

Aristotle on Chance

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Aristotle's technical concepts of chance and spontaneity play three crucial roles in his philosophy of science. In his accounts of his predecessors' views on scientific explanation, Empedocles and Democritus are singled out as invoking chance and spontaneity where Aristotle insists teleological explanation is required.¹ In his own theory of explanation, certain biological processes are characterized as 'spontaneous'.² And in his ethical writings, chance plays a crucial role in determining responsibility for an action.³ It would seem, then, that a proper grasp of his considered doctrine of chance, which is worked out in *Ph* II 4–6, is central to the evaluation of a number of areas of his philosophy. Unfortunately, the development of that doctrine contains a number of difficulties. The central ones turn on the relationship between processes which are due to chance and those which are for the sake of something. The purpose of this discussion is to resolve these difficulties.

The argument of *Ph* II 4–6 makes the following claims:

- (1) Whatever might have been due to thought or to nature is for the sake of something [196b23–24; cf. 197a35, 198a6].
- (2) Chance events are “among the things that come to be for the sake of something” [196b33, 197a6].
- (3) Chance processes are not for the sake of their result [196b34, 197a16, a18, a30, 199b21–22].
- (4) Chance processes might have been due to thought or nature [198a6].

Although (2) may be ambiguous, (1) and (4) imply that:

- (5) Chance events are for the sake of something.

Now if one takes (5) to mean that the something which a chance event is for the sake of is some result of that event, then (5) appears to contradict (3). At the same time, it seems clear from numerous discussions in the corpus that (1) does not represent Aristotle's doctrine of teleology: it is not what *might have been done* by thought or nature

¹ *Physics* II 8, *Parts of Animals* I 1 *Generation of Animals* V 8.

² *Generation of Animals* III 11.

³ *Nicomachean Ethics*, 1111a5, 1135b12; *Eudemian Ethics* 1226b2; cf. R. Sorabji, *Necessity, Cause, and Blame*, Ithaca, 1980, pp. 227–256.

which is for the sake of something, but what *is* done by thought or nature.

There are two plausible strategies for dealing with this problem. The first is to reinterpret (1) to bring it in line with standard Aristotelian accounts of teleological outcomes. This would block the inference to (5) and avoid any chance of contradiction. The other, first suggested (as we shall see) by Porphyry, is to say that chance events are for the sake of *something*, but what they are for the sake of is *not* what results.

Proposition (1) occurs as a parenthetical aside near the end of Aristotle's preliminary enumeration of the conditions which must be satisfied before a process can be referred to as "by chance" or "spontaneous". Aristotle has claimed that a necessary condition for being by chance is that a generation be outside ($\pi\alpha\rho\acute{\alpha}$) that which occurs always or usually. He then goes on:

Of things which come to be some come to be for the sake of something, some not (and of these some are according to forethought, some not, but both are among things which come to be for the sake of something), so it is clear that among those things outside the necessary and usual there are some which may be for the sake of something. *But whatever might have been done by thought or by nature is for the sake of something.* And when such things come about by accident, we say they are by chance . . . (196b17–24).

The nineteenth century German philologist, Torstrik, was vexed enough by this account of what things are for the sake of something to change $\pi\rho\alpha\chi\theta\epsilon\acute{\iota}\eta$ – might have been done – to $\pi\rho\alpha\chi\theta\eta$ – is done.⁴ This brings (1) into line with Aristotle's standard account of teleological explanation, thereby restricting the subjunctive formulations to descriptions of chance events. This move is, however, utterly *ad hoc*. There is no textual basis for these changes, and the ancient commentators were reading the same puzzling texts we are. Such a desperate attempt to deal with the problem should remain an unsatisfying last resort.

On the other hand, the suggestion of Ross and Wieland, that Aristotle's teleology is only "*de facto*" or *als ob*, goes against the spirit of Aristotle's attempt to contrast chance processes with those which are truly teleological.⁵

⁴ Torstrik, A., *Περὶ τύχης καὶ τοῦ αὐτομάτου*, Aristotle's *Physics* B, 4–6, *Hermes* IX (1875), pp. 425–470.

