

Richard Rufus's Theory of Mixture

A Medieval Explanation of Chemical Combination

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ABSTRACT: Richard Rufus of Cornwall offered a novel solution to the problem of mixture raised by Aristotle. The puzzle is that mixts or mixed bodies (blood, flesh, wood, etc.) seem to be unexplainable through logic, even though the world is full of them. Rufus's contribution to this long-standing theoretical debate is the development of a modal interpretation of certain Averroistic doctrines. Rufus's account, which posits that the elemental forms in a mixt are in accidental potential, avoids many of the problems that plagued non-atomistic theories of mixture. This paper is an initial examination of Rufus's account.

KEYWORDS: Richard Rufus; mixture; mixt; combination; accidental potential; potential; elements; medieval chemistry; Aristotelian science; Averroes; medieval chemistry; Aristotelian science

Richard Rufus of Cornwall¹ (d. 1259?) plays an important and as yet unappreciated role in medieval discussions of natural science. This paper focuses on Rufus's novel attempt to make Aristotle's hylomorphic theory consistent with the possibility of mixture—which is analogous to what modern chemists call chemical combination. After explaining Rufus's treatment of the problem of mixture and showing that it is an elaboration and refinement of Averroistic doctrines, we will assess a claim made by the eminent medieval scholar Anneliese Maier,² who suggested that no non-atomistic medieval theory could explain how elements can be combined in uniform bodies or mixts. She further claimed that such theories merely state the fact that mixture is possible, but do not give any explanation of how a mixt reflects the state of the elements. Richard Rufus, as we will see, gave a plausible account, but let us first turn to Aristotle's statement of the problem.

ARISTOTLE'S PUZZLE

In *On Coming to Be and Passing Away*, Aristotle raises a particularly vexing problem for his theory of the elements. The problem concerns the possibility of homogenous mixed bodies. Specifically, he asks what happens to the elemental com-

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ponents in a mixed body. Before turning to this problem, we want to note how we will use the terms “mixture” and “mixt” and how these are related to the philosophical and chemical literature about these issues. We will always use the term “mixture” as a process term. Rather than using “mixture” to refer to the product of the process of mixing, we follow Needham³ and use the archaic English word “mixt.” A mixt is the product of the process of mixture. Using “mixt” as the product term also helps us to distinguish mixts from the sorts of things chemists call mixtures. Chemists’ notion of mixture includes both homogenous and heterogeneous samples. The sand on a beach, for example, is a chemical mixture in the modern sense because it is composed of several different kinds of grains. When a chemist uses the term “mixture” without further qualification, she is usually referring to a heterogeneous mixture like sand. An Aristotelian would describe sand as an aggregate and the process which produced it as juxtaposition, not mixture.⁴ For Aristotelians, mixts are completely homogenous. With these issues clarified, let us consider Aristotle’s argument.

Aristotle sets his argument up in the form of a trilemma. The full discussion can be found in *On Coming to Be and Passing Away*, but we will summarize it briefly.⁵ Imagine combining two elements together to form a mixt. There are three possibilities: they both continue to exist after they have been combined to form a mixt, neither continues to exist after they have been combined, or one of the elements continues to exist while the other is destroyed. Let us consider each of these possibilities.

Horn A: If both elements still exist once they have been combined, then they must have been unaltered in the process of mixture. But if they remained unaltered, then they couldn’t really have been combined because a mixt requires complete homogeneity.⁶ Therefore, mixture is impossible if the elements still exist once they have been combined.

Horn B: If neither element exists once they have been combined, then the elements must have been destroyed in the process of mixture. But if they were destroyed during the process of mixture, then the elements cannot take part in the mixt. If the elements cannot take part in the mixt, then mixture could not have taken place, for there is nothing to combine. Therefore, mixture is impossible if the elements no longer exist once they have been combined.

Horn C: If one element dominates or overwhelms the other, then only one of the elements remains and the other is destroyed. Aristotle gives the example of a single drop of wine being overwhelmed by a large body of water.⁷ If one element dominates the other, only one element remains and a mixt cannot be generated. Therefore, mixture is impossible when one element overwhelms another.

In each case, mixture is impossible. Since we have exhausted the possibilities, we must conclude that mixture is impossible.

