Aristotle on the Motion of Projectiles: A Reconsideration

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Aristotle is still credited in several studies dealing mostly with medieval science with the so-called theory of *antiperistasis*, by which he allegedly explained the motion of the projectiles. Nonetheless, *antiperistasis* is the first of two theories to which Aristotle refers with regard to the motion of the projectiles, passingly in *Physics* iv 8 and more amply in *Physics* viii 10, where it is actually rejected in favour of the second theory. Several commentators fail to notice the strict analogy between the two passages and wrongly take Aristotle as expounding and endorsing just one theory in *Physics* viii 10, which would be (a refined version of) the theory of *antiperistasis*. As a result, Aristotle’s account of forced motion has been repeatedly misunderstood.

As is well known, according to the Stagirite, the natural elements that constitute the universe are either heavy or light or weightless; the heavy elements, i.e., earth and water, naturally move towards the centre, the light elements, i.e., air and fire, naturally move away from the centre, and the weightless element, i.e., the ether that occupies the supralunar region of the universe, naturally moves around the centre. The problem with the projectiles, which are heavy by nature, was not that they do not immediately move downwards, since this was explained as the result of a forced, unnatural (βίαιος or παρὰ φύσιν) motion provided by the thrower’s hand. The real problem was that the projectile continued to move for some time, while there was no mover to move it. Here is how a historian of science presents the difficulty that Aristotle had to face:

> Projectile motion posed a...problem for Aristotle. In the case of a thrown object, the force was provided by the hand of the thrower as long as the object was in contact with the hand. But one needed an explanation of why the object continued to move once it had left the thrower’s hand. Aristotle concluded that the medium through which the projectile moved provided the force that kept it moving. This occurred either by *antiperistasis* (replacement), in which the medium rushes around the

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1 See, for instance, Gabrovsky 2015, 40: ‘There were many problems with Aristotle’s theory of *antiperistasis*: in Aristotle’s argument a stone that is thrown moves the air, and the air propels the stone as it fills in the vacuum left behind.’

2 Various accounts of medieval science treat the theory of *antiperistasis* as a standard part of a general Aristotelian theory of motion; see, e.g., Grant 1974, 275-280. Nevertheless, medieval thinkers themselves, such as Thomas Aquinas and Jean Buridan, clearly distinguished between the two theories in both passages; cf. Maggiòlo 1965, §1163; Benoît 1996, IV, q. 2, 21-28.

3 For a concise presentation of this theory, see Aristotle *On the Heavens* i 3.
body to prevent the formation of a void or vacuum and pushed the body from behind, or by the medium itself having acquired the power to be a mover from the original projector... The medium itself does not have to move, but rather possesses the power to move something else. This power is, however, imperfectly transmitted from one layer of the medium to the next and gradually dies away. (Franklin 1998, 251)

I would like to revisit the two relevant Aristotelian passages and argue three things: (i) that Aristotle was not heavily concerned by the theory of antiperistasis as such; (ii) that he rejected this theory and proposed a different explanation of the motion of the projectiles, which corresponds to the second of the two explanations described above by Allan Franklin but is not fully grasped in his account; and (iii) that Aristotle’s explanation was a preliminary excursus from a larger argument, which sought to establish that there is an eternally continuous motion in the universe, of one thing and due to one thing, namely, the diurnal motion of the outer celestial sphere, a motion that is eternally generated by the First Unmoved Mover.

