Chance and Teleology in Aristotle’s Physics

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ONE OF THE best known and most studied notions in Aristotle’s philosophy is that of finality. In many places in his philosophical writings he makes use of teleological patterns in order to account for different topics. Against his materialistic and mechanistic predecessors and following Plato’s teaching, Aristotle was in the habit of arguing that many things and events may be explained by reference to ends. In his view, an end (telos) means something good, i.e., “that for the sake of which” (to hou heneka) other things are done. Although Aristotle’s emphasis on the final cause as the end of change shows his biological interests, teleological explanation is applied to other fields as well, including physics, ethics, and politics. With his doctrine of final cause he had an instrument which played a crucial role in various areas of his work and perhaps, in a special way, in his philosophy of nature. The intrinsic relevance of the teleological account has led some scholars to believe that teleology is a sort of universal and supreme principle within Aristotelian physics. It was A. Mansion who asserted that chance (tyche; in his translation “fortune”) as well as spontaneity (automaton; in his translation “hasard”) represented a kind of “obstacle to nature’s activity,” since nature and its movements are supposed to be essentially teleological whereas chance is untelological or at least opposed to the finality of nature.

See De part. an. 639a9, 640a33–b4, 645a23–26, 645b14–17, 650b21–22, 658a8–10, 661b22–24, 668b25–32; De loc. an. 704b12–18, 706b8; Phys. 191b12–13, 194a22–33, 195c23–25, 198b5–15; Pol. 1322a5–1322b1–5, 1323b4–35, 1326b15–22, EE 1185a9–11; EN 1904a18–22, 1906a30–34; Met. 982b4ff., 983a31–32, 1012a23–25. Sometimes Aristotle speaks of “existing in view of the best or the good” (cf. De an. 420b19–22, 434b22–29; De gen. an. 717a15). Presumably he is keeping in mind Plato’s Timaeus (46e–75e); cf. also Protrepticus fr. 14, where it is said that “everything that comes into being rightly comes into being for an end” (I. Diog. translation, to his Aristotelis Protrepticus: An Attempt at Reconstruction [Goteborg. Studia Graeca et Latina Orientalia, 1961], p. 53, and fr. 24 and 25. Here the issue is that the end of something is “the best,” and the antecedent of this concept should be sought in Plato, for whom the idea agathos in megiston mathema (Rep. 505a) and the “cause of all correct and noble things” (Rep. 517c–e) are the causes of all correct and noble things (Rep. 517c–e) (hereafter PT). A. Mansion has argued that chance “represent des formes d’opposition à la finalité naturelle”, that “on pourrait rapporter encore à la nécessité, prise comme l’effet d’une violence antéfétale”, and that “la coincidence, dans ce cas, entre nécessité et hasard…, soulève le problème plus général des rapports mutuels de ces deux sortes d’obstacles à la finalité,” Introduction à la Physique Aristotélicienne (Paris: Inst. Supérieur de Philosophie, 1946), pp. 282, 291, and 302 respectively. He takes it for granted that chance (and necessity) is a perturbing cause responsible for certain anomalies in nature’s behavior. By contrast, we think chance processes are contemplated in
In what follows, my attention will be focused on the chance-teleology problem in Aristotle's *Physics* II. I shall try to show here (in part guided by W. Riclcand's interpretation) that chance and teleology are not opposite concepts but are, on the contrary, closely related. If this paper an attempt will be made to prove that chance events (a apo tyche) contain a teleological component, one which is, however, not a primary but a secondary end. This thesis is strengthened by certain remarks Aristotle makes in Ph. II, especially in the passage where tyche is characterized by reference to the notion of proaireis (cf. 197b5–8). I will also analyze some difficulties implied in Aristotle's doctrine of chance, the most problematic of which is the relationship between chance processes and those processes which, in the usual interpretation, are "for the sake of something" in the strict sense. The prevailing view concerning the Aristotelian conception of chance, supported by many important passages, considers tyche as the denial of the end, or at least as something contrary to it. Thus there is no room to link chance to teleological events. Against this point of view, though, I shall try to show that even when the tyche-telos relationship is controversial, nonetheless in Ph. II, where chance is discussed in detail, there is a sense in which chance processes are "for the sake of something."