⁵ W.D. Ross, *Aristotle's Physics*, Oxford, Clarendon Press, 1955, p. 518. Wolfgang Wieland, *Die Aristotelische Physik*, Göttingen, 1962, ch. 16, pp. 271–272.

Simplicius' commentary on this passage [366.27–29] preserves not only his own way out of this dilemma, but also Porphyry's. These two ancients offer the two most plausible interpretations of the passage in question. In his commentary to the proposition I have been calling (1), Simplicius is considering the question why chance processes have the appearance of being goal directed. He rejects a suggestion made by Porphyry, namely, that they appear goal directed because they are.

Something's being for the sake of something is observed not because the process is for the sake of something, e.g., for the sake of marketing, as Porphyry says, but because it might even have come to be for this end.⁶

Porphyry's suggestion seems to be this. The man who happens to collect on a debt goes to the market place for a purpose, though not to collect on a debt. Perhaps he was there in order to take care of a legal matter, or for a festival. Porphyry thus attempts to avoid our dilemma by noting a distinction between claims (1) and (4), on the one hand, and (3) on the other. Claims (1) and (4) generate,

(5) Chance events are for the sake of something

while the third states that,

(3) Chance events are not for the sake of their results.

Porphyry, then, argues that Aristotle's theory of chance is that while chance processes are for the sake of something, they are by chance because they are not for the sake of the result they bring about. It is this unexpected result of a teleological action which is said to be by chance.

Simplicius' view, however, implies that chance processes have the appearance of being goal directed because the result is something which might have been done for that result. This implies that claim (1) is a characterization of a loose sense of ἕνεκά του, covering processes which are of a kind which are normally goal directed, but in certain cases are not. Those cases are differentiated from genuinely teleological ones by the fact that they have "incidental causes" [196b23–29].

There are three pieces of evidence which one suspects led Porphyry to his view.

- (a) Aristotle persistently uses the phrase ἐν τοῖς ἕνεκά του γιγνομένοις ("among the things which come to be for the sake of something") in his characterizations of chance processes. One might suppose this phrase picks out processes

⁶ Simplicius, *Commentaria in Aristotelem Graeca*, Vol. IX, ed., Hermann Diels, Berlin, 1882.

which are generally for something, and thus would include those which are for something other than what they produce (i.e., chance processes).

- (b) The list of the incidental causes of collecting on a debt by chance given by Aristotle at 197a17–18 are all goals other than the result achieved. That is, while I might have collected a debt by chance, I had some other reason for being where my debtor happened to be.
- (c) The definition of spontaneity in chapter six, which is a crucial text, can be read in a way which supports this interpretation.

Let us consider each of these points. The use of *ἐν* in the phrase *ἐν τοῖς ἔνεκά του γιγνομένοις* needn't signify that something so described is one of the class of things which are for the sake of something. The Greek *ἐν* is much broader in signification than this. At any rate, the issue is how one takes *ἔνεκά του* in these passages; so we can't derive support for either interpretation from this turn of phrase.

With respect to (b), it must be admitted that the incidental causes mentioned by Aristotle are other goals. But this need not always be the case. Suppose you were compelled to be at some location and, having been taken there, discovered the woman of your dreams. You didn't go there for *any* purpose, but you would have, had you known whom you would meet. It is also important that Aristotle's account be extendable to natural cases. And it is unclear how spontaneous natural processes could be said to be for ends other than those which result.

But there is another more serious objection to using the evidence noted in (b) to support Porphyry's interpretation. The evidence cited in (b) above in fact says that such processes really are due to thought or nature, not that they might have been. But we are trying to understand why Aristotle says that things which might have been due to thought or nature are for the sake of something, and this end is not furthered by simply saying that they *are* due to thought. Porphyry's understanding of Aristotle's concept of chance processes seems inadequate to account for the subjunctive in claim (1).

