The Four Causes

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Dr. Boris Hennig

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Introduction

<u>Causes and Becauses</u>

Aristotle says that in order to really understand a thing, we need to understand its αἰτία, and he distinguishes between four kinds of αἰτία. This term, αἰτία, is usually translated as "cause." However, not all of Aristotle's four αἰτίαι are causes in the modern sense of this word. Perhaps none of them are. There are no English words that are a direct translation, but if one uses "cause," some explanation should be added as to what it is supposed to mean in this context. A common way of doing so is to give an example like the following.

> Take an artifact, such as a silver cup. The material cause of the cup is the silver it is made of. Its formal cause is the shape into which the silver was brought when the cup was made. The efficient cause of the cup is the person who made it (or, perhaps, the capacity of making it). Its final cause is the purpose for which it was made, which is presumably the purpose that its maker had in mind.[1]

This way of explaining Aristotle's four causes is misleading in several respects (Sprague 1968). To begin with, it explains all of the causes by using a single example, which Aristotle never does, and this single example is in most cases an artifact, such as a silver cup, a statue, or a house. Although Aristotle refers to artifacts in many of his examples, they are not the main targets of his distinction of causes. His four causes are primarily causes of natural things, and natural things differ from artifacts in precisely the respects that are highlighted in the cup example. When natural things come into being, they are not created with a purpose in mind, and not by shaping a

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[1] See the similar account given by Heidegger in Die Frage nach der Technik, Gesamtausgabe 7, p. 10-11.

given portion of independently identifiable matter. Rather, they grow by themselves, by taking in and exchanging matter, so that both their matter and their form undergo considerable change during their development. This makes it difficult to apply the distinctions, as drawn in the cup example, to natural things. Given that many natural things were never made out of a given portion of matter, it is more difficult to distinguish their form from their matter than it is in the case of a silver cup. Further, Aristotle writes that the formal and the final cause of a living being are the same (e.g. Physics II 7, 198a24-25). Again, it would be odd to say this of the shape and the purpose of a cup.

Vlastos suggests that we understand Aristotle's distinction of four causes better when we translate "X is the αἰτία of Y" as "Y happened, or happens, or is the case, because of X" (1969, p. 293-4). Accordingly, Hocutt refers to them as the four "becauses" and claims that for Aristotle, causes are explanations (1974, p. 388). This leads us far away from the cup example. For instance, if Aristotle's causes were explanations, silver could not be one of them. Silver is not a kind of explanation.

Some think that what is wrong with Hocutt's proposal is that Aristotle's causes are real phenomena in the world, whereas explanations and their parts are only bits of language (Mure 1975; Furley 1996, p. 60). However, if this were the only problem, it could be easily avoided. Any explanation must state facts and refer to things, and we can easily switch back and forth between explanation and their parts on the one hand, and the facts and things they refer to on the other (Johnson 2005, p. 41). Still, the silver does not cause the cup, any more than "silver" explains "cup." Likewise, many reasons against identifying the material cause of the cup with the explanation, "because it is made of silver," are also good reasons against identifying it with the fact to which this explanation refers.

The intuition that Aristotle's causes provide explanations is often expressed by saying that they correspond to answers to Why-questions (van Fraassen 1980a, p. 24; Irwin 1988, p. 94; Hübner 2001, p. 378). Indeed, Aristotle seems to introduce them in this way:

For since our undertaking is for the sake of understanding, and we do not believe that we know each thing before we can grasp the "why" [τὸ διὰ τί] of it (this is to grasp its first cause), it is clear that this must be done by us with regard to coming to be and destruction and all natural change, whence, knowing the principles of these, we may try to reduce each one of the things sought to these [principles]. (Physics II 3, 194b17-23, tr. Coughlin, modified)

Aristotle seems to say that to know the cause of something is to grasp the "why" of it. Now if Aristotle's causes were answers to Why-questions, it would be obscure why there should be exactly four kinds of them. It is of course easy to come up with a set of questions that match the cup example:

Why is this cup shiny? — Because it is made out of silver.

Why does the cup not fit in the drawer? — Because of its shape.

Why does this cup exist? — Because someone made it.

Why is this cup on the table? — Because this makes the room look nicer.

This list of questions, however, is rather ad hoc. One might easily go on asking Why-questions about the cup, and not all of these questions would clearly correspond to one of the Aristotelian causes. Why is it made out of silver? Why is it so expensive? Why don't we get another one of these? As Falcon notes, "not all why-questions are requests for an explanation that identifies a cause, let alone a cause in the particular sense envisioned by Aristotle" (2008, section 2). Taken as a classification of Why-questions, Aristotle's scheme is thus at best an "over-simplification" (van Fraassen 1980b, p. 131).

