Abstract: The natural motions of the elements pose an apparent problem for Aristotle’s thesis: everything that moves is moved by something. I argue that we can make better sense of Aristotle’s view if we abandon the idea that the goal, or telos, of the elements is to be in a certain place in favor of the idea that the goal, or telos, of the elements is to go in a certain direction.

How Dirt Works:

Natural Motion of the Elements in Aristotle’s Physics VIII.4

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In the Physics, Aristotle holds that everything that moves is moved by something. But, the natural motions of the elements seem to pose a counter-example to this thesis. So, in Physics VIII.4, Aristotle gives an account of how it is that the elements are moved by something. Today, I plan to talk about three things. First, I will set out the internal tensions in the text. I will then briefly discuss what I take to be the currently received interpretation of Aristotle on the natural motion of the elements. The received view runs up against certain philosophical and textual problems. So, finally, I will sketch an interpretation of the text that avoids some of the problems. I argue that what needs to be explained is not the fact that the elements go in their natural directions, but why they ever stop and how they get going again once they are stopped.

Aristotle claims that everything that is moved is moved by something (256a5); everything is moved either by itself or by something else. He also claims that physics, as a science, includes only those things that possess a principle of motion in themselves (198a28-30). When rain falls and when fire goes up, the elements seem to move in these ways by themselves—without the need for an external mover. By contrast, when the elements move in unnatural or violent ways, an external mover is apparent. We never see earth go up or fire down, for example, without the benefit of some external cause of
motion. But when elemental bodies move in their natural ways, they seem to be moving themselves. By Aristotle’s lights, if elemental bodies move themselves, then they must have distinct parts. Self-motion requires an active thing, the soul, which moves, and a passive thing, the body, which is moved. Self-movers, such as animals, also have distinct parts in the sense that they have articulated limbs—legs, fins, or wings—suitable for creating motion. But Aristotle claims that elemental bodies are “one and naturally unified.” (255a12) They do not have distinct parts in either of these ways. Consequently, the elemental bodies must be moved by something other than themselves even when they move in their natural directions. But if the elemental bodies are always moved by something else, then it seems that they do not have the “internal principle of motion” that is necessary for inclusion in the realm of natural science. But it is absurd to think that the nature of the elements is outside the purview of natural science—Aristotle, at any rate, does not seem to think so. The interpretive question for Physics VIII.4, then, is this: how is it that the elements are moved by something other than themselves and yet have an internal principle of motion.

Sheldon Cohen, among others, offers as solution to these problems by giving priority to the natural place of the elements. Cohen claims that the natural motion of the elements is accidental. The telos, or natural activity, of the elements is to be in their natural places. It is only when the elements are out of these places that they will move naturally toward them. Strictly speaking, then, an elemental body, such as a rock that is high up, does not have the potential for going down, but the potential for being down. It is only when the elements are away from their natural places that they move toward those places. If Cohen is right, the question of the mover of the elements disappears. Aristotle claims that in cases of violent motion in the elements the mover is obvious (255a5). And if natural motion only ever follows a violent motion that moves the
element away from its place, then the cause of the violent motion will also be the 
accidental cause of the natural motion, since the element will not move unless it is out 
of its natural place, a result of violent motion.

One of the strengths of this view is that the natural activity of the elements is 
actualized most of the time.¹ What is natural for a thing is what it does always or for 
the most part. I think Cohen is right insofar as he claims that the cause of natural 
motion in the elements is an accidental cause. I think Cohen is wrong, however, to 
reject the Friedrich Solmsen’s claims: “To be fire is to have a certain movement.”² 
Cohen, like others, attributes explanatory priority to “place”.³ One problem for the 
“priority of place view” is that it attributes to Aristotle a physical system that is 
fundamentally static. If all of the simple bodies were in a state of actuality in this sense 
of being in their proper places, nature would come to a standstill. All the earthy stuff 
would be down and all of the airy stuff would be high up. The transmutation of the 
elements would cease. Everything would stay in its natural place.