II

After having discussed the varied meanings in which a cause (aition) is referred to in Ph. II 3, Aristotle claims that chance (tyche) and spontaneity (autavon) cannot be regarded as kinds of causality. In contrast to earlier thinkers, i.e., the so-called "Physicists," he maintains that there are many things which exist and are generated by chance and spontaneity (Ph. 196a11–12). According to Aristotle, the paradox set up by his materialistic predecessors is that, on the one hand, they asserted that there are things and events which come about by chance or by spontaneity, but, on the other hand, they did not consider either to be a true cause.

When Aristotle begins to develop the constructive part of his exposition at Ph. 196b10–14, he argues that neither chance nor what is attributed to it can be understood as (a) the cause of that which is of necessity and always (ex anankes kai eir) or (b) the cause of that which is for the most part in a certain way (hos epo to poly). Nevertheless, he says that there are things other than what are included in (a) or (b), and since everyone claims that such things come about "by chance," then tyche as well as autavon plainly exist in some way (cf. Ph. 196b15: phaneron hoti esti ti het tyche kai autavon). Chance and spontaneity are unusual or exceptional events that are not included within the sphere of the necessary or of which is for the most part in a certain way.

the natural order. While in general M. D. V. Crohan considers irrelevant the difference between tyche and autavon (pp. 20, 202–93); for us the distinction is crucial.

As an instance, De caelo 28b4; Rep. 1126a11–12; Rhet. 1360a36–34; EE 1274b; and Protrept. fr. 12 (Dühring's edition).

4Here, for Aristotle, tyche and autavon are still synonymous; a similar usage can be found in Met. 10, 1027a–30 and 1070a6–7. But he distinguishes one from the other in Ph. 1976b18–22, quoted below.

5Ph. 196b10–17.

However scholars usually interpret the passages cited above (see note 4), in Ph. II what is attributed to chance is said to be "for the sake of something." Indeed, it should be noted here that Aristotle's doctrine of chance involves several controversial issues. First, it is necessary to clarify the connection between chance and those processes that are assumed to be "truly teleological." In fact, if we argue that tyche is not in opposition to finality, we have to elucidate why chance processes are, as Aristotle says many times, in conflict with tekhne, proaireis, and physis, all of which imply ends. In systematically studying chance as different from spontaneity, however, he connects chance with those things which are "for the sake of something." In effect, there is some sense in which chance events are supposed to occur for an end or purpose since they somehow involve reason. In order to clear up this point it is worth quoting the following passage:

It is plain, therefore, that among the things which in a general way (haplos) come into being for the sake of something (hexeku tov), if something comes to be not for the sake of that which (actually) occurs, and has an external cause, in this case we say that they are an outcome of spontaneity (apo tou automaton). But something is a consequence of chance (apo tyche) when those things generated by spontaneity are chosen by those who are capable of choosing (tov proaireitouv ekeouai proaireis). (Ph. 197b18–22)

At the beginning of this chapter Aristotle had already said that spontaneity is a wider concept than chance because everything which is apo autavon is apo automaton, but not everything which is the outcome of spontaneity is the result of chance. In the passage just cited he specifies the difference between chance and spontaneity. Spontaneity, which is explicitly distinguished from chance, is present in the things which are generated by nature. Aristotle stresses the fact that when something comes to be contrary to nature (para physin), we do not say that it is due to chance, but to spontaneity. This clearly shows that spontaneous events have an external cause, whereas the cause of chance events is internal, and this internal cause is a subject who is able to choose.

J. G. Lennox, in an illuminating article, shows some of the problems that pertain to Aristotle's treatment of tyche. As he rightly indicates, a lack of consistency should be noted between such claims as "chance events are among the things that are produced for the sake of something." (Ph. 19633, 1976a, 1976b1–22 and assertions which suggest that chance processes are not for the sake of their results (1976a35–45, 197a16, 1996b21–22).

