

## *Aitiai* as Middle Terms

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Aristotle's *aitiai* ('causes') are middle terms in Aristotelian syllogisms. I argue that stating the *aitia* of a thing therefore amounts to re-describing this same thing in an alternative and illuminating way. This, in turn, means that a thing and its *aitiai* really are one and the same thing under different descriptions. The purpose of this paper is to show that this view is implied by Aristotle's account of explanation, and that it makes more sense than one might expect.

### *Aitiai as Middle Terms*

We take ourselves to understand a thing, says Aristotle, when we know (1) its *aitiai*, (2) that they are its *aitiai*, and (3) that because of them, the thing cannot be otherwise (*An. Post.* I 2, 71b9–12). To know all this is to be able to derive the thing from its *aitiai*, and such derivations may be set out as demonstrative syllogisms in which these *aitiai* are represented by middle terms (*An. Post.* II 11).

If *aitiai* are represented by middle terms of demonstrative syllogisms, what sort of thing are they? *Terms* in Aristotelian syllogisms are noun phrases, that is, names or descriptions of things or events. The *middle* term is the term that occurs in both premises of a syllogism. In syllogisms of the first form, it occurs once as a predicate and once in subject position: S is M, M is P, therefore S is P. For this to be possible, the middle term must be able to function both (1) as a name or description that *refers* to and introduces an item, and (2) as a predicate that *characterizes* a given item in general terms. Hence, in the context of his theory of syllogistic reasoning, Aristotle cannot categorially distinguish between subject and predicate terms.<sup>1</sup> If *aitiai* are middle terms, they must be capable of playing both roles.

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<sup>1</sup> Geach sees this as a flaw (Geach, Peter T. *Logic Matters* (Oxford: Basil Blackwell 1972), p. 48).

Here are some examples of explanatory syllogisms, taken from *Analytica*

*Posteriora* I 34:

Why is (S) the moon (P) bright on the side that faces the sun? Because (S) the moon (M) receives light from the sun, and (M) that which receives light from the sun is (P) bright on the side that faces the sun.

Why is (S) someone (P) talking to a rich person? Because (S) they are (M) seeking to borrow money from this person, and anyone who is (M) seeking to borrow money from a person will at some point (P) talk to this person.

Why are (S) they (P) friends? Because (S) they are (M) enemies of the same person, and people who are (M) enemies of the same person are (P) friends.

These examples, like several others in Aristotle, may be considered misleading. They concern particular individuals, whereas scientific understanding is supposed to be about general kinds of things. On the other hand, I think that in the present context, Aristotle has a good reason for using proper names (“the moon”) and pronouns (“someone”, “he”, “they”) as subject terms (S). It is that such terms lack the sort of descriptive content that might immediately explain their behaviour. There is nothing about the moon as such, for instance, that explains why it is bright on one side. By choosing subject terms that lack the right sort of descriptive content, Aristotle makes clear that and why an explanation is needed, and he also suggests what this explanation will consist in.

Aristotle says as much in the following passage:

... for the *aition* [1] of being not this or that but of being the *ousia* without qualification, or [2] of not being without qualification but of being a ‘what’, from among those things [that qualify things] as such or by accident, is the middle term. By ‘without qualification’ (ἀπλῶς) I mean the underlying subject, such as the moon, the earth, the sun, or the triangle, and by ‘what’ an eclipse, equality, or inequality, whether in the middle or not. (*An. Post.* II 2, 90a9–14)

Aristotle is distinguishing two cases: [1] We might demonstrate of a substance (*ousia*) that it *is*, period. In this kind of case, the being of the thing demonstrated is not qualified. We show the unqualified being (i.e. existence) of a thing, as opposed to its being *such and such*. I will leave such cases aside. Alternatively, [2] we might demonstrate that a certain description applies to a given thing, either in itself or by accident. In this case, we demonstrate the qualified being of a thing, as opposed to its mere existence. We show, of something that is already known to be without qualification, that it is *such and such*. The examples from *Analytica Posteriora* I 34 are all of the second kind. Now Aristotle says that by “without qualification” (ἀπλῶς) he means the subject,

e.g. the moon. This suggests that the subject term in an explanatory syllogism refers to a thing without describing it, and the other two terms, M and P, state the ‘what’ of this thing, that is, describe it as being this or that sort of thing.

This is, I take it, why Aristotle uses non-descriptive terms (pronouns and proper names) as subject terms in his examples. He wants to highlight that the subject does not yet describe the item in question in any illuminating way. The downside of his strategy is, of course, that the examples seem to lack the generality that scientific reasoning requires. As for this generality, however, I think that it should not be understood in a Fregean, quantificational manner in any case. Let me explain.

### *Generality Without Quantification*

In *De Interpretatione* 7, Aristotle introduces general statements in the following way. First, he says, one may affirm or deny a predicate with respect to the entirety of a subject (καθόλου). His examples are, rendered literally, “All human is pale”, “No human is pale”; 17b3–6). Second, one may affirm or deny a predicate, but not with respect to the entirety of a subject (μὴ καθόλου). Aristotle’s examples are “Some human is pale”, “Some human is not pale” (17b7–10). In the beginning of the *Analytica Priora*, he says that statements such as “Some human is pale” affirm a predicate ἐν μέρει, that is, “in part” (*Pr. An.* I 1, 24a17). But to say that some human is pale is not to say that any human is partly pale. If anything, it is to say of humankind that it is partly pale. The statement, “Some human is pale”, should thus be construed as “*Humankind is in part pale*”.

This is to say that according to Aristotle, to make a general claim is not to affirm or deny a universal predicate of one or more particulars, but rather to affirm or deny a predicate of a kind, either as a whole (universally) or in part (not universally). If this is so, the requirement that scientific knowledge and understanding must be general amounts to the following: In scientific statements, we affirm or deny things of *kinds* of things (either as a whole or in part), and not of their particular instances. If this is so, we should read Aristotle’s syllogisms from *Analytica Posteriora* I 34 in the following way: Why is (S) this kind of thing (P) that kind of thing? Because (S) this kind of thing is (M) that other kind of thing, and (M) that other kind of thing is (P) that kind of thing. These are all universal statements, but none of them is quantified in a Fregean sense.