A related problem for this interpretation is that not only does the mover of the 
elements cause such motion accidentally, but the natural motions themselves are 
accidental, or incidental, to the natural places of the elements. By identifying the telos, or 
purpose, of an element as rest in its proper place, Cohen has made the natural motion 
accidental. But the text strongly suggests that the elements suffer natural motion

¹ Although I believe there are serious problems with Cohen’s account, the fact that on this interpretation, 
the elements are actualized “always or for the most part” is a great strength of this view. This will remain 
an advantage of Cohen’s interpretation over mine. I think, however, that my view has counterbalancing 
advantages which will minimize this problem.

² AEM p. 155.

³ Another notable view that gives such priority to place is Helen Lang’s article, “Why Fire Goes Up: An 
argues that place serves as the requisite mover of the elements, since this is the actuality that brings about 
the corresponding potential in the elements to be in their natural places. I think her view is mistaken, 
however, as the actuality, place, is not in contact with the moved thing until such motion is complete.
essentially (though the efficient cause of such motion may be accidental). Aristotle writes:

[A]ir is actually light, and will at once realize its proper activity unless something prevents it. [But] air may be still potentially light; for it may be
that through some hindrance it does not occupy an upper position,
whereas, if what hinders it is removed, it realizes its activity and continues
to rise higher (255b10, 19).  

But on the “priority of place” view the elements can never immediately actualize their potential. For example, suppose that a rock is at some time hindered on its path to the center of the earth. Once the hindrance is removed, it will not immediately be on the ground, but must go through a further process of falling prior to its achieving this end. On the other hand, if we take actuality of the elements as motion in their proper directions (call this the “priority of direction” interpretation for the sake of contrast), they are able to immediately fulfill this actuality upon removal of a hindrance. This is the alternative interpretation that I shall argue for below.

Turning now to the alternative interpretation, I will start by laying out some key distinctions in Aristotle’s thought.

Aristotle defines motion as the: “actualization of what potentially is, as such.” So what has moved was first such potentially. In terms of our problem the definition can apply to the motion of the elements in either of two ways. First, the motion of the elements could refer to a change in what is potentially down coming-to-be actually  

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down. If the potential in question is the potential to be in a certain place, then it must undergo some process of change prior to its coming into full actuality. Suppose that an earthy thing, such as a rock, is rolling down a hill and never reaches the center of the earth. If the actuality for the rock is to be in its natural place, and it never reaches that place, then we must say that the motion is incomplete. The potential of the rock to be at the center of the earth is never actualized. On the other hand, suppose that the actuality of the rock is going in a certain direction. In this case, even if the rock never reaches the center of the earth, it has still suffered a complete motion. I think this second interpretation of the actuality for the elements makes the best sense of Aristotle’s claim that once the hindrance to the elemental motion is removed its actuality is instantaneously realizable.

This understanding of natural motion as the actuality of the elements is supported by the distinction that Aristotle draws between kinesis (motion) and energeia (actuality or activity). Aristotle draws this distinction in both Metaphysics Theta and Nicomachean Ethics X. Both energeia and kinesis are what I will call “goings on” but there are important differences between them. Activities—such as seeing and pleasure—are complete at every moment and have no further end. Consider two kinds of walking: walking to the store and going for a leisurely walk. In the first case, the walking is incidental to my end of arriving at the store. If my goal is to get to the store then I may well walk there, but the walking is a mere by-product of getting to the store. I might just as easily drive or bike to the store; the goal will still be fulfilled. Walking, in

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7 I shall adopt the convention of using terms such as “goes”, “goings on”, etc. when it is necessary to remain neutral between kinesis and energeia. At times this will be awkward, however, I think that there will be reason to remain cautious and neutral at times in the proceeding discussion.
this sense, is a kinetic process, as it comes about over a temporal interval and is only completed upon one’s arrival at the store. The second case, going for a walk, is an *energeia*. If my goal is to go for a leisurely walk, it will not be fulfilled if I go for a drive or a bike ride instead. The goal of going for a walk is immediately realizable. That is, unless, of course, I am hindered from walking in some way, say, I am eating lunch (i.e., I hinder my own walking) or tied to a chair (i.e., someone else hinders my walking). Once I finish lunch or I am untied, there is no process that I must first go through prior to going for the walk (as there was when my goal was getting to the store). Furthermore, my going for a walk is complete at every moment during the walk. There is no goal of my walking, other than the walking itself, that would make the walk more complete.\(^8\) A motion (*kinesis*) has a beginning, a middle, and an end, but activities are all end (in the sense of *telos*).\(^9\)

