Rationalism in Greek Philosophy
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Aristotle

THE RATIONALISM OF ARISTOTLE led him to construct a world which was similar to Plato's in some respects and vastly different in others. The world of ideas was matched by Aristotle's world of reason, but whereas the former was a set of propositions, intellectual in their nature, open to contemplation, the latter was a fixed set of events which might be named the Order of Nature. Both worlds were eternal and invariable, but there was more of a tendency on Aristotle's part to look for the eternal in the temporal than there was on Plato's. Neither trusted sensory observation to give one the truth. In Plato, as we have seen, one might have true opinion about the perceptual world but no knowledge; in Aristotle one could grasp particulars through observation, and by some process, never clearly defined, universals would emerge out of them, but he too maintained that there was no knowledge of particulars. He introduced a concept which occupies no place in Plato's system, the concept of chance. To Aristotle chance was a genuine cause of events in spite of the fact that one could neither foresee its action nor formulate any laws about its effects. He also introduced a new vocabulary to describe change, a vocabulary
which has survived into our own times, and by the invention of such terms as potency and actuality he seemed to many to explain why change proceeded as it did. And whereas in Plato logical processes were utilized, as they must be by anyone who reasons, but left unsystematized, in Aristotle they were codified into a set of rules for thought. Perhaps the most important point of agreement between the two men was their common acceptance of teleological explanation. We shall now follow our procedure of beginning with the distinction which Aristotle, like his predecessors, made between appearance and reality.

I

Like his master he was looking for that which was permanent in the world, and instead of finding it in some material substance, or in atoms, or mathematical principles, or in the Ideas, he found it in a set of laws which were universally applicable. He assumed—he did not prove—the split between what things would be like if they were organized rationally and what things appear to be like to observation.¹ This assumption is inevitable unless one is prepared to accept all the diversities, conflicts, and exceptions to law of the world of observation and to give up the search for general laws. The most important of Aristotle’s laws was what one might call the Law of Natural Development.

According to this principle, everything which exists in time, inanimate as well as animate, develops or changes in a set manner from what he called matter to what he called form. The form of anything was in all probability a descendant of the Platonic idea, but instead of existing apart from the thing of which it was the form, it was found in normal experience embedded in the matter from which it emerged. The familiar example of this is the development of the chick out of its egg or of a tree out of its seed. By

applying the terminology of potency and actuality to such processes, Aristotle gave his readers the impression that occurrences were simply the uncovering of the permanent. If one says that the oak is potentially in the acorn, the statue potentially in the marble, the chicken potentially in the egg, one has the feeling that development consists of nothing more than pulling the rabbit out of the hat: it was there all the time. There were two types of evidence for the theory of actualization. Cabbages did come out of cabbage seeds and not out of radish seeds. All living things developed in accordance with a predictable set of stages. There might of course be interruptions, of which we shall speak later, such as someone's frying an egg before it turned into a chicken, but for Aristotle that which happened, as he constantly said, “on the whole” or “for the most part” determined the rule. He was not strictly obedient to this principle as a matter of fact, for he first subtracted human interference from the course of history and imagined a world as it would have been if people were not always upsetting the natural development of seeds and eggs. At the same time he did recognize that something else, which he called Chance, was as likely to upset events as human beings were. But of that too, more later.

The second bit of evidence came from art. The architect builds a house according to plan and the builders fashion the wood and other materials to realize the architect's plan. Were Nature to build a house, he says, she would do it in the same way as the architect does. Each step in the process of building is as it is because of the idea which the architect has in mind and which he uses to control the activity of the carpenters. Similarly the physician has an idea of curing a disease, the idea here being a plan of action, and puts it into practice in his profession. It is realized or actualized when the patient recovers and health is the form of the cure as the chicken is of the egg or the oak of the acorn. Now here two things must be distinguished. First there is the general Law of Development, that all change proceeds from matter to form. This applies to all kinds of change, growth, qualitative
change (alteration), motion, and quantitative change. Such changes all pass from one polar antithesis to its opposite, for things can change only into that which they are not. But in the second place the form of each change is the purpose of the change and, when that purpose is accomplished, one has the final term in the various kinds of process. That there is such a purpose in all changes is assumed. What the purpose is in each kind of change is observed.

The form then of any process is the end term. But the word in Greek could be either shape, or goal, or purpose. In the case of the architect a shape or pattern becomes a purpose and it is easy to see why all purposes which are the making of things might be called shapes, since such purposes are realized in material form. Furthermore, the shape of the matter is changed as the purpose is brought to fruition. But in some processes, such as thinking, which proceeds, according to Aristotle, without the utilization of any bodily organ, there is no material shape which is changed and we have two possible ends or forms, the pattern of thinking itself and the solution of the problem about which one is thinking. But the term, matter, also suffers a change in meaning. For since thoughts are not caused by or generated from material things, certain psychological states have to serve as matter to thought. Sensations give rise to ideas which in turn become matter in relation to the purified thoughts about thought. If one can keep one’s mind on the problem which one is trying to solve, then one can say figuratively that the answer is the form which is emerging out of one’s thoughts as the solution progresses. No trouble ensues from the figurative use of these two terms so long as one remembers that they are figurative and not literal.