This non-quantificational way of phrasing Aristotle’s syllogisms recommends itself in the present context because it allows for the middle term to be literally the same

in both premises. A term of the form ‘this kind of thing’ (e.g. ‘the sort of thing that receives light from the sun’) can occur in subject or predicate position without any alteration: ‘S is *this kind of thing*’, ‘*This kind of thing* is P’. In order to capture Aristotle’s understanding of what is going on, then, we need to think of a syllogism as a series of re-descriptions of a given kind of thing. ‘The moon’, for instance, is re-described as ‘something that receives light from the sun’, in order to explain that and why it may also be correctly described as ‘something that is bright on the side facing the sun’. These are three descriptions that are, despite their differing degrees of generality, shown to be true of one and the same kind of thing.

If *aitiai* are middle terms in explanatory syllogisms, explanations have the following form: In order to justify a certain description of a given kind of thing, we provide a further description of this kind of thing. This further description is the *aitia*. If this is so, things will generally be the *same* as their *aitiai*. To state the *aitia* of a thing is to re-describe this very thing. This re-description is required because the two descriptions that constitute the explanandum, e.g. ‘the moon’ and ‘something that is bright on the side facing the sun’, are not related to one another by virtue of their content, such that the first of them would immediately render the second intelligible. The middle term is introduced in the hopes, first, that its application to the moon requires no further explanation, and second, that it is clearly related to the description we want to justify, i.e. ‘something that is bright on the side facing the sun’, by virtue of its descriptive content.

### *Terms or Propositions?*

So far, we have established that a typical explanatory syllogism justifies a description P of a given kind of thing S by providing a different description M of this same kind of thing. One might object that an explanation does not explain a description of a thing, but rather the *fact that* this description applies to this thing. Delcomminette, for instance, emphasizes that the thing to be explained is not the predicate P of the conclusion, but rather the *belonging* of this predicate to the subject, that is, the entire conclusion: *that* S is P.<sup>2</sup> This is highly plausible on the face of it, but it will cause trouble if we stick to Aristotle’s claim that the *aitia* is represented by a term. For, if the *aitia* and

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<sup>2</sup> Delcomminette, Sylvain. “Qu’est-ce qu’un principe selon Aristote?” In: M.-A. Gavray and A. Michalewski, eds. *Les principes cosmologiques du platonisme* (Turnhout: Brepols 2017), p. 41.

what it explains belong to different logical categories, one of them being a term and the other one a proposition, it will follow that there can be no explanatory chains. For suppose that A is the *aitia* of B, that all *aitiai* are terms, and that what they explain is always a proposition. Then, B cannot be an *aitia* of anything further.

One way of putting this right is to argue that *aitiai*, too, are after all not represented by terms but by propositions. Barnes, for instance, does this. He translates *aitia* as ‘explanation’, and although he argues that explanations need not have propositional form, the *aitia* in the example he gives clearly does have the form of a proposition: “[M]y pupils are late, and the explanation ... is that they overslept”.<sup>3</sup> In line with this, Barnes explains Aristotle’s statement that the middle term is the *aitia* as follows: If one fact explains another fact, there is an explanatory syllogism in which the middle term expresses the first of these two facts.<sup>4</sup> For all practical purposes, then, Barnes treats *aitiai* as propositions or facts.

This might work if complex terms would express facts. Delcomminette suggests something like this when he argues that the middle term exhibits a predicative structure.<sup>5</sup> When Aristotle says, for instance, that an eclipse is explained by the interposition of the earth in between the sun and the moon (cf. *An. Post.* II 16), the *aitia* is ‘the interposition of the earth in between the sun and the moon’. This is a complex term that appears to express the fact that the moon is thus interposed. Still, such a complex term will not actually express the fact it alludes to. You might remind me of someone I knew in high school, but this is not at all the same as reminding me of *the fact that* I knew someone in high school. In the same way, we may refer to the interposition of the moon in order to explain an eclipse, but this need not at all be the same as referring to *the fact that* the moon is thus interposed. There are no general reasons for assuming that complex terms of the form ‘the A that is B’ express the fact that A is B. Pepin the Short, for instance, need not have been short.

At this point it might be helpful to note that there are two ways of explaining an eclipse. First, one may explain *why* an eclipse is occurring by saying that the earth is actually interposed. Such explanations relate one proposition (“An eclipse is occurring”) to another proposition (“The earth is interposed”), and they explain one fact by another

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<sup>3</sup> Barnes, Jonathan. *Aristotle: Posterior Analytics* (Oxford: Clarendon Press 1993), p. 90.

<sup>4</sup> Barnes, op. cit., p. 205.

<sup>5</sup> Delcomminette, op. cit., p. 47–8.

fact. Second, one may explain *what* an eclipse is by saying that it consists in the interposition of the earth. This is to explain one term ('eclipse'), by another, more complex term ('interposition of the earth'). When Aristotle says that the explanation is the middle *term*, he must have the *second* sort of explanation in mind. In this sort of explanation, neither the explanans nor the explanandum are propositions. Rather, the explanation is a term that links a term to a more complex term.

Although there is a close connection between explaining why a particular type of event is occurring and explaining what it takes for this type of event to occur, these two are clearly distinct and Aristotle clearly has the latter in mind. His *aitiai* are expressed by terms and not by propositions. Therefore, *aitiai* and what they explain should be taken to be general kinds of things, and not facts.

#### *Further Evidence for the Sameness of Thing and aitia*

So far I have argued that (i) *aitiai* are represented by middle terms of demonstrative syllogisms and (ii) the different terms in such syllogisms provide different descriptions of one and the same kind of thing. The subject term S introduces a certain kind of thing and the other two terms, M and P, describe this same kind of thing, either in its entirety or in part, in alternative ways. If this is so, it follows that the *aitiai* of a thing are really this same thing, described in different ways. In this sense, things and their *aitiai* are the same, either entirely or at least in part. This does not only mean that 'cause' and 'effect' are the same in kind. It means, more specifically, that stating the *aitia* of any given kind of thing will amount to re-describing this kind of thing.

Most of us will need some time to get used to this idea. We usually do not assume that 'causes' or other explanatory factors are the same as what they explain. Let me therefore point to two further passages in Aristotle that tend to confirm the view that a thing and its *aitiai* are the same.

