

Avicenna on the Disunity of Substantial Form: The Case of Elemental Mixture

Celia Hatherly

Abstract. This article considers Avicenna's insistence on the disunity between the souls of humans, animals, and plants and the mixed elemental bodies in which they inhere. In particular, it looks at (1) why Avicenna rejects their unity and (2) why this rejection, *pace* some contemporary scholars, is compatible with the status of these souls as substances. I show that both points derive from the causal role that these souls and the elements play in the coming to be and passing away of mixed elemental bodies.

I. Introduction

It is something of a truism that Avicenna's theory of formal causation receives less scholarly attention than that of efficient causation.¹ As this lacuna begins to be filled, a controversy is emerging as to whether Avicenna accepts the doctrine of the unity of substantial form. This doctrine states that, for example, Socrates's sole substantial form is his human rational soul and that this soul virtually contains an animal sensitive soul, a plant vegetative soul, the forms of the elements, and the corporeal form that makes his body a body. Now, Avicenna is

¹ Notable exceptions include Amos Bertolacci, "The Doctrine of Material and Formal Causality in the «Ilāhiyyāt» of Avicenna's «Kitāb al-Šifā'»,» *Quaestio* 2, no. 1(2002): 125–54; Robert Wisnovsky, "Towards a History of Avicenna's Distinction between Immanent and Transcendent Causes," in *Before and After Avicenna*, ed. David Reisman (LeidenBrill, 2003), 49–68.

very clear that Socrates's rational, animal, and vegetable souls are unified.² However, there is a scholarly controversy as to whether Avicenna accepts the unity of the soul and the lower forms, specifically corporeal form.³

² See Avicenna, *Shifā': An-Nafs*, ed. Rahman (London: Oxford University Press, 1959), 31; *De Anima*, ed. Van Riet (Leyden/New York/Cologne: Brill, 1972), 65–6.

³ The pattern in the scholarship appears to be that scholars initially read the *Metaphysics of the Healing*, Book 2.2 as straightforwardly advocating the disunity of corporeal form. See for example, Amélie Marie Goichon, *La distinction de l'essence et de l'existence d'après Ibn Sīnā (Avicenne)* (Paris: Desclée, de Brouwer, 1937), 432; Étienne Gilson, *A History of Christian philosophy in the Middle Ages* (Washington, DC: Catholic University of America Press, 1955), 193; Arthur Hyman, "Aristotle's 'First Matter' and Avicenna's and Averroes' 'Corporeal Form,'" in *Essays in Medieval Jewish and Islamic Philosophy*, ed. Arthur Hyman (New York: Ktav Publishing House, 1977), 335–56, at 404, n. 85.

More recently, however, scholars have argued that Avicenna's understanding of form and substance requires him to accept the complete unity of substantial form, see Amos Bertolacci, "The Doctrine of Material and Formal Causality in the *Ilāhiyyāt* of Avicenna's *Kitāb al-Šifā'*," *Quaestio* 2, no. 1(2002): 125–54, at 140; Abraham Stone, "Simplicius and Avicenna on the Essential Corporeity of Material Substance," in *Aspects of Avicenna*, ed. R. Wisnovsky (Princeton: Markus Wiener, 2000), 73–130, at 99–102; Kara Richardson, "Avicenna and Aquinas on Form and Generation," in *The Arabic, Hebrew and Latin Reception of Avicenna's Metaphysics*, ed. Dag Nikolaus Hasse and Amos Bertolacci (Berlin: Walter de Gruyter, 2011),

In trying to solve this puzzle about the unity of corporeal form, some scholars have argued that Avicenna accepts the unity of substantial form more generally. Their argument, which originates with Abraham Stone, stems from Avicenna's characterization of a substance as what is not in a subject (*mawḍū'*) and an accidents as what is.⁴ Avicenna explains that a subject is a subsistent member of a species, and the things that exist in it draw their existence from it.⁵ Hence, Stone argues that substances can contain only one substantial form, since if a substantial form were in another substantial form as its subject, then it would be an accident. But as (according to Avicenna) the same thing can never be both substance and accident, it follows that substantial form is never in any subject whatsoever, but always in prime matter."⁶ Note, this is not to say that substances cannot exist in anything. Instead, substances can exist in a receptacle (*maḥall*) rather than a subject. The difference is that a receptacle is not a subsistent member of some species, and it does not sustain the existence of what inheres in it. Instead, the situation is reversed, and the receptacle gets its subsistence and species from what inheres in it.⁷

251–74, at 258, n. 26: Andreas Lammer, *The Elements of Avicenna's Physics: Greek Sources and Arabic Innovations* (Berlin, Germany: Walter de Gruyter, 2016), 165–72.

⁴ Stone, *Simplicius and Avicenna*, 100–1. This objection is echoed by Lammer in *Elements of Avicenna's Physics*, 168 and endorsed by Richardson in "Avicenna and Aquinas," 258, n. 26.

⁵ Avicenna, *Metaphysics of the Healing*, trans. M. E. Marmura (Provo, UT: Brigham Young University Press, 2005), 2.1.2, 45.

⁶ Stone, *Simplicius and Avicenna*, 100.

⁷ Avicenna, *Metaphysics of the Healing*, 2.1.7, 46–7.

In this essay, I approach the problem of Avicenna's understanding of the unity of substantial form from a new angle: looking at why Avicenna rejects the unity between the human soul and the forms of the elements that compose the human body. He devotes almost an entire chapter of the *Generation and Corruption of the Healing* to arguing against it.⁸ There, he writes:

In our time, some have put forward a strange and marvelous opinion, saying that when the simple elements mix and are acted on by each other, this leads them to lose their forms so

⁸ In doing so, Avicenna anticipates and argues against the understanding of elemental mixture included in Aquinas's doctrine of the unity of substantial form. For Aquinas's defense of his position and his objections to Avicenna's, see *De Mix.*; *ST I*, q. 76, a. 4 & 6; *De Anima*, q. 9 ad 10; *De Potentia*, q. 5, a. 7. I have been unable to find any response to the second of Avicenna's two arguments against the unity of form in elemental mixture in Aquinas's corpus, and Aquinas may not have had access to it, since Avicenna's *De Generatione* is attested from the end of the thirteenth century and the first attestation of the complete collection of the *Physics of the Healing* dates from 1338. Indeed, the Latin tradition mostly relied on Averroes's report of Avicenna's position (*In Caelum*, 3 c. 67, 635,115–39) and Avicenna's brief remarks in the *Physics of the Healing*, 1.6. See Anneliese Maier, "Die Struktur der materiellen Substanz," in *An der Grenze von Scholastik und Naturwissenschaft* (Rome: Edizioni di storia e letteratura, 1952); S. van Riet, "Le De generatione et corruptione d'Avicenne dans la tradition latine," in *The Commentary Tradition on Aristotle's De Generatione et corruptione: Ancient, Medieval and Early Modern*, ed. Johannes M. H. H. Thijssen and Henk A. G. Braakhuis (Turnhout: Brepols, 1999), 69–77; and Heidrun Eichner, *Averroes' Mittlerer Kommentar zu Aristoteles' De generatione et corruptione* (Leyden/New York/Cologne: Brill, 2005), 139–45.

that none of them has its proper form, and they then take on one form, and there comes to them one matter and one form. And among them [there are those] who make this form a medium between the strength⁹ of their forms. And they think that the mixture is prepared by this to receive the form of the [higher] species that the mixture possesses. And among them [there are those] who make this form another form, that is, the form of the [higher] species and make the mixture¹⁰ something accidental and not a form.¹¹

Thus, Avicenna is opposed to any understanding of mixture in which the forms of the elements do not persist and are replaced with a single form that pervades the entire mixture.¹² This includes both the view that the mixture has its own substantial form through which it acts as the substrate for a higher form and the view that the substantial form of the higher species is the sole substantial form, with the mixture's balance between hot, cold, wet, and dry being reduced to an accidental form. This second is the model that one would adopt to hold to the unity of substantial form.