On the other hand, the four Why-questions above are not as easily kept apart as one would like, so that there might well be fewer than four general kinds of them. On a more general level, Why-questions seem to divide into two rather than four kinds:

requests for reasons for acting, and requests for causal explanations in the modern sense of "cause." For instance, a satisfactory explanation of why the cup is shiny seems to be that its surface reflects light easily, and this looks like the beginning of an explanation in terms of efficient causes. Further, such causal explanations might still be more fundamental than explanations that cite reasons for acting, so that all kinds of answers to Why-questions might ultimately reduce to one. A good explanation why the cup is on the table might be that someone had a certain desire, which (efficiently) caused that person to put it there. Seen in this way, all causes seem to boil down to efficient causes (cf. Irwin 1980, p. 96; Freeland 1991, p. 50; Furley 1996, p. 62).[2]

Thus the suggestions that causes are answers to Why-questions does not help to preserve the variety of Aristotelian causes. On a very general level, answers to Why-questions seem to divide into fewer than four kinds, and on a less general level, there seem to be more than four kinds of them. This is also the main problem with Hocutt's suggestion that causes are explanations. There are not exactly four kinds of explanation, nor are there exactly four kinds of real phenomena to which explanations refer. Consider, again, the material cause. If causes were explanations, the material cause would have to be a special kind of explanation, which would presumably explain something on the basis of facts about some matter. However, the idea that such explanations constitute their own kind is in at least as bad a position as the idea that any syllogism that refers to an action is a practical syllogism. As Anscombe writes,

> ... one might easily wonder why no one has ever pointed out the mince pie
> syllogism: the peculiarity of this would be that it was about mince pies, and an

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[2] There may be further kinds of answers to Why-questions that do not reduce to efficiently causal explanations, such as mathematical explanations. However, even if these should be the same as explanations in terms of formal causes (cf. Physics II 7, 198a17), the argument above still shows that it is difficult to distinguish between explanations in terms of material, efficient, and final causes.

example would be 'All mince pies have suet in them—this is a mince pie—
therefore etc.' (1957, §33).

Anscombe's point is that there are no good reasons for distinguishing kinds of reasoning only by their subject matter. If practical reasoning is to be taken seriously as a special kind of reasoning, it must be special in virtue of its logical form. This point need not apply to all kinds of explanatory reasoning. One might, for instance, define mathematical reasoning as reasoning about mathematical objects, and thus distinguish it from other kinds of reasoning in terms of its subject matter. However, it does not seem as appropriate to distinguish material from formal or efficient explanations by saying that the former refer to matter, whereas the latter refer to forms or efficient causes. Here, the subject matter is not sufficiently different. For instance, a material explanation of why the cup is shiny is not clearly distinct from formal and (efficiently) causal explanation of the same: It is shiny because of its matter, because of the form of its surface, and because it reflects light. Therefore, if any explanation that refers to matter were a material cause, one might easily wonder why no one has ever imagined a mince pie cause. This would be an explanation that refers to mince pies. If causes were explanations, it would be difficult to see why there should be four of them. There seem to be no formal differences between them.

Perhaps we should not suppose, then, that Aristotle's causes are explanations or answers to Why-questions. And indeed, Aristotle only says that they are answers to the question διὰ τί, and this question is more general than our question "Why?" It asks for an account (λόγος, Metaphysics A 3, 983a28), but one may also give an account of <u>what</u> a thing is, or <u>how</u> it is structured, and this is not to explain <u>why</u> it exists and <u>why</u> it is structured in this way. The question διὰ τί asks on account of what, in what capacity, or in virtue of what something is such and such, and asking "Why?" is only one way of asking this. Other ways of asking διὰ τί are: How did this

happen? Who did this? What's the point? What does it take to be this kind of thing?[3]

For instance, the questions "By virtue of what are these bricks a house?" and "Why are these bricks a house?" are not equivalent. The bricks are a house because someone arranged them in a certain way, so that they provide shelter. These are the efficient and final cause of the house. Now one might as well say that the bricks are a house in virtue of having been used to build one, or in virtue of providing shelter. But the phrase "in virtue of" also has a different sense, in which it does not answer a Why-question. For instance, that in virtue of which the bricks are a house may be taken to be the way in which they are arranged, and to say in what way the bricks are arranged is not to say why they are a house. The question to which it is an answer is not "<u>Why</u> are these bricks arranged so that they constitute a house?" but "<u>How</u> are they arranged so that they constitute a house?"