Note that these passages are intended as further motivation, not as proof. As far as proof goes, I take my point to be already established: If *aitiai* are represented by middle terms, as opposed to premises, in Aristotelian syllogisms, they must be represented by re-descriptions of what the subject term refers to. This implies that they are the same as what the subject term stands for.

## *Simultaneity*

Aristotle argues that a thing and its *aitiai* must be the same with respect to tense and aspect (*An. Post.* II 12, 95a10–14).<sup>6</sup> He does this not only because a temporal gap between a ‘cause’ and its ‘effect’ might render the connection between them interruptible and thus contingent. Aristotle does make that point, to be sure. He says that a demonstration cannot derive what is going to happen from what has already happened, for unless a thing is present together with another thing, it cannot be said to make this other thing *necessary* (*An. Post.* II 12, 95a34–35). But in the present context, the more important reason he gives is the following. In a syllogism, he says, all terms must be of the same kind (ὁμόλογον, 95a37).<sup>7</sup> He says that the middle term “cannot be of the same kind as [both what] has come to be and [what] will be” (95a38–39). Therefore, he concludes, it cannot link what will be to what has come to be. Here, Aristotle argues from something that he takes to be obvious, namely that all terms in a syllogism must be of the same kind, to the conclusion that they must also be the same with respect to time.

Note, incidentally, that Aristotle’s point concerns both tense and *aspect*. That is, with respect to *tense*, the *aitia* of something in the past must be in the past, the *aitia* of something present must be present, and the *aitia* of something in the future must be in the future. With respect to *aspect*, the *aitia* of what is (τὸ ὄν) must be something that *is*, whereas the *aitia* of what is coming to be (τὸ γινόμενον) must be something that is coming to be.<sup>8</sup> Note further that what Aristotle says here implies quite generally that we cannot explain any present phenomenon by reference to the past.

## *The What and the Why*

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<sup>6</sup> Cf. Kupreeva, Inna. “Aristotle on Causation and Conditional Necessity: *Analytica Posteriora* II 12 in Context.” In: F. De Haas, M. Leunissen, and M. Martijn, eds. *Interpreting Aristotle’s Posterior Analytics in Late Antiquity and Beyond* (Leiden: Brill 2010).

<sup>7</sup> Philoponus takes Aristotle to say that the middle term must be the same κατὰ τὸ εἶδος, although it may differ τῷ χρόνῳ (CAG 13.3, p. 386,17–19). I see no reason for reading Aristotle in this way.

<sup>8</sup> Aristotle hints at the distinction between these two modes of being (and predication) in *De Interpretatione* 10 (19b13; cf. Lenci, Alessandro. “The Structure of Predication.” *Synthese* 114(2), 1998, 233–276, p. 236). The background is, of course, Plato’s distinction between being and becoming (e.g. *Soph.* 248c).

In another passage, Aristotle says that “it is clear that what something is (τί ἐστί) and why it is (διὰ τί ἔστί) are the same” (*An. Post.* II 2, 90a14–15). This statement may be taken in a number of ways, so I am not going to put a lot of weight on it. Charles, for one, thinks that the passage “reflects a metaphysical interconnection between essence and causation”.<sup>9</sup> This reading results if we identify, plausibly enough, the ‘why’ of a thing with its cause and the ‘what’ of a thing with its essence. But Aristotle need not imply that essences are causes, let alone that the essence of a kind of thing is “the one cause of all the kind’s derived necessary properties”.<sup>10</sup> For nothing forces us to assume that in this context, Aristotle limits the set of relevant descriptions (‘what something is’) to those that single out the *essence* of the thing described. After all, the essence of a thing will only be one of four kinds of *aitia*. And in fact, Aristotle says that in the present context, the ‘what’ of a thing belongs to it either as such or by accident (*An. Post.* II 2, 90a11). So it seems at least possible to read Aristotle as saying that stating an *aitia* (‘why it is’) of a thing is the same as giving a description (‘what it is’) of this thing.

In response to this line of thought, one might wonder how Aristotle could possibly assume that anything could be explained by giving a *non-essential* description of it. He emphasizes in a number of places that scientific demonstrations must proceed from necessary assumptions, and that the accidental cannot be necessary (e.g. *An. Post.* I 6). He might thus seem to argue that the middle term in a demonstration cannot describe anything in terms of an accident. This would imply that the only ‘what’ that can figure in a scientific explanation of a thing is, after all, its essence.

On the other hand, what is essential in one context may very well be accidental in another one. A master, for instance, can be accidentally human (*Categoriae* 7, 7a35–

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<sup>9</sup> Charles, David. *Aristotle on Meaning and Essence* (Oxford: Clarendon Press 2000), p. 200. Charles is in good company: Robin claims that in *Analytica Posteriora* II 11, “c’est toujours en définitive la forme ou l’essence qui est la cause véritable du fait” (Robin, Léon. “Sur la conception aristotélicienne de la causalité.” *Archiv für Geschichte der Philosophie* 23(1–2), 1910, 1–28 and 184–210, p. 184). A similar view is defended by Sandstad (Sandstad, Petter. “The Formal Cause in the Posterior Analytics.” *Filozofski vestnik* 37(1), 2016, 7–26). Ross suggests that in *An. Post.* II 11, Aristotle is considering how each of the four ‘causes’ “can play its part in definition” (Ross, W. D. *Aristotle’s Prior and Posterior Analytics* (Oxford: Clarendon Press 1957), p. 638). In a different context, Stein argues that the four *aitiai* are *pros hen* homonyms, with the ‘formal cause’ as the focal instance (Stein, Nathaniel. “Aristotle’s Causal Pluralism.” *Archiv für Geschichte der Philosophie* 93, 2011, 121–147).

<sup>10</sup> Charles, op. cit., p. 203. Cf. Hennig, Boris. *Aristotle’s Four Causes* (New York: Peter Lang 2019), ch. 6.



