

Essence and End

Jacob Rosen, 19 June 2011

1. Introduction

In *Physics* 2. 7, Aristotle famously states that a thing's formal cause and its final cause are often one and the same (198^a25–6). He repeats the claim in *Generation of Animals* 1. 1 (715^a4–9), and he seems to reinforce it in *De Anima* 2. 4 (415^b8–28), when he explains that an animal's soul serves both as a formal cause and as a final cause (as well as being an efficient cause also). There are references to the claim elsewhere as well.¹ Aristotle's assertion of identity between formal and final cause is often referred to by commentators, with apparent approval. Yet I find it puzzling: it is not clear to me in what sense, if any, this claim of Aristotle's holds true in the world as described by his own wider theory. In this paper, I would like to explain my doubts, by arguing that in many central cases, and in a central sense of 'final cause', a thing's final cause is not identical with its formal cause. I hope that this negative argument will serve as an invitation to Aristotelians wiser than me, so that they will explain how it is—in what sense and in which cases—that final causes *are* after all identical with formal causes.

Aristotle's claim of sameness is an important one, and there are a number of reasons why it is worth taking some time to reflect on it. First of all, if the import of Aristotle's claim is, as Ross says, that the final cause may be 'completely identified' with the formal cause (at least among material, changeable objects),² then it makes for a great simplification in Aristotle's theory of causation. The famous 'four causes' may be decreased by 25 percent to three. In fact, Aristotle's claim is sometimes used in support of the idea that his four causes reduce to just two principles, matter and form.

Second, reflection on Aristotle's claim can be expected to shed light on his understanding of teleology and on his notion of a form or essence. Aristotle offers little explanation as to what exactly his conceptions of formal causation and of final causation are, and there is considerable unclarity and controversy in the interpretation of these notions. A promising way forward is to examine and evaluate the general propositions which Aristotle endorses con-

1. *Metaph.* H 4, 1044^b1; *PA* 1. 1, 641^a27.

2. Ross, *Physica*, p. 526.

cerning formal and final causation, and to see what they imply about how he conceived of these causal relations.

Third, the attitude we take to Aristotle's identity claim as applied to animals will have implications in Aristotelian biology. In particular, it will affect the range of allowable functions which may be ascribed to animal parts. For Aristotle, the function of a part always subserves the ends of the animal to which the part belongs. If the final cause of each animal is the animal's form, and if this means that each animal's end is the continued existence of the form it instantiates, then we should expect the function of every animal part to subserve the animal's survival and reproduction. (At any rate, those are the only obvious means of furthering the form's continued existence.) Some analyses of function, especially those designed to cohere with evolutionary theory, support this expectation. But on the other hand, if animals have final causes other than their forms—for example, if they exist for the sake of performing some intrinsically valuable activity or activities—then (some of) their parts might have functions which subserve those further ends, and which do not promote survival or reproduction. If this turns out to be Aristotle's view, then it would, I think, point to an interesting difference between Aristotle's conception of teleology and the conceptions at large among biologists today.

These are some of the reasons why I am interested in taking a leisurely and critical look at Aristotle's claim that formal and final cause are often one and the same. Now, I do not doubt that Aristotle's claim is very close to several others which are, for him, both true and important. First, Aristotle's global theoretical commitments to formal causation and to final causation are closely related; his essentialism and his teleology may well stand or fall together. Second, the form of a given individual animal is, for Aristotle, the final cause of many items standing in intimate relation to that animal. For example, the formal cause of a bear is the final cause of the bear's *birth* and *maturation*, and, in another sense, it is the final cause of bear *parts* such as nose, paws, and teeth. Third, it is likely that the final cause of a given item can fairly directly be 'read off' from that item's formal cause. Because of this, knowledge of a thing's formal cause might entail or include knowledge of the thing's final cause.

Given this, we might regard Aristotle's statement that 'the what-it-is [*sc.*, the formal cause] and the for-the-sake-of-which [*sc.*, the final cause] are one' (*Phys.* 2. 7, 198^a25) as a useful

mnemonic, whose purpose is to remind us of these neighboring important truths. That leaves open the question whether the statement itself is literally true: for we must acknowledge that, as naturally understood, it is not equivalent to or entailed by any of its neighboring truths. The statement, taken literally, seems to mean that the formal cause of a given thing is also the final cause of that very same thing; for example, that the formal cause of a bear is the final cause of the bear. The neighboring truths tell us, at the most, (1) that the bear has a formal cause if and only if it has a final cause—but not that these causes are identical; (2) that the formal cause of the bear is the final cause of the bear's birth, maturation, and nose—but the bear is not the same thing as its birth, maturation, or nose; (3) that one knows what the bear's formal cause is if and only if one knows what the bear's final cause is—but not that these pieces of knowledge are of the very same thing. Thus we may grant all the neighboring truths while doubting the literal truth of Aristotle's assertion of identity.

Aristotle's identity claim is open to many different readings. He himself distinguishes between two or more types of final causation; when we consider how variously these types of causation are interpreted in the secondary literature, the options are greatly multiplied. Given this, there is likely to be *some* reading of Aristotle's claim on which it is true. I would certainly not wish to argue that there is no such reading. But I do want to argue that there is an interesting sense in which the claim is false, in which a thing's final cause is something other than its formal cause. I hope that my argument will serve as an invitation for someone else to explain what other sense it is in which Aristotle's claim is true; or else to show why my own argument fails, why Aristotle's claim is true in the very sense in which I think it is false.

I will begin by briefly reviewing the statements in Aristotle which are at issue. Then I will offer a sketch of a positive picture as to what the formal and final causes of a typical object such as an animal, animal part, or artifact are. It will be obvious that on this picture the two causes are distinct, though related. I think the picture is plausible, but am not prepared to fully defend it as a positive interpretation of Aristotle; I offer it for the sake of orientation. I will then state and defend a simple, narrowly focused argument designed to refute the claim of identity between formal and final cause. That is, I will try to show that Aristotle held commitments which jointly entail the following result: for any kind of animal, plant, functional ani-

mal- or plant-part, and tool, the formal cause of a member of the kind is not the same as the final cause of a member of the kind.