So, if the falling of earthy things is an activity (*energeia*), then it will be complete during any moment of the fall, and will be an action complete in itself, like going for a walk. Furthermore, if the falling is an activity, the goal (*telos*) will be immediately

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\(^8\) G. E. L. Owen makes a similar distinction in his article, “Particular and General.” (*Proceedings of the Aristotelian Society* 79, pp. 1-21.). Owen states, “Suppose you interrupt me when I am drawing a circle and the circle is never finished; it cannot follow that I was not drawing a circle. For if what I was drawing was not a circle but the circle-fragment left on my paper, you did not interrupt my drawing.” Let us slightly modify Owen’s example. Suppose I am walking to the store, when I see the coffee shop and decide to go there instead. It will be correct if later I tell a friend, “I was walking to the store, when I decided to go to the coffee shop.” But I never made it to the store, and so the walking was incomplete. I was indeed walking to the store, or I could not have been interrupted from this goal. While I did complete the setting off for the store stage, I did not complete my goal of getting to the store.

\(^9\) The distinction between *energeia* and *kinesis* appears again in a slightly different form in *Metaphysics* Θ 1948b25. “At the same time we are living well and have lived well, and are happy and have been happy. If not the process would have had sometime to cease, as the process of making thin ceases: but as it is, it does not cease; we are living and have lived. Of these processes, then, we must call the one set movements, and the other actualities... For it is not true that at the same time we are... coming to be and have come to be-- it is a different thing that is being moved and that has been moved; but it is the same thing that at the same time has seen and is seeing, or is thinking and has thought. The latter sort of process, then, I shall call an actuality, and the former a movement.”
realizable, as long as the element is not hindered from such motion. If, on the other hand, these goings on are kinetic movements, they should be more like walking to the store. That is the goings on of the elements will eventually be completed if performed for long enough and will have an end other than itself.

To be quite clear about just how going in a natural direction is the actuality of the elements, we should consider what Aristotle has to say about potentiality and actuality more generally. Consider the case of the hot. When something that is potentially hot comes to actually be hot, it is not for the sake of something other than being hot. The hot thing is just doing what it does, being hot. Hotness is simply of the kind which causes a change in things that it comes into contact with. A hot object causes heat in a second object essentially and whenever these are in contact. Heat spreads (unless it is unnaturally hindered); that is just part of what hotness is. If it is hindered, then whatever it is that removes the hindrance will be an accidental cause of motion in the second object. Of course, it is not the case that what is actually hot will make something else hot, unless that second thing is itself, potentially hot. The motion is the making hot—the activity is the being hot. Hot-making is described as motion, when this is actually a change of state from a potentially hot thing to an actually hot thing. An object comes to be hot only if it has the corresponding principle (is able to become hot) and is in contact with something that is actually hot.

10 The corresponding principle of change as a potentiality for something is also addressed in the Metaphysics. Aristotle writes at 1046a11: “For one kind is a potentiality for being acted on, i.e. the principle in the very thing acted on, which makes it capable of being changed and acted on by another thing or by itself regarded as other... i.e. by a principle of change.” So the thing acting has a principle of change and the thing acted upon has a principle of potentiality which corresponds to the principle of change.
The actually hot thing cannot make another thing hot unless that second thing is capable of coming-to-be hot. This is also the case with the accidental causes of natural motion. Aristotle says:

In the same way, too, what is potentially of a certain quality or of a certain quantity or in a certain place is naturally movable when it contains the corresponding principle in itself and not accidentally. (255a24-26)

So, if something goes from potentially going down, to actually going down, such as the case of an earthy thing in natural motion, it must contain in itself, essentially, the corresponding principle to carry it from potentiality to actuality. In other words, the earthy thing is potentially going down, it goes down whenever it is unimpeded because it contains in itself a corresponding principle, that is, a tendency to go downward. The final cause, or nature, of an earthy thing is to fall downward, toward the center of the earth. The moving cause, or efficient cause, is whatever has brought the thing from potentially going down to actually going down. And the actuality for the heavy things, water and earth, it is to go downward, and for the light things, air and fire, it is to go upward. Aristotle further emphasizes this point in the next lines.

