shows promise. In a universe generated from an initial big bang, it is possible that there was one great motion that got all the other motions going, keeping all the elements moving and combining. Still, at the end of this inertial movement we know that there is entropic dissipation, over immense time. There are no eternally rotating spheres.

Perhaps we can put the big bang together with the old idea that every effect must be contained in its cause, with all that might imply of design in nature and the necessity for a designer.

One notion that we should consider is the Aristotelian four forces doctrine, comprised of the combinative, vegetative, animative and intellective forces. The (a) combinative force composes and mixes the elements, which then combine into minerals; (b) the vegetative force makes plants grow; (c) the animative force gives life to all animals, including us; and (d) the intellective force is responsible for our thought. All of these creative and enlivening operations require causes, and these forces supposedly ultimately flow from the soul of the outer sphere. None of that holds except the intuition that there are forces behind life and the creation of all things.

Four is a magic number dear to Maimonides, representing society's lingering attachment to Pythagoreanism, which allowed him to find affinity among the four forces, the four elements, the four humours, the four causes, and so on. Indeed, he rhapsodizes that his view of fourness as a unified field theory came to him in prophetic inspiration (Guide 3:22, 2:10). But insofar as science is now concerned, he is way off the reservation. I suppose we should admit fourness as an idea of balance. To be sure, balance and equipoise are critical to all systems (but now we like fiveness more, cf. the Golden Ratio and the Fibonacci series). In our mathematization of the cosmos, we do find a balancing beauty in the theories of physicists and astronomers.

Following Aristotle, all changes in the universe, especially among creatures subject to generation and corruption, trace to the diurnal action of the sun, through the alternation of light and darkness. It is certainly true that this

alternation affects all living beings on earth. Still, the contention that diurnality causes all change goes too far. The point is important to Maimonides because he will compare this diurnal alternation of the outer sphere to the beating of the heart, and assert that just as the stopping of the heart causes the death of the person, so the cessation of the motion of the sphere would cause the death of the universe.

But this idea the idea flows from the false doctrine of the spheres. The idea also depends on the notion of the terracentric universe. While the cessation of diurnal alternation may lead to the death of life on earth, it would not affect the sun itself, or the rest of the universe, for only the earth would need to stop turning. Taken as an intuition of the importance of diurnality, the idea is interesting, but difficult to extricate from its baggage.

On the other hand, if motion, as such, were to stop, the universe would cease; but since there is no single persisting physical cause of motion, like the outer sphere, there is no way to apply this idea. We can certainly assert that without God the universe would not persist, but this does not involve any cognizable physical mechanism, and would only be a result of the direct exercise of divine will. Pure will, volition, by definition, is scientifically unanalyzable.

MORE LIKELY

Some Maimonidean ideas are making a comeback, such as his opposition to the concepts of atom and vacuum, and his claim that matter is infinitely divisible.

Particle physics for the past half century has made amazing progress smashing the atom, finding a growing array of sub-atomic matter. We also know of places where atoms cannot exist, like plasmas and neutron stars. The response could be that the atom is still the smallest particle of sustained material existence, since the sub-particulate matter and the electric charge into which it devolves may not have independent existence over time. Yet the translatability of matter and energy, in our age of quantum mechanics, seems to doom the atom as the basic unit of physics. Without going further out of my depth, it seems fair to say with Maimonides that the universe now looks filled.

He also opposed the vacuum, which was the space in which the atoms moved. If there was no atom there was no vacuum, and *vice versa*. Maimonides had contended that the universe was solid through (*ayn bo khalel reykh klal*), just like you or me. The payoff is that there is no place free of God or His influence, for God does not create his own vacuous demise. This is, of course, a stab to the heart of the atomic occasionalism of Kalām, since the paradoxical result of their super omnipotent deity would be its ability to negate itself entirely.

Maimonides also believes (with Aristotle) that substances, including elements, transform into one another. This transformative activity is fundamental to the four-element theory of Maimonides. It means that under certain circumstances, earth becomes water, water becomes air, and so on (Mishneh Torah, *Ysodei Ha-Torah* 4:5). The basic idea behind the transformation of elements is that “one substance is common to all,” *khomer ha-kol ekhad*. Chemists now say that you cannot transform elements by ordinary chemical means. Perhaps, in the origin of the planet, when non-ordinary chemical events occurred, some kind of elemental transformation took place.

Maimonides advocated a correspondence between the two material substances, the matter of the microcosm below and the matter of the macrocosmic aether above. The general idea of unity of substance compels. Despite the fact that there really is no aether above, it seems that there is one material reality beneath all appearances. (Averroes abandoned the aether, holding that the spheres are pure form. See Shem Tov, page 111a; Wolfson, *Crescas*, 607).