2. The statements at issue

In *Physics* 2. 7, Aristotle is resuming a discussion of the four kinds of cause, which had begun in *Physics* 2. 3 and then been interrupted by a treatise on luck and chance occupying chapters 2. 4–6. He reiterates and illustrates the four sorts of thing to which the ‘why?’ of something can be referred, and then he says the following:

Since the causes are four, it concerns the physicist to know about all of them, and he will deliver a physical account of the ‘why?’ when he refers it to all of the causes: the matter, the form, the mover, the for-the-sake-of-which. Three often converge upon one thing: the what-is-it and the for-the-sake-of-which are one, and the primary source of change is one in kind with these, since a man generates a man.³

At issue for us now is Aristotle’s claim that ‘the what-is-it and the for-the-sake-of-which are one’. The ‘what-is-it’ means the formal cause and the ‘for-the-sake-of-which’ means the final cause,⁴ so Aristotle appears to mean that, at least ‘often’, the formal cause of an item is identical with the final cause of that same item.

A similar assertion can be found in the opening lines of *Generation of Animals*. By way of introducing the task of the treatise, Aristotle reviews the different kinds of cause: he explains that certain of the causes of organisms have already been addressed in other biological works, but that one sort of cause (namely, the efficient) remains to be examined now.

We laid down four causes: the for-the-sake-of-which as an end and the account of the essence (*now these should pretty much be regarded as one*), then third and fourth the matter and the source of the beginning of motion. Now we have spoken of the others, *for the account and the for-the-sake-of-which as an end are the same*, and the matter for animals is their parts... but there remains to discuss the following:...⁵

3. *Physics* 2. 7, 198^a24-27. ἔρχεται δὲ τὰ τρία εἰς [τὸ] ἓν πολλάκις· τὸ μὲν γὰρ τί ἐστὶ καὶ τὸ οὐ ἔνεκα ἔν ἐστι, τὸ δ’ ὅθεν ἢ κίνησις πρῶτον τῷ εἶδει ταῦτο τοῦτοις· ἄνθρωπος γὰρ ἄνθρωπον γεννᾷ. All translations are my own.

4. [Note on Aristotle’s terminology for the four kinds of cause]

5. *GA* 1. 1, 715^a4-11. ὑπόκεινται γὰρ αἰτίαι τέτταρες, τό τε οὐ ἔνεκα ὡς τέλος καὶ ὁ λόγος τῆς οὐσίας (ταῦτα μὲν οὖν ὡς ἓν τι σχεδὸν ὑπολαβεῖν δεῖ), τρίτον δὲ καὶ τέταρτον ἢ ὕλη καὶ ὅθεν ἢ ἀρχὴ τῆς κινήσεως – περι μὲν οὖν τῶν ἄλλων εἴρηται (ὁ τε γὰρ λόγος καὶ τὸ οὐ ἔνεκα ὡς τέλος ταυτὸν καὶ ἡ ὕλη τοῖς ζῴοις τὰ μέρη...), λοιπὸν

Important for us is Aristotle's statement that the formal and final cause 'should pretty much be regarded as one', and that 'the account [*sc.* the formal cause] and the for-the-sake-of-which as an end [*sc.* the final cause] are the same'.

Finally, we should take note of a passage in *De Anima* 2.4, in which Aristotle explains that an animal's soul is a cause in three ways: it is both a formal cause, a final cause, and an efficient cause.

The soul is a cause and principle of the living body. These are said in many ways, and similarly the soul is a cause according to three of the modes which we distinguish: for the soul is a cause both as source of motion, and for the sake of which, and as the essence of ensouled bodies.⁶

When Aristotle goes on to elaborate this claim in the following lines, it becomes unclear whether he thinks that the soul is the cause of *one and the same thing* in all these three different ways.⁷ Still, the passage quoted at least gives the impression that he thinks so: he seems to say that an animal (a living or ensouled body) has the same thing—namely, its soul—both as its formal cause and as its final cause and as its efficient cause.

2.1. Strength and scope of the statements

Before objecting to these statements of Aristotle's, we should pause to consider how strong of a claim is intended in them. The assertion from the *Physics* is qualified by an 'often': just how often, i.e., in what range of cases, is the convergence of formal and final cause supposed to obtain? And what does this convergence amount to?

The range of Aristotle's assertion is traditionally taken to be very wide. Sir David Ross, for example, comments as follows:

The qualification [*sc.*, 'often'] is necessary, because the formal cause ἐν τοῖς ἀκινήτοις [among unchangeable things] is *not* an efficient or a final cause. But ἐν τοῖς κινήτοις [among changeable things] the essence of a thing is identical

δὲ...

6. *DA* 2. 4, 415^b8–12. ἔστι δὲ ἡ ψυχὴ τοῦ ζῶντος σώματος αἰτία καὶ ἀρχή. ταῦτα δὲ πολλαχῶς λέγεται, ὁμοίως δ' ἡ ψυχὴ κατὰ τοὺς διωρισμένους τρόπους τρεῖς αἰτία· καὶ γὰρ ὄθεν ἡ κίνησις καὶ οὐ ἔνεκα καὶ ὡς ἡ οὐσία τῶν ἐμψύχων σωμάτων ἡ ψυχὴ αἰτία.

7. Aristotle's explanation at 415^b12–28 suggests that the soul is the formal cause of the *animal*, the final cause (in an instrumental, 'for the use of' sense (see n. 14)) of the animal's *body*, and the efficient cause of the animal's *locomotion, alteration, and growth*.

with the end that is fulfilled in it; and the efficient cause of a thing is the essence of the thing present in another member of the same species.’⁸

For Ross, then, Aristotle’s thesis applies to every changeable thing. Other commentators are more cautious, but still quite openhanded. Bostock, for example, holds that the thesis of *Physics* 2. 7 is intended to apply at a minimum to all living things, and probably to many artifacts as well.⁹ So much is very plausible when we place the *Physics* passage alongside those from *Generation of Animals* (where Aristotle seems to speak about the causes of all living things) and *De Anima* (where he seems again to speak universally about the causal roles of souls).

As for the nature of the convergence, it is important to reiterate that, as I and others understand him, Aristotle wishes to identify the formal cause and the final cause of *one and the same thing*. He is not merely saying that the formal cause of one thing is often the final cause of something else. This latter claim is without doubt true for Aristotle, and is indeed important to his teleology, but it would not naturally be expressed by saying that the formal cause and the final cause ‘are one’ or ‘are the same’. For comparison, I believe that everything that is to the east of something is also to the west of something, and vice versa; yet I would not say that ‘what is to the east and what is to the west are the same’.