It is easy to see what Aristotle means when he says that the house is the purpose of the architect or the statue the purpose of the sculptor. It is also easy to see why such purposes may be called ends, since they terminate the processes involved. But in what sense of the word is the chicken the purpose of the egg or the oak the purpose of the acorn? The answer in Aristotle
(Physics ii. 8) is that natural events are always regular and that if the chicken were not the purpose of the egg, it would not appear on the whole when the egg is properly hatched by a hen. Nonpurposive events are random. If we see a man walk down a street with regular stride and buy a newspaper every morning, we predict, as we see him leave his house, that he is on his way to buy his paper. But if today he emerges from his front door and moves to the right, tomorrow comes out and moves to the left, today buys a paper and tomorrow sits dreaming on a bench in the park, and so varies his behavior from day to day, we have no evidence of any purposiveness in what he is doing. He appears to be aimless. Similarly if hens’ eggs turned into a variety of animals instead of turning into chickens, we might say that anything was to be expected of such capriciousness, but, as we know, there is a regular sequence of events to be predicted and the prediction is on the whole justified.

But unfortunately there is one difference between Aristotle’s notion of purpose and ours. It is true that we should insist that a given end be reached, or at least sought, if we are to call a course of behavior teleological. But we should also say that a given purpose may be realized in a variety of ways, that a man of purpose who meets with an obstacle to his usual course will go round the obstacle, climb over it, or otherwise try to circumvent it. If the man on his way to buy a newspaper finds that the street is torn up for repairs, he will look for another street; or if he discovers that he has no change in his pocket with which to buy his paper, he will try to make change; or if his special paper is sold out, he will go farther to find a newspaper stand which still has it in stock. We should be likely to maintain, I imagine, that the steady repetition of a given set of processes was evidence more of mechanism than of teleology. It may be replied that, judging from Greek art, the Greeks were more tolerant of standardization than we are. Otherwise we should not be able to date statues as typical of a certain period, or to identify their subjects. And it is true that the variety of Greek sculpture and architecture does not seem very
great, though we have little to go on. On the other hand Greek hortatory literature was often given over to urging the Greeks to conform, for which there would have been little reason if they were not subject to deviation from the norm and "individualism."

We also believe that a person's purpose must be clear to him as he acts, if he is acting purposively. It is his awareness of what he is trying to do which guides his behavior, not simply the repetition of a set of acts. One may acquire habits which become compulsory, second nature as Aristotle calls it, and which are performed with no purpose whatsoever in mind. But in what sense of the word can one say that an acorn has that sort of purpose as it grows? When Aristotle says that moving bodies seek their natural position, he surely does not mean that they seek it as a conscious being seeks something. Earthy bodies always fall to earth and aerial bodies move into the sphere of air, flames mount upward and rain falls down, but if we say that they strive to do these things, do we actually mean anything more than that they do them regularly? The persistence and constancy of natural law is something in which we all believe, with modifications, but we have purged natural science of its teleological language largely because it is superfluous.

Be that as it may, in Aristotle the form, being the purpose, determines the nature of any event. Things, one may say, are what they are for. This is important, since it gives Aristotle a clue for making correct judgments of right and wrong. It goes without saying that the purposes of things are only those purposes which they normally attain, that is, when they are not interfered with by chance or force. Until a person has matured, he has not achieved his purpose of being a man, and consequently a baby, child, or youth is not yet what he "really" is. What a thing really is was given a name which has survived in English through its Latin translation, the essence. Its essence is contrasted with its accidents. The accidents are those properties which may or may not appear in a thing and are thus a matter of chance. The essences of things, however, are prescribed by Nature and do not
vary; they take the place of the Platonic ideas but are always incorporated. They too are class characters, not the characters of individuals. No individual in itself has an essence; it has an essence only as a member of some natural class. In fact in the order of Nature there is only one individual, the Unmoved Mover, who later was to turn into God. I find no evidence that Aristotle ever raised the question of what purpose was achieved by the existence of individuals. The question which was to be raised by some of the Christian fathers, of why God should have created the world, meaning why forms were incorporated, was never raised by Aristotle. In Plato the Demiurge, who of course did not create but organized the world out of pre-existing matter, did so because he wished all possibilities to be realized. But Aristotle (Metaphysics 1003a 2) expressly denies that all possibilities can be realized. Yet he nowhere, to the best of my knowledge, explains what the barriers are to the realization of any form. In the Order of Nature it is clear that conflicting ends could not exist, but in that order the conflict could consist only in logical contradiction. An irrational man would be such a contradiction since man is a rational animal. An irrational man would be either a child who is not yet rational, or an insane person who has lost his reason, or an anthropoid barbarian who is not "really" a man. There are no forms in the Order of Nature corresponding to such creatures. But in the world of experience another principle is at work limiting the realization of forms.

Certain kinds of matter cannot be the locus of certain forms. It is impossible to realize a physical shape in liquids or gases. Whatever chemically differentiates a hen's egg from a sow's ovum makes it impossible for a sow to give birth to a chicken. In the biology of Aristotle himself, the female produced the matter and

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2 This may explain why a man like Cicero found it difficult to distinguish between the philosophies of Plato and of Aristotle. He says, for instance, that there was only a difference in name between the Peripatetics and the Old Academy. Abundantia quadrar ingenii praestabat, ut mihi quidem videatur, Aristoteles, sed idem fons erat utrisque et eadem rerum expetendarum fugiendarumque partitio (Academia i. 4. 18). Cf. i. 6. 22.
the male the form, so that we should have to transform our example to read: It is impossible for a boar to beget a chicken or for a cock to beget a shoat. There are also certain attendant conditions which are needed if a form is to be realized, such things as moisture and warmth. Finally there are certain causes at work in whose absence nothing will happen. These agents bring about the effect as the sculptor carves his statue or the physician cures his patient. Aristotle calls these agents "efficient causes." But though we may be willing to admit the necessity of the proper matter, the proper conditions, and the proper agent if a form is to be made actual, we still do not know why a possibility, which presumably means something for which the proper matter, conditions, and agent do exist, is not actualized. What prevents it? Clearly, if we knew what prevented a possibility from being realized, we might remove the obstacle or at least imagine conditions under which it could be realized. When we do not have this information, we say that accidents or chance prevented its realization. But does this mean anything more than that things have not happened according to rule?

