

being-at-work of anything. The look disclosed in speech is that to which we pay attention when we recognize anything as belonging to a kind. This notion of form comes to Aristotle from his teacher Plato, but Aristotle develops the idea of form first into that which anything keeps on being in order to be at all, and thus into the activity that makes each thing what it is. Form is nature because it is the inner source of being-at-work in anything that has such a source. But a human being, for instance, is not just a source of its own motion, but can be, as a parent, the source of coming-into-being in another, or, as a legislator, the source of going-to-war by other people. This third kind of cause is not what came to be called the "efficient cause"; that refers to a proximate, incidental cause such as a push or a bump, in which Aristotle has no interest. Causes in Aristotle's sense always stand at the beginning of chains of responsibility, so that they can be adequate answers to the question, Why? The most complete answer to that question is always found in the fourth kind of cause, the end or completion for the sake of which anything does anything. This has two senses, described by Aristotle in other places as the "for which" and the "of which." Sometimes animals act for the sake of their offspring, or wheat seeds are ground up to make bread for humans, but all such instances of external ends presuppose internal ends prior to them. The children for whom parents sacrifice must have lives in which they find completion, the kernels of wheat must be nutritive for the wheat plant itself if they are to be of any use to other species, and so on. Aristotle's "teleology" does not impose the human idea of purpose onto non-human nature, but recognizes that all natural beings are whole and act so as to preserve that wholeness and fulfill its potencies. Final causality governs the action of formal causes, and thus characterizes the whole realm of nature. This topic leads to the next part of the inquiry.

## Book II, Chapters 4–9

### Chance and Necessity

#### Chapter 4

195b, 30 Fortune and chance are spoken of among the causes, and many things are said to be and to come about through fortune or through chance. In what way, then, fortune and chance are among these causes, and whether fortune and chance are the same or different, 196a and in general what fortune and chance are, must be examined. For some people are at an impasse even about whether they exist or not. For they say nothing comes about from fortune, but that, for everything whatever that we say comes from chance or fortune, there is some definite cause; for example, of coming by fortune into the marketplace and catching up with someone whom one wanted, but did not expect, to find, the cause is wanting to go to use the marketplace. And similarly with the rest of the things said to be from fortune, there is always something to take as the cause, but not fortune, since if fortune were anything it would seem strange, and truly so, and one might find it impossible to understand why in the world none of the ancient wise men, speaking about the causes of coming-to-be 10 and passing away, demarcated anything about fortune, but as it seems, they too regarded nothing as being from fortune. But this too is to be wondered at. For many things both come about and are from fortune and from chance, which everyone, though not ignorant that it is possible to refer each of them back to some cause of its coming about, which the earlier argument declared to be the abolition of fortune, nevertheless says are from fortune, some of them, though some are not. For this reason they were obliged to make some mention of it in some way. But surely they did not regard fortune to be any of those things such as friendship and strife, or intellect, or fire, or anything else of that sort. It is strange, then, 20 either if they did not acknowledge it to be, or if, supposing it, they left it aside, despite even sometimes making use of it, as Empedocles says that the air is not always separated in the

highest place, but however it falls out. Certainly he says in his cosmogony that "it fell out thus as it was flowing at one time, but often otherwise." And most of them say that the parts of animals have come into being from fortune.

There are some who make chance responsible for this cosmos and all worlds. For they say that by chance there came about a vortex and a motion of separating out and settling into this arrangement of the whole. And this itself is in fact mightily worth *30* wondering at. For they are saying that animals and plants neither are nor come to be by fortune, but that either nature or intellect or some other such thing is the cause (for what comes into being from each seed is not whatever falls out, but from this one an olive tree, from that one a human being), but that the heavens and the most divine of visible things have come from chance, and there is in no way such a cause as there is of the animals and *196b* plants. But if this is the way things are, this itself is worth bringing one to a stop, and it would have been good for something to have been said about it. In this respect as well as others, what is said is strange, and it is stranger still to say these things when one sees nothing in the heavens happening by chance, but many things falling out by fortune among the things not assigned to fortune, though it would surely seem that the opposite would happen.