In Maimonides’ account, there were originally varieties of vapours, *ha-edim*: then, due to three of the four basic forces, all the minerals, plants and animals arose according to their elemental proportions (see on this

Friedlander's fascinating note 5 on 289). The concept of some kind of original condensation of minerals from vapours is interesting.

He also says that generated and corruptible beings arise from their constituent elements. The disintegration of those elemental compounds is itself the cause of their corruption. Those elements will return to be compounded again in another form. This is true, even though we reject his cycle of eternal recurrence.

Putting this all together, Maimonides asserts a parallel between the transformativeness of the elements and the transformativeness of the forces, resulting in the idea of a single force (*koakh ha-m'kesher*) behind all things, maintaining their harmony. Sometimes he calls it "nature." Even-Shmuel terms this force "self-preservation" (*shmirat ha-kiyum*).

But there are also disharmonious forces. The rotating sphere forces imbalance in those four static sublunar elements. This causes meteorological and geological disturbances, including catastrophes like hurricanes and earthquakes. This goes beyond what we know. He says that if nature were intelligent these disasters would not happen. This could be true, and it does undergird his distinction between mind and nature. Though there may be such a thing as the wisdom of nature, Maimonides reminds us that nature's wisdom is of a general character, a natural law, not at all like the application of mind to specific instances.

I was amused and fascinated by the following quotation about the harmonious transformativeness of elements and forces from the anonymous but all-knowing *Wikipedia.org*, on the subject of "Fundamental Interaction," for what it's worth:

"Traditionally, modern physicists have counted four interactions: gravity, electromagnetism, the weak nuclear force, and the strong nuclear force. Their magnitude and behavior vary greatly, as can be seen in the table below (omitted). Yet, it is strongly believed that three of these interactions are manifestations of a single, more fundamental, interaction, just as electricity and magnetism are now understood as two aspects of the electromagnetic interaction."

Whatever we should make of this, it does not seem ridiculous to assert, as Maimonides does, that nature unites the forces of the universe. The Hebrew *teva*, for "nature" has a root meaning of "stamp" or "impress," i.e., the stamp of God (compare Ibn Tibbon's glossary of strange words in the Guide). He says, believably, if unfalsifiably, that "There also exists in the Universe a certain force which controls the whole...That force is God."

The difference is that we do not argue that spherical motion requires the existence of God, the unmoved mover who keeps it going. That proof was the main casualty of the exhaustion of spherical cosmology. (In the Guide, Maimonides no longer places his full reliance on Aristotle's proof for the unmoved mover. Instead, he moves toward the Kalām proof of the existence of God from the particularization of stellar oddities.)

BIOLOGICAL IDEAS

The correspondence of macrocosm and microcosm depends upon the existence of some similarity between the physical systems we have just reviewed and the biological system in man. Maimonides' ideas about human biology held up better than his ideas about cosmology and physics. After all, physicians earn their keep when they cure people. Still, his general ideas endure better than his specific prescriptions. As a doctor he was no innovator, but was famous for restating and summarizing what was known. He was what we would today call a holistic practitioner, calling for dietary balance, exercise, bathing, and so on (a good brief introduction is *Mishneh Torah, Deot*, ch. 4).

Most troubling for us today, but unexceptional then, was his commitment to the four humours theory of disease. It parallels the four forces theory of biology. According to the four forces theory, every being is subject to four

non-intelligent natural forces: attraction, retention, digestion, and secretion. The cause of disease is the very lack of intelligence in these sustaining forces, for they do not attract just what the body needs, but whatever is available. Thus, instead of a fine balance between the four humours of blood, yellow bile, black bile, and phlegm (corresponding to the four physical elements), the body thoughtlessly absorbs foods whose humours are:

“...Too warm, too cold, too thick, or too thin, or that too much humour is absorbed, and thus the veins are choked, obstruction and decay ensue, the quality of the humour is deteriorated, its quantities altered, diseases are originated, such as scurvy, leprosy, abscess, or a dangerous illness, such as cancer, elephantiasis, gangrene, and at last the organ or organs are destroyed.”

Accordingly, Maimonides sees correspondence between human illnesses and terrestrial catastrophes, like hurricanes and landslides. Both come from the non-intelligent nature of matter. Disasters occur when spherical motion thoughtlessly displaces the elements, just as illnesses come from thoughtless absorption of inappropriate quantities and qualities of humours.