⁹ Omitted in the Latin.

¹⁰ The Latin adds “seu temperamentum” (or the temperament).

¹¹ Avicenna, *Generation and Corruption of the Healing*, ed. Qāsim (Cairo: The General Egyptian Book Organization, 1969), 133; ed. Van Riet (Leyden/New York/Cologne: Brill, 1987), 70. The quotations from the *Generation and Corruption of the Healing* are from my own translations from the Arabic. I have included references to the Latin text and have reproduced it in footnotes when there is a deviation.

¹² For the identification of the unnamed contemporary opponents attacked here as certain Baghdad Peripatetics, see Eichner, *Averroes' Mittlerer Kommentar*, 139–45.

This chapter of the *Generation and Corruption of the Healing* has received almost no scholarly attention nor is there a published modern language translation.¹³ Thus, this article has two aims. First, I translate and explain Avicenna’s two arguments for why the forms of the elements cannot be supplanted by that of the mixture or of a higher-level species.¹⁴ Second, I show why Avicenna thinks that the forms of the elements can remain in the mixture without endangering the higher forms’ status as substances. Taken together, these two points reveal that the higher forms can exist as substantial forms in a distinct mixed body because of the role they and the elements play in in the coming to be and passing away of that body. I, therefore, hope that the essay will help provide a fuller picture of Avicenna’s hylomorphism and the philosophical considerations that guided its development. Before turning to these aims, however, I will give a brief overview of Avicenna’s understanding of elemental mixture.¹⁵

¹³ Abraham Stone treats briefly the first of Avicenna’s two arguments against the unity of substantial form that it contains: “Avicenna’s Theory of Primary Mixture,” *Arabic Sciences and Philosophy* 18 (2008): 99–119, at 114-5.

¹⁴ I would like to thank Jon McGinnis for making his draft translation of the *Generation and Corruption* available. It helped me tremendously in preparing my own.

¹⁵ As Abraham Stone has set out, there was a long tradition of debate prior to Avicenna surrounding how to interpret Aristotle’s theory of elemental mixture as presented in his *On Generation and Corruption*. See Stone, “Avicenna’s Theory of Primary Mixture,” 100–11. For a selection of the ancient commentators’ views on mixture, see Richard Sorabji, *The Philosophy of the Commentators, 200-600 AD: A Sourcebook*, vol. 2 (Ithaca, NY: Cornell University Press, 2005), 290–315. For a comprehensive overview of the reception of Aristotle’s theory of mixture

II. Two Objections to the Unity of Substantial Form

Elemental mixtures are one of the two outcomes of the interaction between the four simple elements (earth, air, fire, and water). The other is transformation.¹⁶ In transformation, “some of [the elements] may dominate another, and so transform it into its [own] substance. In that case, there is generation into the species that dominates, while there is corruption of [the species] that is dominated.”¹⁷ In mixture, however, the substantial forms of the elements remain, for one element does not destroy the substantial form of the other but acts on the other “so as to transform its quality to some limiting point in order that the action and passion are equalized in it, and a homogenous quality comes to be in it that is called the “(elemental) mixture.”¹⁸ Now, as

both before and after Avicenna, see *The Commentary Tradition on Aristotle’s De Generatione et corruptione: Ancient, Medieval and Early Modern*, ed. Johannes M. H. H. Thijssen and Henk A. G. Braakhuis (Turnhout: Brepols, 1999).

¹⁶ Specifying that a mixture is the result of the interaction between the elements is what distinguishes it from a mere composition or blending (*ikhṭilāṭ*). The latter is characterized as a combination in which no action or passion occurs between its constitutive parts. The example Avicenna uses is the combination of the grains of wheat and barley, which, when stirred, affect neither each other’s forms nor qualities; see Avicenna, *Generation and Corruption of the Healing*, 7.10, ed. Qāsim, 127; ed. Van Riet, 62.

¹⁷ Avicenna, *Generation and Corruption of the Healing*, 6.10, ed. Qāsim, 126; ed. Van Riet, 61–2.

¹⁸ Avicenna, *Generation and Corruption of the Healing*, 6.10, ed. Qāsim, 126; ed. Van Riet, 62.

Stone has documented, this picture of elemental mixture is grounded in Avicenna's distinction between the substantial form of the elements and their primary qualities.¹⁹ Thus, in the case of fire, heat is not its substantial form. Instead, heat is an accident caused by the substantial form of fire under appropriate conditions. Under other conditions, fire can be cooled up to a certain temperature and yet still retain its substantial form. The same is true of the other elements. Thus, in an elemental mixture of, say, fire and water, they act on each other until they are at the same temperature, and so are homogenous with respect to their primary qualities. They are, however, heterogeneous with respect to their substantial forms since neither has destroyed the form of the other.²⁰

To defend this understanding of elemental mixture from the two schools that argue that the forms of the elements are not preserved, Avicenna raises two objections which apply to both. These two objections argue that unless the forms of the elements are preserved in the mixture, it is (a) impossible for the mixture to be destroyed and (b) impossible for the mixture to come to be. I focus on the second as it is the more complex and philosophically interesting. The first relies on a handful of Avicenna's well-known and well-studied philosophical principles. The second, however, as I show, relies on Avicenna's understanding of inclination (*mayl*) at the

¹⁹ See Stone, "Avicenna's Theory of Primary Mixture," 112–4. For Avicenna's defense of this distinction, see *Generation and Corruption of the Healing* 7.10, 6.12–21, ed. Qāsim, 127–31; ed. Van Riet, 62–7. For another commentary on Avicenna's argument, see Jon McGinnis, *Avicenna* (New York: Oxford University Press, 2010), 85–8.

²⁰ Avicenna, *Generation and Corruption of the Healing*, 6.22, ed. Qāsim, 131; ed. Van Riet, 67.

limits of change. This is an aspect of Avicenna's theory of inclination that has yet to receive any scholarly attention. I do, however, present both objections to make them available in English translation and to establish my thesis that the higher forms can exist as substantial forms in distinct mixed bodies because of the role they and the elements play in the creation and destruction of those bodies.