In spite of these passages (and against what Lennox says), I do not believe that in Ph. II an evident attempt to contrast chance processes with truly teleological
processes may be found. There is no doubt, as Lennox affirms, that the thesis that events which occur "for the sake of something" include whatever might have been done (prachthidē) as a result of thought or nature, is not a good example of what could be called "Aristotle’s theory of finality." 11 In my judgment, though, it would be better to avoid speaking of events as truly teleological. My suggestion can gain support if it is taken into account that even when we are acquainted with Aristotle’s "true" doctrine of ends from the principal texts on this topic (texts which might support the standard interpretation of chance), it is only in the passages from Ph. II cited above that Aristotle inserts what might be regarded as a "non-classic distinction" in his viewpoint on finality. And only here in Ph. II is Aristotle so concerned to distinguish what he understands by tyche as something different from automaton. I suppose that, in general terms, Aristotle’s "true doctrine of ends" can be understood as the theory according to which nothing in nature, in the universe, or even in human life occurs at random; that is to say, everything is ordered to some end. This doctrine is based on strong arguments 12 and also on the belief that natural processes (when the issue of finality is specifically applied to nature) are determined not mechanically but by design. In Aristotle’s opinion, we can see more clearly how nature operates when we focus on other living beings, for "they act neither by art, nor after inquiry or deliberation" (Ph. 199a21–30). He is considering, then, that there is order in nature but not an order which depends necessarily on human reason.

Thirdly, we do not always find this kind of explanation when Aristotle deals with chance events. One of the key passages where he strongly defends his doctrine of final cause in the domain of nature is Ph. II 8. There he opposes teleological events to incidental events (including chance events) since incidental events are not occurrences "for the sake of something." 13 After rejecting the thesis that nature does not act to some purpose, Aristotle offers some arguments to show that physics implies an end. Let us take a look at the following text:

We do not state as our opinion that the frequency of rain in winter is the outcome of the chance [tyche] or coincidence [symptomata], but only that there is a lot of rain in the

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11 Lennox, AC, p. 53. The word prachthidē (at 190d22) has provoked considerable discussion among scholars. A. Torstrik intended the emendation "prachthē" to solve the problem. "Peri tychef kai tou automaton: Aristoteles, 8 4–6." Hermes 9 (1873), exp. 445–46. Nevertheless, Torstrik’s suggestion, as has often been noted, is arbitrary since it does not have a textual basis: cf. W. D. Ross, Aristotle’s Physics (Oxford: Clarendon Press, 1979), p. 517–18; Wieland, FT, p. 145 n5; and Lennox, AC, p. 53. But both Philoponus (In Phys. 272, 13–20) and Simplicius (In Phys. 336, 20–33, ed. Duhem), as well as MSS, read or imply prachthidē, so that there is no reason to follow Torstrik’s suggestion.


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**CHANCE**

Dog days. . . . Thus if things appear to be either a result of coincidence [apo symptomata] or for the sake of something [hekenei ton], and if these things cannot be either the outcome of coincidence or spontaneity, then they will be for the sake of something. (Ph. 198b16–19a5)

First it must be noted that the use of tyche, symptomata, and automaton is somewhat confusing. Perhaps Aristotle uses these as synonyms; and in that context "chance" is used in its wide sense, for it is closely associated with "coincidence" and with "spontaneity." I do not think it plausible, therefore, that there is here an effort to contrast chance processes with those processes which are "for the sake of something." Like its occurrence in Ph. 196b13–15 (where chance and spontaneity are taken to have a similar meaning), tyche is used in a wide sense. Strictly speaking, however, chance is always connected with a certain sort of end when it implies a being capable of choosing, a being which acts "for the sake of something" (cf. Ph. 197b20–22).

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**III**

For Aristotle, chance and its outcomes are related to praxis (Ph. 197b) and all practical activity (including art, research, and choice) is to be regarded as bringing about something good, which indeed is its end (cf. EN 1094a). Good fortune (eudaimonia) 14 Aristotle argues, seems to be the other side of the coin of practical or rational activity (praxis) since it is a "doing well," i.e., a state or condition in which one feels well (eudaimonia). 15 Hence chance must be concerned with the sphere of practical activity (ananké prakta einai tén tychen). And it is also something which pertains to human beings who have reached maturity, for neither inanimate things, nor beasts, nor children can ever do anything as a result of chance since they are incapable of choosing (Ph. 197b5–8; see also EN 1115b8).