38).<sup>11</sup> Further, Aristotle emphasizes that one must always state the relevant *aitia* in the proper way. This means, for instance, that it is not quite correct to refer to the *aitia* of a statue as ‘Polycleitus’, even if Polycleitus did in fact make this statue. For in this context, ‘Polycleitus’ refers to the relevant *aitia* merely by accident, whereas ‘the sculptor’ would not do so (*Physica* II 3, 195a34–5). This does certainly not mean that ‘the sculptor’ picks out the essence of Polycleitus, or that ‘Polycleitus’ is the name of an accident. It rather means that, relative to the purpose of explaining the coming to be of the statue, a middle term such as ‘Polycleitus’ would be *besides the point*. The same is true of the actual essence of Polycleitus. Suppose it is ‘rational animal’. This essence is not an accident of Polycleitus, the human being, but it is accidental relative to the purpose of explaining the coming to be of the statue. Terms such as ‘Polycleitus’ and ‘rational animal’ pick out the *aitia* of a statue all right, but they do so only by accident. This is the sort of accident that Aristotle wants to ban from scientific reasoning. He is not arguing that all *aitiai* must be essences, he is arguing that all *aitiai* should be referred to as such, as *aitiai*, and not in ways that are accidental to their being an *aitia*.

The plausibility of other readings notwithstanding, then, I take Aristotle to mean the following when he says that the ‘what’ and the ‘why’ are the same: In the cases under consideration, we explain *why* a thing is such and such by saying *what* sort of thing it is. For instance, we may explain why two people are friends by describing them as enemies of one and the same person. In this sense, we understand the ‘why’ by means of the ‘what’. This is, again, to suggest that things are the same as their *aitiai*. We state the *aitia* of a thing by saying *what* this thing is.

### *External ‘Causes’*

So much for considerations that tend to support, if not prove, the claim that things are the same as their *aitiai*.<sup>12</sup> Let me now return to its difficult to accept implications. In *Analytica Posteriora* II 11, Aristotle says that there are four kinds of *aitiai*, which are

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<sup>11</sup> For similar examples, see *An. Post.* I 19 (81b25-29), *De Anima* II 6 (418a20), and *De Anima* III 1 (425a24–27).

<sup>12</sup> One might add Angioni’s argument to the effect that in Aristotle, primary *aitiai* must be co-extensive with what they are *aitiai* of (Angioni, Lucas. “Causality and Coextensiveness in Aristotle’s *Posterior Analytics* 1.13.” *Oxford Studies in Ancient Philosophy* 54, 2018, 159–185, p. 177).

more or less the same as the four ‘causes’ that he distinguishes in *Physica* II 3 (194b23–35) and *Metaphysica* A 3 (983a27–32): the ‘material’, ‘formal’, ‘efficient’, and ‘final cause’.<sup>13</sup> These four ‘causes’ should all be possible middle terms in demonstrative syllogisms.<sup>14</sup> Now if the above observations are right, this means that all these ‘causes’ are the same as their ‘effects’, at the very least with respect to tense and aspect. In some sense, specifying the ‘efficient cause’ of a kind of thing, for instance, should amount to, and not go beyond, re-describing *this same thing*. If this seems to be out of line with our understanding of what an ‘efficient cause’ is, we should question whether Aristotle actually means ‘causes’ when he speaks of *aitiai*. This is why I have so far refrained from translating the Greek *aitia*, and why I have just now put ‘cause’ in scare quotes.

Let us look at how Aristotle introduces his four *aitiai*. Here is the initial list from *Analytica Posteriora* II 11:

... there are four *aitiai*, i.e. on the one hand that which a thing was to be, on the other that which is required given certain things,<sup>15</sup> further that which primarily sets a thing in motion, and fourth that for the sake of which, ... (*An. Post.* II 11, 94a21–23)

It may be possible and fruitful, perhaps along the lines of *Metaphysica* H 6 (1045b17–19), to think of the matter and form a thing as one and the same. This might perhaps solve the problem of material constitution.<sup>16</sup> The third and fourth kind of *aitia*, however, commonly known as ‘efficient’ and ‘final cause’, raise more serious issues.

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<sup>13</sup> On the ‘four causes’, see among many others: Moravcsik, Julius M. E. “Aristotle on Adequate Explanation.” *Synthese* 28(1), 1974, 3–17; Stein, op. cit.; and Hennig, op. cit.

<sup>14</sup> Leunissen argues that an explanation and the middle term that it features need not be of the same type, so that it is conceivable, for instance, that the middle term in a ‘final causal’ explanation represents an ‘efficient cause’ (Leunissen, Mariska. “The Structure of Teleological Explanations in Aristotle: Theory and Practice.” *Oxford Studies in Philosophy* XXXIII, 2007, 145–178). For my present purposes, it is enough that at least some explanations feature ‘efficient causes’ as their middle term.

<sup>15</sup> Literally: “the being necessary of this, given certain beings”. Ross paraphrases with “the conditions that necessitate a consequent” (Ross, op. cit., p. 637) and comments that “the material cause could not be described as τὸ τίτων ὄντων ἀνάγκη τοῦτ’ εἶναι”, because “[i]t does not necessitate that whose cause it is; it is only required to make this possible” (ibid., p. 639). I find it quite obvious that Aristotle is here identifying the ‘material cause’ with “that which, given certain things, is required”. Philoponus initially seems to support Ross’ reading by suggesting that the thing required is the form (ἡγουν τὸ εἶδος; CAG 3.3, p. 376,1); but he goes on to say that the *matter* is required if a certain *form* is posited.

<sup>16</sup> I will not pursue this here. For a compelling statement of the problem, see: Thomson, Judith Jarvis. “The Statue and the Clay.” *Noûs* 32(2), 1989, 149–173.

They are traditionally classified as ‘external causes’,<sup>17</sup> which makes it rather difficult to think of them as the same as what they are ‘causes’ of.<sup>18</sup> For instance, how is the movement of one billiard ball supposed to be the same as the movement of another one? How is a knife the same as the act of cutting things? How is a builder the same as her movements, and how are her movements the same as the house that results from them?

In the remainder of this paper, I will consider three problematic cases, each involving an ‘efficient cause’ as a middle term. In some cases, certain events appear to ‘cause’ later ones. In a second sort of case, the presence of a thing might require and thus explain something earlier. Third, we like to say that people ‘cause’ movements and movements ‘cause’ things. Aristotle clearly does. All these cases are difficult to account for if ‘causes’ and effects, or *aitiai* and what they explain, are the same with respect to tense and aspect.