I believe that most commentators would accept this point. Ross says in connection with our *Physics* passage that ‘the final cause has been *completely identified* with the formal’ (emphasis added). And one sometimes encounters phrases in the secondary literature such as ‘formal-final cause.’¹⁰ This sort of talk strongly suggests that we have to do with a thing acting both as formal and as final cause for a single same thing.¹¹ Yet it is easy for the point to be-

8. Ross, p. 526

9. ‘While it is left somewhat vague quite how “often” this triple coincidence occurs, it presumably is intended to apply at least to all living things, which are Aristotle’s primary examples of substances.’ Bostock, ‘Aristotle’s Theory of Form’, p. 84. Bostock adds in a footnote that Aristotle would probably ‘wish to identify the form and the purpose of many manufactured objects’, including houses, ships, walls, and saws.

10. [REF] {Mary Louise Gill Reviewed work(s): *Substance and Essence in Aristotle: An Interpretation of Metaphysics VII-IX* by Charlotte Witt. *The Classical World*, Vol. 84, No. 4 (Mar. - Apr., 1991), pp. 331-332}{Aristotle on the Homonymy of Being Frank A. Lewis *Philosophy and Phenomenological Research*, Vol. 68, No. 1 (Jan., 2004), pp. 1-36 p. 30, 31, 33...}

11. Indeed, Ross’s remark and the use of the hyphenated expression ‘formal-final cause’ might suggest an even stronger reading of Aristotle’s thesis: namely, that the very *causal relation* of formal causation is identical with the relation of final causation. I would deny this stronger reading; I believe that we would still be faced with two distinct sorts of causal dependence, even if one thing depended on another in both ways.

come blurred. Notice, for example, how Ross speaks of a thing's essence as the end fulfilled 'in it', and not as the end *of* it. He affirms that a thing's essence, its formal cause, is an end or final cause of some sort, yet he leaves it artfully undetermined what this essence is a final cause *of*.

It seems likely that what Ross has in mind is the role of a thing's form as the end and goal of that thing's being created, or born, or of its growth to maturity.¹² The bear came into being in order that the bear's form be instantiated, and so the bear's form is an end. So far so good; we can even grant to Ross that the bear's form is 'the end that is fulfilled in the bear'. But to infer that the bear's form is the final cause *of the bear* would seem to be a confusion. We can and should distinguish between that for the sake of which a process occurs, and that for the sake of which the process's result exists or obtains. For example, I walked into the library in order to be in the library; but it does not follow that I *am* in the library in order to be in the library. Perhaps so (if I pursue inhabitation of libraries for its own sake) but perhaps not: most likely I am there in order to read or to work. Presence in the library is an end, namely the end of my walking in, and it is fulfilled *in* my being in the library, but we should not call it the final cause *of* my being in the library. Similarly the bear's form is an end, namely the end of the bear's birth and maturation, and it is fulfilled in the bear, but it does not follow that the form is the final cause of the bear.

To sum up: we are supposing that Aristotle's thesis about the convergence of formal and final cause is intended to convey a claim about all living things; and we take the intended claim to be that the formal cause of each living thing is the final cause of that same living thing. Now I would like to explain why I think that Aristotle's claim, so understood, is by his own lights false.

3. A picture

Let me start by offering a picture of what the formal and final causes of Aristotelian substances are. I expect that the picture will strike some as obviously right, and others as obviously wrong. I do not intend to justify this picture in full; but I want to indicate at least one

12. Compare Bostock's remark that 'the form [...] functions as a cause by way of being the goal towards which the animal develops.' 'Aristotle on Teleology in Nature', pp. 61–2.

line of positive interpretation of Aristotle which will be available to the reader in case he or she accepts the negative argument to be offered in the next section.

To be the formal cause of an individual of a given kind (as member of the kind) is to be that in virtue of whose presence the individual belongs to the kind in question. If the kind is a so-called substantial kind, being the formal cause also means being that in virtue of whose presence the individual exists. For example, the art of medicine is the formal cause of a doctor as doctor: the individual belongs to the kind *doctor* in virtue of the presence of the art of medicine. The human soul is the formal cause of a human as human: the individual both exists and belongs to the kind *human* in virtue of the presence of the soul. In the first example, the individual exists regardless, and the formal cause merely causes it to belong to a certain kind. In the second example, the very existence of the individual depends on the presence of the formal cause. The individual is composed out of a plurality of things and/or stuff, and it is precisely insofar as the components are jointly informed by soul that they compose an individual. In the soul's absence, there would be some things or some stuff there, but there would be no individual composed out of those things or that stuff.

A formal cause, then, is a metaphysical ground of kind-membership and, in some cases, of existence by composition. What sorts of thing play the role of formal cause for Aristotle? Sometimes he gives the example of a shape, as in the case of a statue or a bronze sphere [REF]. Or it might be some other sort of structure or arrangement, such as (to borrow an example from Ackrill) the arrangement by which bread and cheese compose a sandwich.¹³ But an especially central sort of case is that in which the formal cause is a capacity to do or to make something. Man-made instruments have such formal causes: a thing is an axe in virtue of the capacity to chop wood, a house in virtue of the capacity to shelter bodies and goods. Many animal parts are like this too: a thing is an eye in virtue of the capacity to see, a hand in virtue of the capacity to grasp. Souls also—the formal causes of animals and plants—are capacities to do things such as to perceive, to move about, and (in the human case) to think. Thus the formal cause of a living thing is the capacity to perform certain life-activities.

The formal cause is the capacity, not the activity. An animal is still itself while it sleeps, an

13. J. L. Ackrill, 'Aristotle's Definitions of *psuchê*', p. 66.

eye is still an eye in the dark, and an axe is still an axe while it hangs in the shed. The capacity to perform appropriate activities is enough to ground the individual's existence and its membership in the relevant kind; the individual need not actually be performing the activities.

Now what is it to be a final cause? Aristotle's way of referring to this kind of cause consists in only the fragment of a sentence: it is 'that for the sake of which.' That for the sake of which... what? Well, presumably the final cause of a change or an action is that for the sake of which the change occurs or the action is performed; and the final cause of a thing is that for the sake of which the thing *is*.¹⁴ In particular, to be the final cause of an individual of a given kind (as member of the kind) is to be that for the sake of which the individual belongs to the kind in question, and, in some cases, to be that for the sake of which the individual exists altogether.