Now there can be no accidental or fortuitous events in the Order of Nature. There all ideas are linked together by logical necessity and presumably it is possible to express all such linkages as a series of propositions which follow logically from their premises. For Aristotle makes a good bit of the importance of logical and natural priority. Thus if he says that the form is naturally prior to the matter, the hen to the egg, he means that one could not tell what the matter was aiming at until one knew its form. And since the world is everlasting, without beginning or end, and processes go on repeating themselves cyclically, the natural priority of the form is logical priority too. For temporal priority is never absolute, but determined within a series of events abstracted from the total cosmic history. One should visualize the Order of Nature as a logical map in which all possibilities are laid out in logical order like a system of Euclidean geometry in which every inference has been deduced and put in its place. On such a
map there would be no temporal dimension whatsoever, and the
adjectives "prior" and "posterior" would be figurative, if their
primitive meaning is chronological. If all went well, there would
be a parallelism between logical and causal order. Premises would
be parallel to causes and conclusions to effects. But unfortunately
all does not go well. For the incorporation of a form is also its
degeneration. As Plato saw that no geometric figure or other
ideal was ever perfectly exemplified in experience, so Aristotle
saw that no process of actualization was ever exactly as it ought
to be. In both cases the trouble lay in the nature of matter, though
how matter, which has no properties whatsoever except that of
becoming something, could effectuate anything, even deterioration,
was not explained.

It may seem incredible that any man should make so sharp a
cleavage between appearance and reality as I have indicated. It
will seem the more incredible, if that adjective is susceptible of
comparison, to those who have been indoctrinated with the
Hegelian formulas of intellectual history. To them it is essential
that Plato’s successor take a point of view diametrically opposed
to that of his master, and consequently they have interpreted the
relation between the Order of Nature and the world of observa-
tion as that of a pattern embedded in the latter. It is true that
Aristotle insists that all forms exist in matter, that none are off by
themselves, while at the same time insisting that the Unmoved
Mover, who might have been expected to be the form of the
world, does exist apart from that of which he is the form. If the
Order of Nature in its fixity and invariability is to be found only
in its incorporation, then there should be no deviation from what-
ought-to-be in what-is. But unfortunately for the neatness of the
theory Aristotle did admit that what-is is often disorderly, that
accidents prevent the realization of potentialities, and that mon-
sters upset the regularity of classes. This made for better sense
rather than for greater consistency. And since the disparity be-
tween the two worlds has been obscured by most historians, we
shall dwell a bit longer on it here.
To begin with we have on the one hand a world which is real, which is rational, and in which logical necessity is the rule. It is real because it is permanent. It is rational because it consists of ideas which are linked together either as species and genera or as groups of genera which can be subsumed under one or more of the ten categories. Its structure is determined by logical necessity in that certain ideas are believed to imply others. On the other hand we have the world in which we live from day to day and which is the world of appearance, of observation, of causality. It is a world of appearance because things in it do not enter our consciousness as linked together in permanent series, but are seen to be so linked only after they have been purified into logical concepts. It is the world which we observe, in that our contact with it comes through our senses and to Aristotle sensory perception is not knowledge (Posterior Analytics i. 31). Moreover, there is no knowledge of individuals (Metaphysics 1003a 13). And finally the events in it are produced by causes which may or may not succeed, though unless chance intervenes they will. To introduce a dangerous formula, dangerous because it may be misleading, one can say that in the Order of Nature formal causes always terminate events; in the world of observation accidental traits may terminate them. To return to our eggs, in the Order of Nature chickens always come out of eggs; in the world of observation the eggs may terminate on the breakfast table.

It requires little in the way of argument to show that one could not have a science of the accidental, except a science combining statistical manipulations with the laws of probability. But though Aristotle is willing to say that the natural is that which happens "on the whole," a phrase which sounds like a statistical generalization, he means by it simply that we poor men have no other

3 In Categories iv. ib 25, the categories are listed as follows: substance (a man, the horse), quantity (two cubits long), quality (white), relation (greater than), place (in the agora), time (yesterday), position (sitting, lying), state (shod, armed), activity (to cauterize), passivity (to be cauterized). In Metaphysics 1017a, the list is reduced to eight. The categories are the most general things that can be said about anything, are not deducible from one another, and indicate questions which may be asked about any subject.
means of detecting it. I have no statistics on the destiny of eggs, but I imagine that in the United States more end up as food than as chickens. But it should be recalled that Aristotle is thinking of nature as it would be without the interferences of human beings. Clearly, if there were no human beings, there would be no breakfasts, and one may doubt whether snakes and rats eat so many eggs that one could identify the final cause of eggs as furnishing food for reptiles and rodents. Hence we can eliminate statistics, which, as a matter of fact, had to wait until the seventeenth century before being discovered. In Aristotle's own words (Metaphysics 1064b 30),

We say either that everything exists always and from necessity (and we use the word "necessity" not as we do when speaking of things caused by force, but in the sense in which it is used when speaking of logical demonstration) or that it occurs for the most part, or else neither for the most part nor always and necessarily, but as it happens. For instance, it might be cold in dog days, but this happens neither always nor for the most part, but it might happen sometime or other. The accidental then is that which occurs neither always nor from necessity nor for the most part. We have then told what the accidental is, and wherefore there is no science of it is clear. For all science is of that which always exists or exists on the whole, but the accidental is of neither sort.