Also, to ask "Who did this?" is not the same as asking "Why was this done?" The latter question asks for an explanation, the former merely concerns the attribution of an action to an agent. When we say that Polycleitus made a statue, we do not actually say why the statue was made; all we say is <u>who</u> made it. That Polycleitus made the statue also means that one may find out why it was made by asking Polycleitus. Polycleitus is responsible, he should be able to give an answer to the question "Why?" In this sense, he may also be said to provide an explanation. Still, to say who did it is not to say why it was done.

Aristotle's four αἰτίαι are not causes in the modern sense of the word "cause," in the same way in which his question διὰ τί is not our question "Why?" In order to understand what they are, and why there are four of them, we need to understand what the question διὰ τί means, and why there are four ways of answering it. Since διὰ τί does not always mean "why," we cannot understand the four ways of answering it by investigating Why-questions and their answers. When Aristotle says that the silver is a cause of the cup (194b25), he does not say that silver is the cause for the cup's being

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[3] Charlton translates the διὰ τί in 194b19 as "on account of what," Wicksteed (in the Loeb edition) as: "how and why."

shiny, nor does he say that the fact that silver has been shaped explains the existence of the cup. He simply relates the cup to the silver as one of its causes, and this is not the kind of explanatory relation that would hold between a fact and the explanation why it is so.

Frede points out that Greek philosophers generally distinguish between the αἴτιον of a phenomenon, which is something that is responsible for it, and its αἰτία, which is an account or explanation of why and how an αἴτιον is responsible for this phenomenon. He also notes that Aristotle does not observe this distinction (1987, p. 129-30). Had Aristotle done so, he would probably have consistently used the term αἴτιον rather than αἰτία for his causes (as he does in Physics II 3, 194b24). They are not kinds of explanations or answers to Why-questions. Rather, they correspond to four ways in which one should look at things in order to understand them, and eventually be able to answer Why-questions about them. Just as we may ask Polycleitus in order to find out why and how the statue was made, we may investigate certain aspects of natural phenomena (ask them, as it were) in order to find out why and how they come about.[4]

When Aristotle says that in order to really understand a thing we need to ask four kinds of question about it, he says that we may find answers to Why-questions about this thing by asking four questions that are not Why-questions. These other questions are questions like the following:

What is this made of?
What does it take to be this kind of thing?
What made this happen?
What is this for?

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[4] In the sense in which Heidegger says that the question of what nature is must address the movedness of natural things ("bei der Bewegtheit dieses Seienden anfragen," Vom Wesen und Begriff der Φύσις, Gesamtausgabe 9, p. 245).

It is, of course, still not obvious why there should be exactly four kinds of What-questions, any more than it is obvious why there should be four kinds of Why-questions. All we have achieved by turning from Why-questions to What-questions is to direct our attention away from "becauses" and explanations. In doing so, we have also turned back towards the cup example and its flaws. We still do not see why there should be exactly four kinds of Aristotelian causes, and what each of them is. Showing this is the aim of the present book.

Things to Keep in Mind

I take it that the four causes are primarily causes of natural things and processes. All of the following is therefore about such things and processes, and only accidentally about artifacts and intentional actions. The reader should keep this in mind. Counterexamples that involve artifacts, mathematical entities, or intentional agents may not be relevant. For instance, I will eventually claim that the matter of a thing is something that turns into this thing as a result of the thing's natural development, and this is obviously not true for artifacts and their matter. Silver does not naturally turn into a cup, and cups do not naturally come to be out of silver. Also, I argue that the formal cause of a natural thing must be a compound thing, and this does not apply the formal causes of immaterial and mathematical entities. For instance, Frede argues that in Metaphysics ΖΗΘ, Aristotle claims that the primary substances are pure forms, and that material substances are substances only in a secondary sense (1987, p. 79). In a context that only involves natural things, material substances are as primary as it gets, and therefore, I can leave it open whether pure forms are even more primary.

Another thing that should be kept in mind is that I use the term "cause" only because it is the standard translation of αἰτία (and αἴτιον). As a translation of αἰτία, "cause" behaves in unusual ways. It is not associated with the usual verbs and adjectives, so that in general, there is no causation or causality associated with it.