The strongest evidence for Porphyry's reading is the definition of spontaneity (the wider concept, covering chance in both the human and natural realms) in *Ph II 6*.

Hence it is clear that events which are among those things which come to be without qualification (*ἀπλῶς*) for the sake of something, when they do not come to be for the sake of the result, and which have an external cause, are due to the spontaneous [197b14–20].

The crucial distinction, for the purpose of this discussion, is that between processes without qualification for the sake of something and

processes not for the sake of the result. Spontaneous processes are said to be both. On Porphyry's reading the *ἀπλῶς* signals that such processes are for something, and the requisite qualification is then specified: they are not for the sake of their results.

Though on its own this passage suggests Porphyry's solution to our dilemma, that solution faces insuperable difficulties. These difficulties can be clearly seen by paying careful attention to the closing lines of *Ph* II 5.

Both chance and spontaneity are incidental causes, as we said, among the things which may come to be neither without qualification nor for the most part; and among these, whichever might have come to be for the sake of something (197a32–35).

Here Aristotle claims clearly that it is what might have been for the sake of something that is by chance. This suggests that Simplicius' solution, rather than Porphyry's, is the correct one.

The difficulty in the way of accepting Simplicius' solution is that it forces us to take proposition (1) seriously. But this proposition seems to sanction the description of processes which are not causally tied to their outcomes as for the sake of their outcomes. This solution also requires us to accept the implication that, in some sense, chance processes are for the sake of something. Simplicius' solution, then, forces us to take account of *all* of the textual evidence, and brings with it all the attendant problems.

Simplicius' original insight was to note that Aristotelian chance processes have to be descriptively like those which normally achieve the end achieved either by thought or by nature. I would like to pursue this idea by suggesting that Aristotle is willing to describe such processes as for the sake of their outcomes. In such cases, however, "for the sake of something" doesn't carry the causal force that it does when applied to processes where the goal is essentially (rather than incidentally) related to the process leading to it.

To defend such an interpretation I wish to consider the crucial passage of *Ph* II 5, in which Aristotle attempts to present us with an example of a chance event, and then notes its philosophically relevant features.

Thus, the man would have come for the sake of recovering the money when his debtor was collecting contributions, if he had known; in fact, he did not come for the sake of recovering the money, but he happened to come and to do this for the sake of collecting the money [196b34–36].⁷

⁷ Reading, with Ross and Charlton, *κομιζομένου* at b34. The argument is confused by the use of this verb to refer to the actions of the debtor collecting subscriptions at b34, and to the actions of his creditor in collecting from him at b35. But that such a

This passage presents numerous difficulties of interpretation which I shall gloss over. The central philosophical problem is making three claims in this passage consistent. They are:

- (i) He might have come for the sake of debt-collecting.
- (ii) He did not come for the sake of debt-collecting.
- (iii) He happened to come and to do what was for the sake of debt-collecting.

Bonitz⁸ excised the phrase “for the sake of collecting” in the last line, and one can sympathize with him. However, the best manuscripts and commentators have it, and I believe we can make sense of the passage with it. To do so, we need to consult Aristotle’s notes on this example, which run from 196 b36–197 a8. In summary, Aristotle takes the example to show that:

1. The person in question does not usually, or necessarily, go to the market for the purpose of collecting on debts [196 b36–197 a1].
2. The end result, collecting on a debt, was not among the causes in him [197 a1–2].
3. Recovering money owed to one is the sort of thing typically achieved by intelligent action [197 a2, a5].

Point 3. tells us that debt-collecting is the sort of thing that could, and normally would, be the result of goal-directed, intelligent action. This also helps us to understand claim (i) – “might have” has the force of “could, and normally would have”. However, point 2. reminds us, collecting on a debt was not in this case a part of the explanation of the events that led up to it. Unlike truly teleological processes, the end result of this process was not that for the sake of which the process took place. This explains the meaning of (ii) in the example.