That things do happen in general with steady recurrence is of course granted by Aristotle, but at the same time the recurrence is interrupted and an accident may replace an essence as a final cause.

When interruptions to the rule occur, the human mind asks why. We take it for granted, as Aristotle did too, that the rule ought never to be disobeyed. Hence when one observes the accidental occurrences in the world of observation, one imagines that a cause for them can be found. Now frequently it looks as if a cause could be found in individual events, as when a man drops dead in his youth of cardiac failure or a vegetable is eaten before it goes to seed. But in all such cases we read into the event a class of causal linkages of which we already know something.
If we did not know that death came as a result of cardiac failure, or of something similar, we could not qualify the sudden death in question as a case of anything whatsoever: we should simply see the young man drop dead. So too with the vegetable. We happen to know that some vegetables are edible and that their nutritive value causes people to eat them from time to time. In all such explanations we first integrate the observed event into a larger class of events which has all the characteristics of a universal. If one lumps all such occurrences together into one class and asks why natural potentialities are not always realized, one has to invent some blanket term to cover them as an aggregate. In the past that term was "chance" and it was said that chance was the name which covered our ignorance of causes. But it is now known, if not generally accepted, that it is also the name for the combining of several causes acting together in a genuinely unpredictable fashion. For in order to have any science, we must untangle from the mass of observations certain regularities, to which either we or tradition gives a name. The planets and the sun in our solar system would be an excellent case in point. For the planets are well separated from one another and the Law of Gravitation applies within a very small margin of error to their movements round the sun. We think of them as isolated beings of enormous size cut off from the gravitational fields which emanate from them, as well as from whatever gases form their atmosphere. It is true that they are not so independent in their motions from one another as children are led to think, but their reciprocal attraction and repulsion are calculable, given their masses and distances. When we come down to earth, however, we find it harder and harder to untangle causal series which will be independent of all others. Hence we have developed laboratory techniques which permit us to single out those events which we want to study. But outside the laboratory the events intersect, collide, swerve from their normal course, and if we do not, or cannot, anticipate the collisions, intersections, and swervings, we call the events accidental. As a matter of fact, since every event which
actually takes place is an individual event, and since knowledge is always of groups of events, the most improbable event is the occurrence of anything individual. We would do better to define "chance" as that which never ought to occur but frequently does. A chance event is an event for which there is only a proper name. It is the event for which there is a multiplicity of co-operating causes, not the event for which there is no cause or the event of whose cause we are ignorant.

Aristotle personified Chance as if it were some sort of general cause instead of being the name for a large class of events. The reason which he gives for their not being subject to demonstration is that they always occur as accidental, not essential, causes (Physics 196b 23) and that they occur "contrary to what happens always or on the whole" (197a 20). Yet one can recognize a chance event. And indeed he devoted a whole chapter of his Physics (ii. 5), to defending chance as a cause, and devoted the preceding chapter to attacking people who deny this. But here trouble ensues, for he also maintains that a cause is always existentially distinct from that on which it acts (the patient), and even to know that is to know something about the unknowable. If that is pressing a point too much, let us take one of Aristotle's own examples of a chance event. In the Metaphysics (iv. 30), he cites the case of a man being driven by a storm at sea to a place to which he did not intend to go. Here chance is that cause or set of causes which was not implicated in the patient's purpose. If the storm blew the ship off its course, the storm was the cause of the man's being where he did not intend to go. Thus in this example a chance event is also an event which is "conditionally necessary." The ship in the instance cited was driven to the island of Aegina, so that the event in question was a dated, localized, historical event. One could predict that because of all the islands between Greece and Asia Minor, a ship which was driven off its course by heavy winds might hit one of them. But one could not predict that that particular ship on that particular day would be so driven off its course as to hit that particular island. There is no class of
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events called “The ship which put off from the Piraeus on May 1, 350 B.C., and which was driven by a storm to Aegina.” Hence there was no way of inferring anything about it. After it had happened, one could absorb it into various classes of events. At that time one could apply logic to whatever classes one had in mind and make various inferences from what one knew of them. No individual event is any rarer than any other, for none occurs more than once. It is kinds of events which are rare.