In his first objection, Avicenna invites us to consider a mixture being subjected to uniform heat. He writes:

If this opinion were true, then when fire is brought to bear on the composite, it would cause a uniform action. In that case, the cucurbit and the alembic would not separate [the mixture] into something that is distilled and evaporated, which is not established on the fire at all, and something earthy, which does not evaporate at all.²¹

As we may recall from our high school chemistry labs, uniform heating often does not produce uniform results. Instead, some parts of the mixture evaporate, and some precipitate out and settle

²¹ Avicenna, *Generation and Corruption of the Healing*, 7.2, ed. Qāsim, 133; ed. Van Riet, 70. McGinnis, in his draft translation, identifies a cucurbit as part of an alchemical still. It is the pot, which is heated and contains the liquid to be distilled. The Latin of this passage is quite different than the arabic and reads "Alambicum distillatorium non faceret separationem inter rem evaporantem et ascendentem in fumum vel vaporem quae aliqua ratione non duraret super ignem, et inter rem terrestrem quae nullatenus ascendet in vaporem." (The alembic of a still would not cause a separation between something that is evaporated and ascends as smoke or vapour, which for another reason would not remain above the fire, and something earthy, which does not at all ascend as vapour.)

as a solid. Now, according to Avicenna, unless the substantial forms of the elements remain in the mixture, uniform heating cannot produce these disparate effects since he takes it to be a general principle that a uniform agent can produce disparate effects only if there is variation in its patient.²² Now, in the case of the chemical mixture, variation can be due to either:

substantial forms or through some accidents. If it occurs through accidents, then these accidents are either proper accidents or adventitious. But if the accidents are proper accidents, it follows that the natures from which these different accidents proceed are different.²³

Avicenna's opponents rule out the first alternative *ex hypothesi* since, according to both schools, mixtures do not contain diverse substantial forms. Hence, they must maintain that the diversity in the patient is due solely to accidental forms. As Avicenna will show, however, this is impossible.

The reason for this impossibility is that these accidental forms are either proper accidents or adventitious. That is, the accidental forms are caused either by the nature of the substance in

²² This principle is used throughout Avicenna's corpus. Notable instances of it can be found in, the *Metaphysics of the Healing*, 4.2.21–2, 138; 9.5.3–5, 335. Stone takes Avicenna's use of this principle to be an instance of his more general commitment to the Principle of Sufficient Reason, see Stone, "Avicenna's Theory of Primary Mixture," 114–5. Discerning which version of the Principle of Sufficient Reason Avicenna is committed to is beyond the scope of this essay. Interested readers should see Kara Richardson, "Avicenna and the Principle of Sufficient Reason," *Review of Metaphysics* 67, no. 4 (2014): 743–68.

²³ Avicenna, *Generation and Corruption of the Healing*, 7.3, ed. Qāsim, 134; ed. Van Riet, 71.

which they inhere (as being a three-sided figure causes a triangle to possess interior angles adding to 180) or by an external agent. The former is ruled out *ex hypothesi* since, given that diversity in the effects requires diversity in the cause, different proper accidents must be caused by different substantial forms. Hence, the accidents that cause variation in the mixture must be caused by an external agent.

Avicenna argues, however, that it is impossible for these differentiating accidents to be adventitious unless the substantial forms of the elements remain in the mixture. He writes:

And if the accidents are adventitious, then, for example, there are earthy parts in every like mixture that demand that, when they mix, [an accident] like that accident always comes to them from an external cause, or they do not demand [this]. If they do demand [this], it necessarily follows that, at the time of mixing, they have a specific property [that is] a disposition that nothing else has to receive that [accident] or a specific property [that is] a disposition to preserve [that accident]. This disposition will either be something substantial so that the substance is distinguished, and the elements are distinguished in the mixture due to their substances²⁴ or something accidental, in which case the discussion returns to the beginning. Or there will not be earthy parts, for example, in every mixture like that mixture that demanded that when they mix [these accidents] are necessitated by an external [cause].

²⁴ The Latin reads: “Et cognoscetur per substantiam, et erunt componentia cognita in composito per eorum substantias” (and it will be known through substance and there will be components in the composite known through their substances).

Instead, that would occur to some by chance. But if this is the case, this would occur only in a few cases.²⁵

In this quotation, Avicenna considers the two ways in which an external agent could produce variations in an elemental mixture: either by necessity due to a variation in that mixture or not. In his argument against the former case, Avicenna assumes that it takes a variation to necessitate a variation and that the former must exist with the latter. Hence, the prior variation in the elements that make up the mixture cannot explain its variation.²⁶ For example, fire and earth are certainly different before they mix, but unless they keep some of those differences after they mix, they

²⁵ Avicenna, *Generation and Corruption of the Healing*, 7.3–4, ed. Qāsim, 134–5; ed. Van Riet, 71–2.

²⁶ This seems to be the view closest to the one that Cardinal Mercier attributes to Aquinas. He considers “why it is that beings which are substantially one should, under the influence of a single extrinsic agency, make other beings of different kinds issue from them, sometimes indeed of very many different kinds”; his response is that it is the continued virtual presence of the elements in the compound that makes this possible as “the new being possesses the real properties, though in a weakened state, of the components so that each of the simple constituent bodies is represented in it by several properties that are analogous to those it possessed at the time of the combination. Thirdly, each group of properties representative of the elements has a definite place in the mass of the compound.” Désiré Mercier, *A Manual of Modern Scholastic Philosophy* (St. Louis: B. Herder Book Company, 1928) vol. 1, 103. Thus, a single substantial form can preserve a variation in accidents that was once caused by a variation in substantial forms.

cannot necessitate that an external agent produces a variation in the mixture they have created. Again, those differences must be differences in substantial or accidental forms. The former is ruled out *ex hypothesi*; the latter merely pushes the question back to another level.

If, on the other hand, there is nothing in the mixture that necessitates the external agent to produce a variation in it, then the external agent will produce it accidentally or by chance. Now, Avicenna takes it to be a general principle that what happens by nature happens always or for the most part and what happens by chance happens infrequently.²⁷ Thus, if the accidents are caused by chance, then the same accidents will not be produced in the same mixture with any regularity. If this is the case, then the effect of, say, uniform heating would not be the same in the same mixtures. Recall that the purpose of introducing these accidents was to explain the variation in the effect of uniform heating. Thus, if mixtures of the same kind do not have the same differentiating accidents always or for the most part, then they will not react to uniform heating in the same way always or for the most part. They do, however, and so the internal variation in the mixture, which causes uniform heating to always produce the same non-uniform effects, must be caused by different substantial forms existing within the mixture.

²⁷ This principle is used throughout Avicenna's corpus. Notable instances of it can be found in, the *Metaphysics of the Healing*, 4.2.21,138; the *Demonstration of the Healing*, ed. Abu al-eIla Affifi (Cairo: al-Amiriya, 1956), 1.9, 95, 96; 3.5, 223. Explaining why Avicenna thinks there is a relationship between chance, necessity, and temporal frequency is beyond the scope of this essay. The topic is explored at length in *Physics of the Healing*, Book 1, Chapters 13 and 14; and interested readers should see Catarina Belo, *Chance and Determinism in Avicenna and Averroes* (Boston: Brill, 2007), 24–38.