Franklin, presumably following W.D. Ross, correctly specifies that the theory of antiperistasis was in reality not Aristotelian but probably Platonic in origin. Plato does not use this specific term but he explains nonetheless the mechanics of respiration in Timaeus 79a-e as a round pushing (περιωθεῖν) of air exhaled and inhaled, which goes on without interruption because there can be no void left in the universe. Plato also invites his readers to explain by a similar reasoning, among other phenomena, the motion of the projectiles. It was the Platonist Plutarch (2nd cent. AD) who first undertook the task to expand the teaching of the Timaeus by describing the kind of round motion that keeps the motion of the projectiles, a round motion that he precisely calls antiperistasis:

In what sense does Plato say [in the Timaeus] that, because there is void nowhere, the antiperistasis of motion is the cause of what happens in the case of medical-cupping instruments and in that of swallowing and of weights that are thrown and of flowing waters and of thunderbolts and of the apparent attrac-

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4 See Ross 1936, 726. Other scholars trace the origins of the theory back to Empedocles, who also argued from the mutual replacement of bodies that there can be no void in the universe (cf. DK 31 A5); see Taylor 1934, 558, and Barnes 1982, 399-401. I believe, however, that what we see in Empedocles is not an antecedent of the specific theory of antiperistasis but a more general case of antimetastasis (see below). Although pseudo-Aristotle (M XI G 976b22-29 = DK 31 A5) uses the verb περιίστασθαι to explain Empedocles’ doctrine, other doxographers (see DK 31 A35) refer to it more properly with such verbs as μεταλαμβάνειν and ἀντιπαραχωρεῖν, which have the more general meaning of changing places (and not of round displacement).

5 See Opsomer 1999. Opsomer rightly speaks of the Platonic ‘concept of periôsis’. Note, however, that this word, too, does not appear as a technical term in Plato but in Aristotle; cf. Aristotle, On Respiration 472b6: ἡ δ’ ἐν τῷ Τιμαίῳ γεγραμμένη περίσσει...

6 Plato, Timaeus 80a1-2: καὶ τὰ τῆς καταπόσεως τὰ τε τῶν ῥυποτυμένων [sc. αἰτία], ὡσα ἄφεθέντα μετέωρα καὶ ὡσα ἐπὶ γῆς φέρεται, ταύτῃ διωκτέον.
tion to amber and the lodestone and of the consonances of sounds? …Weights that are thrown cleave the air and separate it because of the impact with which they have fallen upon it; and the air because of its nature always to seek out and fill up the space left empty flows around behind and follows along with the object discharged, helping to accelerate its motion.7

The theory of antiperistasis, therefore, was not considered to be Aristotelian in antiquity. The word antiperistasis, however, is first found in Aristotle, who also uses the related term antimetastasis. Most scholars tend to treat the two terms as synonymous but they are not (see Barnes 1982, 400). On the one hand, antimetastasis relates to the impossibility of having any void left in the universe, since when a body leaves its place, another body immediately occupies the place left. Aristotle uses it as an endoxon in order to establish the existence of place in Physics iv.8 To take Aristotle’s example: when I pour water from a vessel into a bowl, the vessel does not remain void but is instantaneously filled with air; thus, air and water change places (ἀντιμεθίστανται). On the other hand, antiperistasis occurs twice in Aristotle’s Physics and is used to refer not to a mere interchange of bodies, which could happen in any direction, but to a round displacement of bodies until the last displaced body occupies the place of the first displaced body.9 (This is more or less equivalent to the action of periôthein, with which Plato explains the process of respiration: the air, which is heated in the body and thus exhaled, pushes around several portions of air that are outside the body until a freshly inhaled air occupies inside the body the place left by the exhaled air.) Aristotle uses the term antiperistasis in a context that relates specifically to the motion of the projectiles:

Moreover, the projectiles move when the thrower is not in contact with them either (i) because of antiperistasis, as some say, or (ii) because the air pushed [by the thrower] pushes [the air]10