The world of observation is then a world which is not only unknowable, though perceptible, but also the world of chance. We have a situation in which an eternal world is set over against a temporal world, unity against multiplicity, immutability against change, universality against particularity, logical necessity against causality, including chance as a cause. But there was another conflict between the two worlds which arose in part out of the traditional Greek admiration for that which is according to Nature. Nature is purposive and good, whereas the unnatural is, whether purposive or not, bad. The question arises of how a network of timeless beings, a map, can in itself be either purposive or un-purposive. Where nothing whatsoever happens, no purpose can be achieved. But when Aristotle talks about natural ends, he switches from the primary meaning of “nature” as an order, to its exemplifications in the world of observation. Here processes do go on and some purposes are achieved regularly. Nature as the Order of Nature is, one might might say, the universal end or purpose of all things; that is, all things make for order, strive to exemplify order, and the order which they strive to exemplify is the realization of forms. But in that case one wonders how anything could be called unnatural. And the only answer seems to be, “When chance intervenes, an unnatural purpose may be achieved.” But this is merely substituting one word for another.4

If I overemphasize this, it is because of the custom which his-

4 It will be found that most of the acts which are called unnatural are performed by human beings, or caused by the desires of human beings. But why should human beings be unnatural?
torians seem to follow either of maintaining that Aristotle “bridged the gap” between Plato’s Ideas and their incorporation or else of maintaining that everything in Aristotle can be found in his master. The gap between the universal and the particular, between the eternal and the temporal, is bound to be dug whenever a philosopher reasons. If the timeless were simply that whose rate of change is very slow, the case would be different. But there is every reason to believe that in Aristotle the eternal is the logical as opposed to the causal, the timeless as opposed to the historical. He does not say that in our experience we collect a large number of instances of something or other and then gradually see a uniformity of behavior in them. On the contrary, though he gives experience its due, he realizes that his class concepts cannot be simply more or less uniform ways of behaving. They must be absolutes, like the primitive terms in mathematics, and he wants them to emerge out of experience. This brings him back face to face with the problem of Meno.

Nor is it right to say that all this can be found in Plato. The theory of potencies and actualities, the doctrine of the Unmoved Mover, the notion of inherent teleologies, to say nothing of a dozen other theses, are far from being Platonic. The closest approach to the doctrine of potencies in Plato is the use of the word “to participate,” but the participation of the particulars in the universals is not the development of the universals out of the particulars. There is no Unmoved Mover in Plato, not even in *Timaeus*. The Demiurge in that dialogue is the organizer of pre-existing matter, acting as an architect, not as the beloved object. The purposes in the cosmos are those of the Demiurge, not of individual beings, except in so far as the individual beings are themselves complicated instruments, which is true of human bodies. One does not have to be either a Platonist or an Aristotelian, as the old saw would have it, but if one is an Aristotelian, one cannot also be a Platonist.
Aristotle is a philosopher whose method is among the clearest. He states his methodological assumptions without evasion and in full consciousness of what they determine. Whether they are based on his metaphysics or are simply harmonious with it, I do not know. But since they have become an integral part of the philosophical tradition, which includes the scientific, and were not seriously questioned until the Italian Renaissance, I list them here-with. They form as complete a system of rational method as exists and it was by discarding one or more of them that rationalism began its decline.\(^5\)

First, Aristotle assumed that things are arranged in serial orders. This is a cardinal principle for Aristotle and he lists the kinds of order in three different works, the Categories (xii), the Metaphysics (iv. 11), and the Physics (viii. 7). Though the lists are not all alike, none of them mentions logical order, except in so far as the relation between genus and species or premise and inference is logical order. This is worth noting, since later philosophers, especially the Neoplatonists, were to make much of arranging all classes in a single series running from most inclusive to least. Examples of Aristotle's serial orders are temporal, causal, and what he calls "natural." To be prior or posterior in time and in a causal series is easy enough to understand. To be prior or posterior in nature is harder. In the Metaphysics, as just cited, he gives as an example of natural priority the relation between subject and attribute, the former being naturally prior to the latter. Presumably the subject could exist without the attributes, but not the attributes without the subject, though just what meaning one could give to a subject without any attributes is obscure. Yet this is very important, for the substratum is also naturally prior to its qualities and one might imagine him to be saying that there exists a substratum which has no attributes. But I think it is fair to say

\(^5\) I refer again to my "Some Assumptions of Aristotle" for a detailed study of these assumptions.
that in this unique case he means nothing more than that the qualities of the substratum may change, while the substratum itself, in its own nature, no more needs to have these qualities than any others. The substratum, like the subject of a sentence, is a grammatical necessity. We have to have a noun to which attributes and qualities can be given. We shall see below how the substratum, the being without qualities, became in later thought Non-being, Matter, Ugliness, and Evil, potentially anything, actually nothing.

That which is prior in nature may be posterior in time. For the form of a thing is temporally later than its potency and yet naturally prior. It is prior in the sense that it directs, guides, controls the development of the potency, as the artist's aim guides his artistry, but it is not overtly present until the process of development is finished. Therefore it is necessary that one know what a thing's nature is before attempting to know it, for otherwise one might confuse one of its accidents with its essence. The essence, being a characteristic of the class to which a thing naturally belongs, is not determined by convention, but is an inherent trait of the class over which human beings have no control. It is this feature of things which makes it possible for a man to begin where he will and be assured of finally reaching the "real nature" of that which he is studying. Epistemologically the universal is prior to the particular, but in the order of the acquisition of knowledge, the particular is prior (Metaphysics iv. 11). If there were no fixed species, there would be no assurance that starting with particulars we should end at one form rather than at another. But since the form or essence of things is established "by nature," there is a possibility of laying down rules which will lead to its discovery. These rules include that of looking for what happens on the whole.

There are, Aristotle admits, varying degrees of regularity. The circular movement of the heavens is the most regular. Then come the combinations of the elementary qualities, the hot-cold, the moist-dry. These are followed by the motions of the elements
themselves which may be displaced by force, but always return to their natural positions. Then the plants, animals, and finally men and their works. I have found no explanation of why these degrees of regularity should obtain; they are simply observed to exist. One cannot introduce as an explanation the amount of matter present in each type of change, since the works of man, such as politics, include no handling or use of material tools or organs. Degrees of regularity are simply there to be observed and the scientist must regard them as stubborn facts. For this reason such sciences as ethics and politics can never be so certain as physics.