Aristotle, of course, thinks that there is a solution to this puzzle, a possibility which we overlooked when setting up the trilemma. He writes that “each of the things which were, before they were mixed, still is, but potentially, and has not been destroyed.”⁸ We were wrong to think that the elemental components must either exist or not exist. We overlooked the possibility that the elements may be only potentially, not actually present. After discussing the trilemma, Aristotle tells us that it is a potential, not actual element that continues to exist in the mixt.⁹ So it is neither true that the elemental components continue to exist actually nor that they cease to exist completely. Rather, in a mixt, elemental forms exist as potentialities.

Aristotle correctly emphasizes the distinctness of mixture from generation, corruption, and domination.¹⁰ Unfortunately, his solution seems only to push the problem back a few steps. Even if we accept the idea that the elements are potentially, not actually, present in a mixt, we are still very far from understanding how mixture is possible. Specifically, we are still left with at least three related puzzles concerning mixture:

1. In the processes of mixture, how can different mixts have less or more of the same element, given that the elemental ingredients exist as potentials, not as actual components of the mixt.
2. How can potential elements affect the properties of actual mixts?
3. Why aren't all mixts the same given that they all contain the four elements as potentialities?

These puzzles and associated worries about the metaphysics of mixts set the stage for thousands of years of discussion.

Still today students of ancient philosophy disagree about how to understand Aristotle. Kit Fine recently offered an interpretation of Aristotle on mixture,¹¹ which suggests that the mixed form is a ratio of the elements in the mixt. Responding, Alan Code argued that Fine's solution does not escape Horn B, since it cannot distinguish between mixture and generation and corruption. It cannot, he argues, "rule out the possibility that the original matter was destroyed," and a "new compound popped into existence."¹²

More seldom considered today are medieval contributions to the discussion. The recent collection of articles on the commentary tradition for Aristotle's *On Coming to Be and Passing Away*, edited by J. Thijssen and H. Braakhuis, laments the fact that this topic is seriously under-studied. Their introductory collection includes only one article on the problem of the mixture, a piece by de Hass which focuses on Philoponus, Alexander of Aphrodisias, Proclus, and Simplicius.¹³

Interesting as it is, this piece by de Hass offers little to the student of the thirteenth century commentary tradition, since, when Rufus was active, between 1230 and 1255, virtually all these works were unavailable. By contrast, Anneliese Maier surveyed the views actually discussed in the thirteenth century. Moreover, the twenty-five medieval authors whose solutions to the problem of the mixture she described include some of Rufus's contemporaries.¹⁴ For that reason, the best way to evaluate Rufus's contribution to the debate is by considering his views in the context provided by Maier.

Maier began her study by describing the alternative solutions inherited by medieval authors from the Islamic world of Avicenna and Averroes. We will follow Maier's lead and begin our discussion with Averroes because Rufus's theory of mixture is a development of certain Averroistic doctrines.

AVERROES: ELEMENTS AS QUASI-SUBSTANCES

It is easier to understand Averroes' views about the status of the elements in a mixt if we begin by considering his theory of elemental change. Let us consider the transition from air to fire. The primary qualities of air are hot and moist whereas the

primary qualities of fire are hot and dry. Thus in order to be transformed into fire, air must lose its quality of moistness.

Aristotle and the medievals were aware that such transitions, invoked in discussions of both generation and mixture, took place by degrees.¹⁵ When you burn wood, it doesn't instantaneously become fire. It proceeds through stages of getting hotter and hotter until finally it bursts into flame. The observation is commonplace, but giving a theoretical account of this turned out to be very difficult. The hylomorphic theory requires a transition from one *form* to another, because matter is postulated as the unchanging substratum. To explain elemental change, therefore, one has to be able to explain how the transition between forms can admit of degrees.

The metaphysics of hylomorphism suggests no obvious way to allow for degrees of change, but as we have said, observations of nature require it. This appears to be a serious problem. However, we already know what form the solution will have to take. There will have to be some part of our theory of the elements that can change in degrees. This will give us the necessary theoretical tool with which we can offer a solution to the problem.