His medicine displays purposiveness that ours lacks, just as his physics does, due in both cases to the Aristotelian notion of teleological cause. Thus, his view of the heart is unexceptional, but for that purposive element. It is the “principal part in the human body” and is always in motion like the spheres. It rules all the other motions of the body, distributing forces throughout. (He follows Aristotle, not Galen, who had said that the ruler was the brain: see *scholia* of Goodman, L. E., and MacGregor, R. *The Case of the Animals against Man before the King of the Jinn*, Oxford, 2009, 81 – 83, notes 52 – 55.)

He observes that no organ of the body, e.g., the liver, can exist apart from the body. However, he pairs this to his misconception that the cosmic bodies, i.e., the stars, could not exist independently of their spheres.

Nature unites the bodily forces in orderly action, just as it does in the cosmos. He maintains that nature harmonizes the microcosm and the macrocosm, in opposition to those, like the Kalām, who rejected nature.

His final and most important harmony is this: if we were only speaking of bodies we could say that a donkey or a horse is the microcosm, analogous to the macrocosm. But it is only due to man’s mind that he can live, since the provision of his food, dwelling and clothing require the intellect to master crafts and organize communities. This faculty is what makes man the only true microcosm, a “small world,” governed by a God-like principle, the mind.

Notice that by making this claim he has shifted the guiding principle of the microcosm from the heart to the mind.

THREE DISHARMONIES

Maimonides admits elements of disharmony, which undermine the grand analogy between the macrocosm and the microcosm. He had subtly suggested at the outset that the analogy was a parable, not a demonstration (i.e., the double iteration in his opening sentences of *derekh mashaal* / מִתְּלָא, i.e., “parable”). These disharmonies highlight the distinction between Aristotle’s god of the philosophers and Maimonides’ Torah view of the nature of divinity. The god of the philosophers is *in* the universe, not completely separate from it.

He lists three disharmonies:

1. *Who Benefits?* The guiding principle of the body, the heart, derives a benefit from the external body parts, which protect it. The harder bones and skin, outside the center of the body, secure the soft organs within the body. He asserts this important principle of organicism significantly at the beginning of chapter 3:32 (his famous chapter on the meaning of the sacrificial system). By contrast, God and the outer sphere receive no benefit from the other parts of the universe. The macrocosmic ruler gets no direct benefit from the world, unlike the heart, the ruler of the microcosm, which does benefit from its rule of its small world.

2. *The Principle of Proximity.* The inner and outer parts of man and universe have opposite functions. Man's indispensable parts are within him. They rule the outer, subservient, parts of his body. The opposite is true in the macrocosm. The outer sphere of the macrocosm is indispensable, for it rules the inner part, i.e., the earth. The earth does not affect or influence the outer sphere the way that the heart affects and influences the outer parts of the human body. On the other hand, there is a similarity. *Matter* predominates as we move farther from the rulers of the macrocosm and the microcosm. In the universe the inner parts, *farthest* from the ruling sphere, are more turbid, solid, inert, dim and dark, as they are further from the outer light. The same is true of the body, whose more solid parts are *farthest* from the heart. The most rarified "simplest" parts of the physical cosmos are closest to the ruling sphere. Maimonides thinks this is true in the human body, i.e., that the softer, finer and more delicate parts are closer to the heart, their ruler (Guide 3:32).

3. *Embodied or Disembodied?* "The faculty of thinking is a force inherent in the body, and is not separated from it." By contrast, in the macrocosm, God is completely separate from the universe. By "faculty of thinking," Maimonides refers not to the active or acquired intellect, but only to the "rational faculty," *koakh ha-divri*. He explains that he restricted his grand analogy to this hylic intellect for heuristic purposes, since the proofs for the *separate* intellects of the spheres and of man were too complicated for this chapter's portrayal, although they would eliminate these three disharmonies (see below, "Maimonides Changes the Subject").

Thus, in his third disharmony, the world relates to God differently than man relates to his material intellect. Unlike this rational faculty, which governs man from within, God is radically other than the universe He governs.

Yet He does govern it. Maimonides firmly maintains that in some fashion God remains involved in His creation, despite His absolute otherness. He is both perfectly immanent and perfectly transcendent. How He rules the universe, and how His providence extends to "all parts," is a "complete mystery" which elicits an outburst of feeling, captured in the Pines translation: "May He whose perfection has dazzled us be glorified!"

(L. E. Goodman translates, "Glory, then to Him whose perfection dazzles us." Prof. Goodman kindly provided me this from his forthcoming translation of the Guide. Kafih: *ytalei mi sh'ha-eiratenu shlemuto*. Schwarz: *hashva l'mi sh'shlemuto m'sanveret et eineinu*.)