The one control over observation is repetition, for only by repeating one's observations can one discover what happens for the most part. There is nothing in the corpus to suggest that Aristotle anticipated either the Baconian or the Millesian technique of experimentation, in spite of his appeals to experience when he is criticizing his predecessors. The story which Pliny tells of Alexander's sending back to his tutor specimen plants and animals from Asia seems to be the source of the legend that Aristotle made great collections of data before generalizing, as indeed he may have done, though how he could generalize about the breeding and movements of animals from dead specimens is a bit difficult to imagine. It is, however, true that his works contain collections of scientific and pseudoscientific data and can be used as source books of political constitutions, sophistic arguments, and the habits of animals. But it should also be remembered that he did not believe perception to be knowledge. One uses the evidence of the senses to study the sensible, he says in the *Nichomachean Ethics* (1104a 13), but the sensibles are "mixed conglomerates" from which arise "the knowledge of the elements and first principles through analysis" (*Physics* 184a 21). Perceptual evidence can obviously be used to confute a purely *a priori* argument, if the argument implies that certain perceptual effects ought to occur. But Aristotle also uses perceptual evidence to prove, for instance, the earth's sphericity (*De caelo* 295b 20), and the existence of
qualitative change (*De generatione et corruptione* 314b 12). And he overtly lays it down as a rule that "we should rationally assert only what we see occurring in many or all cases" (*De caelo* 279b 18). One cannot reach the true universal in this way, but observation can always reinforce purely deductive reasoning.

Aristotle, as we have said, believes that sensory perception is always of particulars, whereas scientific understanding is of universals. The universal (*Posterior Analytics* i. 31) can be abstracted from a large number of particulars, for at least in this passage it is present in them. This will work for sensory qualities, *red, sweet, loud, round*, but will not work for universal ways of behaving, for, as we have suggested above, there is no way of being sure that our statistical similarities are natural if we rely on observation alone. Judging from some of his examples, he was aware that wood is used for building and that reason is used for cheating, and though he does not compare the numbers of natural occurrences with those of unnatural, perverse, or unusual occurrences, he must have had as much common sense as his critics, for he says that understanding is not acquired through sensation: "the universal and that which occurs in all things it is impossible to perceive" (*Post. Anal.* i. 31). Moreover scientific knowledge, as distinguished from perception, is always knowledge of the *why*. The *why* in this case is not the teleological *why* but the *why* of antecedent causation. Completed knowledge for Aristotle is knowledge of the four causes of all events and he nowhere asserts that perception is more than the first step toward such knowledge.

Aristotle also takes it for granted that nothing can come from nothing (*ex nihil nihil*). This principle, which has been interpreted in a variety of ways, in him means primarily two things: (1) that material objects cannot be created out of nothing, (2) that nothing happens without a cause if the event is "in accordance with nature," but chance too is a cause. Both usages limit possibilities: not everything can happen. This is his version of what used to be called the Uniformity of Nature. It is a methodological rule which we all use in some form or other, for if any-
thing can happen without restriction, then science is impossible. But at the same time we can give no reason why men are always born of men and wheat of wheat, to cite a criticism which Aristotle made of Empedocles. If we find nonwheat being born of wheat, or wheat being born of nonwheat, we call the produce a mutation or a special kind of wheat (or nonwheat) or deny that its parent stock was really wheat or, following the alternative, nonwheat. Our vocabulary is our initial help in such matters. It all boils down to the problem of classification, or, if one prefer, to that of the identification of what is essential. If whiteness is an essential trait of swans, then black swans are not really swans and that is the end of the story. This may seem silly, but there are still human beings who think that skin color is an essential character of Homo sapiens. Aristotle thought that it was rationality.

I have said that both interpretations of the principle ex nihilo nihil are to be found in Aristotle. But two different methodological traditions grew out of his works. On the one hand those scientists who took the preposition ex seriously insisted that no explanation was complete until a material identity had been established between cause and effect. This involved their reducing all problematical situations to material substrata: the human being is identified with his body, physical objects with their masses. Thus what Poincaré called a cascade of equations could be established. The successes of this mode of scientific thinking are too well known to require exposition here. The second interpretation, which is more frequently found in Aristotle, becomes teleology. No complete explanation can fail to state the purpose of any event. But here events which were ostensibly purely material were invested with motivations which normally could have been attributed only to human beings. Fire and the other elements must seek their natural positions; the planets must move in circles, because circles are perfect shapes; the universe does not wish to be governed badly; the organs of the animal and vegetable bodies

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are instruments for good ends.\textsuperscript{7} The famous Table of Opposites (Metaphysics 986a 22) is also a table of goods and evils, and when we learn that Nature always does the best possible thing, we also learn that since the upward, the clockwise, the forward directions are better than the downward, the anticlockwise, and the backward directions, we are not surprised at which way the heavens move. And since we are told to the point of satiety that Nature does nothing in vain and that she is also good, we can see why teleological explanation answered all scientific questions.