Avicenna's first objection, then, is that the unity of substantial form prevents elemental mixtures from being destroyed in the way that they routinely are. His second is that this unity prevents mixtures from forming in the first place. To understand why, recall that according to both schools, when a mixture comes to be, the forms of the simple elements are destroyed, and a new substantial form comes to be in their place. Hence, both assume a cause capable of destroying the forms of the elements when they mix. This cause, according to Avicenna, is either the mixing elements themselves, so that, say, "fire destroys the form of earth, or something distinct from them both which destroys [earth's] form when it mixes [with fire]."²⁸ As Avicenna argues, however, neither is possible: in forming a mixture, the elements cannot destroy each other, nor can they be destroyed by some third thing. Against the first possibility, Avicenna argues that:

If, therefore, fire destroys the form of earth, it destroys the form of the earth either when its fieriness exists in act or when its fieriness is non-existent.²⁹ If, therefore, [the fire] destroys [the earth], while the fire is non-existent, then its destruction of the form of the earth would be after the non-existence of the fire or with the non-existence of the fire.³⁰ And the non-existence of its fieriness, in this case, would, of course, be due to earth. The discussion

²⁸ Avicenna, *Generation and Corruption of the Healing*, 7.5, ed. Qāsim, 135; ed. Van Riet, 72.

²⁹ The Latin adds "et private" (and in privation).

³⁰ The phrase "or with the non-existence of the fire" is omitted from the Latin.

concerning that is the very same. Thus, the upshot of this is that after the fieriness and the earthiness have ceased to exist,³¹ each destroyed the form of the other, and this is absurd.³²

Now, the conclusion of the argument is clear: the mutual destruction of the mixed elements is impossible because it requires one element to destroy another when the former does not exist. That is, the mutual destruction of fire and earth requires the fire to destroy the earth after it has ceased to exist and vice versa. That mutual destruction requires this is surprising. After all, we can easily imagine a scenario where it is not. For example, two dueling swordsmen could kill each other by stabbing each other through the heart at the exact same moment. They would both be alive when they deliver the fatal blow, and yet they still die at the same moment.

Moreover, Avicenna's argument against mutual destruction is elliptical. It begins by asking whether, when the fire destroys the earth, the fire either exists or does not. He then shows that since each it impossible, mutual destruction is also impossible. However, he never explains why we can eliminate the first option. As for the second, he writes that if the fire did not exist, then, since the elements destroyed each other, the fire would have been destroyed by the earth. He then asks the same question about the earth: When it destroys the fire, does it exist or not? If not, then since the elements destroy each other, the earth would have been destroyed by the fire.

³¹ Latin of this phrase reads “per privationem igneitatis a terreitate, unum destruxit formam alterius” (through the privation of fieriness by earthiness, one destroyed the form of the other).

³² Avicenna, *Generation and Corruption of the Healing*, 7.5, ed. Qāsim, 135; ed. Van Riet, 72.

This, according to Avicenna, leads to the absurd conclusion that after the fire and earth have ceased to exist, each destroys the other.

I believe that we can make sense of this argument and see why Avicenna takes himself to be able to eliminate the first option (that the fire destroys the earth while it exists), if we understand him to be using the following temporal premise: if x is destroyed (and therefore rendered non-existent) at t_1 , then the cause of its destruction exists at t_1 . Applying this premise to the second option (that the fire destroys the earth when the fire does not exist), his argument against it would be that if a non-existent fire destroys the earth at time t_1 , then the fire was destroyed (and therefore rendered non-existent) by the earth at t_1 or earlier. Therefore, if the fire was destroyed by the earth at t_1 , then the earth exists at t_1 , and so the earth can only be destroyed at t_{1+n} by the very fire that destroyed it at t_1 . As for the first option, if an existent fire destroys the earth at time t_1 , then at t_1 , the fire exists and the earth does not. Therefore, the fire can only be destroyed at t_{1+n} by the very earth that it destroyed at t_1 .

In sum, the temporal premise yields the conclusion that mutual destruction is impossible because it requires that when one thing destroys another, the former exists when the latter does not. Thus, an absurdity arises regardless of whether or not the fire exists when it destroys the earth. If it does not, then it destroys the earth *after* it has been destroyed by it. If it does, it will be destroyed by the earth it had *previously* destroyed. In either case, destruction is caused by something non-existent.

We can confirm that this is how Avicenna understands his argument against mutual destruction by looking at his argument in defence of mutual alteration. He writes:

An argument such as this does not necessarily follow in the case of alteration because, when, say, fire is the cause of the heating of the matter of the earth, it is a cause existing in

actuality as fire, and it heats through some heat existing in it. If it is reduced, it is because it also receives cold through its matter from actually existing earth. Thus, it is an agent through a disposition [i.e., form] and a recipient of action through matter, and the disposition exists while it acts on the matter, and the matter exists while it receives the action.³³

Avicenna's purpose in this paragraph is to show why the reasoning that forbids mutual destruction does not forbid mutual alteration. Therefore, I use this quotation to confirm my interpretation of the former. Here, Avicenna argues that fire and earth can mutually heat and cool each other because while the fire is being cooled by the earth, the former retains its existence as fire and, therefore, the ability to heat; likewise, while the earth is being heated by the fire, the former retains its existence as earth and, therefore, its ability to cool. In short, mutual alteration is possible because, during alteration, both the agent and patient exist, and, therefore, the patient can act on the agent.

Now, if the co-existence of the agent and patient makes mutual alteration possible, then, presumably, the impossibility of this co-existence makes mutual destruction impossible. That is, mutual destruction is impossible because, when destruction occurs, the agent exists while the patient does not. Hence, I attribute to Avicenna the temporal premise that if x is destroyed (and therefore rendered non-existent) at t_1 , then the cause of its destruction exists at t_1 . The grounds Avicenna gives for his temporal premise are the subject of Sections III & IV; for now, I complete

³³ Avicenna, *Generation and Corruption of the Healing*, 7.6, ed. Qāsim, 135–6; ed. Van Riet, 73.

my commentary on Avicenna's objection by considering why the mixed elements cannot be destroyed by some third thing. He writes:

[The alternative is that] another external thing destroys the form of each of them when they mix. If, however, it needs, for example, the form of the earth to destroy the form of the fire and bestow the other form, while the earth either exists or not, then the earth is part of this auxiliary [cause] and the discussion returns to the beginning. If [this external thing] needs nothing else,³⁴ then there is no need for the mixture to destroy the fiery form and bestow another form. Instead, it would be possible for the generable thing to be generated from the simple [elements] without mixture.³⁵

In this argument, as in so many others, Avicenna argues via a *reductio*. In it, he shows that a third thing cannot destroy the mixed elements and give them a new form. If it did, then that third thing will either make use of a non-existent auxiliary cause or not need the elements to form the mixture. Avicenna takes each to be absurd.

As for why these absurdities arise, Avicenna considers whether this third thing does or does not need the cooperation of the elements to destroy them and form the mixture. He quickly dismisses the idea that the third thing does not need the cooperation of the elements, for if it did not, there would be no reason why, say, the fire is destroyed only when mixed with earth. Instead, the fire could be destroyed without the presence of the earth. Here again, Avicenna seems to be appealing to the principle that what happens always or for the most part happens by

³⁴ The Latin adds "scilicet quod inveniatur terra" (namely that the earth is present).