What plays the role of final cause? Where a kind is defined by a capacity, the final cause will typically be the activity or the thing which kind-members are able to do or to make. For example, the art of medicine is a capacity to produce health, and a person is a doctor for the sake of health: health is the final cause of a doctor as doctor. Similarly, a house exists for the sake of sheltering bodies and goods, and an eye exists for the sake of seeing. A living thing exists for the sake of performing certain life-activities: those activities are the final cause of the living thing.

Thus we see that although the final cause of a house is related to the formal cause of the house, the causes are not the same. Its formal cause is the capacity to do something (hence the house exists so long as it is able to shelter, regardless of whether it is actually sheltering anything). Its final cause is that which it is able to do, *viz.*, to shelter. Likewise, the final cause of a living thing, such as a cat, is related to but distinct from the thing's formal cause. The formal cause is a capacity (hence the cat still exists while asleep), while the final cause is the corresponding activity.

The cat's formal cause is the final cause of a number of things, just not of the cat itself. It

14. Some people prefer to think of the final cause of a thing as that for the sake of which the thing *was made* or *came into being*. Granted, when a thing is for the sake of X, then normally it will also have been made or come into being for X; but there is still a distinction to be made between the aim of the thing's existence and the aim of the process by which the thing came into existence. (Cf. *Metaphysics* Z 17, 1041^a31–2 for a distinction between causes of *coming to be* and causes of *being*.) For my purposes, this distinction makes a difference.

is, for example, the final cause of the processes by which the cat came into existence and developed to maturity. It is also the final cause of various of the cat's parts, albeit in a different sense of final cause. The cat's form is a capacity to perform some activities, and many of the cat's parts are there to be used in the performance of those activities. The parts are for the sake of the soul in the sense that they are instruments for the soul to use in the attainment of its further ends.¹⁵

This is the picture I would like to recommend concerning the formal and final causes of material substances. Though I think the picture has a number of attractive features, I do not vouch for its complete adequacy and faithfulness to Aristotle, and will not try to justify it in full. I will, however, now argue for its central feature, namely its refusal to identify formal and final cause.

4. An argument for the non-identity of formal and final cause

Here, in brief, is my argument. I would like to show that Aristotle is committed to accepting each step in the following deduction.

For every member of a kind of animal, plant, functional animal- or plant-part, and man-made instrument:

1. The thing has a function (*ergon*).
2. The thing's function is its final cause.
3. The thing can exist while not producing its function.
4. The thing cannot exist while its formal cause is not present.
5. So the thing's function is not its formal cause.
6. So the thing's formal cause is not identical with its final cause.

The argument concerns man-made instruments (houses, axes, and so forth), animals and plants, and the functional parts of animals and plants. By a 'functional part' I mean a part

15. For this instrumental, 'useful to' sense of 'for the sake of', in distinction to the more central 'productive of' sense, see *GA* 2. 6, 742^a22–8. In the 'productive of' sense, the cat's parts are for the sake of the activities they are used to perform, as opposed to being for the sake of the soul that uses them.

which has a function, such as an eye or a hand has; my intention is to exclude gerrymandered parts (e.g., a part consisting of a bit of liver and a bit of intestine) as well as any other useless parts Aristotle may have believed certain living things to possess. By ‘animal’ I mean embodied animals; thus although Aristotle refers to god as an animal (ζῷον), my argument does not apply to god nor to any other immaterial substance.¹⁶

My talk of the final causes, formal causes, and functions of things requires a word of clarification. Things do not generally have final causes, formal causes, or functions full stop but rather relative to a kind. For example, if one and the same person is both a doctor and a clown, then as a doctor his function is health, while as a clown his function is mirth;¹⁷ as a doctor his formal cause is the art of medicine, while as a clown his formal cause is the clowning craft. Accordingly, each statement in the deduction is subject to a double quantification over things and over kinds, and should be understood as speaking about the thing relative to the kind. For example, the statement ‘the thing’s function is its final cause’ means: for each kind *k* of animal, plant, etc., and for each thing that is a *k*, the function of the thing as a *k* is the final cause of the thing as a *k*.

A related clarification concerns my talk of a thing’s existence: here, the statement that a thing exists should be understood as meaning that it both exists and belongs to the kind in question. Thus, for example, the statement ‘the thing cannot exist while its formal cause is not present’ means: for each kind *k*, and for each thing that is a *k*, the thing cannot exist and be a *k* while the formal cause of it as a *k* is not present. By way of illustration, a doctor cannot exist and be a doctor without the presence of the art of medicine; a clown cannot exist and be a clown without the presence of the clowning craft. (By contrast, the doctor can exist full stop without the presence of the art of medicine; she just wouldn’t be a doctor.)

Finally, a word of clarification on the use of ‘function’ as a translation of ‘*ergon*’. The translation is traditional, and I can think of none better, but the English has two implications which (I think) the Greek lacks. First, ‘function’ normally denotes an activity performed,

16. God is called an animal at *Metaphysics* Λ. 7, 1072^b28-9.

17. In English, ‘function’ normally denotes an action; it is more natural to say that the doctor’s and clown’s functions are *to bring about health* and *to bring about mirth*, respectively. But ‘function’ is the closest thing we have to a good translation of ‘*ergon*’, and in Aristotle’s Greek an *ergon* can be either an action or the outcome of an action. So I stretch the usage of ‘function’ to match that of ‘*ergon*’.

whereas ‘*ergon*’ can equally denote a thing made or result accomplished. In English we normally say that the function of a cabinet-maker is *to make* cabinets, not that his function is a cabinet. But in my use of the word ‘function’ as stand-in for ‘*ergon*’, we can say the latter. Second, the word ‘function’ in English, at least in English-language philosophy of mind, seems to be tightly connected with the idea of playing a role in a containing system.¹⁸ By contrast, having an *ergon* does not seem to require playing a role in a system. I will return to this point when we discuss the first premise of my argument, in particular the claim that animals have functions.

For the sake of making my argument more concrete, here is an example of how the deduction presented above could be specified to case of an eye:

1. The eye has a function, namely the activity of seeing.
2. Seeing is the final cause of the eye.
3. The eye can exist and be an eye while not seeing.
4. The eye cannot exist and be an eye while the formal cause of the eye is not present.
5. So seeing is not the formal cause of the eye.
6. So the formal cause of the eye is not identical with the final cause of the eye.