Narboni wants to know why Maimonides was dazzled (81a). He argued that God's emanations readily explain both creation and providence. Maimonides did not agree. Neither emanation nor anything else known to us can explain creation *ex nihilo*, the work of utter transcendence.

WHAT IS LEFT OF THE MICROCOSM?

What remains of Maimonides' science? Does anything endure in his grand analogy of the microcosm and the macrocosm?

We must doubt his assertion of the similarity in the substances of the universe with the substances in man; i.e., where he claims that the orbs and elemental combinations in the macrocosm correspond to the organs and humoral combinations in man. There can be no comparison between the heart and the outer sphere because there is no sphere. Humors do not govern our physical health, nor do the four elements comprise all compounds.

On the other hand, the comparison of human intelligence to the intelligence behind the universe is wonderful, though unfalsifiable and unprovable. The same is true when he says that man could not live without mind, just as the universe could not exist without God. Again, the generalization that there are balancing affinities in the universe and man has uses in alternative medicine and spirituality generally that it no longer has in our reified science. This may be a fault of that science.

The more general and poetic statements survive eight hundred years of scientific advance. Thus, when he says that the universe is but one individual it is an assertion that retains force, although it is just as unprovable now as it was then. Perhaps piling on more harmonious items between man and the universe helps his case, although this is no apodictic proof in the spirit of the *Posterior Analytics*. As we noted, he had already suggested that his portrayal was a parable, a *mashal*, not a demonstration. He tells us, only at the end of the chapter, that the analogy would have been perfect had we compared the separate intelligences guiding the sphere to the active intellect guiding man.

The truly grand analogy turns out to be the recognition of the unity of mind.

ARE WE ASKING THE RIGHT QUESTIONS?

It is certainly reasonable to question the enduring quality of Maimonides' science. It is the question of medieval science versus modern science. We could ask the same questions of Aquinas and Averroes.

A student asked me whether Maimonides would have changed his mind in the light of the developments in science. My conclusion was not encouraging. The last paragraph of the chapter, in which he castigates anyone who would question any part of his picture, is rather sad. There are examples of Jewish thinkers who continued to defend the Ptolemaic cosmology *after* and *against* the Copernican revolution (i.e., the astronomer R. David Gans, 1541-1613), and it is quite possible Maimonides would have done the same. This is, however, the paradoxical way of scientific revolutions. (See, *the Structure of Scientific Revolutions*, Thomas Kuhn. On Maimonides' resistance to science, see Gad Freudenthal, "Maimonides' Philosophy of Science," *Cambridge Companion to Maimonides*, ed. Seeskin, 2005, 149-150).

Maimonides' commitment to experimentalism was questionable, as in his belief that spontaneously generated creatures emerge when we slit open cancers. (*Pirkei Moshe* 24:11. See also his peony cure for epilepsy, his dog excrement prescription for throat swelling, *ibid.* p. 153, notes 60-62. For many more risible prescriptions, see Herbert Davidson, *Maimonides, the Man and His Works*, Oxford, 2005, 438-439, 449-450).

Still, the battle between his science and our science is our battle, not his battle. His battle was between rationality and irrationality. The important question of his time was whether the universe and man could be studied at all. That was the point of his microcosm/macrocosm lesson in his time, and we see the consequence of that battle.

The Kalām declared Aristotelian science off-limits to belief. It was a form of heresy. For the Kalām dogmatists, Allah miraculously recreates the universe at every moment. Our existence from moment to moment is an illusion. We have no will. Only the creator has will, and only will, for there is no discernible rationality in His action. There is no microcosm, macrocosm or nature, and assertions about anything at all are worthless, except for the dogmas of Islam. Our mind is of no consequence for we have no choice. When they answered the question of how the many come from the One, they did not respond, as Maimonides does, that God creates a single universe containing all variety in an organic whole. They responded that God creates miracles: a congeries of atoms with no rational connection between them, followed by another, and then another. They made no explanation of the apparent patterns in the universe, for there is no explanation for the illusory, but that it is illusory. All perceived relations are illusions. (On the Kalām, and the accuracy of Maimonides' portrayal of it, see next chapter).

How deadly this has been for the state of science and culture in the Middle East. And, taken apart from the particular Muslim context, how deadly modern (or rather, postmodern) this all sounds.

Despite the crisis of the Aristotelian/Ptolemaic system (see immediately below), Maimonides' science was an advance over Kalām fantasy. He contended that the universe is ultimately rational and comprehensible. Just by maintaining this, he left room for the development of new speculative and experimental ventures. He saved

Judaism from descent into this seductive Kalām irrationality, as his student Aquinas preserved Christianity, but as Averroes, his Cordovan contemporary, failed to do for Islam.