Averroes' solution to the problem of gradual change is known as *formae fractae*, which means "broken forms" or "fractured forms." The view is that the elemental forms are not of the same character as ordinary substantial forms. They are *diminished* in some way. Averroes elaborates this point as follows:

We say that the substantial forms of these elements are diminished in respect of perfect substantial forms; they are, as it were, an intermediate between forms and accidents. And therefore it is not impossible that their elemental substantial forms should be mixed, in such a way that another form should arise from their commingling, as many intermediate colors are made from the mixture of white and black.¹⁶

For Averroes, elemental change is possible because elemental forms can be enhanced or diminished. For normal substantial forms, this is impossible. Having the elemental forms be halfway between a substance and an accident, however, is supposed to make room for the possibility of greater and lesser degrees of the form. In order to see how this is possible, we need to know that in typical Aristotelian metaphysics, accidents admit of degrees, while substances do not.

First let us consider full-blown substances like the human. One woman cannot be more human than another. All women are of the same species, human. Similarly, for all substantial forms, an object either instantiates the form or it does not. There is no room for degrees.

The situation changes when we consider accidents. Consider an example discussed by Henry of Ghent¹⁷: the accident of being white. Clearly this accident comes in degrees. There are many degrees between pure white and pure black, indicating that the accident of whiteness comes in degrees. In addition, there are a variety of instantiations of whiteness within different individuals. Henry writes that "whiteness [varies from the] whiteness existing in this rock to the whiteness existing in that wood."¹⁸

We can now piece together what Averroes had in mind with his doctrine of *formae fractae*. Elements seem to have properties of both substances and accidents. Like substances, they can exist independently; like accidents, they come in degrees and can be combined. Averroes thus posits that while elemental forms are a special case of substantial forms, they have some characteristics of accidents. Therefore, they are "halfway between substance and accident."¹⁹ This seems perfectly reasonable, but

also deeply unsatisfying theoretically. Accepting the Averroistic doctrine at face value gives us little insight into the nature of this intermediate position between substance and accident. Without this knowledge, it will be difficult to determine whether this is a useful development of Aristotle's ideas. As it turns out, Richard Rufus elaborated on this doctrine in a far more sophisticated way than Henry, using it to provide a novel and important theory of mixture.

RICHARD RUFUS

In her essay on material substance, Maier discusses various thirteenth century refinements to the basic Averroistic doctrine. She credits Roger Bacon with giving the doctrine of *formae fractae* a modal interpretation.²⁰ This claim is misleading, since Richard Rufus also provides a modal interpretation to Averroes, and his early lectures influenced Bacon.²¹ We will begin with a general discussion of modal interpretations of Averroes based on Rufus's discussion. We will then turn to some specific theoretical concepts that Rufus employs.

Rufus's modal interpretation of Averroes suggests that elemental forms can be more or less present by being more or less actual. This potentiality allows elemental forms to admit of degrees like accidents, but to remain substantial forms potentially. The degree to which an elemental form is potential or actual is the much needed dimension which admits of degrees that will allow us to account for the degrees of elemental change.

Consider again the transition from air to fire. According to this interpretation of Averroes, what happens as we heat the air is that the elemental form of fire becomes closer to actuality while the elemental form of earth becomes further from actuality. Both forms are present during the change, but they differ in how close to actuality they are. Rufus explains this as follows:

But we should say that in some sense there is remission and intension there — namely, as when we refer to the intension of the form itself as it actually exists, but to the remission of a form itself as it potentially exists, as has been mentioned. Intense heat is caused by the actually existing form of fire; remiss heat is caused by the same form existing in potential, partly moved toward act. And yet the substantial form itself, in its essence as form, does not undergo intension and remission.²²

Although it seems that the Rufus/Averroes view is a pretty good solution to the problem of elemental change, it is less straightforward how the theory works in the case of mixture. In order to assess and understand the view, we will need to begin by examining one of Rufus's key theoretical distinctions.

Rufus distinguishes between *essential potential* and *accidental potential*. This distinction has to do with how close to being actual a particular possibility is. Forms that are in accidental potential are very nearly actualized. Forms that are in essential potential, on the other hand, are far from being actual: they are "remote possibilities."