There are reasons to think that Aristotle would be committed to endorsing each step in this deduction, both as specified to the case of an eye and in its general form applying to all animals, plants, functional animal- and plant-parts, and artifacts. On the other side, objections could be raised against attributing some of the premises to Aristotle, at least in a sufficiently unqualified form to warrant the conclusion. Let us consider the steps of the deduction in order.

18. An example: ‘Functionalism in the philosophy of mind is the doctrine that what makes something a mental state of a particular type does not depend on its internal constitution, but rather on *the way it functions, or the role it plays, in the system of which it is a part*’ (emphasis added). Janet Levin, ‘Functionalism’, *The Stanford Encyclopedia of Philosophy* (Summer 2010 Edition), Edward N. Zalta (ed.), URL = <<http://plato.stanford.edu/archives/sum2010/entries/functionism/>>.

4.1. *The thing has a function*

The first premise of the deduction is that every animal, plant, functional animal- and plant-part, and man-made instrument has, qua animal, etc. of the kind in question, a function.

The premise trivially holds true of functional animal- and plant-parts, since these were stipulated to be those parts which have functions. The only question would be whether, for Aristotle, there *are* any such parts; the answer to this is undoubtedly affirmative. Aristotle refers to the functions of various animal parts—most typically hands and eyes—both in his biological writings and in physical, metaphysical, and ethical contexts.¹⁹

The case of instruments seems equally straightforward. For example, Aristotle indicates in the *Meteorology* (4. 12, 390^a13) that an axe has a function, and in the *Politics* (7. 8, 1328^a31) that instruments in general have functions.²⁰

Finally, in the *Nicomachean Ethics* (1. 6, 1097^b24 ff.) Aristotle appeals to a function of man, and in *Generation of Animals* he speaks of the functions of plants and animals quite generally:

Of the being of plants, there is no other function and no other action than the generation of seed; of an animal, on the other hand, generation is not the only function (for this is common to all living things), but all animals partake also of some sort of knowledge—some of more, some of less, some of very little indeed. (*GA* 1. 23, 731^a24-33)²¹

Now, some commentators have urged that Aristotle's attribution of functions to entire organisms should be treated with caution. Martha Nussbaum claims, for example, that according to Aristotle's core notion of a function, something can have a function only if it acts as part of a larger system, of whose activity its function will be a constituent. Since Aristotle does not think of animals and plants as forming parts of a larger system in the appropriate

19. For example, *History of Animals* [*HA*] 633^b18-29 (eye and womb); *Parts of Animals* [*PA*] 690^a30-^b2 (hands and feet); *De somno* 454^a26-30 (eye, hand, and something whose *ergon* is perception in general); *Meteorology* 390^a10-15 (eye, flesh, and tongue); *Metaphysics Z*, 1036^b30-2 (hand); *NE* 1. 7, 1097^b30-2 (eye, hand, foot 'and altogether each of the parts [of a man]').

20. Also: function of a house in *Metaph.* B 2.

21. τῆς μὲν γὰρ τῶν φυτῶν οὐσίας οὐθέν ἐστιν ἄλλο ἔργον οὐδὲ πράξις οὐδεμία πλὴν ἢ τοῦ σπέρματος γένεσις... τοῦ δὲ ζώου οὐ μόνον τὸ γεννῆσαι ἔργον (τοῦτο μὲν γὰρ κοῖνον τῶν ζώντων πάντων), ἀλλὰ καὶ γνώσεώς τινος πάντα μετέχουσι, τὰ μὲν πλείονος τὰ δ' ἐλάττονος τὰ δὲ πάμπαν μικρᾶς. See also *GA* 1. 4, 717^a21-2.

way, it would follow that they do not have functions in the core sense. Nussbaum concludes that when Aristotle ascribes a function to an animal or plant (in particular, when he writes in the *Ethics* of a function of man), he is relying on a rather loose analogy. ‘Function’ in such a case means no more than a characteristic or distinctive activity.²²

Similar reservations are expressed by David Bostock. Bostock assumes that functions in the proper sense are only had by instruments, that a thing’s function is always ‘useful for something further’. Since an animal or plant is not an instrument, and its activity is not useful for something further, Bostock thinks it is wrong or at best misleading to call its activity a function.²³

I suspect that these reservations come from reading modern philosophical notions of function back into Aristotle’s notion of *ergon*. It is of course true that numerically by far the greatest quantity of functions in Aristotle are attributed to parts and to instruments, but that is easily explained by the fact that there exist overwhelmingly many more parts than wholes, and instruments than users of instruments. It does not show that Aristotle had no single notion of function which was applicable both to the activities of parts and instruments, and to the activities of wholes which are not instruments. A thing has as its task to do such-and-such. Why should it do this task? Well, perhaps because the task contributes to something further, or perhaps because the task is intrinsically valuable. Which it is, merely useful or intrinsically valuable, is indeed important; but this does not preclude there being a common relation of thing to task in both cases. Aristotle speaks in the same way of a tool’s function, of a part’s function, and of an animal or plant’s function, and to my mind no persuasive case, whether textual or philosophical, has been made against accepting what he says literally. Thus there is good reason for attributing to Aristotle the view that all animals, plants, and instruments, and many animal- and plant-parts, have functions.

22. Nussbaum *Aristotle’s de motu animalium. Text with translation, commentary, and interpretive essays* (Princeton: 1978), 81–5 and 100–2.

23. Bostock, ‘Aristotle’s Theory of Form’, p. 88 (see esp. n. 21).

4.2. *The thing's final cause is its ergon*

The second premise of the deduction is that the function of every animal, plant, functional animal- and plant-part, and man-made instrument (qua animal, etc. of the kind in question) is also its final cause (qua animal, etc. of the kind in question).

Aristotle's commitment to the truth of this premise is evidenced, first, by two general pronouncements made in *De Caelo* and the *Eudemian Ethics*, respectively:

Each of the things that has a function is for the sake of the function. (*DC* 2. 3, 286^a8-9)²⁴

The end of each thing is its function. (*EE* 2. 1, 1219^a8)²⁵

Now, the sentence from *De Caelo* is fairly independent of its surrounding text: it does not play any obvious role in Aristotle's argumentation there. Given this, its evidential weight might be questioned. If it were our only evidence, it could be regarded as a mere one-off assertion, something Aristotle no doubt believed when he said it but which did not occupy any central position in his network of beliefs, and which he could therefore have easily given up.