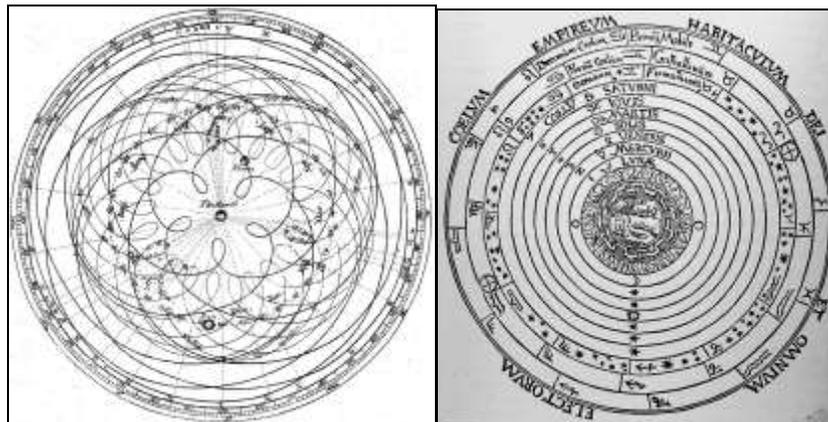
The attack on Aristotelian science began shortly thereafter in Europe. Maimonides’ great rabbinic opponent, R. Hasdai Crescas, was one of the originators of that critique. But that attack was usually not directed against rationalism itself, unlike the Kalām’s attack on science, which denied man’s ability to learn anything.

Overall, though the hypothesis of the macrocosmic correspondence has lost force, we retain its assertion that man can know that which he has not directly experienced.

JUDAISM AFTER THE COLLAPSE OF THE COSMOS

Maimonides knew that cosmology was in crisis. Guide 2:24 reveals the extent of that crisis. The cosmos was not the perfect Aristotelian geometry of nested spheres. The cosmology must assume the existence of the eccentric and epicyclic spheres proposed by Ptolemy (2nd Cent. C.E.). Only the messy multiplication of epicycles could fill the crevasse between the Aristotelian scheme and the evidence of observation.

These theories conflict with what Aristotelian science had ruled about the two forms of natural motion. Natural motion could only be vertical or circular: the four elements move vertically, while the cosmic quintessential matter circled a fixed center. But Ptolemaic spheres have centers that move. These are the epicycles. There are also eccentric spheres that surround us but circle a point that is off-center with respect to the earth. Both violate the laws of Aristotelian motion.



Ptolemaic Cosmos

Aristotelian Cosmos

Maimonides seems to have accepted the eccentric spheres but not the epicycles. This, however, did not resolve the dilemma. He responded, in Guide 2:24, by concluding that it was not the job of the astronomer to discover the truth of the universe. We can only expect the astronomer to create elegant mathematical models of our perception of celestial order:

“These difficulties do not concern the astronomer: for he does not profess to tell us the existing properties of the spheres, but to suggest, whether correctly or not, a theory in which the motion of the stars is circular and uniform, and yet in agreement with our observation.”

As a result, Maimonides denies that the extra-lunar cosmos is humanly knowable, for “Man’s faculties are too deficient,” because science just could not reach that high. He says:

“This is all I can say on this question; another person may perhaps be able to establish by proof what appears doubtful to me. It is on account of my great love of truth that I have shown my embarrassment in these matters and I have not heard, nor do I know that any of these theories have been established by proof.”

This is so. He does not express unreserved acceptance of either of the contending cosmologies.

Nonetheless, he claims, in our chapter, that non-acceptance of his peculiar version of this science comes from ignorance or dogmatism:

“Opposition can only emanate either from an ignorant man, who contradicts truths even if they are perfectly obvious, just as a person unacquainted with geometry rejects elementary propositions which have been clearly demonstrated, or from the prejudiced man who deceives himself.”

How should we assess his position, and what are its consequences?

Maimonides was able to accept the perplexities of cosmology because he accepted the Kalām proof of God from “determination” or “particularization” (Guide 1:74, fifth argument). This proof explains celestial oddities as expressions of divine will. No other explanation sufficed. The lawfulness of nature would not have allowed these aberrations to exist but for divine volition, the force beyond nature. God wanted it to be that way, and that is how we know that He is God. Nonetheless, by preserving those astronomical perplexities Maimonides left the door open for Crescas to dismantle the entire Aristotelian/Ptolemaic cosmology (H. A. Wolfson: *Crescas’ Critique of Aristotle*. On particularization, see Freudenthal, above, p. 141).