Aristotle’s comments on his example give us a means of rendering (i)-(iii) consistent. For one way of understanding the claim that someone did not come to p for the sake of X (ii), but happened to be at p and did what was for the sake of X (iii), is this. He carried out all the actions required to achieve X, having done so he achieved X, and yet X was not the goal of his actions (not an αἰτία in him). And while achieving X is not the reason why he normally goes to p, X is the sort of thing which typically is achieved by purposeful action.

The outcome is related incidentally to the process which leads to it in the following way. Just as the proper characterization of the efficient cause of a home’s being built picks out the sort of agent whose actions

change in reference has taken place is clear from 197 a15 where the phrase τοῦ ἐλθόντα κομίσασθαι τὸ ἀργύριον, μὴ τούτου ἕνεκα ἐλθόντα refers back to ἕνεκα τοῦ ἀπολαβεῖν τὸ ἀργύριον ἦλθεν . . . ἦλθε δ’ οὐ τούτου ἕνεκα. Both passages clearly refer to the creditor’s collecting. See Ross’ notes, *Aristotle’s Physics Comm.*, p. 520, and Charlton, W., *Aristotle’s Physics I II*, Oxford, 1970, p. 107.

⁸ Bonitz, Hermann, *Aristoteles Studien I*, Wien, 1862.

characteristically lead to completed houses – i.e., the builder – so the proper characterization of the final cause of a process picks out that result which was the goal of the process. If the result being scrutinized was not the goal of the process leading to it, then it is related to that process only incidentally. However, if the process is one which might have been properly for that goal, if the end result is capable of being the proper goal of the process, and if the process does in fact achieve that end result, there is sense to saying, as Aristotle does, that the process is, by accident, for the sake of that result.

Let us now return to the original problem. We noted that Aristotle asserts:

(1) Whatever might have been due to thought or nature is for the sake of something.
and

(4) Chance processes might have been due to thought or nature.

These assertions imply

(5) Chance events are for the sake of something.

But (5) seems to violate Aristotle's insistence that chance processes are *not* for the sake of anything (3).

The suggestion I have made is that Aristotle is willing to describe chance processes as for the sake of their results provided certain conditions are met. When he says they are for the sake of something without qualification, but not for the sake of what actually results, I suggest he means this: the result was not responsible for (not an αἰτία of) the process that lead to it;⁹ nonetheless, the result was valuable for the agent, and was the sort of thing that is typically achieved by goal-directed activity.

To the suggestion that there are two senses of ἐνεκά του in Aristotle, the obvious response is to wonder why we aren't explicitly told about it. I will thus close by indicating what positive evidence there is for the view that two different sorts of processes are described as "for the sake of something".

First of all, there are passages which tell us about two sorts of things which can be described as that for the sake of which.¹⁰ These passages are usually taken to contrast the beneficiaries of processes and the actual goals of processes.¹¹ Only one of these is causally related to the process which leads to it. The favored example among the commenta-

⁹ A detailed defense of this analysis can be found in my "Teleology, Chance, and Aristotle's Theory of Spontaneous Generation", *Journal of the History of Philosophy*, Vol. 20, No. 3, pp. 1–20, July, 1982; it is suggested in Charlton (*Aristotle's Physics I II*), pp. 106–108.

¹⁰ Cf. *De An.* II 4 415b1–3, 415b20–21; *Ph.* II 2, 194b1; *Meta.* XII 7, 1072b2–4.

¹¹ E.g., Simplicius, *In De An.* (CIAG XI) 119.22–37; Philoponus, *In De An.* (CIAG XV) 269.26–270.10; Ross, W.D., *Aristotle's De Anima*, Oxford, 1961, p. 228; Hicks, R.D., *Aristotle's De Anima*, Cambridge, 1907.

tors is that health is the τὸ οὐ ἕνεκα of medicine as its goal, while the patient is the τὸ οὐ ἕνεκα as its beneficiary. One of Aristotle's favored examples of a chance result is the restoration of health by unintended means (e.g., a chance change in the weather).¹² In this case, we could say the change was for the good of the patient, *if* the change brought about just that physiological effect the doctor would have had as his goal.