There is no aitiation or aitiality, as it were.[5] Also, causes in the sense of αἰτίαι do not generally have effects. There are no material effects to result from material causes. This makes it look as though "cause" is really not an adequate translation at all. On the other hand, it makes it easy to distinguish the ordinary sense of "cause" from the one that the word takes on when it translates αἰτία. Whenever there is causation, causality, or an effect involved, the word "cause" can only have its plain English sense. I exploit this in order to keep the Aristotelian and the modern sense apart. By "cause" I generally mean an Aristotelian cause, unless stated otherwise; when I speak of "causation" and "causality" I generally refer to causation and causality in the modern sense of the word "cause," again unless stated otherwise. As for "cause" in its capacity as a translation of αἰτία, I pretend to know nothing about its meaning, so that this meaning may emerge from the ways in which Aristotle actually uses the word that it translates. The labels "material cause," "formal cause," etc. are not used by Aristotle. I also use them without putting any weight on their literal meaning.

Further, I use the word "type" in a somewhat technical sense. In this sense, something is an instance of a type to the extent to which certain standards of typicality apply to it; not to the extent to which it satisfies them. I will not formally introduce this sense. Rather, the word as used by me will gradually acquire it, especially in the course of Chapters 5 and 6. The sense I am giving it is in any case not far from what seems to be its literal sense; for "type" and "typical" are obviously related. That I am using "type" in a special sense is important to keep in mind when reading Chapter 10, where I argue that when something can be shown to contribute to the well-being of a living being, it may be taken to be typical for it.

The reader should further be warned that in a way, this is not a book about Aristotle. Whenever I say something about Aristotle in the following, I have made sure, to the best of my ability, that it is adequate and accurate. I am, of course, liable for possible misreadings and misinterpretations, so that if anything that Aristotle says

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[5] Aristotle uses the term αἰτίασις once (Poetics 18, 1455b31), but there it means "accusation" (not "causation").

should contradict what I say about him, I would have to defend what I say or take it back. However, my primary aim is not to say correct things about Aristotle or to explain how he came to think what he thought. My primary aim is to say what Aristotle said, not in the sense of reporting what he said but in the sense of repeating and elaborating on it. Repeating a claim comes with more responsibility than reporting it. In general, I endorse the claims that I attribute to Aristotle, so that I am as accountable for their intelligibility and truth as I think Aristotle is. Taking this kind of vicarious responsibility is the best way of finding out whether Aristotle was right or wrong.

Some of the following is not about Aristotle in a more obvious sense. It is, ostensibly, about Hume, Kant, Austin, Anscombe, and others. If this were a book about Aristotle, these authors might play a marginal role in it, by helping modern readers to situate Aristotle's views within their own philosophical context. As it stands, they play a less than marginal role. A discussion of their views is important, and sometimes essential, for understanding the way in which I say and develop what Aristotle said.

The Introductory Chapters Introduced

A previous version of Chapter 1 was accepted for publication a while ago. I have been very conservative about the accepted version (Hennig 2009) and applied many changes only to the book version; as a result, the two versions differ in many details. In particular, I have rewritten section 4 and omitted the better part of the concluding section. Chapter 1 may be read as a summary or outline of the overall argument.

On the face of it, Chapter 2 is not at all concerned with Aristotle and his four causes. It introduces and explains Austin's distinction between two directions of fit. This distinction has been widely misunderstood, and it is important for my purposes to restate it in its original form. I find it convenient to do this by confronting Austin, who gave it its name, with Kant, who would have had good use for it.

The second chapter may be read as a reflection on method, in general as well as in

particular. It gives a rough impression of how a priori knowledge is possible and thus of the status and possibility of genuinely philosophical claims. This concerns the method of the present book, insofar as it is a philosophical work. The distinction between two directions of fit also performs more specific tasks in the following. It makes a brief appearance in Chapters 3, sections 4 and 5, in a gloss on Aristotle's distinction between τι and τοιόνδε, and in relation to Plato's Timaeus and Cratylus. Above all, it is important in Chapter 6, section 5, for explaining how essences differ from properties. I argue, generally, that essences are that in terms of which we may identify an object, without yet describing it as having certain properties. The distinction between two directions of fit explains how this is possible. Incidentally, in section 6, it will also help to address the question whether Aristotle's forms are universal or particular.