The inevitable result was revolt against physical cosmology. Since the Guide opened the yawning chasm between what was seen and what could be known about the universe, the natural reaction was to escape the chasm by internalizing the spheres, exactly as accomplished by the Zohar.

Moshe de Leon (c. 1240-1305), the man most associated with the publication of the Zohar, was a sophisticated student of the Guide, who would have known how bad the scientific crisis had become.

In the Zohar the spheres become *sefirot*, hypostases, or at least moments of divine thought, modes, with no physical properties (which was probably what the decad originally was, see Idel, *op. cit.*). In this way, Judaism was able to realize the implicit esoterism of our chapter.

One of Maimonides’ early commentators, Shem Tov Ben Joseph (c. 1461-89) calls this chapter the *shiur koma* “dimensions of divine stature” 110b. Shem Tov probably knew that Maimonides had rejected the authenticity of the actual book called *Shiur Koma (Responso, 1-201, Blau)*. Shem Tov seems to be saying that our chapter was the true *Shiur Koma*. (On *shiur koma*, Scholem, *Kabbalah*, 16-17).

The *shiur koma* was a Cabalistic parable of the immense size of the primordial *anthropos (adam kadmon)*, which represented the human microcosm’s grasp on the levers of the universe. Shem Tov solidifies his point, suggestively, when he says, “Understand that everything Maimonides says in this chapter comes to explain *Maaseh Bereshit*, and to explain *Maaseh Merkava*, and to explain providence, Torah, and *mitzvoit*” (113b).

THE GRAND ANALOGY AS GRAND MEDITATION

We saw that Maimonides subtly suggested that he had not meant this chapter to be a scientific account, but rather a parable, due to his double use of the word *mashal* at the beginning of the chapter.

His grand analogy represents a certain type of stepwise meditation pattern that he seems to favor. The paradigm for this is the meditation on the fringes, *tzitzit*, which a Jew wears on his garment, and which display a blue thread in a group of white threads. The meditation is upon that blue thread. It comes from the Talmud, *Khullin* 89a:

“Blue resembles the colour of the sea, and the sea resembles the colour of the sky, and the sky resembles the colour of a sapphire, and a sapphire resembles the colour of the Throne of Glory, as it is said: And they saw the God of Israel and there was under His feet as it were a paved work of sapphire stone (Exodus 24:10).”

He does something like this in his brace of chapters on the essential attributes of God (1:51-60). His doctrine of negative attributes, as we have shown, is a meditation that also proceeds step-by-step. He first asks his student to conceive of God in the light of any one of these attributes. Then the student must deny that attribute. He does this systematically with each of the attributes, asking the student to produce every possible reason why he must deny that attribute. As the student advances in each step of this meditation, he develops a more sublime view of divine sanctity.

I think that something like that is involved here. Once the student has developed the grand microcosmic analogy as Maimonides developed it here, he must then recognize the three exceptions to that analogy. He then appreciates the need to change the subject to an analogy between God and the active intellect, the “image” of God in which the student was made. He sees that the analogy produces a system of correspondences and affinities working down from God to man. He then achieves the illumination that he can, in principle, work his way back up through those analogies to God. He realizes, deeply within himself, his role in the divine purpose.

Of course, he has to be the right student, who has the basic learning, and who can work out the rest for himself. The student is able to find the metaphysical truth behind all the lore about the physics and cosmology. Maimonides does make a claim to infallibility for his physical science, but he directed that diatribe to his larger audience, which was not prepared to enter his *pardes*.

MAIMONIDES CHANGES THE SUBJECT: THE SOULS OF THE SPHERES

The entire direction of our chapter’s discussion changes at the point where Maimonides asserts that the only real microcosm is man, and only because of his unique mind:

“Bear in mind, however, that in all that we have noticed about the similarity between the Universe and the human being, nothing would warrant us to assert that man is a microcosm; for although the comparison in all its parts applies to the Universe and any living being in its normal state, we never heard that any ancient author called the ass or the horse a microcosm. This attribute has been given to man alone on account of his peculiar faculty of thinking, I mean the intellect, viz., the hylic intellect (*ha-koakh ha-hoga, k’lomar ha-sekhel, sh’hu ha-sekhel ha-hayuli*) which appertains to no other living being.”