In my view, the assertion that only those who are able to choose are in turn capable of doing something by chance is crucial to understanding the technical usage of tyche in Ph. II. I think this fact, which scholars sometimes ignore, should be noted in order to grasp why things done by chance are supposed to imply purpose in some way. Aristotle, in Ph. 197b5–9, stresses the point that only rational beings can be lucky; in fact "kósth' hosposois mé . . . poïēsai" (197b5–6) can be interpreted in this way. 16 But in pointing out that neither a beast nor a little child (paideion) can do anything by chance, Aristotle shows that tyche, strictly speaking, belongs to the domain of human beings who have developed their rational capacity at all. It is also worth noting that he thinks children and animals can sometimes perform voluntary acts, and that acts done from sudden
impulse may be characterized as voluntary. In his view, however, not all voluntary acts are dependent on choice, because *proairetik* involves deliberation (NE III 1–2, esp. 1112a13–17).

In Ph. 197b5–8, then, the question of finitude seems to be closely linked with *ta apo tychés*. Unfortunately, the development of Aristotle's doctrine of chance in its details has a number of difficulties, perhaps the greatest of which is how to reconcile two opposite claims each of which in its own context turns out to be equally tenable. I refer to the apparent lack of consistency between such claims as "chance events are for the sake of something" and "chance events are not for the sake of their results." Another related, crucial problem concerns the meaning of "*whatever might have been done [prachthētē]* as a result of thought or of nature" (Ph. 196b21–22). In what follows I shall, first, provide an argument to explain this inconsistency, and second, try to show how *prachthētē* might be understood.

IV

Aristotle usually affirms that chance processes are incidental. In Ph. 196b29–33 he maintains that when in the case of things done for the sake of one thing something else is generated incidentally, the consequence is said to be by chance. (It must be noted that in this passage Aristotle explicitly remarks that *tyche* and *automaton* are not here to be taken as distinct, for he says that "we shall determine later the differences between them, but at present it must be taken as evident that both are included within what is for the sake of something.") Although in chance events there is no "true" teleology in the usual sense, nonetheless I think that there is a certain kind of finitude present in things attributable to chance. Even if chance is characterized as an "incidental cause," it is not insignificant in those events which could be called "teleological-causal processes."

Although Aristotle says that in its absolute sense (*katal*) chance is the cause of nothing (Ph. 197a14), it should be recalled that in those things that come about by chance, causality is not lacking, but only a completely determinate line of causality. The *per se* cause is determinate (for example, someone's housebuilding skill; Ph. 196b26), but the incidental cause is indeterminate (for example, that the person is pale or musical) since any number of things could turn out to belong to the cause of what results (Ph. 196b28–29). The consequence of chance processes is not evident beforehand, but is a result of the coincidence of different and independent teleological connections which can coincide. This coincidence of distinct teleological elements explains why chance events always deal with the incidental.\

18I think Clapham is right in noting that "there is no conflict between the thesis that everything has a *definite* cause, and that some things are due to chance." In effect, as he argues, the same thing under one standpoint may have a definite or determinate cause, and under another may be due to chance (p. 108).