³⁵ Avicenna, *Generation and Corruption of the Healing*, 7.5, ed. Qāsim, 135; ed. Van Riet, 73.

necessity, while what happens rarely, happens by chance.³⁶ If the earth is not necessary, then the third thing would be sufficient by itself for the destruction of fire; but it would, by some extraordinary series of coincidences, destroy the fire only in the presence of the earth. Therefore, in the case of the mixture of fire and earth, the presence of earth and the mixture of fire with earth are necessary for destroying the fire. Furthermore, the source of the necessity is that the earth makes a causal contribution to the destruction of fire.

If this is the case, however, the third thing must make use of a non-existent auxiliary cause, for the third thing, the earth must either destroy the fire when the earth exists or not. If the earth does not exist, then following the temporal premise, if a non-existent earth destroys the fire at time t_1 , then the earth was destroyed (and therefore rendered non-existent) by the third thing and the fire at t_1 or earlier. Therefore, if the earth was destroyed by the third thing and the fire at t_1 , then the fire exists at t_1 , and so the fire can be destroyed only at t_{1+n} with the help of the very earth that it helped destroy it at t_1 . If, however, the earth exists when it and the third thing destroy the fire at t_1 , then at t_1 the earth exists, and the fire does not. Therefore, the earth can be destroyed only at t_{1+n} with the help of the very fire that it helped destroy at t_1 . Thus, an absurdity arises regardless of whether the earth exists when it helps the third thing destroy the fire. In either case, destruction requires the aid of something non-existent.

Thus, as we can see, Avicenna's temporal premise—if x is destroyed (and therefore rendered non-existent) at t_1 , then the cause of its destruction exists at t_1 —is key to his rejection of the unity of substantial form. I devote the next two sections of this article to presenting his grounds for holding this premise. Before doing so, however, it is necessary to give a more

³⁶ See n. 27.

precise account of Avicenna's understanding of destruction and, thereby, a more precise formulation of the temporal premise. Specifically, I do so by formulating both in terms of Avicenna's understanding of limits.

III. The Limits of Substantial Change

According to Avicenna, the change of one element into another is a substantial change; thus, like all substantial changes, it is instantaneous rather than gradual.³⁷ This does not mean that there is an instant in which the change takes place. That is, there is no single instant in which something is, say, fire and then earth. Instead, change is instantaneous "if it is true of either the thing that does not exist during an entire period of time, while existing at its limit (which is not time), or the thing that does exist during an entire period of time, while not existing at its limit (which is not time)."³⁸ Thus, in elemental change, there is a limit that divides, say, the existence of earth from that of fire. Moreover, at this limit, one exists while the other does not. Thus, this

³⁷ Avicenna gives a series of lengthy arguments for why substantial changes are instantaneous in the *Physics of the Healing*, 2.3.2–6, 136–41. For a detailed treatment of his arguments as well as the Aristotelian background of the questions, see Jon McGinnis, "On the Moment of Substantial Change: A Vexed Question in the History of Ideas," in *Interpreting Avicenna: Science and Philosophy in Medieval Islam*, ed. Jon McGinnis (Leiden: Brill, 2004), 42–61; McGinnis, *Avicenna*, 84–5.

³⁸ Avicenna, *Physics of the Healing*, trans. Jon McGinnis (Provo Utah: Brigham Young University Press, 2009), 1.12.3, 241. A more detailed account of the various senses of gradual and non-gradual can be found in Jon McGinnis, "Ibn Sīna' on the Now," *American Catholic Philosophical Quarterly* 73, no. 1 (1999): 73–106, at 89–97.

limit marks either the last moment at which the earth exists, with the fire existing at every subsequent moment, or the first moment at which the fire exists, with the earth existing at every prior moment. Hence, to better understand the nature of elemental transformation, that is, to better understand what it means for earth to be destroyed and for a new fire to come to be, we need to know which of the two exists at that limit.

We get some indication of this in the *On Generation and Corruption of the Healing*. There Avicenna writes:

Each one of the elements has latitude for receiving increase and decrease in its quality, for it may increase and decrease in its natural or accidental quality. And it may do this while maintaining its form and species. But increase and decrease in this has two extreme limits.

When they are surpassed, the complete disposition for its form is annulled in matter, and it is prepared with a complete preparation for another form.³⁹

Here, Avicenna explains that elemental transformation is an instantaneous substantial change brought about by a continuous qualitative change. Applying this to the transformation of earth into fire, let us suppose that the temperature that marks the limit between the two is 200°C. Thus, at any temperature lower than 200°C, the earth exists, while at any temperature higher than 200°C, a newly generated fire does. The question, then, is which of the two exists at 200°C? Now, the natural reading of this passage is that up to and *including* the limit of change, the original element exists since the complete disposition for the old form is destroyed when the limit is *surpassed*. Thus, the earth exists up to and including 200°C but not at any temperature

³⁹ Avicenna, *Generation and Corruption of the Healing*, 14.5, ed. Qāsim, 190; ed. Van Riet, 139.

beyond that, be it 200.5°C, 200.25°C, 200.00025°C, etc. Instead, at any temperature beyond the 200°C limit, fire exists.

On this reading, destruction is not completed at the limit of change. Instead, this limit marks the last instant at which the patient of destruction exists. Hence, the more precise version of the temporal premise would be that at some t_{1+n} , which is arbitrarily close to the limit of change t_1 , the patient of destruction does not exist, but the agent of destruction does. Moreover, on this natural reading, Avicenna is entitled to his temporal premise, since the earth must be heated beyond the 200°C limit for it to be destroyed. After all, the earth exists at the 200°C limit and, therefore, would presumably continue to exist if it never got any hotter. Hence, the cause of heating must exist beyond the 200°C limit, for existing effects require an existing cause, and an increase in heat, however infinitesimally small, is such an effect. Thus, the fire that heats the earth and causes its transformation into fire must exist after the earth's existence, or else it could not cause the increase in heat necessary for the new fire to come to be. Thus, mutual destruction is impossible, for the earth must destroy the fire after it has been destroyed by it.

Such a reading, however, contradicts Avicenna's own understanding of the instant of substantial change. Avicenna's treatment of the topic is found in the section of his treatise on time devoted to the nature of the instant.⁴⁰ There, he imagines being asked:

In the instant common to two periods of time, in one of which something is in one state and in the other of which it is in another state, is the thing altogether lacking both states, or does it have one of the states to the exclusion of the other? If the two situations are

⁴⁰ For a much more detailed treatment of this question and Avicenna's response, see McGinnis, "Ibn Sîna' on the Now," 90–5.

potentially contradictory ..., it must inevitably have one of the two [states], and I wish I knew which one!⁴¹

The answer, Avicenna informs the reader, depends on what kind of state the second state is: fixed (*qārra*) or unfixed (*ġayr qārra*). A fixed state is one that can exist at an instant and remains the same at every instant during its existence. For example, being a square is a fixed disposition because a square is a square at every instant of its existence. An unfixed state, however, requires a period of time to exist and so cannot exist in an instant. These states include any kind of continuous motion, such as local motion, getting hotter, or getting cooler.⁴² Now, according to Avicenna, which of the two states exists at their common limit depends on what kind of state the second one is. He writes:

That opposing [second] thing might, in fact, do so at an instant. In other words, it is something whose state remains the same during any instant you take during the time that it exists, and it does not need some [other] instant in such a way as to correspond with a period of time in order to exist. As long as that is the case, the thing in the common division is described by [such a state]—as, for example, being contiguous, being square, and the other fixed dispositions whose existence remains the same during every instant of the time that they exist. Alternatively, the thing might be contrary to this description, and so its existence would occur during a period of time, while not occurring at an instant. In that case, its existence would be in the second period of time alone and would not be

⁴¹ Avicenna, *Physics of the Healing*, 2.12.4, 241.