There are others to whom it seems that fortune is a cause, but one not disclosed to human understanding, as though it were something divine and more appropriate to miraculous agency. So it is necessary to examine what each is, and whether chance and fortune are the same or different, and how they fall in with the causes that have been marked out.

## Chapter 5

*10* First, then, since we see some things always happening in a certain way, and others for the most part, it is clear that of neither of these is fortune or what comes from fortune said to be the cause, neither of what is out of necessity and always, nor of what is for the most part. But since there are other things besides these that happen, and everyone says that they are from fortune, it is clear that fortune or chance is in some way. For we know that things of this kind are from fortune and that things from fortune are of this kind.

Now of things that happen, some happen for the sake of something and some not (and of the former, some in accordance with choice, some not in accordance with choice, but *20* both are among things for the sake of something), so that it is clear that even among things apart from what is necessary or for the most part, there are some to which it is possible that being for the sake of something belongs. And for the sake of something are as many things as are brought about from thinking or from nature. But whenever such things come about incidentally, we say that they are from fortune. (For just as a thing is something either in virtue of itself or incidentally, so also is it possible to be a cause, as of a house, the cause in virtue of itself is the builder's art, but an incidental one is the pale or educated man; the cause in virtue of itself, then, is definite, but the incidental one indefinite, for to one thing, infinitely many things incidentally belong.) Just as was said, then, whenever this happens among things happening for the sake of something, in that case it is said to be from chance or from fortune. (The difference between these in relation to one another is something that must *30* be distinguished later; for now let this be clearly seen, that both are among the things for the sake of something.) For example, someone gathering contributions would have come for the sake of collecting money, if he had known; but he came not for the sake of this, but it happened to him incidentally to go and to do this. And this was not through frequenting *197a* the place for the most part or out of necessity, but the end, the collection, though not belonging to the causes in him, is among choices and things that result from thinking. And in this case he is said to have come by fortune, but if he had chosen to, and for the sake of this, or if he frequented the place always or for the most part, not by fortune. It is clear then that fortune is an incidental cause among things proceeding from choice, which in turn are among those for the sake of something. Whence thinking and fortune concern the same thing, for there is no choice without thinking.

It is necessary, then, that the causes be indefinite from which what arises from fortune *10* comes about. Whence fortune too seems to be indefinite, and obscure to humans, and it is possible for it to seem that nothing comes about from fortune. For all these things are said correctly, reasonably. That is, there are things that come about from fortune; they come about incidentally, and fortune

is an incidental cause, but of nothing is it the cause simply. As of a house, the cause is the builder's art, but incidentally a flute-player, also of coming to collect money when one has not come for the sake of this, the multitude of causes is unlimited. One wanted either to see someone, or look for someone, or get away from someone, or see a show. It is even correct to say that fortune is something non-rational, for 20 a reasoned account belongs to what happens either always or for the most part, and fortune is among things that come about outside of these ways. Thus, since causes of this kind are indefinite, fortune too is indefinite. Still, in some situations, one might be at a loss whether the things that happen to occur would become causes of fortune, as of health, the wind or the sun's warmth, but not having had a haircut. For among incidental causes, some are nearer than others.

Whenever something good turns out, fortune is called good, or indifferent when it is something indifferent, but good fortune or ill fortune are only spoken of when these outcomes are of some magnitude. For this reason too, to come within a hairsbreadth of obtaining some great evil or good is to be fortunate or unfortunate, because our thinking 30 picks out what comes out, but seems to hold off what was within a hairsbreadth as nothing. Further, good fortune is unstable, and reasonably, for fortune is unstable, since it is not possible for any of the things from fortune to be always or for the most part. Both, then, are causes, incidental ones as was said, both fortune and chance, among those things which admit of coming into being neither simply nor for the most part, belonging in turn to those which could come about for the sake of something.