19At this point I follow Wiedan's view (PT, p. 146). It should be taken into account that, as he pointed out (PT, p. 146 note), the builder who is incidentally white or a flute-player (cf. Ph. 197a14f.) is not an example of a chance cause, but only of an accidental one. At any rate the example is pertinent because, in Aristotle's view, chance is an accidental cause. I do not agree with R. Smith when he says that "those [tyche and automaton] reveally are not causes or explanations for events, but rather *causes of causality*" (my italics). "Filling in Nature's Deficiencies," in A. Press and J. P. Anton, eds., Essays in Ancient Greek Philosophy: V. Aristotle's Ontology (Albany: SUNY Press, 1992), p. 300. *Tychē* and *automaton* are not "real" causes due to the fact that they are not *per se* or determinate causes. Nevertheless, they are *per accidentem* or indeterminate causes which are used to explain some kinds of events (cf. Ph. 196b23–28).
unplanned encounter in the marketplace, purpose in some sense is involved.
Thus, I think, it could be said that in the human sphere coincidence is neither
always nor necessarily an exceptional occurrence, because in such an occurrence
there are different teleological elements which can coincide. I want to emphasize
this point because if this is taken into account, I believe it shows more clearly the
difference between automaton, which is restricted to the field of nature, and
tychē, which refers only to the human sphere.
If this is so, we would have to conclude that chance belongs to the ethical
rather than to the physical sphere. In human praxis there is an indetermination
which in some sense can be directed. At this point it would be useful to note
Aristotle’s distinction between rational and non-rational potencies. While the
former have more than one direction, the latter have only one. Chance is an “as
if” (as Wieland says) because it is a potency (characteristic of human adults)
capable of moving toward different goals.29 If this approach is right, then in the
province of human rational activity chance events are neither always nor neces-
sarily exceptional occurrences.
The other controversial point concerns the complicated problem of what
Aristotle means when he speaks of praktheiē and of “that for the sake of which”
in Ph. 166b21–22. Different explanations have been given. Charlton connects
the verb praktheiē with what is said in 166b23–24; he maintains that chance events
come about by virtue of concurrence, “i.e. things which, though they might have
been done for something, in fact were not.”20 I think that, on the one hand, he is
right because this is a very plausible explanation of chance events; but, on the
other hand, his account leaves aside the actual problem, that is to say, what
Aristotle intends to say when he affirms that whatever might be done (praktheiē)
by thought or nature is for the sake of something (heneka tou). I mean that in this
case the problem is focused on whether here heneka tou signifies “designed to
attain an end” or “actually attaining something which either was, or might
naturally have been, taken as an end.”21 Ross points out that in EN 1111a5 (where
it is said that some actions are for the sake of their results even if that conse-
quence was not intended by the agent) chance processes might be seen as those
in which a result occurs which might have been taken as an end (although not
actually so intended).

Lennox, on his part, suggests that:

Aristotle is willing to describe chance processes as for the sake of their results provided
certain conditions are met. When he [Aristotle] 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 alia of) the process that led to it:
nonetheless, the result was valuable for the agent, and was the sort of thing that is
typically achieved by goal-directed activity.

Cf. Met. 1096a36ff.; actually, Aristotle says only that rational potencies can produce contrary
effects, but it is implied that they involve more than a direction.

This last paragraph I am indebted to Prof. Alejandro G. Vigo, who has brought to my attention
the Aristotelian distinction between rational and non-rational potencies as a possible solution to the
chance problem.

Charlton, p. 106.
Ross, p. 517.
Lennox, AC, p. 58.

Lennox’s explanation at this point is also plausible, but it does not clarify
Aristotle’s words in Ph. 166b22–23 that “whatever might have been done by
thought or nature is for the sake of something.”

Lennox notes the remarks of Simplicius, who suggests that in the case of the
marketplace example, chance processes appear to be goal-directed activities not
because they are so, but because they might have come to be for the sake of
something (In Phys. 366, 27–29). As Lennox observes, Simplicius’ view takes for
granted that chance events appear to be goal-directed activities because “the
result is something which might have been done for that result.”22 Lennox
considers it difficult to accept Simplicius’ solution because it forces us to take
seriously the proposition “whatever might be done . . . .” We might wonder, of
course, why this proposition should not be taken seriously, for in spite of what
Lennox says, the fact is that the statement mentioned above is made by Aristotle,
and if we want to be consistent, we should take that proposition as seriously as we
do other Aristotelian propositions which do not conform to a standard
interpretation. Here, I think, Aristotle is providing a sense of finality (applied to
chance events) which does not fit the standard explanation of “that which is for
the sake of something.”

Finally, if my approach to the problem of chance-teleology is right, I suggest
that the verb praktheiē in Ph. 166b22 might be interpreted as follows. First, it is
worth pointing out (as scholars have done) that there is a difficulty because the
characterization of “what are done for the sake of something” involves a sort of
“unreal” possibility. In effect, Aristotle here seems to take as true that what
might have been done (praktheiē) by thought or by nature are for the sake of
something, although not actually so intended. Second, it should also be noted
that this characterization of finality is applied to chance events (Ph. 166b23–24).
This makes me think that Aristotle believed that chance is supposed to imply an
end in some way. This sense of finality is related to the incidental feature that
belongs characteristically to chance and its results. This is what we mean when we
argue that in Aristotle’s example, the meeting between the creditor and his
debtor is by chance, for such a meeting was not a primary goal of either. In this
example, then, there is no room for speaking of any “true” teleological connec-
tions, because what might have been done for the sake of some end was not
actually undertaken for that purpose.