Another principle assumed by Aristotle was the Principle of Parsimony. This rule is usually phrased: Entities should not be multiplied beyond necessity. For methodological practice the entities in question are first selected by the questions which they raise. If we ask why certain stellar bodies move and others are fixed, we have already made a classification which rules out of our answer anything other than causes of motion. We consequently must know beforehand what the causes of motion are and see to what extent they are applicable to the planets. Looking at the heavens, we see a vast variety of perceptual differences and the one reason why we pick out the differentia of motion is that we presumably thought that all stellar bodies ought to be stationary. (Historically the question is raised because our predecessors raised it and we were not satisfied with their answers.) The multiplication of entities is relevant then to the problem which has been asked about a delimited subject matter. In Aristotle’s case this particular problem was solved by his conclusion that there must be a divinity resident in each planet who kept it on its circular path. He could maintain that he had observed the Principle of Parsimony, in that all planets were asserted to move in circles about the earth and that each divinity was behaving in the same way.

A better example of his use of the principle is in his criticism of Anaxagoras (De caelo 302b 21), where he points out that there

\textsuperscript{7} But those inclined to sneer at Aristotle should remember that purposive behavior was identified by him with regular behavior.
is no need to postulate an infinity of elements since a finite number will give the same results. Again, when he is discussing the kinds of locomotion (*Physics* 243a 16), he reduces the four kinds, pulling, pushing, carrying, and twirling, to two, pushing and pulling. Carrying can be explained as a form of pulling or pushing, since the vehicle on which something is being carried is itself pushed or pulled. Twirling consists of pulling one part of a body and pushing another. Thus carrying and twirling are unnecessary. The application of this principle amounts to the simplification of observation. It does not reduce the observed factors to "appearance" in the sense of "unreality," but it does reduce the number of basic factors which must be studied by the scientist. This intellectual simplification of the world is neither more nor less than that. It means that we can understand the events which interest us more easily than we could if they were as various as they seem to be. But to erect a metaphysics upon such simplification seems unwarranted.

Yet it was standard operating procedure to transfer the technique of understanding to the structure of the world. As late as Copernicus, and indeed later, we find such slogans as, "Nature always follows the simplest course." And in our own time we find epistemologists maintaining that if we can explain sensory qualities as the effects of air waves or light rays upon sensory end organs, then only the waves and rays are real, oddly enough reviving a dictum attributed to Democritus to the effect that only atoms and the void are real. But this is analogous to saying that if one is hit in the head with a stick, only the stick really exists but not the pain. Explanation is not annihilation. Now in Aristotle we have the phrase (*Metaphysics* 1076a 3), "Things do not wish to be governed badly." And by "badly" Aristotle means, "by a multiplicity of rulers." "Things" of course mean the universe, and to his way of thinking there is one pattern in accordance with which all events take place. But it is probable that he also thought that a pattern or direction or set of laws presupposed a cosmic
mind responsible for them. And that cosmic mind turns out to be the Unmoved Mover, a descendant of the Nous of Anaxagoras. The Unmoved Mover of Aristotle moves by the force of attraction, "as the beloved attracts the lover," to use Aristotle's own phrase, which in turn recalls Plato's Symposium. It is an idea which had the noblest of fortunes, terminating as it does Dante's Divine Comedy. It is interesting that two of the greatest intellects that Greece ever produced should have been so naïve as to put the weakest of forces at the heart of the cosmos.

All generation, according to Aristotle, is either combination or separation, and in the long run what are combined or separated are the irreducible simples. Consequently, though the whole is always prior to its parts, compounds should always be resolved into their elements as a first step in understanding them. Strictly speaking, the only complete analysis is that of material substances into the elements, which in turn are analyzable into the opposing elementary qualities of the hot and the cold, the moist and the dry. Aristotle makes no claim to being able to analyze everything that far; such ability is simply a theoretical possibility. Nor can he show us exactly how such an analysis would proceed, for the only tests he had for the presence of any elementary quality were perceptual. One can feel heat and cold, wetness and dryness. One similarly can see the natural motions of upward and downward, which indicate the presence of fire and earth on the two extremes, water and air in between. The rest is purely dialectical. For instance, air arises out of fire when fire loses its dryness, for since qualitative change is always between opposites, the only quality which can take the place of dryness is wetness. One never sees air being produced out of fire or water out of air, but logically—verbally?—that is what must happen if analysis is reliable.

Such logical analysis appears also in a work like the Politics. States must be ruled by either one ruler, a few rulers, or many rulers, an idea which is also in Plato. This analysis is superficial, as must be obvious, since "a few" is vague enough to require fur-

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ther precision. Be that as it may, and it may be that Aristotle was simply relying here on the actual monarchies, oligarchies, and democracies with which he was acquainted, the analysis is presented as a logical operation, and indeed it makes sense to oppose the one and the many, even if it does not make much sense to insert the few in between. Again, he says that a state must be governed for the sake of the ruler or for the sake of those who are ruled. If we know what "for the sake of" means—I do not say that we do know this—then we need no empirical investigation to see that these are the only two possibilities. In general Aristotle in his analyses relies on opposition, and his basic opposites were qualities and their "privations," for the absence of a quality, such as dryness, is its privation, wetness, and this is just as perceptual as dryness itself. One of his favorite oppositions is that between agent and patient, and to act and to be acted upon are among the ten categories. One might imagine a third possibility, that of simply existing without either acting or being acted upon, but I recall no Greek thinker who followed that lead. Yet in Greek there are two verbal forms which might have aroused curiosity in the mind of so grammatically oriented a thinker as Aristotle. I refer to reflexive verbs and the middle voice. In the former case it looks as if something were both acting and being acted upon, and in the latter, though the sense is active, the form is not.