So when fire or earth is moved by something the motion is violent when it is unnatural, and natural when it brings to actuality the proper activities they potentially possess. (255a28-30)

Hence, when a mover allows an element to actualize its nature (telos), the resulting motion is natural. If a mover, on the other hand, moves an element in a way contrary to its nature, the resulting motion is unnatural. For example, the proper activity for a heavy element, such as a rock, is to fall. Rocks will not fail to actualize this nature unless they are prevented from doing so by some outside impediment, or hindrance.
But, if they have the tendency toward motion, how is it that they are moved by something other than themselves?

Aristotle suggests that the reason that the mover of the elements and the other inanimate things is obscured is due to ambiguous use of the term ‘potential’. He introduces the example of a learner of science and the knower of science to help us here. In the example of the learner and the knower of science there are two levels of potentiality identified and one level of actuality. The first and most potential level of scientific knowledge, or the potential potential, is the learner who does not yet fully understand the facts of science. The next level of potential, or the actual potential, is occupied by one who has knowledge of a science, yet is hindered from exercising such knowledge. The final level, the full actuality, is occupied by one who knows the facts of science and is currently exercising such knowledge.

In our analogy a hindrance is something that may prevent one who has actual scientific knowledge from actually exercising this knowledge—she may be eating lunch or she may be tied to a chair. It is the relief from these hindrances that allows one who has actual scientific knowledge to actualize this knowledge, qua her potential to do so. Similarly, once a thing is actually light, it may be hindered from fully exercising its proper activity, i.e., rising. Consider a case of transmutation of the elements\(^\text{11}\), such as the case of air rising from water, the proper activity may be prevented by a covering which stands between the air and its natural place, or by a gust of wind which may push the air downward. Just as in the case of the actual potential scientist, whatever serves to remove the hindrance renders the light thing able to reach its fully actualized state, for the elements this means going in their natural directions. So, if a person comes

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\(^{11}\) See *Meteorology* as well as *Physics* VIII.4 for more on transmutation of elements.
along and removes the covering, allowing the light thing to exercise its natural
tendency, and indeed, allows it to actually be light, he is the requisite mover in this case.
If the gale of wind ceases pushing the air downward, this ceasing causes the light thing
to rise. Hence, it is clear that whatever removes a hindrance to an element that is
actually potentially in motion toward its natural place causes it to fully realize this
actuality.

So, in this way the requirement that everything that is moved is so moved by
something is satisfied in the case of natural elemental motion. The reason that the
requisite mover remains obscure in the case of elemental motion is just this equivocal
use of the term ‘potential’. When we understand that the potential for natural motion is
an actual potential and they will actualize such motion unless hindered, the mover is
revealed. The mover of the elements is whatever removes a hindrance to their actuality.
It is clear from the text that to have a natural tendency to move downward is what it is
to be heavy and to have a natural tendency to move upward is what it is to be light.\textsuperscript{12}

Understanding the propensity to go in a certain direction to be the telos, or end,
for an element fits well with the text of VIII.4 and with Aristotle’s definition of motion.
The actuality of the element is immediately realizable upon the removal of a hindrance.
If we understand the mover of the elements as an accidental mover and the elements
themselves as essential sufferers of motion satisfies the conditions that everything
moved is moved by another. The elements have an external mover and an internal
principle of motion, this distinguishes them from self-movers and satisfies the

\textsuperscript{12} This fits the text as Aristotle notes in closing his argument that everything moved is moved by
something by saying: “[T]he light things and heavy things... are moved either by that which brought the
thing into existence and made it light and heavy, or by that which released what was hindering and
preventing it.” It is strange that Aristotle should use a disjunction here, mentioning one alternative that is
not correct. Perhaps, however, this quotation is not meant as a disjunction. Since the “what brought
them into existence” is insufficient to account for elemental motion, perhaps the “or” in this passage is
meant as a “that is to say”, or some other non-disjunctive sense of “or”.

conditions in Book II of things which fall under the scope of physics as a science. The \textit{prima facie} obscurity of the mover of the elements is explained by its accidental character.

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