## Chapter 6

They differ because chance is more extensive, for everything from fortune is 197b from chance, but not everything from it is from fortune. For fortune and what comes from fortune are present to beings to whom being fortunate, or generally, action, might belong. For this reason also, fortune is necessarily concerned with actions. (A sign is that good fortune seems to be either the same thing as happiness or nearly so, while happiness is a kind of action, namely doing well.) So whatever cannot act cannot do anything as a result

of fortune either. And for this reason no inanimate thing nor any animal or small child can do anything as a result of fortune, because they do not have the power to choose in advance. 10 Neither good fortune nor misfortune belongs to them, except metaphorically, as Protagoras says the stones out of which altars are made are fortunate, because they are honored, while their quarry-mates are trampled on. But it belongs even to these things to be affected by fortune, whenever an active being acts on them in some way that results from fortune, but in no other way. Chance, though, belongs to the other animals and to many inanimate things, as we say a horse came along by chance, because he was saved by his coming, though he did not come for the sake of the being saved. Or a tripod fell down by chance, for it stood there in order to be sat upon, but did not fall down in order to be sat upon. So it is clear, among things happening for the sake of something simply, whenever they happen not 20 for the sake of what turned out, of which the cause was external, we then say that they are from chance. And as many of these things that happen by chance as are choices, and happen to those having the power of choice, are from fortune.

A sign of this is the phrase "in vain," which is said whenever what is for the sake of another thing does not come to pass for the sake of that, as, if taking a walk were for the sake of evacuation, but when one had walked this did not happen, we would say that having walked was vain and taking a walk futile, as though this was the "in vain": for something by nature for the sake of another thing, the not being brought to accomplishment of that for the sake of which it was and to which it was naturally disposed, since if someone said he had bathed in vain because the sun was not eclipsed, it would be ridiculous, for this was not for 30 the sake of that. Thus, even from its name, chance [*ho automaton*] is that which itself happens in vain [*ho auto matōn*]. For the stone fell not for the sake of knocking someone out; therefore the stone fell by chance, because it could have fallen by some agency and for the sake of the knocking out.

Chance is separated most of all from what comes from fortune in things that happen by nature. For whenever something happens contrary to nature, we say that it happened not by fortune but by chance. But it is also possible that this is for a different reason, since of the one the cause is outside, of the other inside.

198a. What, then, chance and fortune are has been said, and how they differ from each other. And of the ways of being a cause, both of them are among things from which the source of motion is; for they are always among either things in some way by nature, or causes that come from thinking, but the multitude of them is infinite. But since chance and fortune are causes of things for which either intelligence or nature might have been responsible, whenever something incidentally becomes responsible for these same things, but nothing incidentally is prior to things in virtue of themselves, it is clear that neither is the 10 incidental cause prior to what is in virtue of itself. Therefore chance and fortune are subordinate to intelligence and nature, so that if chance is responsible for the heavens as much as possible, it is necessary that intelligence and nature have a prior responsibility, not only for many other things, but also for this whole.<sup>1</sup>

## Chapter 7

That there are causes, and that they are as many in number as we said, is clear, for the why includes so many in number. For the why ultimately leads back either to the what-it-is, among motionless things (as in mathematics, for it ultimately leads back to the definition of straight or commensurable or something else), or to the first source of motion (as, Why 20 did they go to war? Because they were plundered), or something for the sake of which (in order to rule), or, among things that come into being, the material.

That the causes, then, are these and this many, is clear; and since there are four causes, it belongs to the one who studies nature to know about all of them, and he will supply what is due in the way of natural inquiry by tracing back the why to them all: the material, the form, the mover, and that for the sake of which. But often three of them turn back into one, for the what-it-is and that for the sake of which are one, and that whence the motion first is, is the same in form with these; for a human being brings forth a human being, and in general, as many things as, being moved themselves, cause motion, are the same in form with the things moved. (Whatever is not like this does not belong to the study of nature. For it causes motion not by having motion or a source of motion in itself, but being

motionless. On which account there are 30 three studies, one about motionless things, one about things moved but indestructible, and one about destructible things.) So they supply what is due by tracing back the why to the material, and to the what-it-is, and to the first mover. About coming into being, they examine the cause mostly in this way: what comes about after what, and what did it do first, or how was it acted upon, and so on always in succession.