7 Plutarch, Platonicæ Quaestiones 1004d9-1005a: Πῶς ποτέ φησιν ὁ Πλάτων τὴν ἀντιπερίστασιν τῆς κινήσεως διὰ τὸ μηδαμὸν κενὸν ὑπάρχειν αἰτίαν εἶναι τῶν περὶ τὰς ιατρικὰς σικύας παθήματος, καὶ τῶν περὶ τὴν κατάποσιν καὶ τὰ ῥιπτούμενα βάρη καὶ τὰ τῶν ὑδάτων ρεῖματα καὶ κεραυνοὺς, τὴν τε φαινομένην πρὸς ἥλεκτρα καὶ τὴν λίθον τὴν Ἡρακλείαν ὅλκην τὰς τῶν φθόγγων συμφωνίας; …Τὰ δὲ ῥιπτούμενα βάρη τὸν άέρα σχῆξε μετὰ πληγής ἐμπεσόνται καὶ διήστισον· ὁ δὲ περιρρέων ὀπίσω, τῷ φύσιν ἐκεῖν ἀεὶ τὴν ἐρημουμένην χώραν διώκειν καὶ ἀναπληροῦν συνέπεται τῷ ἀφιεμένῳ τὴν κίνησιν συνεπιταχύνων. Cherniss 1976, 63 trans., which renders antiperistasis by ‘cyclical replacement’.

8 Cf. Phys. iv 1.208b1-8: ὅτι μὲν οὖν ἔστιν ὁ τόπος, δοκεῖ δὴλον εἶναι ἐκ τῆς ἀντιμεταστάσεως· ὅπου γὰρ ἔστιν οὖν ὅπου, ἐνετῶθη ἐξελθόντως ὅπερ ἔστιν ἀεὶ ἐνετῶθη, ὅτε δὲ τὸν τόπον ἀπόστησε· τοῦτο δὴ τὸν ἐγγεγραμμένον καὶ μεταβαλλόντων ἕτερον πάντων εἶναι δοκεῖ· ἐν ὅ γάρ ἐστι τὸν, ὅποι ἐν τούτῳ πρότερον ἦν, ὅτι δὲλον ὡς ἐν ὅ τόπος τι καὶ ἡ χώρα ἐπερνόν ἄμφοτερον, εἰς ἕν καὶ εἰς ἄλλους. Cf. also iv 7.214a29-31: ἁμα γὰρ ἐνδέχεσθαι ὑπεξείαν ἀλλάλιος, ὀδύνης ἐντὸς διαστήματος χοριστοῦ παρὰ τὰ σῶμα τὰ κενοῦμενα.

9 Note, however, that the word is used in a different sense with regard to natural motions in Aristotle’s Meteorology; it refers to a round force exercised by one body on another, leading to the contraction of the latter (cf. Meteor. i 12.34b15-22). See Groisard 2008, 45-46.

10 Most scholars think that what the air pushes is the projectile itself. As we shall see, this inter-
in a more rapid motion than that of the [natural] motion [of the projectile] towards its proper place.\textsuperscript{11}

This is just a passing reference to the motion of \textit{antiperistasis}, which Aristotle brings forward as one of several arguments against the existence of void. Aristotle is not explicit about the motion to which \textit{antiperistasis} refers, presumably because this was supposed to be known. As the word does not occur in Plato, we are allowed to think that it was used by philosophers of the Old Academy to describe a specific motion in the air or in the water, through which some Academics explained the motion of the projectiles.\textsuperscript{12} Despite the brevity of the passage, the presence of an alternative explanation makes clear that this Academic theory was not plainly endorsed by Aristotle. Thanks to another passage of the \textit{Physics}, we can actually see that Aristotle rejected the theory of \textit{antiperistasis} as inadequate and opted for the second alternative, which was in all probability his own conception. This second passage comes in as an excursus that solves a difficulty in the last chapter of the last book of the \textit{Physics}, namely, the motion of the projectiles that move continuously without being moved by something.