It seems plausible to suppose that there will be processes – just those Aristotle says are by chance – which achieve beneficial results and yet are not goal directed. That is, there will be a non-causal sense of ἕνεκά του corresponding to the non-causal sense of τὸ οὐ ἕνεκα.

A second bit of support for this view derives from the *Nicomachean Ethics*. Ross has pointed out that *NE* 1111a5, 1135b12 and *EE* 1225b2 describe actions as for the sake of some result even though that result was not a goal of the agent.¹³

Finally, there is a natural and reasonable distinction to be made here, as is suggested by a contemporary dispute on the same issue. In his *Teleological Explanations*,¹⁴ Larry Wright insisted that a consequence could be a function only if that consequence was the reason why what has that consequence exists.¹⁵ A number of philosophers have properly objected to this, on ground that structures can come to have functions which have nothing to do with why they are there.¹⁶ To legislate against this very natural use of 'function' seems utterly uncalled for. Nonetheless, it is true that to attribute a function to something is to at least raise the possibility that it *explains* the structure in question. Discovering that it achieves good things for its possessor quite by chance does not, however, lead one to stop saying that this is its function. Likewise, evolutionary biologists distinguish between useful traits which are *adaptations* and those which are not, where the former are *explained* by their functional contributions to fitness and the latter are not.¹⁷ Such a distinction closely resembles Aristotle's between good

¹² Cf. *Meta.* VII 7 1032b22–32; *PA* I 1 640a27–28.

¹³ Ross, *Aristotle's Physics*, Comm., p. 518.

¹⁴ Larry Wright, *Teleological Explanations*, California, 1976.

¹⁵ Wright, pp. 78–79.

¹⁶ Achinstein, P., "Function Statements", *Philosophy of Science*, 44 (September, 1977), pp. 341–367; Boorse, C., "Wright on Functions", *Philosophical Review*, 85 (1976), pp. 70–86.

¹⁷ E.g., R. Lewontin, "Adaptation", in *Evolution*, Scientific American, New York, 1978, pp. 114–125; G. C. Williams, *Adaptation and Natural Selection*, Columbia University Press, New York, 1966, pp. 3–20, pp. 251–273.

results achieved by chance and good results which were goals of the changes that produced them. There is every reason to suppose he felt the need for such a distinction as acutely as contemporary philosophers and biologists. The terms of Aristotle's teleological vocabulary are ambiguous in much the way that our concept of 'function' is, and the passages referred to in note 9. indicate that Aristotle was sensitive to this ambiguity.

Let me conclude by reviewing the original problem, the difficulties in the way of a Porphyrean solution, and the solution I am recommending.

The problem originates from Aristotle's apparently conflicting desires to sharply distinguish chance processes and outcomes from teleological ones, and to describe *certain* chance processes in teleological terms. Porphyry's solution, a subtle and ingenious one, was to distinguish between the actual goal of a process and its outcome, and to see chance processes as those which achieve outcomes other than those toward which they were directed. There was a fundamental difficulty with this solution. It insists that all chance processes are due to thought or nature (in a causal sense), whereas Aristotle only makes the weaker claim that they might have been. It thereby restricts the range of processes which can be described as chance in a way which conflicts with Aristotle's scientific and ethical use of the term.

The solution I have suggested, a descendant of Simplicius', is that Aristotle has a causal and a descriptive sense of *ἐνεκά του*, and that chance processes are for the sake of their results only in the noncausal sense. It is these which 'might have been due to thought or nature', while *truly* teleological processes *are*. The form of an object of craft, the good perceived as achievable by action, or the nature (form) of a sort of organism are all aspects of the world which Aristotle argues are typically responsible for the processes which produce them. When just these sorts of things are produced and yet are not responsible for the processes which produce them, they are by chance.¹⁸

¹⁸ I would like to take this opportunity to thank this journal's associate editor, Professor E. M. Curley, and an anonymous referee for many valuable suggestions which lead to improvements in the argument of this essay.