⁴² Avicenna, *Physics of the Healing*, 2.12.4, 242.

predicated of the instant dividing the two such that there would be a certain opposition at it.⁴³

Thus, if the second state is a fixed state, such as being round, white, or fire, then the second state exists at the limit between the two.⁴⁴ If, however, the second state is unfixed, then the first state exists at their common limit.⁴⁵ Applying this to the case of elemental transformation, it is obvious that it is a change from one fixed state to another. Therefore, at the common limit between the existence of earth and fire, it is the fire that exists. Thus, returning to our above example, at 200°C, it is the fire rather than the earth that exists.

This understanding of elemental transformation yields a different understanding of the temporal premise than the first. Now, the limit of change no longer marks the last instant *before* destruction is complete and the patient of destruction does not exist. Instead, it marks the first instant *at which* destruction is complete and the patient of destruction does not exist. Hence, the

⁴³Avicenna, *Physics of the Healing*, 2.12.4, 241–2.

⁴⁴ While Avicenna does not offer an argument for this conclusion, McGinnis reconstructs one for him based on Aristotle’s reasoning in *Physics*, 6.5, 235b9–26, that “if the thing were not C at the now at which the thing has changed to C, then ‘the thing which has changed, when it has changed, is changing to that which has changed; but this is impossible’.” See McGinnis, “Ibn Sîna’ on the Now,” 94.

⁴⁵ Avicenna thinks that there cannot be a common limit between two contrary unfixed states. Instead, there must be a period of rest between them (*Physics of the Healing*, 4.8, 450–63). Avicenna’s argument for this conclusion will prove to be the key to understanding his views on elemental transformation and will be discussed shortly.

temporal premise's more precise version no longer claims that at some t_{1+n} , which is arbitrarily close to the limit of change t_1 , the patient of destruction does not exist, but the agent of destruction does. Instead, it claims that at the limit of change t_1 , the patient of destruction does not exist, but the agent of destruction does.

Now, this understanding of transformation makes accepting the temporal premise more difficult than the first. On the first reading, earth exists at the common limit, 200°C, and for it to be destroyed, something needs to heat it beyond that degree. Thus, the cause of heating must exist, if only for the briefest of duration beyond the existence of the earth. Hence why at some t_{1+n} , which is arbitrarily close to the limit of change t_1 , the patient of destruction (i.e., the earth) does not exist, but the agent of destruction (i.e., the fire) does. On this second reading, however, the new fire exists at 200°C, and so there is no need for a cause of heating to exist beyond that point. Instead, the question is whether the cause that heats the earth to 200°C needs to exist at 200°C? Avicenna answers this question undoubtedly in the affirmative. I show in the next section that Avicenna answers in the affirmative because of his theory of *mayl* or inclination. More precisely, it is the behavior of inclinations at the limits of the changes they produce that grounds Avicenna's temporal premise. This essay marks the first time that this behavior is discussed in the secondary literature⁴⁶

⁴⁶ Jon McGinnis has produced a series of excellent studies on limits and the behavior of motion at a temporal limit (e.g., an instant); see Jon McGinnis, "A Medieval Arabic Analysis Of Motion At An Instant: The Avicennan Sources to the forma fluens/fluxus formae Debate," *British Journal for the History of Science* 39, no. 2 (2006): 189–205; "The Topology of Time: An Analysis of Medieval Islamic Accounts of Discrete and Continuous Time," *Modern*

IV. *Mayl* and Temporal Premise

Avicenna discusses the behavior of inclination at the limits of motion in the context of considering whether it is possible for two contrary motions to be continuous or whether there must be a moment of rest between the two. That is, he affirms it in the context of showing that a ball thrown up into the air must undergo a period of rest before it falls to the ground, and that a heated pot of water must undergo a period of time in which its temperature is neither increasing nor decreasing before it cools down. This aspect of Avicenna's physics has yet to receive scholarly attention. This is a shame because he devotes an entire chapter of the *Physics of the Healing* to arguing that contrary motions cannot be continuous while offering a critical assessment and reinterpretation of the arguments for the same conclusion in Aristotle's *Physics* 8.8.⁴⁷ In this article, however, I consider only the parts of his arguments that support the temporal premise. Moreover, I have also mostly confined myself to presenting Avicenna's arguments rather than giving a complete analysis. This is all that space allows and all that is necessary to explain why Avicenna holds that temporal premise. I hope that this brief treatment will spur interest in research into this topic in its own right.

While, as Jon McGinnis notes, Avicenna never gives an account of what exactly an inclination is, for our purposes we can content ourselves with characterizing it as something

Schoolman 81, no. 1 (2003): 5–25; “Ibn Sīna' on the Now.” My study of the behavior of inclination at an instant builds on his work.

⁴⁷ Avicenna, *Physics of the Healing*, 4.8, 450–63.

which the mover imparts to the thing moved and through which the latter produces motion.⁴⁸

Furthermore, according to Avicenna, a rest must occur between two motions because (1) the inclinations that produce them exist at their limits, and (2) two contrary inclinations cannot co-exist.⁴⁹ These two premises yield the conclusion that there must always be period of rest between

⁴⁸ McGinnis, *Avicenna*, 79–80. Avicenna argues that in a void, a moving object’s inclination would cause it to move eternally; see *Physics of the Healing*, 2.8.18, 195–6. Hence, some scholars have come to see inclination as a precursor to the Newtonian theory of inertia; see, for example, Ahmad Hasnawi, “La dynamique d’Ibn Sina (la notion d’‘inclination’: *mayl*),” in *Études sur Avicenne*, ed. J. Jolivet and R. Rashed (Paris: Les Belles Lettres, 1984), 103–23; and Aydın Sayılı, “Ibn Sînâ and Buridan on the Dynamics of Projectile Motion,” in *İbn Sînâ, Doğumunun Bininci Yılı Armağanı*, ed. Aydın Sayılı (Ankara: Türk Tarih Kurumu, 1984), 141–60. McGinnis rejects this interpretation, concluding that once it is understood in its broader context, Avicenna’s understanding of *mayl* explicitly opposes the doctrine of the conservation of motion in a void; see McGinnis, *Avicenna*, 79–84. For an account of Avicenna’s theory of inclination considered in the context of the theories of inclination found in John Philoponus and Alexander of Aphrodisias, see Lammer, *The Elements of Avicenna’s Physics*, 241–52.