Aristotle is not entirely clear about the way in which this difficulty relates to his overall argument. But since \textit{Physics} viii 10 is concerned with the single continuous motion of a single magnitude, which is continuously moved by a single thing, that is, the perpetual motion of the universe eternally moved by the First Unmoved Mover, we may reasonably assume that he is preliminarily dealing with the problem of having a continuous motion \textit{without} an actual mover in the sublunary sphere. This might cast doubt on the logical necessity of having a mover eternally acting on the celestial sphere, and thus open the way for an alternative theory of the heavenly motions. This may seem a pseudo-problem, since one could readily reply that the continuous motion of the projectile is finite, whereas the motion of the universe is infinite; this is why the First Unmoved Mover has to be eternally acting on the celestial sphere. But this reply would be hardly convincing. For the finitude of the projectile’s motion is due to the projectile’s natural heaviness, whereas the motion of the heaven could be sustained by the very nature of the ethereal heavenly bodies. Would it not be true that the celestial element, which moves in a circle by its very nature, could move infinitely in a continuous way even if it had been set in motion once for all time, say, by an extra-celestial thrower, who would afterwards retreat in inactivity? Aristotle’s strategy to solve this problem is to prove that the motion of projectiles is only seemingly continuous, so that if the universe would move the way projec-

\textsuperscript{11} \textit{Phys.} iv 8.215a14-17: ἔτι νῦν μὲν κινεῖται τὰ ῥιπτούμενα τοῦ ὄσαντος οὐχ ἁπτομένου, ἢ δὲ ἀντιπερίστασιν, ὡσπερ ἐνθαί διαφορά, ἢ διὰ τὸ ὦθεῖν τὸν ὄσθεν ἄρα θάττω κίνησιν τῆς τοῦ ὦσθεντος φορᾶς ἢ ἤ ἀποφέρεται εἰς τὸν οἰκείον τόπον.

\textsuperscript{12} The theory of \textit{antiperistasis} is explicitly attributed to the old Academics (οἱ περὶ Πλάτωνα) by Alexander of Aphrodisias in his commentary on \textit{Phys.} viii 10.267a17 (ἡν λέγωσι τινες ἀντιπερίστασιν εἶναι); cf. Rashed 2011, n° 810.
tiles do, its motion would not be really continuous. 13 But if the universe is eternally moved, as it has been proved in Physics viii 1, 14 it has to be moved continuously, and in order to be moved continuously it has to be eternally acted upon by an unchanging substance.

Aristotle puts forward a different explanation of the motion of projectiles, according to which a motive force is transmitted from the first mover to a chain of moved movers, until it is finally exhausted. Thus, the postulate that whatever is moved is moved by another 15 is preserved not only out of logical necessity but also because it is finally not contradicted by the empirical evidence. The theory of antiperistasis is laterally rejected, because it fails properly to account for the motion of projectiles:

Concerning things in locomotion, we would do well to face a problem before proceeding. If everything in motion is moved by something, as for those that do not move themselves, how is it that some of them will move continuously even when they are not in contact with their mover, as in the case of projectiles? If the mover simultaneously moves something else, such as the air, which causes motion by being moved, it is no less impossible [for this than for the projectile] to be in motion, if the first [mover] is not in contact with it nor does it cause its motion. But at the same time all things will have been moved and stopped whenever the first mover stops, even if, like the magnet, it renders what it has moved able itself to cause motion.

This is what we must reply: the first mover renders able to cause motion the air or water or whatever has a nature to move and be moved, but this does not simultaneously stop moving and being moved; rather, it stops being moved at the same time its mover stops moving it, but it still causes motion. That is why it moves something else contiguous to it, and the same account applies to the latter [i.e. to what is contiguous to the former, which in its turn moves what is contiguous to itself]. And it begins to stop as long as the power of causing motion becomes always less in each contiguous body. And finally it

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13 This point is also made by Falcon 2015, 281.

14 The chief argument is that, if beings had pre-existed motion, then there has been a generation of the motion of the universe, which was necessarily the first (πρῶτη) motion; but this motion was produced by something, which was previously the cause of the universe’s being at rest and has now turned to be the cause of the motion of the universe; there had been, therefore, a motion, namely, the change of the non-mover to mover, which was previous (προτέρα) to the first motion; but this is logically absurd.

stops when the previous body no longer makes [the next one] a mover, but only something moved; these [last] things must cease simultaneously, the one to move and the other to be moved, and with them stops the whole motion. Now this motion comes to be in things that can be at one time in motion and at another time at rest, and it is not continuous, though it appears to be. For it occurs either in successive things or in things in contact; for there is not a single mover, but a series of contiguous ones. This is also (καὶ) why the kind of motion (ἦ τοιαύτη κίνησις) some call antiperistasis takes place in air or water. But it is impossible to resolve the problem [of the motion of the projectiles] in any other way than the one mentioned, whereas the antiperistasis makes everything simultaneously be in motion and cause motion, and thus stop simultaneously. But, as it is, there appears to be one thing in continuous motion. What keeps it in motion then? Surely not the same thing that set it in motion [but a series of contiguous movers].