The Causes In More Detail

Beginning with Chapter 3, the project outlined in the first chapter is carried out in more detail, in the form of two chapters devoted to each of the four causes. These chapters vary quite a bit as to their background, topic, style, and method. This is partly due to the fact that I wrote some of them long before I knew that they would get to belong together. Further, Chapter 1 already goes into some of the details concerning Aristotle, and there is no need to repeat things that are already clear enough. Sometimes, it was necessary to add more of the same to the discussion that had already taken place in Chapter 1. In other cases I find it more helpful to engage in an independent discussion and defense of what I take to be Aristotle's position.

This does not so much concern the two chapters about the material cause (3 and 4). They are based on a published paper (Hennig 2008), which is almost exclusively concerned with things that Aristotle and Plato say. In the published paper, I had treated the Timaeus somewhat carelessly. I have tried to make up for this in the book version, and this has led to considerable changes in the chapters on matter. Both of them differ from the chapters about the other causes in at least two respects. First,

they discuss only one special kind of material cause (namely matter), whereas the other chapters are not restricted to special cases of the respective causes. Second, the chapters on matter refer much less than the others to modern or contemporary debates, such as the problem of material constitution or the concept of matter in modern physics. An excuse for this might be that "in the case of matter, the deepest and most promising insights remain those of Aristotle" (Chappell 1973, p. 680). Still, I could have written about the material cause in the same way as I treat the efficient cause, for instance, or vice versa. I have not, but I do not think that this is a bad thing. It brings in more variety. Chapter 1 shows that the causes form a system, so that many things that may be said about the material cause may also, mutatis mutandis, be said about the efficient cause, and many things that are true of formal causes are also true of final causes. If I had written about all causes in the same way, I would have had to repeat many details.

The two chapters on the formal cause (5 and 6) are somewhat independent and different from one another. The aim of Chapter 5 is to develop the notion of a type and to set it off against competitors, such as extensionally defined sets, intensionally defined classes, biological species, and the like. Chapter 6 defends a reading of Aristotle that is already present in Chapter 1, and that corresponds to the systematic results of Chapter 5. It concludes by invoking the distinction between two directions of fit in order to explain how the primary use of type terms differs from the primary use of predicates. Both chapters have been newly written for this book, though some parts of them are based on a very old unpublished draft.

Causality (that is, efficient causality) is a big topic in modern and contemporary philosophy. Our very idea of what causes are has been shaped by discussions of Hume's conception of causality. Therefore, it is important to directly address Hume and his followers, if only in order to see to what extent their views differ from Aristotle's. Actually, I do not even explicitly compare Humean accounts of causation with Aristotle's notion of an efficient cause. Rather, I discuss Hume's conception in its own right and show in what ways it is mistaken. As it turns out, many of these are

also ways in which Hume's conception differs from Aristotle's. On the face of it, the two Chapters on causality (7 and 8) are rather remote from Aristotle. I trust that what I say about Aristotle's efficient cause in Chapter 1 is clear enough and that it will eventually become clear how it relates to my arguments against Hume and more recent accounts of causation.

In Chapter 7, I argue that efficient causation is not a relation between distinct items. I do not as explicitly argue against the idea of a causal relation between material, formal, or final causes and what they are causes of. Since the efficient cause is the cause that has an effect, it lends itself more easily than the others to the idea of a causal relation between two distinct items (cause and effect). I take it that if it is wrong to speak of a causal relation between distinct items in this case, it is more obviously wrong to speak of causal relations in the case of material, formal, and final causes. The result of Chapter 7 may thus, mutatis mutandis, be extended to all four causes.

The upshot of Chapter 8 is that for a process to be causal is the same as to instantiate a type of natural process. Given my notion of a type, this means that processes are causal insofar as they are subject to standards of typicality. Taken together with claims that I defend elsewhere in this book, this implies that processes are causal if and only if they have a final cause. This latter claim is further elaborated upon and defended in Chapter 9.

In Chapter 9, I draw a distinction between internal and external final causes. This distinction also applies to efficient causes, and it is important for understanding the examples that Aristotle gives of efficient and final causes. I take it that the notion of external final and efficient causes is less basic but more familiar to us than the notion of internal final and efficient causes. In his examples, Aristotle therefore usually refers to external causes. My discussion, in contrast, will most often focus on internal causes. Since external causes can be defined on the basis of the more basic notion, this does not constitute a real difference between my account and Aristotle's.