The pronouncement from the *Eudemian Ethics*, on the other hand, does get relied upon in the text which ensues. Aristotle's argumentation relies first on an identity between the functions and the ends of states (ἔξεις), including arts, perceptual abilities, and bodies of theoretical knowledge. He then extends his argument to apply to soul and its parts. Thus even if he could have stopped short of a completely general identification of end and function, his argument does evince a commitment to the view that at least for every *state* and for every *soul* and *soul part*, the final cause is the function.

Let us consider a few more passages. In the *Politics*, Aristotle offers the example of an instrument and its function as illustrative of one thing being for the sake of another:

When one thing is for sake of another, there is nothing in common between them, except for the one to make and the other to take. I mean, for example, every instrument in relation to the function produced... (*Politics* 7. 8, 1328^a28-31)²⁶

24. ἕκαστόν ἐστιν, ὧν ἐστὶν ἔργον, ἔνεκα τοῦ ἔργου.

25. καὶ τέλος ἕκαστου τὸ ἔργον.

26. ὅταν δ' ἢ τὸ μὲν τούτου ἔνεκεν τὸ δ' οὐ ἔνεκεν, οὐθέν [ἐν] γε τούτοις κοινὸν ἀλλ' ἢ τῷ μὲν ποιῆσαι τῷ δὲ λαβεῖν· λέγω δ' οἷον ὄργανῳ τε παντὶ πρὸς τὸ γιγνόμενον ἔργον...

According to this text, the final cause of any instrument is the instrument's function.

Another class of things to consider are animal parts. To my knowledge, Aristotle makes no explicit, general statement identifying the final cause of every (functional) animal part with its function. However, in particular cases such as teeth, he refers to the same things both as functions and as final causes of the part in question.²⁷ He also sometimes combines talk of function with talk of final causation, for example in *Parts of Animals*:

Animals also have the nature of a mouth *for the sake of these functions*, as well as—in those animals that breathe and are cooled from outside—for the sake of breathing. (*PA* 3. 1, 662^a16–18)²⁸

A further reason to think that the final cause of an animal part is its function derives from Aristotle's repeated description of animal parts as instruments (ὄργανα).²⁹ We just saw that according to the *Politics*, every instrument is for the sake of its function. If animal parts are instruments, then of them too the final cause is the function.

Finally, we must consider the case of whole animals and plants. It is difficult to find direct evidence relating specifically to these items.

In *De Somno* 455^b22–25, Aristotle seems to say that waking activity (ἐγρήγοροις), in particular perceiving and thinking (αἰσθάνεσθαι, φρονεῖν) is the end of every animal to which these activities belong. We saw that in *Generation of Animals* Aristotle spoke of the function of animals as being 'some sort of knowledge' (γνώσις τις). It is reasonable to identify this 'sort of knowledge', which Aristotle attributes to all animals, with the perception and thought referred to in *De Somno*.³⁰ If the identification is correct, then in this pair of passages Aristotle

27. Teeth are *for the sake of* nourishment, in some animals also for defense, and in humans for speech, *GA* 788^b3–6; the *function* of teeth is the preparation of nourishment, in some animals also defense, *PA* 655^b8–11 (see also *PA* 691^b19–20; *GA* 745^a27–30, 788^b30–3).

28. ἔχει δὲ καὶ τὴν τοῦ στόματος φύσιν τὰ ζῷα τούτων τε τῶν ἔργων ἔνεκα καὶ ἔτι τῆς ἀναπνοῆς, ὅσα ἀναπνεῖ τῶν ζῴων καὶ καταψύχεται θύραθεν. Emphasis added.

29. [REFS] *GA* 716^a24–5. *PA* 645^b14–20 both associates parts with instruments and says explicitly τὰ μόρια τῶν ἔργων (sc. ἔνεκα) πρὸς ἃ πέφυκεν ἕκαστον. *PA* 669^a13: the lung is an instrument of breathing. *PA* 687^a11: hands are an instrument. *PA* 694^b13: nature makes instruments (*viz.* body parts) for the function, not the other way round. *DA* 2. 1, 412^b1–4: The parts of plants too (sc., like the parts of animals) are instruments.

30. It is hard to see what else, other than perception, Aristotle could be referring to as the 'sort of knowledge' in which lower animals partake. His thought might be that even the most basic perceptual activity is to some degree the apprehension of how things are: as such it is a knowledge-like activity and can be expected to have some small share in the characteristics and remarkable value enjoyed by genuine theoretical contemplation.

refers to the same thing as the function and as the final cause of every animal. (Add? EE 1219^a24–5, ἔστω ψυχῆς ἔργον τὸ ζῆν ποιεῖν, τοῦ δὲ χρήσις καὶ ἐγρήγορις.)

4.3. *The thing can exist while not producing its function*

The next premise of the deduction is that every animal, plant, functional animal- and plant-part, and man-made instrument can exist (and be an animal, etc. of the kind in question) while not producing its function. I have not found a text in which Aristotle says explicitly that this is so, but it seems obviously true. Axes, teeth, and eyes surely do not start and stop existing every time we start and stop chopping, chewing, and seeing. Again, an animal presumably does not produce its function while it is asleep, but animals do not start and stop existing every time they wake up and nod off.

If we look for textual evidence, perhaps the strongest to be found is the following. In a handful of passages, Aristotle draws a connection between a thing's function and the requirements on the thing's existence. In each case he says that it is impossible for a thing of a given kind to exist if it is not *capable* of producing the relevant function. It would be very difficult to explain Aristotle's mention of capability if he had held the simpler and stronger view that each thing could not exist while not (actually) producing its function. Consider:

Furthermore, there cannot be a hand disposed in any arbitrary way, such as a brazen or wooden hand, except homonymously, like a drawing of a doctor. For it *will not be capable* of producing its own function... (PA 640^b35–641^a2)

All things are defined by the function: for those things that *are capable* of producing their own function truly are each thing, such as an eye if it sees, whereas what *is not capable* [is the thing] homonymously. (Meteor. 390^a10–12)³¹

To these passages we may add *De Anima* 2. 1, 412^b10–413^a1. There Aristotle clarifies his account of soul by means of analogies to an axe and to an eye. He states that the being (οὐσία) of an eye is sight (ὄψις, ^b19), and that without sight nothing is an eye unless homonymously. Sight is the capacity for the activity of seeing (ὄρασις, ^b28), and, as we know from other texts,

31. Another passage: *Metaph.* Z 10, 1036^b30–1 (something is a hand only if it is capable of accomplishing the function (δυναμένη τὸ ἔργον ἀποτελεῖν)).

seeing is the function of an eye (*HA* 633^b19–22, *Somn.* 454^a28). Thus the being of an eye, that which stands to an eye as soul stands to an animal, and without which an eye cannot exist, is the *capacity* for performing the eye’s function. Surely, then, the capacity suffices: a thing of a given kind can exist and belong to the kind while not actually producing its function.