### *The ‘Cause’ of War*

In *Analytica Posteriora* II 11, Aristotle promises to explain how the ‘efficient cause’ may be represented by the middle term of a syllogism. His discussion focuses on one of the more difficult cases:

By virtue of what (διὸ τί) did the Persian war come to be for the Athenians? What is the *aitia* of the Athenians’ being attacked? It is because they made an invasion into Sardis together with the Eretrians; this set it in motion to begin with. Let ‘war’ be A, ‘invade first’ B, ‘the Athenians’ C. Now B belongs to C, i.e. to invade first belongs to the Athenians, and A belongs to B, for people make war against those who have initially acted unjustly. To B, then, A belongs, i.e. being made war against belongs to those who began first, but this, B, belongs to the Athenians, for they began first. The middle term in these cases, then, is the *aition*, i.e. beginning first. (*An. Post.* II 11, 94a36–b8)

It might be significant that the attack on Sardis was not actually the event that started the Greco-Persian Wars; it only marks the beginning of the Athenian involvement (cf. Herodotus V 97). Accordingly, the question is not how the war started, but how the Athenians got involved. We should therefore treat the syllogism as being about the Athenians, rather than about the war. The three terms in our demonstration, then, will

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<sup>17</sup> Cf. Johnson, Monte Ransome. *Aristotle on Teleology* (Oxford: Clarendon Press 2005), p. 18–20.

<sup>18</sup> Philoponus thinks that the problematic cases are the material and the efficient cause, since both (may) precede in time what they explain (CAG 13.3, 387,7–19). Avicenna accordingly discusses these two cases in more detail (*Metaphysics of The Healing* VIII 1–3).

refer to the Athenians under three different descriptions: C = the Athenians (without further qualification), B = those who attack first, and A = those who get involved in a war. The problem is that these three terms do not seem to apply to the Athenians with respect to the same tense and aspect. The Athenians *were* the ones who attacked first, and now they *are* the ones who are involved in a war.

There are two ways of dealing with cases like this. The first is to take the example at face value and give up either one of the two assumptions from above, namely (i) that *aitiai* are middle terms in an explanatory syllogism, or (ii) that all terms in such a syllogism signify or describe the same thing. The second way is to read Aristotle's case descriptions with a grain of salt.

As for the first strategy, one might argue that an *aitia* is a 'mediating item' in a loose sense, in that it links something to be explained with something already understood.<sup>19</sup> It might link two items in the very general sense in which a bus line links a train station to an airport. An *aitia*, then, will be something like an inference ticket: It may well connect a present event to an earlier one, so that we can move from one to the other one. It will not, however, be a middle term in a strict sense.

Wieland suggests a fairly moderate version of this move, when he writes that in *Analytica Posteriora* II 12, Aristotle is abandoning the predicative model of reasoning and instead relying on the transitivity of implication.<sup>20</sup> Presumably, this is to say that Aristotle explains the Athenian involvement in the Greco-Persian wars by an instance of *modus ponens*: If A attacks B, then B will retaliate, now A has attacked B, therefore B is retaliating. This is no longer a predicative nexus among terms. It is an inferential nexus among propositions or states of affairs.

This approach, however, amounts to saying that Aristotle isn't thinking straight, and this on a rather large scale. He would set out an elaborate theory of explanatory syllogisms in terms of predicative ties among general terms, and then proceed to show how *aitiai* are middle terms, only in order to immediately abandon this entire syllogistic, because *aitiai* turn out to belong to a quite different sort of reasoning. They would not be middle terms in the sort of explanation that Aristotle explains at length, but rather mediating propositions in a sort of reasoning that Aristotle nowhere accounts for. This

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<sup>19</sup> Ross, *op. cit.*, p. 647.

<sup>20</sup> Wieland, Wolfgang. "Zeitliche Kausalstrukturen in der aristotelischen Logik." *Archiv für Geschichte der Philosophie* 54(3), 1972, 229–237, p. 233

approach also amounts to ignoring Aristotle's explicit claim that thing and *aitia* must be the same with respect to tense and aspect. Sometimes, to be sure, Aristotle does appear to make general claims that he should not make, and which he contradicts in his more detailed accounts.<sup>21</sup> However, we should not assume that he does so unless he is indeed contradicting his more general claims in his more detailed work. We should therefore ask whether a reading can be found that avoids such a contradiction.

The strategy that I prefer is therefore the second one from above: to stick to Aristotle's account of *aitiai* as middle terms in predicative, Aristotelian syllogisms, and to see whether we can tweak his examples so that they fit. If all terms of a syllogism refer to one and the same thing, it will in fact be impossible to deduce the Persian response from the earlier Athenian attack. However, we can deduce something very close to this: The Athenians *are* under attack at a given time because *they are*, at this same time, those who have attacked first. Put this way, what explains the Athenian involvement is not simply their previous deed, but the description, presently applicable to the Athenians, as someone who has done it. This makes sense. Presumably, no one would be attacking the Athenians unless at least someone at present remembered them as a past aggressor. The past has an impact only inasmuch as it extends into the present. I conclude that tweaking the example is easy and straightforward.

### *The House and the Bricks*

As we have just corroborated, Aristotle denies that anything can necessitate anything else, unless the two are actually present at the same time. He does concede, however, that we may often infer that something must have been present earlier on by appealing to something that is present later on (*An. Post.* II 2, 95a27–31). He illustrates this case as follows:

When a house has come to be, it is necessary that stones have been cut and thus have come to be. By virtue of what is this so? Because it is necessary that a foundation has come to be, if indeed a house has come to be, too; and if a foundation has come to be, stones must have come to be beforehand. Again, when a house will be, stones will likewise be beforehand; this is shown by a

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<sup>21</sup> Two examples: (1) Aristotle's theory of classification in the *Analytica Posteriora* does not seem compatible with Aristotle's zoological writings (Lloyd, G.E.R. *Methods and Problems in Greek Science* (Cambridge: Cambridge University Press 1991), p. 394); (2) Aristotle generally suggests that the final and the formal cause of natural things are the same, but he also holds views that are incompatible with this (Rosen, Jacob. "Essence and End in Aristotle." *Oxford Studies in Ancient Philosophy* 46, 2014, 73–107).

middle term in a similar way, for there will be a foundation beforehand. (*An. Post.* II 12, 95b32–37)

There are two ways in which Aristotle's example might be misleading. First, the three terms of his syllogism seem to refer to at least three distinct entities: a house, a foundation, and some stones. Second, he is arguing that we can only explain the stones by appealing to the house, and not vice versa. But we would not usually say that a house *causes* its foundation, or that the foundation *causes* the stones it is made of. Therefore, it seems, the coming to be of the house can at best be a merely epistemic reason for assuming that stones have come to be. Which is to say that it is not its *aitia* (cf. *An. Post.* I 13, 78a36–7).