The distinction can be made clearer with an everyday example. Imagine three standard spring-loaded mousetraps. Mousetrap *A* is unloaded, meaning the swing-bar has not been retracted. Trap *B* is "set," but has not gone off. Mousetrap *C* has been triggered and the swing-bar is swinging down on its target with tremendous force. Although we are talking about high-velocity swinging motion, not forms, we can use the example to make the relevant distinctions.

The swing-bar on *A* is in essential potential. Although it could be made to swing at high velocity if the trap were set, at the moment the high-velocity motion of the trap is far from becoming actual. *B* is in accidental potential. A hook, which we should think of for the purpose of this example as something external to the swing-bar, prevents the spring from swinging the bar with tremendous force. One might say that the natural state of the bar attached to this spring would be to swing. However, this state is prevented from becoming actual by the hook, which holds the bar in place. Finally, in the high-velocity motion of *C*, the potential has been actualized. The important lesson to be extracted from this case is that not all potentials are of the same character. Some are far more likely to be actualized than others.

Since we will be most concerned with understanding the nature of accidental potential, let us consider the second case in more detail. It is important to note that in trap *B*, there is only one *external* factor *preventing* the motion of the swing-bar from being actual. It needs no further *positive* action by an external agent to move; it only requires the removal of an external obstacle in order for the motion to be actualized. Rufus tells us that accidental potential is the state in which a form “could emerge in act by itself, yet ... is prevented by another.”²³

We need one further concept in order to interpret Rufus's theory of mixture, the concept of *necessity*. For Rufus, the term “necessity” is a term of art. A fairly clear indication of the term's meaning can be found at *DMet* 9.4, where he writes:

But we should know that ultimate matter is a natural thing, which is a necessity to which no addition is possible. For such matter lacks nothing except only actuality, and that actuality adds no other essence.²⁴

In other words, when something is a necessity, it has all the properties that it would have if it were actual. The only thing it lacks is actuality.

It seems that there should be a connection between accidental potential and necessity. Without even looking at the text, it seems pretty obvious that all necessities are also accidental potentials. This is confirmed in the text where Rufus says:

When there is a necessity, then it is in accidental potential, and it will emerge in actuality by itself unless prevented. And it seems to me that we should suppose that this is the state of component forms in the mixt.²⁵

The next natural question to ask, then, is whether necessity and accidental potential are coextensive terms or whether necessity is a proper subset of accidental potential.

Rufus commits himself in at least one passage to accidental potential and necessity being coextensive. He writes “And before there is this necessity, the form is always in essential potential and needs an agent [to be actualized].”²⁶ Because Rufus believes that among potentials, the distinction between essential and accidental potential is exhaustive, we can conclude that when something is no longer in essential potential, it is in accidental potential.²⁷ Hence, at the same time the matter becomes a necessity, it also is in accidental potential, and the two terms are therefore coextensive.

RUFUS'S THEORY OF MIXTURE

We now turn to Rufus's theory of mixture. In this section we will present Rufus's theory and discuss the extent to which it solves Aristotle's dilemma. Some of these details form the basis for answering Maier's challenge, which we will discuss in the

concluding section of the paper. We begin by examining an early key text (*MMet* 7.16), where Rufus is quite explicit about the nature of mixture:

We can say that components are in the mixt with an incomplete and diminished actuality, and so the conclusion is evident. But if we are to understand what we are asking about in this section, you should keep in mind that the components are neither actual nor in essential potential in the mixt. Rather they are in accidental potential or incomplete act. This does not, however, occur violently, [but rather] on account of the confusion of its forms in the third nature which is the form of the mixt.²⁸

In this passage, Rufus very directly tells us that the elements are neither in essential potential nor are they actual; rather, they are in accidental potential. The elements are not actual substances; they are special kinds of potential forms that are being prevented from becoming actual by something external.

The next step in understanding Rufus's theory requires us to ask how the elements in a mixt can be in accidental potential and what is preventing them from becoming actual. Rufus writes (*In De Gen* 1.6.3):

And it seems to me that we should suppose that this is the state of component forms in the mixt. Thus each could emerge in act by itself, yet each is prevent by another. Therefore the actual form does not exist, and yet what is there is not matter alone, but a potential moved toward form, and because it is a formal nature, force is consequent on this potential. So, too, when fire is generated from earth, heat is consequent on such a potential moved toward the form of fire in the same matter, [even] when it is still subsumed in the form of earth.²⁹

This passage suggests that each elemental form could emerge in act if it was not prevented from doing so *by another elemental form*. In other words, the elements prevent each other from becoming actual. The elements are potentials moved toward (actual) forms, prevented from actuality by each other.