The sources which bring about motion naturally are twofold, of which one kind is 198b not natural, for sources of that kind do not have in themselves a source of motion. And of this kind is whatever causes motion without being moved, as does not only what is completely motionless and the first of all beings, but also the what-it-is or form, for it is an end and that for the sake of which. So, since nature is for the sake of something, it is also necessary to know this, and one must supply the why completely: for example, that from this necessarily comes that (from this either simply or for the most part), and that if it is going to be, this will be (as from the premises, the conclusion), and that this is what it is for it to be, and because it is better thus, not simply, but in relation to the thinghood of each thing.

## Chapter 8

10 One must say, first, why nature is among the causes for the sake of something, then, about the necessary, how it holds a place among natural things. For everybody traces things back to this cause, inasmuch as, since the hot and the cold and each thing of this kind are by nature a certain way, these things are and come into being out of necessity. For even if they also speak of another cause, they send it on its way after only so much as touching on it, one on friendship and strife, another on intellect.

Here is an impasse: what prevents nature from doing things not for the sake of anything, nor because they are best, but just as Zeus rains, not in order that the grain might grow, but out of necessity? (For it is necessary that what is taken up be cooled, and that 20 what is cooled, becoming water, come down; when this happens, growing incidentally happens to the grain.) Likewise, if the grain is ruined on the threshing-floor, not for the sake of this did it rain, to spoil it, but this was incidental. So what prevents the parts

in something that is by nature from being the same way, say the teeth growing with the front ones sharp out of necessity, suitable for tearing, but the molars flat and useful for grinding the food, although not happening for the sake of this, but just falling together? Likewise with the other parts, to however many being for the sake of something seems to belong, 30 wherever everything happened to come together just as if it had been for the sake of something, these were preserved, having been put together advantageously by chance. Anything that is not like that has perished and still perishes, just as Empedocles says of man-headed offspring of cattle.

The account, then, by means of which one might come to an impasse, is this one or any other that might be of this kind; but it is impossible for things to be this way. For these things and all things that are by nature come about as they do either always or for the most part, but none of the things from fortune or chance do. For it does not seem to be from 199a fortune or by coincidence that it rains often in winter, but it does if this happens in the dog days, nor scorching heat in the dog days, but in winter. If, then, it seems that something is either by coincidence or for the sake of something, and if things by nature cannot be by either coincidence or chance, they would be for the sake of something. But surely such things are all by nature, as even those making these arguments would say. Therefore, there is being-for-the-sake-of-something among things that happen and are by nature.

Further, among all things that are for some end, it is for the sake of this that what precedes it in succession is done. Accordingly, in the way that one performs an action, so 10 also are things by nature, and as things are by nature, so does one perform each action unless something interferes. But one acts for the sake of something, and therefore what is by nature is for the sake of something. For example, if a house were something that came into being by nature, it would come about in just the way that it now does by art, and if the things by nature were to come about not only by nature but also by art, they too would come about in exactly the same way as they do by nature. Therefore each is for the sake of another. And in general, art in some cases completes what nature is unable to finish off, but in others imitates nature. If then, what comes from art is for the sake of something, it is clear that what

comes from nature is too, for the series of things from art 20 and from nature are alike, each to each, in the way that the later things are related to the earlier.

This is clear most of all in the other animals, which do nothing by art, inquiry, or deliberation; for which reason some people are completely at a loss whether it is by intelligence or in some other way that spiders, ants, and such things work. But if we move forward little by little in this way, it becomes apparent that even in plants what is brought together comes about in relation to the end, as the leaves for the sake of protection for the fruit. So if both by nature and for the sake of something the swallow makes a nest and the spider a web, and the plants make their leaves for the sake of their fruit, and their roots not 30 upward but downward for the sake of nourishment, it is clear that there is such a cause in things that come into being and are by nature. And since nature is twofold, both material and form, and the latter is an end but the former is for the sake of an end, the form would be the cause for the sake of which.