Some authors have concluded from this that in the present case, causation and explanation part ways. Robin, for instance, thinks that material, efficient, and even final 'causes' must be temporally prior to their effects, so that they cannot be represented by middle terms.<sup>22</sup> This is the reason why he thinks that *Analytica Posteriora* II is really only concerned with 'formal causes'.<sup>23</sup> He is right, in a way, since Aristotle's *aitiai* are beginning to look rather unlike what we are used to calling 'causes'. I do not agree, however, that there is a tension between syllogistic *aitiai* and real 'causes' in Aristotle.<sup>24</sup> Rather, I suspect that there are no real 'causes' in Aristotle at all, that is, no 'causes' in the sense of links by which the earlier necessitates the later. If there are no such 'causes' in Aristotle, we cannot take his material, efficient, and final 'causes' to be temporally prior to their effects. There will be no tension within Aristotle, but only a disagreement or incongruency between Aristotle and us.

Wieland takes Aristotle to say that there *are* 'causal' relations between the earlier and the later, but that we can understand these relations only by thinking backwards.<sup>25</sup> But the house cannot be the *aitia* of the foundation in this sense. Aristotle says that an *aitia* is that through which a thing is or comes to be such and such, and as Wieland admits, the foundation does not come to be through the house. So, either Aristotle is wrong, or there is a way of construing the coming to be of a house, for instance, as an actual *aitia*

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<sup>22</sup> Robin, op. cit., p. 18. Robin (op. cit., p. 23) refers to *Categoriae* 12; but there, Aristotle explicitly *distinguishes* causal priority from temporal priority (*Cat.* 12, 14b10-11).

<sup>23</sup> Robin, op. cit., p. 184.

<sup>24</sup> Robin, op. cit., p. 25.

<sup>25</sup> Wieland, op. cit., p. 233.

of the coming to be of its foundation, rather than as a merely epistemic reason for certain assumptions about the past.

Given Aristotle's constraint, that the earlier cannot explain the later, the stones cannot be the *aitia* of the house, since they come to be before the house comes to be. On the other hand, the house cannot be the *aitia* of the stones, since the stones should be causally prior to the house.<sup>26</sup> The only remaining option is that the stones are an *aitia* of the house precisely insofar and as long as they are actual parts of the house. This will no longer violate Aristotle's constraint, because the stones are not parts of the house before the house comes to be.

Let me thus restate Aristotle's example accordingly. First, the three terms should all be referring to the same thing, presumably either the house, the foundation, or the stones. Second, the *aitia* should be something by virtue of which this thing *is* what it is, not merely something by virtue of which *we find out* that it is what it is. The question to be answered, I take it, is the following: Why is a house partly made of stones of a certain sort? Answer: Because a house is a thing with a foundation, and a thing with a foundation must be partly made of that sort of stones.<sup>27</sup> That we must begin with what comes later in time means that the subject term of both our question and our answer must be the house. The coming to be of the house, then, is the coming to be of something that is partly made of a certain sort of stones, which explains why these stones must have come to be before the house could possibly come to be.

Seen in this light, it is clear that the coming to be of the stones does not explain the coming to be of the house. There is no explanatory order here that leads from the earlier to the later. On the other hand, the requirement that stones must have come to be is not merely epistemic. The *house* needs these stones, it would collapse without them. Also, the stones that the house needs in order to remain stable are not doing what they are needed for before the house comes to be. They are present, qua foundation, no sooner than the house is.

We need a middle term in order to explain why a house needs such stones because there is no obvious, immediate link between the essence of a house (say, *shelter for belongings*, as in 94b9–10) and the notion of a thing that requires the sort of stones in question. To introduce this middle term is to re-describe the house as something that

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<sup>26</sup> Cf. Philoponus, CAG 13.3, 388,10–16.

<sup>27</sup> Recall that these should be read as statements kinds of things, as opposed to particular instances.

would collapse without a foundation. Once we realize that a house is something with a foundation, we see the link between the house and the stones.

In the present context, the most important thing to note is that the three terms of our revised syllogism do in fact refer to the same kind of thing, and they do so with respect to the same tense and aspect. For let A = a house, B = something with a foundation, C = something that is partly made of a certain sort of stones. A house that *will be*, for instance, is something that *will be* partly made of the relevant sort of stones, a house that *was coming to be* is something that *was coming to be* partly made of them, and so on.

### *The Builder and the House*

The following problem remains, though. We like to think that by undergoing and causing certain movements, a house builder brings about the existence of a house. Aristotle routinely refers to house builders as *aitiai* of houses (e.g. *Physica* II 3, 195b23–25), fathers as *aitiai* of children (194b30–31), and sculptors as *aitiai* of sculptures (195a32–34). These are all cases of transeunt causation, where one thing causes another thing, and such cases will be impossible to account for if the cause of a thing must always be this same thing.

For our purposes, the main problem is that the builder has existed before her movements. She is a persistent being, whereas her movements are occurrents (i.e. comings to be). Therefore, the builder differs from her movements with respect to tense and aspect. The same is true of the movements and the house that results from them. If *aitiai* are the same with respect to tense and aspect as what they are *aitiai* of, it looks like the builder cannot be an *aitia* of her movements, and her movements cannot be an *aitia* of the house. But Aristotle clearly suggests that they are.

Now of course, the mere presence of the builder does not explain the process of building. The proper *aitia* of the movements of a house builder is not the house builder without qualification, but rather the house builder insofar as she is actually moving in certain ways (cf. *Physica* II 3, 195b16–28). Hence, the movements and their proper *aitia* are actually the same with respect to time and aspect. Further, the movement by which a particular house builder is moving bricks and timber are the very same movements that these bricks and timber are undergoing. For, as Aristotle argues in *Physica* III 3, when one thing acts on another one, acting and being acted on are the same (202a21–b22). More specifically, the movement by which a particular house builder is moving a brick and the



movement that this brick is undergoing as a result will be one and the same movement under two different descriptions. So far, then, we can argue as follows that things and their *aitiai* are indeed the same with respect to time and aspect: The house builder is an *aitia* of the house being built only insofar as she is actually building it, and when she is building it, for her to be doing so is the same as for the house to be in the process of being built.