Note that the intellectual faculty spoken of here is the hylic intellect, which he terms the *sekhel*, and more frequently in this chapter, *ha-koakh ha-hoga* (Schwarz: *koakh ha-m’daber*, Judeo-Arabic: אלקוה אלנאטקה, the rational faculty, Gr.: *logike/logistike dunamis*). This is not merely the *potential* intellect, that is, the possibility for thought that all men are born with. We know this because he immediately describes the necessary benefits we derive from this *koakh ha-hoga*, the benefits that accrue only to man through his intellectual organization of commerce, exchange and politics.

When I say that Maimonides changes the direction of the chapter, he is, after this point, no longer concerned with the purely physical correspondences between the spheres and man. He presages the turn that Judaism itself will make. He seems to relapse to physicality when he returns to the three disharmonies, but this is a subtle misdirection, since only the first two of those disharmonies had to do with the physical heart. Had he focused on the mind there would have been no disharmonies.

The problem is the third disharmony, that between the *koakh ha-hoga* which is *in* the human body (*sh'ha-koakh ha-hoga ha-zeh hu koakh b'guf u'bilti nifrad mimenu*), and God who is totally *other* than the universe. Raising the level of complexity, he tells us that even the soul of the sphere is *in* the sphere, but that were we to contemplate the *separate intelligences*, *ha-sikhlim ha-nivdalim*, we would find correspondence between them and the *active* or *acquired* intellect in man, *ha-sekhel ha-nikna*. To sort this out we need to introduce some distinctions.

There are three ways an entity can have a relationship with a physical body:

- 1) There can be a *nexus of distribution*. This means that the soul or other entity distributes through the body, mixing with it. Thus, slicing a worm leaves each part wriggling, so that, by this theory, its animal soul divides with the worm. It also means that when the worm moves its soul travels with it by *accidental motion*, like a nail in a boat moves with the boat (as opposed to *essential motion*, which describes the movement of the boat itself directly caused by the wind or waves).
- 2) There can be a *nexus of admixture*. Here the entity is in the body, and moves with it, but is *not* distributed through it. Maimonides holds that the rational faculty, responsible for the preparation of man's necessities, relates to the body of its human owner by a nexus of admixture. It is *undistributed* through the body, but moves *accidentally* with it. Thus, it is not distributed through the body like the life of the worm, but travels with the body and dies with it. It is, therefore, a material intellect.
- 3) There can be a *nexus of inexistence*. This Latinate term (*inesse*) does not mean "nonexistence," nor does it mean "existing in," but more like "existing with." It is a relation of intention or direction to its object, a relation of immanent objectivity. This is the relationship of the active intellect with the body, whereby the active intellect is wholly separate from the body, emanates its influence upon it, and persists after its death. (For all these distinctions: Wolfson, *Crescas*, 602-612)

Maimonides thought that the intelligence in the sphere was like the rational faculty in man, in that both relate to their respective bodies by a nexus of admixture. The intelligence or soul of the sphere is *in* the sphere, but undistributed, and *moves with* the sphere. To this extent, there is correspondence between the spherical macrocosm and the human microcosm, i.e., between the soul in the sphere and the rational faculty in man.

Nonetheless, the final cause of the motion of the sphere is the separate intellect, *ha-sekhel ha-nivdal*, which rules the soul in the sphere.

Why do we need the separate intellect in addition to the soul in the sphere? Since the sphere is in infinite motion, the cause of its motion cannot be finite. That is because the effect can possess nothing that the cause did not give it. If the motion is infinite, its cause must also be infinite. But an intelligence *in* the sphere is by definition finite, limited by the form of the sphere. There must be an eternal infinite force producing the sphere's eternal motion. That cause cannot be limited in the sphere and must be separate from it. Therefore, there must exist separate intelligences, *ha-sikhlim ha-nivdalim*, which govern the spheres. This has its analogue in the microcosm. The separate active intellect is the final cause of the motion and life of man. (The active intellect, *sekhel ha-poel*, he calls here the "acquired intellect," *sekhel ha-nikna*. See Friedlander note 3, 307, and my essay "The Debate on the Nature of the Potential Intellect," Guide 1:68).

Maimonides, at the end of the chapter, suggests that had he been talking about the separate intelligences in the macrocosm and the microcosm there would have been no disharmonies, but he had to postpone that discussion because the proofs for the separate intellects were too complex for this chapter. He says that he had to portray the macrocosmic correspondence in a “concise” (*tamtziti*) manner so that it would be instantly accepted by any reader who was not ignorant or dogmatic (*sikel...l'ha-khazik hashkafa msuyemet sh'kadma lo*).