In the earlier passage we quoted from *MMet*, Rufus claimed that all four elements are present in mixts as necessities, or accidental potentials. This re-creates part of the problem that we claimed a modal interpretation of Averroes solves—namely, finding a dimension along which there can be degrees or concentrations of the elemental forms. Since according to the *MMet* text, the elements are all in accidental potential and since we know that accidental potential is the same as necessity, there seems to be no room for intension and remission. The upshot of this worry is that all mixts will be the same. All mixts will consist of the four elements in accidental potential. There will be no difference between different mixts.

Rufus specifically addresses this worry in a latter passage of *In De Gen* (2.4.3). He introduces the question that we have been worrying about as follows:

Next we can pose the following doubt: If, as has been said, components are necessities in so far as they are present in a mixt, then all mixts will be similar, since short of being actual, a necessity is as complete as it can be.³⁰

In this passage, Rufus is expressing exactly the sort of worry we discussed above. He suggests that all mixts will be similar if all the ingredients of the mixt are necessities.

Rufus continues by giving us his first response:

We should say that this does not follow, since just as fire, light, flame and coal differ as more and less, in some sense, so too necessities differ from the [form] itself. Thus it can happen that some potential, which is a necessity, can be more and less.³¹

Rufus is here asking us to imagine the substances that contain only fire. Light, flame, and coal, he argues, are all species of fire, with different degrees of heat. Yet,

he argues, something remains in accidental potential. Given that this can happen when only a single element is present, it seems likely that it could also happen when we have multiple elements.

Rufus is here making a legitimate comparison between mixture and elemental generation. Since we already know from experience that elemental forms can come in degrees, it is only a bit more complicated to see this in the case of mixts. The problem with this answer is that it doesn't really explain anything. What is at issue is not the fact that mixts differ from one another; but rather, *how* mixts could differ from one another. His continued response, however, sheds more light on the problem.

In the second part of the passage, Rufus writes:

Again we can say that some mixt is such that one contrary is a necessity, but another is not, as happens in some mixt when there is corruption. And on this basis, we can verify what the Commentator [Averroes] says—namely, that the forms of elements are intermediate between substances and accidents or [rather] substantial forms and accidents. Let us understand this in so far as they are in the mixt. For they are there as potentials and not in ultimate actuality. In that sense they are deficient in respect of a substantial form absolutely [speaking]. But in so far as when joined together they can perfect matter, they are more than accidents.³²

In this passage, Rufus gives a substantial explanation for the similarity problem, but one that is quite confusing. He tells us that in mixts, not all of the elements need be necessities. Perhaps this means that only one element needs to be a necessity. The others are all essential potentials, but can be closer to or further from actuality. These differences in actuality allow us to explain how different mixts have different properties and, thus, how they are distinct.

That only one element need be in accidental potential makes a good deal of sense. The problem is that this seems to conflict with the earlier passage from *MMet* where Rufus tells us that all of the elements in a mixt are in accidental potential. We know that the *MMet* text is earlier than the *In De Gen* text. Further, this passage is consistent with the earlier passage quoted from the same book that we have been discussing. An easy way out of the difficulty would be to claim that Rufus changed his mind in the later texts. If we could find an even later passage with the same view, we would be quite justified in going this interpretive route.

Another possibility, which seems more promising, is that Rufus resolves this issue by implicitly relying on a traditional explanation which allows mixts to be composed of the elements in different proportions. This militates against common prejudices about non-atomistic Medieval theories of mixture which are alleged to only have room for qualitative, not quantitative dimensions. But Rufus clearly discusses different proportions of the elements both in *In De Gen* 2.4.3 and in his Oxford theology lectures. So this seems likely to be his solution to the problem, but the subject still requires further investigation.