The final chapter is based on a paper that has been under review for several years

now. In a way, it starts a new agenda. In Posterior Analytics II 11, Aristotle writes that the four causes relate to four kinds of syllogism. How they do so is a difficult question to which I have no general answer. In Chapter 10, I discuss what is probably one of the more difficult cases: reasoning about final causes. Among other things, I suggest canonical forms of practical, teleological, and functional reasoning. In a similar way, one might establish rules for material, formal, and (efficiently) causal reasoning. However, this would easily fill another book, and it is far from clear, for instance, how material and (efficiently) causal reasoning would differ from each other as kinds of reasoning.

<u>Acknowledgments</u>

Conclusion

What follows is a rough summary of some of the more basic claims made in this book. It goes without saying that they cannot all be adequately expressed and defended within a few pages; they have already been explained and argued for in the rest of this book. Also, I have sometimes distinguished between what Aristotle literally says and what I take to be a possible and helpful position that he does not explicitly take, which nonetheless matches and explains other things he says. In this conclusion, such distinctions are blurred. It should therefore not be taken to represent Aristotle's stated views.

Throughout this book, I have been concerned with natural things and processes. Natural things are things with an inherent principle of motion and rest, and natural processes are processes that are governed by such principles. Principles of motion and rest may be thought of as standards of typicality that apply to the processes that are governed by these principles. That they are inherent to a thing means that such standards of typicality follow from a proper account of the thing's nature. Both natural processes and things are instances of types insofar as they are subject to standards of typicality, not insofar as they meet them. Natural things are such that one may assess on the basis of their own nature whether the processes in which they are involved are typical and natural for them. A natural thing is a thing for which there are intrinsic standards of typicality. The standards of typicality that apply to artifacts, in contrast, do not arise from an account of their nature but from an account of the nature of the living beings that produce and use them.

Aristotle's four causes are primarily causes of natural things and processes. They correspond to four questions that one must raise about them in order to treat them as the natural things and processes they are. Natural things are capable of change. In order to study them, one must therefore study the processes in which they are typically involved. Further, the ways in which natural things change and develop are

governed by standards of success and typicality. Natural things may fail to change and develop according to these standards, and the natural processes they undergo may take atypical courses or remain incomplete. For each natural thing, one must therefore distinguish between that which potentially meets the respective standards and what it would be if it satisfied them. The first is something that potentially is a thing of a certain kind, out of which such a thing may come to be. The second is what the first potentially is. The same distinction between a potential and its possible actualization must be observed concerning natural processes. All in all, four questions must be raised, none of which is a Why-question:

	out of what?	what?
concerning natural things:	material cause	formal cause
concerning natural processes:	efficient cause	final cause

The Material Cause

The material cause of a natural thing is something that potentially is this thing. This does not mean that everything that potentially is a thing is its material cause. One must in any case begin with a given material substance, a τόδε τι, and may then ask which thing it is, in this case, whose potential is being partly or fully realized by the substance. To describe something as the material cause of a natural thing is to describe it as potentially this thing. In order to describe a potential as such, one must describe how it is actualized. Therefore, the material cause of a thing is not conceptually separable from this thing. The form of a potential is the form of its actualization. A potential and its actualization are neither two different things, nor are they two parts, ingredients, or constituents of one thing, nor is one an attribute of the other. They are the same in the sense that one of them is potentially the very same as the other actually is. A potential beaver is potentially the very same as an actual

beaver (namely a beaver). On the other hand, a potential and its realization are not identical because the potential may fail to be realized, so that it is only potentially what the actualization is. Actualities cannot, as such, remain merely potential. Potentials and actualities have different modal properties.

Essences

The matter of a natural thing is something that potentially is a typical instance of the thing's type. The paradigmatic form of a natural thing is what its matter potentially is. "Potentially" has a generic and normative sense here: What a thing potentially is, is what instances of its kind typically are. The paradigmatic form of a thing is not a feature or property of this thing and it is not a further thing that would be related to it, but it is also not identical to this thing. Paradigmatic forms are essences, and the essence of a thing is what its definition defines. Essences are general because definitions are general. The paradigmatic form of a thing is what this thing is, and what this thing is may be what other things are as well. This, however, does not imply that essences are properties. The definition of a compound thing defines a compound thing, and if the essence of the thing is what this definition defines, it must also be a compound thing.