This passage resists an easy interpretation. Most scholars, who following Ross omit καὶ at 267a15, although it is transmitted by most manuscripts, seem to believe that ἡ τοιαύτη κίνησις at 267a16 refers to the motion that Aristotle has just described, which some (but not Aristotle) identify with antiperistasis. But it is hard to see how this could be true. The motion described by Aristotle

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17 It would be, therefore, tantamount to a matter of naming and Aristotle would mean this: ‘This is why this kind of motion [I have just described and] which other people say that it is antiperistasis takes place in air or water.’ Ross’ explanation (Ross 1936, 727: ‘Some thinkers…say this propagation of motion from one thing to another is mutual replacement’) is self-contradictory; mutual replacement involves two things (the projectile and the air), whereas the ‘propagation of motion’ implies a chain of multiple movers each imparting to the next the power to move its successor.
accounts for the motion of the projectiles, whereas immediately afterwards he explicitly says of the antiperistasis that it makes all things involved move and stop simultaneously, which is of course not true of the projectiles. The theory of the antiperistasis involves the air in front of the projectile acting as a motive force once it is behind the projectile, and the problem with such a theory is that the air that is now at the back of the projectile cannot move the projectile, since it has no motive force as it is no longer in contact with the mover. The example of the magnet (267a1-2) is used to illustrate the incapacity of antiperistasis properly to account for the motion of the projectiles. A magnet transmits its motive force to an intermediate ironstone that in its turn moves a third ironstone, just like the thrower, according to the theory of antiperistasis, transmits a motive force to the projectile that in its turn moves a third element, namely, the air that is now displaced at the back of the projectile. But just as the intermediate stone has no motive force as soon as the magnet does not move it, so the air that is now between the thrower and the projectile has no motive force either, since it is moved neither by the projectile nor by the thrower.

A way to escape the difficulty posed by the motion of the projectiles was to posit something that stops being moved at the same time its mover stops moving it, but it still causes motion. This is the explanation briefly exposed by Aristotle in Physics iv 8 and expanded in Physics viii 10. It essentially consists in saying that the thrower does not launch just the motion of the projectile, as it happens in the theory of antiperistasis, but he also launches the motion of a body, which, unlike the projectile, is by its nature capable to be moved and to move (267a4-5: ὃ πέφυκε κινεῖν καὶ κινεῖσθαι; the projectile is per se only capable to be moved). 18 We can explain the motion of projectiles, Aristotle says, only if we posit not a continuous motion produced at once by a single mover but a successive transmission of a motive force that gradually diminishes as it is transmitted from a first mover to successive moved movers (267a8-9: ἀεὶ ἐλάττων ἡ δύναμις τοῦ κινεῖν ἐγγίγνηται τῷ ἐχομένῳ), until there remains only something moved with which the whole unnatural motion ceases. The transmission of such a motive force can only take place in contiguous bodies, which have to be portions of air or water (and not of earth or fire, and of course not ‘portions’ of void), as these are successive and are by their very nature capable to move and to be moved. 19 The projectile continues to move without being in contact with the mover because the air is pushed by the mover together with the projectile and successively moves further portions of air that move for a while faster than the

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18 This means that in the theory of the antiperistasis the projectile moves the air accidentally, insofar as the air moves at the back of the projectile not because it is properly moved by the projectile but in order to occupy the place left by the projectile.