⁴⁹ Lammer is insistent that inclination does not cause motion but something that can manifest itself as motion, see *Elements of Avicenna’s Physics*, 246–7. Hence why I have been careful to use the neutral verb “produce.” Lammer also explains that motion is one of the ways in which inclination can manifest itself, see *Elements of Avicenna’s Physics*, 247–9.

two contrary motions.⁵⁰ After all, for continuous contrary motion to be possible, the two motions must share a common limiting instant at the end of the first and the beginning of the second. If, however, there is a common limit between the two motions, then, by (1), the two inclinations that produce the two motions exist at that limit. According to (2), however, this is impossible. Hence, there must be a period of rest since “it has become evident that the two instants [the last and the first] are distinct; and, between every two instants, there is a time.”⁵¹ As for why continuous contrary motion requires the co-existence of contrary inclinations, Avicenna writes:

The instant at which there is the first existence of the second inclination, however, is not the instant at which there is the last existence of the first inclination ... that instant will be

⁵⁰ Avicenna’s argument for the second premise is that if a body contained two contrary inclinations simultaneously, then it would also contain two contrary motions simultaneously. The latter, however, is impossible and, thus, so is the second. As Avicenna puts it, “the two instants were not one [and the same] precisely because it is not in something’s nature to be that which simultaneously necessitates occurring and not occurring such that its nature requires that, at [that single instant], there be some necessity in actuality that is not in actuality” (*Physics of the Healing*, 4.8.17, 461–2). As he further elaborates: “Pay no attention to whoever says that the two inclinations are together! How could there be something in which there is actually a resistance to a certain direction, or clinging to it while withdrawing from it? So, one should simply not think that there is some downward inclination in a stone that is thrown upward; rather, there is a principle whose character is to produce that inclination when the obstacle [to it] is withdrawn or perhaps overcome” (*Physics of the Healing*, 4.8.18, 462).

⁵¹ Avicenna, *Physics of the Healing*, 4.8.18, 462.

the last only if it is the last of what exists at it, since the last of it is something bringing about the arrival, and it does not bring about the arrival when it does not occur.⁵²

To understand the argument in this passage, recall that two motions can be continuous only if they share a common limiting instant. Moreover, Avicenna assumes throughout this discussion that the inclination for the second motion exists at this common limit.⁵³ Thus, to get his desired conclusion—that continuous contrary motion requires the co-existence of two contrary inclinations—Avicenna must argue that the inclination for the first motion also exists at the common limit. To do so, Avicenna considers the last instant of the first inclination. He notes that to be the last instant, it must be the final instant at which the first inclination exists. Second, he notes that the first inclination is the cause of arrival and that an arrival is an effect that requires an existing cause. This is a point Avicenna had forcefully made earlier: “Now, it is absurd that what arrives at a given limiting point should do so without some existing cause that makes it arrive.”⁵⁴ Now, I take it as obvious that an arrival is equivalent to the first instant at which a

⁵² Avicenna, *Physics of the Healing*, 4.8.17, 461.

⁵³ As Avicenna puts it: “So, just like that instant that might function as motion’s limit, [inclination] might itself be the limiting point of the non-motion, such that there is no motion, [and yet] it exists at some instant as a limit of the continuous motion that will exist after it” (*Physics of the Healing*, 4.8.16, 461). This statement serves as the conclusion for why inclination *can* exist at the beginning limit of motion, but he does not provide an argument for why it *does*. Perhaps he thinks it is obvious.

⁵⁴ Avicenna, *Physics of the Healing*, 4.8.16, 460.

moving object exists at its terminus *ad quem*. Thus, the cause of arrival must exist at the first instant at which the moving object is at the terminus *ad quem* of its motion.

Before applying this argument to Avicenna's understanding of elemental transformation, I wish to make a critical note about it. Now, obviously, the last instant of the first inclination cannot take place before the instant of arrival. For, suppose that the cause of arrival ceases to be at some instant before the moving object arrives at its terminus *ad quem*. At this instant, the moving object will be at a spatial location other than its terminus *ad quem*. Furthermore, the object will have to stay at that location and cease moving toward its terminus *ad quem*, since the cause of its change no longer exists. Thus, if the cause of arrival ceases to exist prior to the object arriving at its terminus *ad quem*, then the moving object will not arrive at its terminus *ad quem*. The odd thing about this argument, however, is that Avicenna does not, as a rule, allow fixed states like inclination to have a last instant of existence.⁵⁵

Now, Avicenna explicitly affirms that inclination is a fixed state when considering the transition from rest to motion. He writes:

[Inclination], rather, is like the non-motion that is at each instant. So, just like that instant that might function as motion's limit, [inclination] might itself be the limiting point of the

⁵⁵ This is, moreover, an important point in Avicenna's philosophical system. Indeed, McGinnis argues that it is at the heart of Avicenna's ability to maintain that substantial changes are instantaneous despite Aristotle's arguments to the contrary in *Physics* 6.6; see McGinnis, "On the Moment of Substantial Change," 57–61.

non-motion, such that there is no motion, [and yet] it exists at some instant as a limit of the continuous motion that will exist after it.⁵⁶

In this passage, Avicenna faithfully follows the rules he set out in Book 2, Chapter 12 on the behavior of contrary states at common limits. In the transition from being stationary at a spatial location to moving away from it, there is the transition from a fixed to an unfixed state. Thus, it is the first rather than the second that exists at the common limit. Moreover, in the transition from the absence to the presence of the inclination, there is a transition from one fixed state to another. Thus, it is the second rather than the first that exists at the common limit, and so, at the beginning limit of motion, when the object is at its terminus *a quo*, no motion exists, but the inclination for that motion will.

By Avicenna's own understanding of limits, however, the situation ought to be different at the final limit of motion, when the object is at its terminus *ad quem*, for, again, at the instant that limits two fixed states, it is the second that exists. Thus, one would expect that at the limit between the existence and non-existence of the inclination, the inclination would not exist. The inclination would exist at every instant prior to the limit but there would be no last instant since,

⁵⁶ Avicenna, *Physics of the Healing*, 4.8.16, 460. Ahmad Hasnawi, in the context of comparing Avicenna's theory of inclination to that of Buridan, takes this passage to imply that inclination has a first and a last instant of existence: see "La théorie avicennienne de l'impetus: Ibn Sînâ entre Jean Philopon et Jean Buridan," in *Views on the Philosophy of Ibn Sînâ & Mullâ Sadrâ Shîrâzî*, ed. Mokdad Arfa Mensia (Carthage: The Tunisian Academy of Sciences, 2014), 25–42, at 33. Again, however, by the rules laid out in Book 2, Chapter 12 of the *Physics of the Healing*, this passage ought to entail that inclination has a first but no last instant of existence.

given the continuous nature of time, no matter how close to the limit an instant of the existence of the inclination may be, it is always possible to find one closer.⁵⁷ Thus, given Avicenna's own theory, it seems that inclination ought not have a last instant of existence.