Before we can attribute properties or features to anything, we must identify a subject to attribute them to. Essences are that in terms of which we may identify natural things as instances of types. The difference between these two acts, identifying a thing and attributing properties to it, can be explained by using Austin's distinction between two directions of fit. Austin distinguishes between several ways in which a sentence such as "#123 is a rhombus" may be used. For instance, one may utter it as an answer to the question, about an item (#123), whether it fits a given type ("rhombus"). This is what Austin calls casting: An item is referred to in its capacity of fitting a description. In casting, the direction of fit is item to type; item #123 is chosen in virtue of fitting a description. Another possible use of "#123 is a rhombus" is to give it as an answer to the question, about #123, what type it instantiates. Here, #123

is described as a rhombus, and the direction of fit is description to item. The description "rhombus" is presented as fitting the item. Austin calls this use <u>stating</u>.

On the basis of Austin's original distinction between casting and stating, I distinguish two parts of what I call a Sellarsian sentence ("This such is so and so"). In a Sellarsian sentence, "this such" casts an item as falling under a certain description or fitting a type, and "is so and so" states that the item thus cast has certain properties. Sellarsian sentences are somewhat artificial constructs because it happens only very rarely that an item is freshly cast and described in one single sentence, and there are many ways of casting things other than uttering (parts of) sentences. The division of labor between the parts of a Sellarsian sentence needs to be projected onto our use of language and thought as a whole. If this succeeds, it may help us understand what essences are. Essences may then be taken to be that in terms of which we cast a thing, in order to state something of it.

Casting something is like calling a name. One may call a name without knowing whether anyone with that name is present. If someone responds, one has good prima facie reasons for assuming that this person has that name. When one successfully casts an item as an instance of a type, one also has good prima facie reasons for assuming that it actually is an instance of this type, even though in some cases it may fail to be one. Whether it is possible to miscast an item as something else depends on how general the casting term is. "Empirical object" is one of the most general casting terms, and if Kant is right, certain substantive claims must hold true of all objects that we can possibly cast as empirical objects. By reflecting on the way in which we must cast empirical objects in order to get hold of them, we can find out certain things that must be true of them. Since we can do this prior to actually casting and investigating any actual item, this reflection may result in a priori knowledge about all empirical objects. Further, it does not seem to be possible to miscast an empirical object for something else. Everything that can be cast by using an empirical casting term must be an empirical object. It may be that there is no empirical object at all to be cast, but if one succeeds in casting anything as an empirical object, it must be one. As such,

this object must have the features that all empirical objects must have.

"Natural thing" is a less general but still quite general casting term. It casts a subclass of empirical objects, just as "empirical object" casts a subclass of "object." By reflecting on the way in which we must cast natural things and processes, we may get to know certain things that must hold true of all natural things. I take it that when Aristotle tells us what questions we must ask in order to see natural things and processes as the natural things and processes they are, he engages in this kind of reflection. He tells us something that we can know a priori about all natural things and processes.

The Formal Cause

Formal causes are essences of natural things, and essences are general. To describe the essence of a thing is to describe the general type that the thing instantiates. I argue that the safest way to define a type of natural things is to pick a focal instance and specify a relation that all other instances must have to this instance. Further, I show that in cases where this relation involves reproduction or copying, its description involves standards of success. That something is a copy of another thing does not simply mean that it does in fact resemble the first; it only means that it is <u>supposed</u> to resemble the first in certain respects. There may be failed and atypical copies. To call something a copy or replica of another thing is thus not to say what it is like. Rather, it is to say what it should be like, and thus what standards of typicality apply to it. Further, that one living being is an offspring of another one does not even imply that it is supposed to resemble this other living being. The offspring may be more typical than its parent. All it must do in order to qualify as an offspring is to meet certain standards of health, so that it is capable of living a life of a certain kind. In order to qualify as a good offspring, it must meet some more specific standards of typicality, which are tied to its nature.

Natural things have inherent principles of motion and rest, and this means that there are objective reasons why certain standards of typicality apply to them. They

can only be cast, as the natural things they are, by applying these standards. Natural things may fail to act and develop according to their own principles of motion and rest. When this happens, they are atypical by standards that lie in their own nature. By casting a natural thing as an instance of a type, one sets up a certain standard, as it were, and waits for something that subscribes to it (and may or may not satisfy it). The standards that we set up when we cast a natural thing as such may remain unsatisfied in two ways. First, nothing might show up that is subject to them. Second, something might show up and be subject to them but still not satisfy them.