CONCLUSION

Maier claimed that all non-atomistic medieval theories were unable to solve the problem of mixture. They could assert that elements combined to form mixts, but they couldn't explain how mixts reflected the states of the elements. Rufus, as we have seen, has a theory about how the elements can remain in the mixt and how the mixt reflects the states of the elements. Like Averroes, he thinks elemental forms are

in a certain kind of potential. However, he rejects Averroes' claim that elemental forms are quasi-accidental forms, and he is able to give a much more detailed account of the status of the elemental forms and prime matter in the mixt. There are still problems with Rufus's account, both in his actual theory and as we have interpreted it. It is clear, however, that had Maier been acquainted with Rufus's account of mixture, she would have had to modify her claim. Though unpolished, Rufus has a fundamentally satisfactory account of the potential existence of elements in a mixt.

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4. ARISTOTLE. *Metaphysics* VIII.2.1043a13 and *On Sense and Sensibilia* III.440b1-3. [Editor's note: References to Aristotle's works are given according to Bekker's 1831 system, showing page number, column letter, and line number. This information is generally included as marginal notes to current published translations.]
5. ARISTOTLE. *On Coming to Be and Passing Away* I.10.327a33-327b10. [Editor's note: This paper follows the practice of much current philosophical literature, and of the Forster translation, in using the English word "mixture" to translate the Greek *μῖξις* (*mixis*). The Foster translation also uses "mixture" to render the Greek *μικτός* (*mixtos*)—for which this paper uses the antique English word "mixt." In contrast, the revised Oxford translation by H. H. Joachim (1984. *The Complete Works of Aristotle*. J. Barnes, Ed. Princeton University Press. Princeton, NJ) construes *mixis* (in *On Coming to Be*) by the English word "combination," and uses forms of the verb "to combine," rather than forms of "to mix." Most people familiar with the language used in contemporary chemical discourse would find the Joachim translation much more congenial than the Foster version. Michael Weisberg has pointed out that, in translating a passage in an earlier work of Aristotle (*Topics* 4.2, 122b30, Barnes, ed., page 206), Joachim uses the English "mixture" for *mixis* (*μῖξις*). (For the Greek text, see: Ross, D. 1974. *Aristotle's Topica et Sophistici Elenchi*. Clarendon Press. Oxford.) In this passage, Aristotle contrasts *mixis* (*μῖξις*) with *krasis* (*κρᾶσις*), "blending"—pointing out that merely putting two components together (mixing) does not necessarily mean that those components will blend (combine). It seems that Aristotle's use of *mixis* (*μῖξις*) in *Topics* is similar to the modern chemists' use of the English word "mixture" and quite different from his more technical use, in *On Generation*, of *mixis* (*μῖξις*) to mean a homogeneous ("blended") combination. (In a preface to his translation of *On Coming to Be*, Foster comments on the difficulty of translating technical terms, and also has high praise for Joachim's work.)