Shem Tov suggests a different reason for Maimonides' diffidence: he wanted to avoid the question of the existence of individual minds, that is, whether there is really only one mind, the unity of intellect. Thus he avoids, according to Shem Tov, the question of whether individual souls survived the destruction of the body (115b). In my view, however, the real reason he begins with the basics of physical science is that he wants this to be a real step by step meditation, in which the student develops himself to the point of experiencing the wholly intellectualized cosmic consciousness, the goal of Maimonides' version of *shiur koma*.

THE ETERNAL RECURRENCE

One of the more interesting ideas in the chapter is the notion of the eternal recurrence. It began its life in ancient Stoicism, and it recurs in Nietzsche's new Stoicism. (Nietzsche: *The Gay Science*, §285 and §341; “Pity and Mercy: Nietzsche's Stoicism” by Martha C. Nussbaum, in *Nietzsche, Genealogy, Morality: Essays on Nietzsche's “On the Genealogy of Morals”* ed. Richard Schacht, U. of California Press, 1994). I would explain it in the following way.

First, the ancient Athenian philosophers held that the universe was eternal. They saw that the stars moved in the night sky, but eventually returned to their original positions. That this was not strictly true, because of equinoctial precession, which they knew, did not change their sense that recurrence was a feature of the cosmic system.

Secondly, the Greeks believed that the objects of our material world were composed of form and matter. There could only be a finite number of such forms. This was due to Aristotle's principle, *infinitum actu non datur*, “there is no actual infinite” (Physics 3:7, 207b10-12). He meant that it was contradictory to assert the existence of a *definite* set of an infinite number of actual objects, because the term “infinity” implies indefiniteness.

Third, the infinity of time eludes the rule of *infinitum actu non datur* since time manifests itself as the definite present moment only. Matter is also infinite, because it is, in itself, only a potential, an infinite formless potency. The finite number of forms in-forms hyllic matter to produce the material objects, over infinite time. Different combinations of elements form the objects, but these combinations eventually break apart, decay, and then the underlying material substrate adopts another form.

Since the number of forms is finite, while the process proceeds in infinite time, it must follow that there will be an eternal recurrence of each form in the material substrate. Thus, a dead man will die, become dust, then perhaps a worm, and so forth, but eventually the matter will be in-formed as that particular man again. Every form that can be realized will be realized, over and over again.

There is, then, a correspondence of the principle of eternal recurrence in both the stellar cycle and in our sublunar sphere. The idea appears in Judaism in Ecclesiastes (1:9, 3:15, 6:10) and in the Midrash, *Genesis Rabba* 3:7: *sh'haya borei olamot u'makhrivin ad sh'bara et elu*, “God created worlds and destroyed them until this one.”

Maimonides rejected the notion in this Midrashic/Stoic form because it contradicted creation *ex nihilo*, but he accepted the recurrence within this present universe, the only one God created.

YOSEF IBN TSADIK AND THE *OLAM KATAN*

R. Yosef ibn Tsadik (d. 1149), noted at the beginning of this chapter, wrote *Olam Katan (The Microcosm)*. This work, which predates the Guide, elaborated the microcosm's correspondence with the macrocosm.

Yosef is an important bridge figure. He is one of the exceptions to Maimonides' rule that all the Andalusian Jewish authorities, especially the later ones, rejected the Kalām. Yosef was close to Maimonides in some ways yet represented a Jewish Kalām. He is more neo-Platonic than Maimonides was, though both are part of the general neo-Platonized Aristotelianism of the era. He may have been one of Maimonides' earliest teachers, and perhaps sat with Maimonides' father as a judge of the Jewish court in Cordova.

Maimonides claims that he was familiar with *Olam Katan's* doctrines but never read the book (*Letter to Shmuel Ibn Tibbon*). This amazes me. I can only interpret it two ways. 1) He did read it but did not want to admit it, for then he would have to criticize one of his teachers. By denying that he read it, he avoided the engagement; or 2) he really did not read it, knowing what it would say, since it would force him to criticize one of his teachers.

The doctrine of *Olam Katan* anticipates in many ways the microcosm/macrocosm of our chapter. Still, it employs much stronger neo-Platonic language than Maimonides approved. According to Alexander Altmann, "The work as a whole thus reflects the two then prevailing trends, neo-Platonism and Kalām." Among its major neo-Platonist influences were the so-called *Theology of Aristotle*, which is really from the *Enneads* of Plotinus; and the *Ikhwan Al Safa*, the "Brethren of Purity," the neo-Platonic encyclopedists of 10th Century Baghdad.

(See p. 274, *The Case of the Animals*, op. cit., Goodman and MacGregor, which discusses the *Ikhwan* approach to the microcosm-macrocosm analogy; Alexander Altmann from Encyclopedia Judaica on R. Yosef).

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scottmalexander@rcn.com