But even if the process of building and the process of being built are the same, this does not fully explain how the builder can be an *aitia* of this process, or how either the process or the builder can be an *aitia* of the house. What is worse, there is a passage that appears to imply that no persistent being can be an *aitia* of any process of coming to be, or vice versa. In *Physica* VI 5 (236a10–14), Aristotle says that for any given process, there is a time at which it ends, but none at which it begins. This is so because whenever anything is already moving, it must have been moving before. In *Physica* VI 8 (239a2), he adds that something analogous is true of states of rest. If this is so, it looks like no movement of a thing can possibly overlap with a state of rest of this thing. There can be no one point in time that would constitute both the end of the movement and the beginning of the state of rest. In particular, the movements by which a house is being built will not temporally overlap with any state of rest of the house that follows them, such as the continued existence of the house. But if they do not even overlap, they cannot possibly be simultaneous, and hence they cannot be the same with respect to tense and aspect.

There are reasons, however, for reading Aristotle's claims in *Physica* VI in a different way. For in fact, the arguments that he gives do not imply that there is no *point* in time at which a movement or a state of rest begins. What he shows is only that there is no smallest initial *interval* during which a movement or a state of rest first occurs.<sup>28</sup> There may well be a point in time at which a movement or a state of rest begins, then, and this point might be identical to the point at which a movement stops.

This, on the other hand, does not help us much. For one thing, the movement of the builder and the house are still rather different with respect to tense and aspect. Presumably, the movement of building the house begins before the house exists, and the house outlasts the movement. For another, the builder and the house are clearly distinct, and they need not even overlap in time. With a little ingenuity, we can conceive of a

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<sup>28</sup> Wagner, Hans. *Aristoteles, Physikvorlesung* (Darmstadt: Wissenschaftliche Buchgesellschaft 1967), p. 628.

scenario where a house builder ceases to exist before the house they build begins to exist. Someone might, for instance, build a solid block out of several kinds of material, so that over the course of a certain amount of time, everything but the walls and the roof of a house withers away. In any case, we are still far away from being able to show that there is any sense in which ‘house builder’ and ‘house’ are two descriptions of the same thing. This means that either the house builder is not in fact an *aitia* of the house, or the *aitia* of a thing is not always this same thing under a different description.

As a faithful Aristotelian, Avicenna bites the bullet and chooses the first of these two options: the house builder is not in fact a proper *aitia* of the house. Here is his initial description of the case:

As for the builder, his movement is an *aitia*<sup>29</sup> of a certain movement, [and] then his being at rest and his ceasing to move, or the lack of his movement and of his carrying [of materials] after this carrying, is the *aitia* of the completion of this movement. This carrying as such and the completion of this movement is the *aitia* of a certain combination [of materials], and this combination is the *aitia* of a certain shape, and each one of them is an *aitia* such that what it is an *aitia* of is together with it. (*Metaphysics of The Healing* VI 2,2)<sup>30</sup>

Avicenna is arguing that in fact, nothing can last longer than its *aitia*. All *aitiai* are together, that is simultaneous, with their effects. Therefore, when the movements of a house builder have stopped, they can no longer be the *aitia* of anything present, including the persistence of the resulting house.<sup>31</sup> The movements of a builder can only cause simultaneous movements, and the state of rest that follows them must be caused by a state that lasts as long as this state of rest. Avicenna even says that the *cessation* of movement of the builder is the *aitia* of the completion of the house’s being built. This makes it seem as though the *aitia* of the persistence of the house is something the builder does *not* do. Then what is it that makes the house persist after its completion?

Another example makes clearer what Avicenna has in mind:

Likewise, fire is an *aitia* for the heating of the element, water. The heating is an *aitia* for the abolition of the actual preparedness of the water for the reception or preservation of the form of

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<sup>29</sup> In the set of passages that I am discussing, Avicenna uses *‘illa* and, at one point, *sabab* where Aristotle would have used *aitia*. I translate *‘illa* as *aitia* and *sabab* as ‘cause’.

<sup>30</sup> Avicenna. *Al-Shifā’, Ilāhiyāt*, ed. Anawati et al. (Cairo: Al-Hay’ah al-‘Āmma li-Shu’ūn al-Muṭābi’ al-’Amīriya 1960), p. 264,9-11. Translation: *The Metaphysics of The Healing*, tr. Marmura (Utah: Brigham Young University Press 2005), p. 201.

<sup>31</sup> Cf. also *Al-Shifā’, Ṭabī’iyāt* I 12,8, ed. Zāyid (Cairo: Al-Hay’ah al-Miṣrīyah al-‘Āmma lil-Kitāb 1983), p. 59,9-11. Translation: *The Physics of The Healing*, tr. McGinnis (Utah: Brigham Young University Press 2009), p. 80.

the watery; and this is because in a situation like this, another thing is an *aitia* for implementing the complete preparedness for the reception of the form's contrary, which is the fiery form. The *aitia* of the fiery form are the *aitiai* that furnish the elements with their forms, and they are separate. (*Metaphysics of The Healing* VI 2,4)<sup>32</sup>

Here, Avicenna distinguishes two sorts of *aitia*. First, the fire brings about the “complete preparedness” of the water to take on the form of fire. Second, once this preparedness is complete, certain separate *aitiai* furnish that which used to be water with the form of fire. A little further on, Avicenna adds:

The *aitia* of the fire [when water turns into fire] is the cause that bestows form (*al-sabab al-mufīd li-l-ṣawwar*) and [it is this cause] together with the cessation of the complete preparedness for the contrary of this form. (*Metaphysics of The Healing* VI 2,5)<sup>33</sup>

Again, two kinds of explanatory factor are involved: (1) *aitiai* that prepare a thing for the reception of a form, and (2) *aitiai* or causes that bestow this form onto that which is completely prepared to receive it.<sup>34</sup> The first, preparing *aitiai*, are *aitiai* of movements. They are not, strictly speaking, *aitiai* of the result of these movements. The proper *aitiai* of the persistent results of the movements are separate from both the fire and its movement. Avicenna appears to identify these separate causes with celestial intellects (*Metaphysics of The Healing* IX 5,3).<sup>35</sup>

This is not so much a solution to our problem as it is a clear and honest recognition of its significance. For, if Avicenna is right, a very large set of phenomena cannot actually be explained by natural, sublunar causes. They can only be explained by *separate* causes, and for Avicenna this means: by intervention by celestial intellects. Still, even though Avicenna recognizes the problem, he is clearly not willing to withdraw the assumption that leads to it, that causes and their effects must be the same with respect to time and aspect. He gladly accepts the consequences: The movements of a builder are not actually *aitiai* of the house that results from them; they are only *aitiai* of the movements that lead

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<sup>32</sup> *Ilāhiyāt*, p. 264,15-18; tr. Marmura, p. 201.