6. ARISTOTLE, On Coming to Be, I.1.314a20 and I.10.328a10
7. ARISTOTLE, On Coming to Be, I.10.328a25-30
8. ARISTOTLE, On Coming to Be, I.10.327b2-27
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14. MAIER, Die Struktur, 3–140.
15. ARISTOTLE, On Coming to Be, I.10.328a33 and II.4.331a24
16. AVERROES. 1550. *Aristotelis opera cum Averrois Cordubiensis commentariis* 5, In *De Caelo* 3.67.ed. apud Juntas. Venice.
17. MAIER, Die Struktur, 38.
18. MAIER, Die Struktur, 38–39.
19. AVERROES, In *De Caelo*, 3.67.
20. MAIER, Die Struktur, 46.
21. Maier, of course, cannot be faulted for this mistake since the manuscript of Rufus's commentary on Aristotle's *On Coming to Be* was not known in her day. For more on the relationship between Rufus and Roger Bacon, see WOOD, R. 1997. Roger Bacon: Richard Rufus's successor as a Parisian physics professor. *Vivarium* **35**: 222–250.
22. RICHARDUS RUFUS CORNUBIENSIS. In *De generatione et corruptione* Aristot. 2.4.2: "Sed dicendum quod aliquo modo est ibi remissio et intensio—ita, scilicet, ut dicamus intensionem in ipsa forma actu existente; remissionem autem in ipsa secundum potentiam existente, ut prius tactum est. Et a forma ignis actu existente causatur calidum intensum, et ab eadem potentia existente, mota tamen in parte ad actum, causatur calidum remissum. Sed tamen ipsa forma [lectio dubia E] substantialis secundum quod est sub ratione formae non suscipit intensionem et remissionem" (Q312.18ra). Quotations are based on a provisional edition of Rufus' works edited by R. Wood and N. Lewis. Since this edition is unpublished, citations are to the manuscripts at Erfurt University, Amploniana Quarto 312.
23. RUFUS, In *De Gen* 1.6.3: "Et in tali statu, ut mihi videtur, debemus ponere formas miscibilium in mixto, ita ut cum quaelibet possit de se exire in actum, quaelibet tamen per aliam prohibetur" (Q312.16vb-17ra).
24. RUFUS. *Dissertatio in Metaph. Aristot.* 9.4: "Sciendum est autem quod materia ultima est res naturalis, quae est necessitas cui impossibile est additio. Nihil enim [tamen E] tali materiae deficit nisi solum actualitas, et illa [add. vero E] actualitas non addit essentiam aliam" (Q290.27vb).
25. RUFUS, In *De Gen* 1.6.3: "et cum est necessitas, tunc est in potentia accidentali et per se ipsam exiens in actum si non sit prohibita. Et in tali statu, ut mihi videtur, debemus ponere formas miscibilium in mixto" (Q312.16vb).
26. RUFUS, In *De Gen* 1.6.3: "Et antequam est necessitas, semper est forma in potentia essentiali et indiget agente" (Q312.16vb).
27. Of course unlike accidental potential, which has a very specific state attached to it, there are many ways for a form to be in essential potential. This is where the terms "near" and "remote potential" become useful. "Accidental potential" refers only to the state of lacking nothing but actuality. Forms that are in essential potential, however, can be near or far from becoming actual.
28. RUFUS. *Memoriale in Metaph. Aristot.* 7.16: "Dici potest quod miscibilia sunt in mixto actu incompleto et diminuto, et ita patet conclusio. Sed ut quaesita in parte ista pateant intellige quod miscibilia sunt in mixto non potentia essentiali nec in actu, sed in potentia accidentali sive secundum actum incompletum, non tamen violente, propter

confusionem formarum suarum in naturam tertiam quae est forma mixti” (Q290.49va).

29. RUFUS, In De Gen 1.6.3: “Et in tali statu, ut mihi videtur, debemus ponere formas miscibilium in mixto, ita ut cum quaelibet possit de se exire in actum, quaelibet tamen per aliam prohibetur. Sic ergo non est ibi actu forma, nec tamen sola materia, sed potentia mota ad formam—ad quam potentiam, quia ipsa est natura formalis, consequitur virtus. Et sic etiam ad talem potentiam motam ad formam ignis, cum ex terra generatur ignis, consequitur caliditas in eadem materia adhuc existente sub forma terrae” (Q312.16vb-17ra).
30. RUFUS. In De Gen 2.4.3: “Consequenter potest dubitari sic: Si, sicut dictum est, miscibilia prout sunt in mixto sunt necessitates, ergo omnes mixtiones erunt similes, quia quod necessitas est completum est quantum potest citra actum” (Q312.18ra).
31. RUFUS. In De Gen 2.4.3: “Dicendum quod non sequitur hoc, quia sicut ignis, lux et flamma et carbo differunt aliquo modo secundum maius et minus, sic et necessitates ad ipsa. Et sic contingit potentiam aliquam, quae est necessitas, esse et secundum plus et secundum minus.” (Q312.18ra).
32. RUFUS. In De Gen 2.4.3: “Possumus iterum dicere quod aliqua mixtio est sic, in qua unum contrarium est sic in necessitate, alterum autem non, ut est in aliquo mixto quando est in corruptione. Et iuxta hoc possumus verificare hoc quod dicit Commentator, quod formae elementorum sunt media inter substantias et accidentia sive formas substantiales et accidentia, ut intelligamus hoc secundum quod sunt in mixtione. Sunt enim ibi ut potentiae et non in suis actibus ultimis, et in hoc deficiunt a forma substantiali simpliciter; eo autem quod simul coniunctae possunt perficere materiam, plus habent quam accidentia” (Q312.18ra).