4.4. *The thing cannot exist without its formal cause*

The final premise of the deduction is that nothing of a given kind can exist and belong to the kind while the formal cause of it (qua member of the kind) is absent. Similar to the previous premise, this was perhaps for Aristotle a truth too obvious to state. I can point to no passage where the thesis is asserted in generality, but it seems both clear and universally agreed that Aristotle held it.³² The thesis is suggested in Aristotle’s explanations of particular cases. For example, when Aristotle analogizes in *De Anima* 2. 1 between animals, axes, and eyes, he says of the formal cause of each of the latter two that ‘if it were separated off’ (or ‘went away’), ‘there would no longer be an axe’ (or ‘eye’).³³ The presence of the formal cause of axe or eye is a requirement on being an axe or eye.

Here is a further consideration. Aristotle’s phrases for referring to formal causes include ‘the what is it’ (τὸ τί ἐστὶ), ‘what it is to be the thing’ (τὸ τί ἦν εἶναι), and ‘the being’ (ἡ οὐσία). It seems obviously necessary that every *k* exemplifies what a *k* is, what it is to be a *k*, and the being of a *k*.

This point is reinforced if we recall the close connection in Aristotle between formal causes and definitions. The definition of a kind of thing specifies what the form of this kind of thing is.³⁴ Thus, necessarily, if something satisfies the definition of *k* then it has the formal cause of a *k*.³⁵ It is also surely necessary that all members of a given kind satisfy the definition of that kind. It follows that it is necessary that all members of a given kind have the formal

32. For one example from the secondary literature, see Ackrill, ‘*psuchê*’ p. 68: ‘The form is what the matter has to get or have if it is to become or be an *X*; for the matter, to become or to be an *X* is precisely to get or to have the form.’ I take the ‘has to’ in ‘has to get or have’ to express necessity.

33. *DA* 2. 1, 412^b13–14, 20–1.

34. [? *Metaph.* Δ 8, 1017^b21–2, ἔτι τὸ τί ἦν εἶναι, οὗ ὁ λόγος ὀρισμός, καὶ τοῦτο οὐσία λέγεται ἐκάστου.] Cf. Frede, ‘The Definition of Sensible Substances in *Met. Z*’. For present purposes it is unimportant whether Frede is right to deny that definitions of sensible substances must *also* specify their matter.

35. I assume that there is a unique formal cause for each kind. (I mean specifically unique – we need not decide whether all *ks* share *numerically* one formal cause; perhaps each individual *k* has its own individual form.)

cause of that kind. It is impossible for something to be a *k* while the formal cause of it qua *k* is not present.

We now have in place a set of statements jointly entailing the non-identity of formal and final causes. Each animal, plant, functional part, and instrument has a function; the function is the final cause; production of the function is not required for existence; but the presence of the formal cause is required for existence. Hence the function is the final cause, but not the formal cause, of each animal, plant, functional part, and instrument. Formal and final cause are not the same.

5. Objections and replies

There are many possible strategies for responding to the argument I have given. It is not possible for me to consider them all, because the range of interpretations and views in play is simply too wide. But I would like to briefly discuss two or three lines one might take in attempting to rescue Aristotle's identification of formal and final cause.

5.1. *Survival and reproduction*

I attributed to Aristotle the view that living things exist for the sake of their functions (§4.2). An objection might be raised to this based on the idea, expressed fairly often in the secondary literature, that an animal's characteristic activities and products are all directed towards the maintenance or reproduction of the animal itself. The idea suggests that an animal's function is for the sake of its form, in the sense that the function is performed in order to maintain the form's continued existence by way of the animal's survival and reproduction. A scholar who holds this view may grant that an animal's function is its proximate final cause, but insist that its form is also a final cause of it. The form is the higher end to which the function is a means; an animal functions in order to maintain and propagate itself, and thereby further the existence of its form. Thus the animal's form has good title to be called the final cause of the animal. (This line of thought is designed to identify the formal and final causes of whole organisms, not those of parts or instruments.)

Such a view is endorsed, for example, by Gareth Matthews in ‘*De Anima* 2. 2–4 and the meaning of life’:

Now if the soul of a living thing is the cause of its living, and its living is naturally directed towards the preservation of its species, then the soul's powers (the ‘psychic powers’ we have been talking about) are presumably powers naturally directed toward the preservation of the species of that particular thing.³⁶

The view is also suggested in Jonathan Lear’s discussion of final causation in his book *Aristotle: The Desire to Understand*. After listing some characteristic plant and animal activities, Lear writes:

In each case such activities of plants and animals are for the development, maintenance, or protection of form: ‘Since nature is twofold, the matter and the form, of which the latter is the end, and since all the rest is for the sake of the end, *the form must be the cause in the sense of “that for the sake of which.”*’³⁷

What are we to think of this view? To begin, let us grant for the sake of argument that the functioning of an animal or plant always contributes to survival or reproduction. Then we are faced with a positive feedback loop: the form promotes the function (since it grounds the ability to function, or is this ability), and the function promotes the form (since it preserves and reproduces the form). In this mutual furthering of form and function, which is for the sake of which? Or, to shift the question, which is the more intrinsically valuable, and which rather derives its value from that of the other?³⁸

It seems to me that preference must go to the function, not to the form. The situation is analogous to what we find in the *Ethics* in the relation between virtue and virtuous activity. Virtue is a state which provides, or is, a disposition to act virtuously; acting virtuously reinforces and cultivates the state of virtue. Aristotle is insistent—against Plato—that our highest good is the activity, not the state.³⁹ As in the practical realm, I would argue, so in the biologi-

36. In Nussbaum and Rorty, *Essays on Aristotle’s De Anima*. pp. 190–1.

37. Lear, *Desire to Understand*, p. 35. The passage quoted by Lear is *Phys.* 2. 8, 199^a30–2; emphasis is Lear’s.

38. When one thing is for the sake of another, normally the latter is intrinsically better than the former. This comes out, for example, in the reasoning about goods and ends in *NE* 1: see especially *NE* 1. 1, 1094^a5–6 and 1. 7, 1097^a25–34; also *EE* 2. 1, 1219^a8–11.