Furthermore, it does not seem that the inclination for motion needs to exist at the moment of arrival. For at the moment of arrival, the moving object is at its terminus *ad quem* and its change has been completed. Therefore, there seems to be no need for the inclination which causes the change to exist when the change has been completed. Of course, the inclination cannot cease *prior* to the moment of arrival, but Avicenna's understanding of the continuity of time allows that the inclination can fail to exist at the moment of arrival without ever having not existed prior to it. I hope further research into Avicenna's understanding of the limits of change will resolve this puzzle, but I end this section by applying Avicenna's clear conclusion to the case of elemental transformation.⁵⁸

⁵⁷ Furthermore, in a passage from *the Metaphysics of the Healing*, Avicenna writes that "Moreover, every power imparts motion only through the mediation of inclination. Inclination is the idea sensed in the mobile body. If it comes to rest by compulsion, that inclination in it is sensed resisting [both] that which puts [the body] to rest and its coming to rest, seeking motion. Hence, it is necessarily other than the motion and other than the motive power, because the motive power exists when it completes the motion, whereas the inclination does not exist" (9.2.4, 383). Thus, we could take this passage to claim that neither motion nor the inclination that produces it exists at the terminus *ad quem*.

⁵⁸ We know that Avicenna thinks that heating and cooling, like local motion, arise from an inclination because he writes: "This is like when water is vigorously heated by a foreign

Let us consider again the transformation of earth into fire by fire. Suppose that at 200°C the earth is transformed into fire. Therefore, at 200°C, the new fire exists, but at any lower temperature, the earth will exist. Now, according to the preceding argument, the inclination for heating must exist when the heated matter reaches 200°C. This, again, is because Avicenna has specified that the inclination for a change must exist at the terminus *ad quem* of said change. Moreover, if the inclination for heating exists, then the fire that was heating the earth must exist as well, for just as the heating depends on the inclination, so too does the inclination depend on the fire and its power.⁵⁹ Hence, at 200°C, two instances of fire exist: the fire that was heating the earth and the fire that was once the earth. This, of course, explains why Avicenna thinks that mutual destruction is impossible: The fire that was heating the earth until it transformed into fire must exist simultaneously with the new fire and, therefore, with the non-existence of the earth. This, then, completes our understanding of why Avicenna rejects the unity between the forms of the elements and that of either the mixture or the higher forms that inhere in that mixture. I now end this essay by explaining why this lack of unity does not undermine the status of these higher forms as substances.

V. Higher Substantial Forms

[source], after which the natural coolness of the water is prevented from arising from the water's nature; for we know that a foreign inclination can overpower and bring about the absence of the natural inclination and prevent the natural motion" (*Physics of the Healing*, 4.8.11, 455).

⁵⁹ Avicenna affirms this point at *Generation and Corruption of the Healing*, 6.10, ed. Qāsim, 131; ed. Van Riet, 63. The relationship between nature, power, inclination, and motion is more fully explored in Lammer, *Elements of Avicenna's Physics*, 248–51.

Recall that, according to Stone, substances contain only one substantial form, for if a substantial form were to exist in anything other than prime matter, it would exist in a subject and, therefore, would not be a substantial form.⁶⁰ Avicenna, however, explicitly rejects this claim in Book 1, Chapter 3 of *On the Soul of the Healing*.⁶¹ This chapter rebuts several objections to the status of all souls (be they vegetable, animal, rational, or Separate) as substances. The first objection claims that while the Separate Intellects are obviously substances because they do not exist in anything, in the case of “the rest, such as the vegetable soul or the animal soul, this is not certain because the proximate matter in which these souls exist is not without a specific elemental mixture and a specific disposition.”⁶² Thus, the objector doubts whether vegetable, animal, and rational souls are substances because these souls inhere in a specific elemental mixture. Avicenna replies, however, that this is no bar to their being substances since a specific elemental mixture is not a subject. Hence, “the existence of the soul in the body is not the same as the existence of the accident in its subject. Therefore, the soul is a substance because it is a

⁶⁰ Stone, “Simplicius and Avicenna,” 100.

⁶¹ Quotations of this chapter are my own translations of the Arabic. Passages from this chapter are also translated and discussed in Seyed Mousavian and Seyed Hasan Saadat Mostafavi, “Avicenna on the Origination of the Human Soul,” *Oxford Studies in Medieval Philosophy* 5, no. 1 (2017): 41–86. However, they are done so not in reference to the unity of substantial form but to the progressive ensoulment of the human embryo.

⁶² *An-Nafs*, ed. Rahman, 27; *De Anima*, ed. Van Riet, 58.

form that is not in a subject.”⁶³ As for why an elemental mixture is not a subject, Avicenna explains that:

the matter remains actually existent in this proper mixture only while the soul is in it, and the soul gives it this mixture, and the soul is, without a doubt, the cause by which the plant and the animal have the mixture they do, because, as said, the soul is the principle of unification and arrangement. Therefore, the proximate subject of the soul cannot be what it is except through the soul, and the soul is the cause of its being thus.⁶⁴

Hence, the proximate subject of the soul is a mixture of elements. Moreover, the soul brings about this mixture, and it persists only as long as the soul inheres in it. Avicenna expands on the role the souls play in giving being to the mixture as follows:

Therefore, the soul is the perfection of the body in which it exists and conserves it according to an order which would naturally dissolve and disperse since each one of the parts of the body deserves a different place, and each ought to separate from its neighbour. [The body] is preserved as it is by something other than its nature, and that thing is the soul of the animal. The soul, therefore, is the perfection of the subject that is subsistent through it.⁶⁵

The soul is a substance because the soul (through the elements) causes of the existence of its receptacle, while accidents do not give existence to their subject. The soul does so by unifying, arranging, and keeping the elements a mixture. It is necessary for the soul to play this causal

⁶³ *An-Nafs*, ed. Rahman, 29; *De Anima*, ed. Van Riet, 60.

⁶⁴ *An-Nafs*, ed. Rahman, 28; *De Anima*, ed. Van Riet, 58–9.

⁶⁵ *An-Nafs*, ed. Rahman, 32; *De Anima*, ed. Van Riet, 64.

role because the elements, left to their own devices, would naturally separate from each other and head toward their different natural places. Thus, mixture of elements in which the soul inheres would not exist without it, and Stone's claim that prime matter is the only receptacle is simply not one that Avicenna accepts.

I now end this section and essay by summing up why the souls of plants, animals, and humans exist as substances in a mixed body composed of elemental substances. The soul exists as a substance because it is a necessary cause of that mixed body. Without it, the elements would not be brought and held together in the way that is necessary for the mixture to come to be and continue to be. Furthermore, the soul's departure causes the mixture to break up and pass away. Hence, it is because the soul plays this necessary role that it inheres as a substance in a receptacle rather than as an accident in a subject. However, the elements are also necessary for the coming to be and passing away of the mixture. It is the soul that brings them together, but the mixture is formed by the elements acting on each other. Furthermore, while the departure of the soul causes the mixture to pass away, the elements are needed to explain why the body decomposes into the disparate elements that it does. Thus, Avicenna thinks that the souls of plants, animals, and humans exist as substances in a mixed body composed of elemental substances because of the causal roles that these souls and the elements play in the coming to be and passing away of mixed bodies.

MacEwan University

Edmonton, Alberta