The Efficient Cause

The material cause of a natural thing is something that potentially is that thing. Accordingly, the efficient cause of a natural process might be taken to be something that potentially is this process (so that not everything that potentially is a natural process is its efficient cause). This, however, is not exactly what Aristotle says. Aristotle speaks of agents as efficient causes of what they do, and an agent is not potentially an action. On the other hand, agents are efficient causes only insofar as they act, and what they do is a natural process only insofar as it is governed by a principle of motion and rest inherent in the agent. Therefore, one cannot, in this context, separate agents from their actions, or actions from their agents. When an agent realizes its potential, a potentially acting thing becomes an actually acting thing; or what is the same: a potential action of a thing comes to be an actual action of this thing. Aristotle usually refers to the things involved in a process as efficient causes, and he often refers to examples where one cause is an efficient cause of another process. These cases are more familiar, but less basic; they can be described in terms of the more basic notion of an efficient cause introduced here.

The efficient cause is the one of the four causes that has an effect; there are no effects corresponding to material, formal, or final causes. There is also no such thing as material, formal, or final causation. All causation is efficient causation. I argue that even though one may always distinguish between an efficient cause and its effect,

causation is not a relation between distinct items. It is also not a special kind of process that connects two distinct processes. Rather, the effect of an efficient cause is the realization of its potential. Once a potential is realized, it does not differ from its realization. Therefore, once and insofar as an efficient cause actually leads to its effect, it is not distinct from this effect. To describe a process as the efficient cause of another process is to describe both of them as the beginning and end of the same process; or more generally, as different stages of the same process. Since a potential is not conceptually separable from its realization, one cannot first perfectly separate cause and effect and then find out what their causal relation consists in.

That a process is causal means that it admits of a complex description, according to which the beginning of it turns into a process of a generally specifiable type. All causal processes must therefore be instances of generally specifiable types. Further, all processes are such that as long as they are going on, they are not yet complete, and some part of them has not yet happened. This part must be something specific, e.g., a movement with a certain direction, for if nothing specific is missing, nothing is missing. Thus all ongoing natural processes must proceed toward an end that they might fail to meet. (If they had reached this end, they would be over and would not any longer go on.) This end, which is their completion, is their final cause.

The Final Cause

Final causes, in a basic sense, are for natural processes what formal causes are for natural things. They are the essences (or "limits") according to which natural processes proceed. Just as the matter of a natural thing is inseparable from its paradigmatic form, there can be no causal processes without final causes. The proper account of the nature of a natural thing implies certain standards of typicality. To proceed for the sake of a final cause is to proceed according to such a standard.

The essence of an item is also that in terms of which it may be cast as a subject of possible predication. Likewise, the final cause is that in terms of which we may cast an ongoing process as an instance of a type. The essence of a process makes us expect

a certain further course that the process should take, which is the course that instances of its type typically take. The final cause of a natural process is the course that is typical for instances of its type. Since the typical course of a process is not a further process that this process undergoes, the final cause of a natural process is a paradigmatic instance of its kind. This paradigmatic instance is "the best" in the sense that it constitutes the best-case scenario.

We usually refer to things in order to attribute properties to them. We often refer to processes in order to say that they are parts of, contribute to, or are involved in further processes. This explains why the notion of a final cause, as introduced here, is less familiar than the notion of a remote aim or purpose. Since in most cases, the final cause of a process is that in terms of which we cast it in the first place, it would be redundant to explicitly attribute this final cause to the process. For instance, when we have already referred to a process as an instance of pushing, saying that its final cause is pushing does not add anything of interest. More often, we associate the basic final cause of a complex process with the final causes of its parts. We say, for instance, that the final cause of pushing is opening the door. Opening the door is a more complex process, of which pushing is a part. The proximate final cause of opening the door is opening the door, and this proximate final cause is here referred to as a remote final cause of its part, pushing. Complex processes have complex final causes. These complex final causes may be reduced to their simple parts, but this is not to reduce final causes to efficient causes. Complex processes also have complex efficient causes, and these complex efficient causes may be reduced to their less complex parts. Still, these parts have final causes, since they are what they are only by taking some specific course.

I elaborate on this by discussing teleological reasoning. Teleological reasoning is about the mereology of causal processes and their final causes. Practical reasoning is an instance of teleological reasoning. In practical reasoning, we relate actions that are means to actions that are ends. Practical reasoning mirrors speculative reasoning in the following sense. From a task A, one may practically infer B as a derived task, if

one can show, by speculative reasoning, that B leads to A. However, practical reasoning mirrors speculative reasoning only on a large scale. The speculative syllogism is not mirrored in its details. There are no special inference rules that apply exclusively to teleological reasoning; rather, it is an application of ordinary inference rules in a special context. If there were such things as formal and material reasoning, formal reasoning would presumably mirror material reasoning in the same way.

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