Now missing the mark happens even among things done according to art (for the grammarian on occasion writes, or the doctor gives out a drug, incorrectly), so it is clear that 199b this is possible also among things done by nature. But if there are some things according to art in which what is done correctly is for the sake of something, but in the ones that miss the mark what is done is for the sake of something that is attempted but missed, it is the same among natural things, and monsters are failures of that for the sake of which they are. Therefore even the cattle-offspring, in their original constitution, if they were not able to come to some limit and end, would have come into being when some originating cause in them was disabled, as might happen now with the seed. Still it is necessary that a seed come into being first, and not straightaway the animals; "first the mixed-natured" was the seed. 10 That for the sake of which is also present in plants, though less articulated. So then did there come about among the plants, like the man-headed offspring of cattle, also olive-headed offspring of grapevines, or not? It would be strange, but it would be necessary, if it also happened among animals.

In general, it would be necessary, among seeds, that whatever chanced come into being, but the one speaking this way abolishes nature and what is by nature. For by nature are as many things as, moved continuously by some source in themselves, reach some

end; from each beginning does not come the same end for them all, nor just what chances, but each always reaches the same end unless something interferes. That for the sake of which, and that which is for the sake of this, might also happen by fortune, as we say that a stranger 20 came by fortune and, having paid the ransom, went away, when he acted as though having come for the sake of this, but did not come for the sake of this. And this is incidental (for fortune is among the incidental causes, just as we said before), but whenever this happens always or for the most part, it is neither incidental nor by fortune. But among natural things, things happen always in the same way, unless something interferes.

It is absurd to think that a thing does not happen for the sake of something if we do not see what sets it in motion deliberating. Surely even art does not deliberate. If shipbuilding were present in wood, it would act in the same way as nature does, so if being 30 for the sake of something is present in art, it is also present in nature. This is most clear when someone practices medicine himself on himself; for nature is like that. That, then, nature is a cause, and in this way, for the sake of something, is clear.

## Chapter 9

Does what is by necessity belong to things conditionally or simply? For now 200a people suppose that what is by necessity is in the coming into being of things, as if someone were to think that the wall of a house came into being by necessity, because the heavy things are of a nature to be carried downward and the light ones on top, so that the stones and foundations are at the bottom, the earth above on account of its lightness, and at the very top the wood, since it is lightest. But even though it did not come into being without these things, it surely did not do so as a result of them, except as by means of material, but rather for the sake of enclosing and sheltering certain things. And similarly with everything else, in whatever being-for-the-sake-of something is present, each thing is neither without things 10 having necessity in their nature, nor as a result of them other than as material, but for the sake of something. For example, why is a saw thus? In order to do this and for the sake of this. But this which it is for the sake of

would be incapable of coming about if it were not made of iron. It is necessary, therefore, that it be of iron if the saw and its work are to be. So the necessary is conditional, unlike the end. For the necessary is in the material, but that for the sake of which is in what is grasped in speech.

The necessary is present both in mathematics and in things that come about by nature, in ways closely resembling one another. For since the straight is a certain way, it is necessary that the triangle be equal to two right angles, but not the former because of the latter, despite the fact that were this not so, neither would the straight be as it is. But in 20 things that come to be for the sake of something, contrariwise, if the end is to be or is, then what precedes it will be or is; and if not, just as there [in mathematics] the first principle will not be so when the conclusion is not, so also here [in nature] with the end and that for the sake of which. For this too is a starting point, not of action but of reasoning (and of reasoning there; for there are no actions). So that if a house is to be, it is necessary that there come into being or be present or in general be these things as material for the sake of something, such as bricks and stones if it is a house. Nevertheless, the end is not present as a result of these, other than as material, nor will it be, just because of them. In general, however, neither the house nor the 30 saw will be if the bricks, in the former case, and the iron in the latter, are not; for neither will the starting points be the case there if the triangle is not two right angles.

It is clear that the necessary in natural things is the so-called material and its motions. And both must be stated as causes by the one who studies nature, but more so that for the sake of which. For this is responsible for the material, but the material is not responsible for the end. And the end is that for the sake of which, and the beginning comes from the definition and that which is grasped in speech; just as in things that come from art, since the 200b house is such, these things must come into being or be present necessarily, and since health is such, these things must come into being or be present necessarily—so also if a human being is such, these things, but if these, these others in turn. Perhaps the necessary is even in the definition. For the work of sawing having been defined as a certain kind of dividing, this will not be unless it has teeth of a certain kind, and these will not be of that kind unless they are of iron. For even in the definition there are certain parts, as material of the definition.