Finally, I want to make brief reference to the function of chance in the sphere
of human action. It is well known that in Aristotle’s view to admit absolute
determinism gives rise to a serious problem concerning the role of free will in
decision making or in establishing responsibility for an action. According to
Aristotle, one is responsible only for the voluntary actions performed subsequent
to deliberate choice (cf. EE 1223a9–20). We also are aware of the decisive role of
deliberation (boulēsis) not only in determining moral virtue but also in practical
wisdom (EN 1144a5ff.), and we deliberate only about those things that depend on
(peculiar) causes and are matters of moral action (EN 1112a30–31).

The contingency of chance events, however, has often been considered crucial

22Ibid., p. 34.
to the issue of determinism. In fact, Aristotle discusses whether all events are determined by necessary chains of causation, but rejects this possibility, insisting instead that without chance happenings everything would occur of necessity (Met. 1027a30-b14). But, as Sharples has pointed out, Aristotle does not seem to distinguish (i) that "there are events which are not predetermined" and (ii) that "there are some things that do not always happen in the same way." According to Aristotle, some of his predecessors maintained that everything is determined, while others denied that chance and spontaneity exist. Aristotle, however, argues against such determinism, often emphasizing the practical side of the problem; thus he argues that should everything be and happen of necessity, "there would be no need to deliberate or to take trouble (thinking that if we do this, this will happen, but if we do not, it will not)." 22 Aristotle also observes that "what will be has an origin both in deliberation and in action, and that, in general, in things that are not always actual, there is the possibility of being and not being" (De int. 19a7–10; Ackrill's translation). Hence he draws the conclusion that not everything is or occurs of necessity, but that some things are the result of chance (see men hopoter etychē; De int. 19a19).

These passages seem to show, on the one hand, that Aristotle faced the problem of determinism, 20 and clarify, on the other hand, the importance of chance in avoiding the assumption that every event in the world is caused in an absolute way. Chance as a form of incidental causality carries a great deal of weight in Aristotle's theoretical philosophy as well as in his practical philosophy. In fact, chance appears to be the concept that joins both kinds of knowledge, and it is the element that breaks the possible causal sequences in the realm of nature. And finally, as I have argued, the existence of a certain kind of possibility may be maintained not only in chance but also in the events attributed to it, for the concept of etychē is explained by direct reference to choice, which involves deliberation and thus reference to an end and to purpose. I admit, however, that the teleology in chance is peculiar and one that it differs from the finality that can be adverted to in processes considered "true" in the standard interpretation. For in chance events an agent's activity does not take the intended course, nor can chance's results be foreseen.

21 This is the common view that Aristotle was unaware of the problem of determinism (see, for example, P. Huby, "The First Discovery of the Freewill Problem." Philosophy 42 [1967], 353–62). It is the conclusion discovered in Hellenistic times. But according to Sorabji (NCB, pp. 243–49), Aristotle "does sometimes produce arguments against determinism," and further, "Aristotle thinks of causation in a deterministic, but . . . the view that not only is determinism true, but that also, because of it, there is no such thing as moral responsibility or voluntary action" (p. 244).


23 Cf. Ph. 19a19–23; here Aristotle is thinking of Empedocles who in his cosmos makes use of chance (tyche) but does not give it an operative function. For Aristotle, however, chance is a cause, even if it falls under the accidental.


25 It is true that the classic notion of determinism, i.e., a thesis according to which "every state of affairs is a necessary consequence of any and every preceding state of affairs," is almost entirely absent from Aristotle's approach to the physical world (cf. Sharples, p. 4). If this is so, we should accept that Aristotle was not concerned with how to guarantee that every event in the world was causally determined. But I think he saw the ethical consequences of positing a physical model, implying that "every state of affairs is a necessary consequence of every preceding state of affairs."