<sup>33</sup> *Ilāhiyāt*, p. 265,4-5; tr. Marmura, p. 202.

<sup>34</sup> Cf. *Ṭabī'iyāt* I 10,3, p. 49,1-4; tr. McGinnis, p. 65. On the ‘giver of forms’ cf. Hasse, Dag Nikolaus. *Avicenna's De anima in the Latin West* (London: The Warburg Institute 2000), p. 187–9; Janssens, Jules. “The Notions of *wāhib al-ṣuwar* (Giver of Forms) and *wāhib al-'aql* (Bestower of Intelligence) in Ibn Sīnā”. In: M.C. Pacheco and J.F. Meirinhos, eds. *Intellect et imagination dans la Philosophie Médiévale* (Turnhout: Brepols 2006); McGinnis, Jon. *Avicenna* (Oxford: Oxford University Press 2010), p. 85–88 et passim.

<sup>35</sup> *Ilāhiyāt*, p. 410,14-411,9; tr. Marmura, p. 335.

to its existence.

This is only to scratch the surface of Avicenna's account. In the present context, what matters is that he provides a clear answer to the question about the house-builder and the house. The moving house-builder is the *aitia* of her movements. These movements coincide with the movements that the building materials undergo. These latter movements are in turn *aitiai* of the house being built. There are, strictly speaking, only two causal relations involved: The movements of the builder cause the act of building a house, and the movements of the building materials cause the process of being built. None of the other relations is causal in the strict Aristotelian sense. That is, the builder is not as such, taken as a persistent being, the *aitia* of her movements, and her movements are not *aitiai* of the house, again taken as a persistent being. Further, the movements of the builder are not *aitiai* of the movements of the building material. These movements coincide, which means that they are one and the same in number, but none of them is an *aitia* of the other one.<sup>36</sup> By describing the situation in this way, we can stick to the claim that the *aitiai* of a thing are this thing under a different, explanatorily relevant and illuminating description. We do this by denying of several things that we would otherwise think of as 'causes' that they they are, strictly speaking, *aitiai*. This is a cost that not everyone might be willing to pay. For instance, there will actually be no such thing as agent causation in Aristotle, at least not in the sense that a persistent being is the proper *aitiai* of what it does.

So what shall we do with Aristotle's statements, that the builder is the *aitia* of the house, the father of the child, and so forth? If we follow Avicenna, all these claims will be true, but only if we understand them as elliptical and somewhat imprecise versions of slightly different claims.

We have seen that the house builder is the *aitia* of her movements as long as and insofar as she performs these movements. The moving builder is the *aitia* of the builder's movement. We have also seen that the movements of the building materials are *aitiai* of the house being built. Finally, we have seen that the movements of the house builder coincide with the movements of the building materials. They are in fact one and the same set of movements. The point to note is that when one movement coincides with another

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<sup>36</sup> Marmodoro claims that "[t]eaching causes learning" (Marmodoro, Anna. "The Union of Cause and Effect in Aristotle's Physics 3.3." *Oxford Studies in Ancient Philosophy* XXXII, 2007, 205–232, p. 227). This is clearly a case of coincidence (teaching and learning being numerically the same process), not a case of causation.

movement, it is perfectly legitimate to refer to the *aitiai* of the first movement as *aitiai* of the second movement. This is so because the second movement is not actually a separate movement. It is one and the same movement. Therefore, we may treat the *aitiai* of the movements of the builder as an *aitia* of the movements of the building materials. What is an *aitia* for one is an *aitia* for the other. In order to make this perfectly clear, one should not without qualification refer to the house builder as an *aitia* of the house, as Aristotle admittedly often does. Strictly speaking, one should say that the moving builder is the *aitia* of the movement of the building materials. Aristotle acknowledges as much at the end of *Physica* II 3. He distinguishes between possible and actual *aitiai* and argues that the house builder is a possible *aitia* of a house, but that only the particular human being that is actually engaged in building is the actual *aitia* of a house being built. And a little further down, he emphasizes that an *aitia* of something that is being actualized must itself be something that is being actualized. Strictly speaking, then, the house builder as such is only an *aitia* of *potential* movements of building materials. But we do not always speak strictly, and we do not always need to. When Aristotle refers to the builder, without qualification, as an *aitia* of the house, he is being imprecise.

### *Conclusion*

I have argued that for Aristotle, to state the proper *aitiai* of a kind of thing is to offer an alternative and illuminating description of this same thing. My aim in this paper has not been to recommend this view to modern philosophers of science. For now, all I have done is to argue that Aristotle held it, and that he was not obviously mistaken in doing so. I have argued for this in three ways: (1) by pointing to passages in Aristotle's writings, (2) by showing that the view makes enough sense to be worthy of Aristotle, and (3) by showing that one of Aristotle's most competent readers, Avicenna, supports it.

If Aristotle did indeed believe that things and their *aitiai* are the same, this will have consequences for the way in which we tell the history of the notion of causality. For instance, Aristotle will turn out to be in substantial agreement with Hume. Hume argues that there is no such thing as causation if by this we mean a necessary connection among distinct events. He concludes that causation is not necessitation. Aristotle, too, argues that things and their *aitiai* cannot be both distinct and necessarily connected. He concludes that *aitiai* are not distinct from what they are *aitiai* of.

What we think of as causal explanations, then, is conspicuously absent from

Aristotle's theory of explanation. Just as his basic logic is about predicative ties, as opposed to implication, conjunction, or disjunction, his basic theory of explanation is about re-describing things, as opposed to predicting events on the basis of earlier occurrences.

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