19 Aristotle is generally credited with a contact physics; in other words, he is supposed to hold as true the proposition ‘for all motion a force in direct contact with the object being moved is required’. I think that this is misleading. All that Aristotle required is that for all moving objects there is a mover that moves them, whereas the mover and the moved might be either in contact or in succession; cf. 267a14: ἢ γὰρ ἔφαξε ψής ὅτι ἢ ἀπομένων ἔστιν. The magnet and the ironstone are not in contact but successive.
natural motion of the projectile, thus impeding it to move downwards towards its own place. In other words, contrary to Franklin’s account, the medium has to be moved, so that the projectile can be moved too.

The καί at 267a15, therefore, has to be restored. It is not meant to say, as Ross apparently thought before deleting it, that the motion of antiperistasis takes place both (καί...καί) in the air and in the water,20 as if someone had claimed that it takes place only in the air or only in the water, but is meant to say that also (that is, in addition to the successive motion of portions of air or water just described) the motion of antiperistasis happens in the air or in the water, because it also presupposes contiguous bodies. But whereas it may account for natural motions, such as the respiration, it fails to account for the motion of the projectiles.

Aristotle’s overall argument is resumed towards the end of the chapter before the final conclusion of the book. The only way for something to be continuously moved, as it happens with the celestial sphere (in other words not to be moved again and again, as it happens with the sublunary natural and unnatural motions, which are moved either by moved movers or by unmoved movers, i.e., the souls, which are moved accidentally), is to be moved by something completely, i.e., even per accidens, unmoved:

There is a difficulty as to whether it is possible for something in motion to cause continuous motion in a way different from what pushes repeatedly, which pushes continuously by a succession [of thrusts]. For either the same mover must always push or pull or both, or another thing receiving a thrust from a series of intermediaries must do so, as was mentioned previously in the case of projectiles, on the grounds that since the air is divisible, a different portion always causes motion by being moved. In neither case can there be a single motion; there can be only contiguous motion. The only continuous motion, therefore, is that which the unmoved mover causes. For, by always remaining in the same state, it will also hold the same relation continuously to the moved.21

Unless we mean the celestial sphere to move as the air and the water do in the case of the motion of projectiles, that is, each one of the parts of the sphere being bumped by the one behind it,22 or to be set in motion again and again by one moved mover (and not by many moved movers, as it happens in the motion of

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20 This is how the text is understood by Wicksteed and Cornford 1934: ‘And so there comes about both in air and water the kind of motion that some have called antiperistasis.’

21 Phys. viii 10.267b9-17 (I have modified the punctuation): ἔχει δ᾽ ἀπορίαν εἰ ἐνδέχεταί τι κινούμενον κινεῖν συνεχῶς, ἀλλὰ μὴ ὤσπερ τὸ ὠθοῦν πάλιν καὶ πάλιν τῷ ἐφεξῆς εἶναι συνεχῶς· ἢ γὰρ αὐτὸ δεῖ ἄει ὥθειν ἢ ἔλεγεν ἢ ἄμφοτερον τι ἐκδεχόμενον ἄλλο παρ᾽ ἄλλου, ὥσπερ πάλαι ἐλέγχθη ἐπὶ τῶν ῥυτισθεμένων, εἰ διαιρετέος ὄν ὁ ἄρτος [ἡ τὸ ὕδωρ] κινεῖ ἄλλος ἀεὶ κινούμενος, ἀμφοτέρος δ᾽ σύνολον τε μιὰν εἶναι, ἀλλ᾽ ἐρμηνεύει. μίνη ἀρκεῖ συνεχῆς ἢν κινεῖ τὸ ἀκίνητον· ἢ γὰρ ὁμοίως ἔχον καὶ πρὸς τὸ κινούμενον ὁμοίως ἔχει καὶ συνεχῶς. Graham 1999 trans., modified.

22 As Menn 2012, 440 argues, Aristotle undermines here Democritus’ vortex-theory of heavenly motion, which would indeed be non-continuous, produced by a succession of shocks.
projectiles), we must posit an unmoved mover eternally acting on the universe, so that it can rotate continuously.