## Commentary on Book II, Chapters 4–9

Aristotle's four kinds of cause apply to everything that is by nature, and analogies to them apply to products of human art. But are there not some things that happen with no end or form governing them, just by chance or by mere necessity? Aristotle repeatedly remarks on the strangeness of everything said about chance by his predecessors, who either give it the ultimate responsibility for the world or abolish it altogether, or even do both. This combination is present in much of the thought of our times as well, in which the world itself (compare 196a, 27, with Chapter 6 of Descartes' *Le Monde*) and all living things (compare 198b, 29, and the other reference to Empedocles at 199b, 9, with Darwin's *Origin of Species*) are said to come about by chance but then run along in constant ways determined rigidly by necessity. Even the idea of "laws of nature," expressed in algebraic equations, implies that everything is governed by chance and necessity together, since values are plugged in to one side of the equation arbitrarily, and ground out on the other side necessarily.

Aristotle sees chance and necessity as missing the realm of nature altogether, on opposite sides. Natural beings and events display constant patterns that cannot be the result of chance alone, but they never display the machine-like uniformity of necessary determinism. Nature looks to the whole being or the whole activity, with a flexibility about parts, means, and other incidental attributes. In nature things happen in certain ways "for the most part." The world contains many things of many kinds, not running their course in isolation but interacting in ways that are literally innumerable. When two or more lines of causes cross, the result is incidental or accidental. Incidentally the housebuilder is a flute-player; accidentally the rock fell on someone's head. But each thing must first be something and act in accordance with what it is, before it can interact by chance with anything else. Chance is a genuine and widespread part of the world, but a subordinate one, and the mysterious thing called fortune is just chance that befalls human beings.

The famous example of the rain that spoils the crop that has already been harvested is widely discussed but rarely understood. This is Aristotle's own fault, since he leaves so much of the argument inexplicit. As with Antiphon's bed in II, 1, where we had to see for ourselves that whole trees of definite kinds, and not mere wood,

are the only things that could sprout from rotting wood, in the way that human beings come from human beings, the crucial point about rain is left for us to supply (or is so obvious to Aristotle's students that it is taken for granted). The phrase "Zeus rains" is an idiomatic expression taken from Homer, but if we believe that rain happens by nature then we must recall the definition of nature. What is the being to which the activity of rain belongs *primarily*, as the result of an internal source of motion? The whole being is not clouds or air or water, each of which remains by nature in a certain region of the cosmos, but it is the cosmos as a whole; in the whole, evaporation and rain always balance out in the long run, and are governed by the yearly course of the sun up and down the sky. Like everything else in nature, rain is activity for the sake of an end, but the end is the maintenance of the cosmos. Rain is an activity of the cosmos. Rain also contributes to the growth of crops, but the relation between rain and any particular wheat-field is subject to a great deal of chance, since fostering wheat is incidental to the end that belongs to the cosmos. Rain is for the sake of crops in at most the secondary sense of final causality, the "for which" as opposed to the "of which." The incidental ruining of one harvest by rain that comes just too late, or of another by a dry spell that comes too early, is in either case a result subordinate to the true and primary causes at work in the cosmos and in wheat.

When Aristotle argues that (a) nothing that happens for the most part is by chance and (b) everything that is not by chance is for the sake of something, the argument is not presented in a vacuum and meant to stand as a demonstration. It depends upon the recognition and definition of nature in II, 1. In that context, the argument shows that all events either are end-directed, by nature or by human choice, or result from the incidental combination of two or more activities that are end-directed. Chance does not fall outside the realm of ends, but depends upon ends. Final causes, causes for the sake of which, govern all other causes, incidental and non-incidental as well. It is clear that the material cause is subordinate to the others, and in nature the other three kinds of cause are one. The end of any natural being is to live the life given by its form, and the external source of its coming into being is the form transmitted by its parents into its embryonic material. The material has to be suitable, and hence it contributes necessary conditions of the natural being, and this is