39. Cf. *NE* 1. 5, 1095^b31–1096^a2, 1. 7, 1098^a5–6, 1. 8, 1098^b31–1099^a7, 10. 6, 1176^a33–^b2. For the opposite view, on which virtuous action is choiceworthy because of its contribution to one’s virtuous state, see for example *Republic* 4, 443E5–6 and 445A5–B4.

cal. An activity such as perception or thought is of basic intrinsic value; its value is akin to the value of divine activity. The form of an embodied animal is valuable because it is or provides the ability to perform such valuable activity. Aristotle's higher valuation of activities over capacities seems to be quite general, extending outside his ethical works into the physical and metaphysical.⁴⁰ For example, in *Metaphysics* Θ 9, he argues that whenever a capacity is good, the corresponding activity is better.

I started out by granting the claim that, for Aristotle, the functioning of a living thing always contributes to its own survival or reproduction. It is unclear to me whether this should really be granted. In the human case, theoretical activity is an obvious and acknowledged sticking point for the claim. In other animals and in plants, there are no such obvious counterexamples: the activities described in Aristotle's biological works all seem connected with getting food, mating, and protecting oneself. Nevertheless, Aristotle's theoretical framework seems to allow room for animal activities which are performed simply for their own intrinsic value, and not for the sake of any contribution to survival. This is, I think, an interesting difference between Aristotle's views and the prevailing Darwinian views of today, and it would be a shame to obscure it or cover it over.

5.2. *Benefit*

Aristotle tells us that the for-the-sake-of-which is said in two ways: the one is something 'of which', the other is something 'to which'.⁴¹ He does not explain further, and it is unclear what distinction he wishes to draw. It is often held, however, that a final cause in the 'to which' sense is a *beneficiary*, and it may be suggested that an animal's formal cause is a final cause of the animal as beneficiary.

The suggestion could be developed in various directions, depending on what 'benefit' is taken to mean. Perhaps benefiting an animal's form means maintaining and preserving the form's existence: in this case, an animal aims at the benefit of its form insofar as it aims to survive and to reproduce. On this understanding of benefit, the proposal is pretty much equivalent to the one I have discussed and rejected in the previous section.

40. Cf. *PA* 1.5, 645^b17–19; *De Somno* 2, 455^b22–5; *EE* 2.1, 1219^a8 and 31

41. *De Anima* 2. 4, 415^b1–2 and 20–1; see also *EE* 8. 3, 1249^b15

Alternatively, one might suppose that benefiting something means helping to achieve that thing's ends. 'Benefit' would mean something like 'assist'.⁴² The proposal would then be that each animal exists in order to help realize the ends of its form, i.e., of its soul. Now Aristotle does say that an animal's *body* is an instrument for soul, to be used for the attainment of the soul's ends, and that it is for the sake of soul in this sense.⁴³ I do not know whether Aristotle's claim can somehow be transferred legitimately from the animal's body to the animal itself. I doubt that it can, but if it can, we would obtain the result that each animal is for the sake of its soul, and there would be a sense in which the formal and final cause of an animal are the same. (There would remain the other and, I think, more central sense in which they are not the same. Being useful to the soul means being useful towards the achievement of some end, and the animal will also be for the sake of that end, and, according to the argument I gave in Section 4 above, that end is not identical with the soul.)

Or again, one might connect the idea of benefit with the idea of welfare, of being well off. To benefit something is to increase its welfare, to make it better off, and this is what each living thing should do for its own soul. The success of this proposal will depend on making it plausible that the notion of welfare plays a theoretical role in Aristotle's philosophy, and on providing some relatively clear outline of this notion. (What counts towards a thing's welfare? Survival? Being in a good, healthy condition? Achieving one's ends? Enjoying subjective feelings of contentment, well-being, pleasure?)

5.3. Puppies

Proposal: Aristotle's identification of formal and final cause is intended to apply to immature animals. (Or even embryos?) A puppy, for example, exists in order to grow into a mature dog,

42. As mentioned in n. 15, Aristotle says at *GA* 2. 6, 742^a22 ff., that there is a sense in which instruments are for the sake of their users, as distinguished from the sense in which things are for the sake of what they aim to produce. It is unclear whether the *GA*'s distinction 'productive of vs. useful to' is the same as the *DA*'s distinction 'of which vs. to which'. If it is the same distinction, I advise against describing the 'to which' or user as a 'beneficiary', since the goals which a user is helped to achieve need have nothing to do with his or her own benefit. Accordingly, in the *Euthyphro*, Plato has Euthyphro and Socrates balk at the idea that humans can *benefit* gods (ὠφελεῖν), but seemingly accept the idea that we can *assist* them (ὕπηρετεῖν) and that they can *use* us (χρησθαι) in the accomplishment of fine works (12E5–14A10).

43. *DA* 2. 4, 415^b18–20. The statement at *PA* 1. 1, 645^b19, 'the body is in a way for the sake of the soul', should likewise be understood in the 'for the use of' sense: the body and its parts are instruments for the soul's use (cf. 642^a11).

and so its final cause is the form of dog. Its formal cause is also this same form, which it instantiates in an as yet incomplete way.

Reply: I can't disprove the proposal, although my own intuition says that if a puppy is a dog then it exists for the sake of dog-activities rather than for the sake of dog-form; the form is the final cause of a process which the puppy is undergoing (namely, the process of maturation) but not the final cause of the puppy itself. If a puppy is not yet a dog then its final cause could be the dog-form, but its *formal* cause will not be the dog-form.

It's also unclear to me whether immature animals are a central enough focus in Aristotle's works that he would make a general-sounding claim which really applied only to them. My impression is that he is interested in (a) the causes of mature animals and their features; (b) the causes of the processes by which mature animals come into existence. I don't see him focusing on (c) the causes of immature animals and their features.

6. Conclusion

[To be written]