We may resume the train of thought in *Physics* viii 10 in the following propositions:

(i) the finite motion of projectiles is apparently continuous and is not exclusively generated by the thrower; in reality, it is a motion that is due not to a continuously moving force but to a successive transmission of a motive force between contiguous bodies that are naturally apt to be moved and to move;

(ii) any instant of motion, therefore, and not merely any setting in motion, must be due to a mover (which may be moving by being in contact with the moved object but it may also be moving in some other way);

(iii) a single infinite motion of a single body cannot be successive, since such a motion implies either a moved mover or a chain of moved movers; it must be a continuous motion that is due to a mover that always remains in the same state;

(iv) such is the infinite motion of the universe (or its outermost sphere), which is due to the eternal First Unmoved Mover.

As is well known, in fourteenth-century Paris John Buridan explained the motion of the projectiles with what is nowadays known as his impetus theory, according to which an external force is transmitted not to the medium but to the object itself during contact (see, e.g., Lang 1992, 168-171). This was by no way an innovation. ‘It is necessary’, wrote John Philoponus in the sixth-century Alexandria, ‘that some incorporeal motive force is imparted (ἐνδίδοσθαι) to the projectile by the thrower and that the pushed air does not at all contribute to this motion, or contributes very little.’ In spite of Philoponus’ and Buridan’s criticisms of the *Physics*, Aristotle’s contribution towards the conception of their own theory was not historically unimportant. By rejecting the theory of antiperistasis and by putting forward the concept of a motive force that is successively transmitted through the medium, Aristotle paved the way for Alexander of Aphrodisias (fl. A.D. 200), who transformed Aristotle’s idea of a motive force transmitted *successively* into a concept of ‘impulse’ (τὸ ἐνδόσιμον), imparted *at once* by the mover to a medium capable by its own nature to preserve for a while a proper motive force (οἰκεία δύναμις):

Perhaps by saying that the air takes some power of causing motion from the original mover, [Aristotle] means that it maintains a power of its own that it took from what caused it to

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24 The expression used in the relevant Byzantine scholion (see Rashed 2011, no 805) is τὸ διαδόσιμον (‘transmission’, ‘propagation’). But τὸ ἐνδόσιμον is clearly preferable, since τὸ διαδόσιμον would correspond to the literal interpretation of Aristotle’s text, which Alexander is trying to dismiss. Philoponus obviously has in mind Alexander’s text, when he says that ‘that some incorporeal motive force is imparted (ἐνδίδοσθαι) to the projectile by the thrower’.
move. But if it cannot cause motion without itself being moved, it also <received the power> of being moved from it. And so it is from the thrower that it has taken the start and the impulse of being moved as well as of causing motion. But it has got from it the kind of power that makes it able to cause motion being moved by itself, becoming in a way a self-mover for a little while, because its nature is such that thanks to its susceptibility it receives this power, which <is imparted> by what moves it. 25

According to Alexander, the problem with the literal interpretation of Physics viii 10 is that it does not solve the difficulty that it is supposed to solve. Since all bodies that cause motion cause motion by being themselves moved, the air will cease to cause motion as soon as it ceases to be moved; and it will cease to be moved as soon as the thrower will cease to cause motion (cf. Alexander apud Simplicium, In Phys. 1346.29-35). Alexander’s solution to this problem is to say that the air receives from the thrower not only the start but also the impulse of causing motion by being moved, so that it becomes a kind of a transient self-mover; 26 it resembles to a portion of water once affected by the fire, which preserves for a while a proper heat becoming hot and heating other bodies (cf. Alexander apud Simplicium, In Phys. 1347.16-22). It was only a step to transfer the received impulse from the medium to the moving body itself, once the idea of an upward and sideways force present in an earthly body, as a projectile is, ceased to seem strange. 27

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26 It is not a self-mover in a proper sense because it is not a part of itself that moves itself but the impulse it has received by the thrower.

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