Verbal as such analyses appear to be, they clearly are not exclusively verbal or there would have been an analytical possibility for every form of word. They were thought of by Aristotle as reflecting the actual state of affairs. If something happened, then there must have been an agent to bring the change about, a patient to be acted upon, and a passage from one condition to its opposite. The four kinds of change, genesis, destruction, locomotion, and alteration (qualitative change), all exhibited these traits. Matter was always moving toward form, unless accidents happened, and that in itself was opposition. Genesis and destruction, being either composition or disintegration, were clearly movements from being to nonbeing or from nonbeing to being. Locomotion had to be
from one direction to its opposite except in the case of the planets, for even if air, for instance, moved in the plane of air, it could only move from left to right or right to left. Qualitative change was always the appearance or disappearance of "floating qualities" and each had its opposite. Analysis thus mirrored the fundamental character of natural change.

Another and equally important methodological rule was the denial of action at a distance (De generatione et corruptione 322b 23). This implies that whenever a change is effected, the agent must actually touch the patient. The one exception to this seems to be the changes produced by the Unmoved Mover, but He acts only metaphorically (324b 14). Now if agents touch patients, then the tendency will be for the scientist to explain all changes as changes in material things, for it would seem to be impossible to touch anything immaterial. And if contact is established between two material objects, $A$ and $B$, if $A$ touches $B$, then $B$ also touches $A$. In generalized form this might read: When an agent acts upon a patient, the patient reacts upon the agent. Because of this possibility, Aristotle takes the trouble to point out that we can touch something without being touched by it. "We say sometimes that a man's grief touches us but not that we ourselves touch him" (323a 32). This pun is far from convincing, though it does give us an example of an effect without a complementary effect. Our pity for a friend's grief may leave him cold, for he need know nothing about it. He need, moreover, have done nothing to let us know of his grief: we may have learned of it at second hand. In view of this sort of exception, it would perhaps be best to conclude that no action at a distance applies only to action upon material bodies.

These are the most important of Aristotle's methodological rules and as a group determine the bulk of his conclusions. They suggest, it is hoped, the vast distance between the world of science and the world of experience. That there is serial order in the way our experiences come to us or are concocted by us is undeniable, but it is simply spatiotemporal order. Nothing in raw experience
is seen to be the cause of anything else; causality is a relation which we discover after reflection upon the confusion of daily life. If this were not so, there would be no need for all the proverbs which urge men to think about the effects of their desires, appetites, emotional crises, aspirations, or lack of them. Nothing in perception is evidence of anything else until it has been shown to be so. The perceptual world is a phantasmagoria of colors, sounds, and other sensory data, jumbled together as far as anyone can tell in a hit-or-miss fashion. We have to learn that smoke means fire, that clouds mean rain, that acorns mean oaks. Such meanings are not written in raw perception. Daily we see things coming from nothing: green emerging from blue and yellow pigments, the rainbow appearing in the sky, flowering plants coming out of hard pellets in the ground, arms and legs moving after an act of will. The enunciation that nothing can come out of nothing was hailed as a great discovery by Lucretius and Lucretius was not a savage. As for Nature's always following the simplest path, how complicated is the development of a child in the womb, how varied the shapes of leaves, how diversified the human face! To discover the simplicity and uniformity underlying such phenomena and others like them was the work of scientific giants, not the undisciplined observation of what was taking place before the eyes of all. There is nothing apparently uniform in the tremendous diversification of species, over 700,000 kinds of insects alone, and probably about a million animal species as a total. Could not the goddess Nature have satisfied her love of simplicity by less diversification? And as for analysis, it would not be needed if our daily life were analytical. James's buzzing confusion does not merely surround our infancy; the buzzing diminishes solely because we become used to it. Similar remarks could be made about action at a distance. When a soldier obeys a command, is the effect due to contact? If so, the contact has to be discovered; it is not apparent. The probability is that human beings were more empirical when they believed all natural events to be produced by divine command, as light appeared by the command of God. For as late
as Newton scientific laws were thought of as divine legislation by scientists as well as by the rest of us.

Each of Aristotle's methodological principles is an intellectual simplification of experience. Each operates for the sake of intellectual satisfaction, and if it brings in its train pragmatic values as well, that makes it all the better. As a group, they establish the rules of the game, rules which need not be followed at all if one does not wish to follow them. A childlike mind can get along pretty well as far as the ordinary business of life is concerned. He will have need of some causal information, of knowing the regularity of the seasons and the sequence of day and night. But the causal information he requires need not go much beyond folklore. If he knows what seeds produce what plants, how animals are bred and what they eat, he can live. For he can also accept all the disasters of life with a shrug of the shoulders or a cry for forgiveness to his gods. Men have lived surrounded as they thought by capricious divinities whose nature it was to do things which could not be understood. If you think that a dance will produce rain when you need it and the dance fails, you can always say that the rain god was displeased either with you or with the dance, or that your enemies had danced a counterdance, or that one of the dancers had made a false step. I doubt that many people have found their faith weakened by the failure of their prayers. It might in fact be considered vulgar to expect God to be influenced even by a contrite heart. For how could an immutable will be influenced? No, the introduction of the rules as they were codified by Aristotle was the introduction of order into our ways of thinking. They gave us an intimation that we were not living in a chaos.

But it goes without saying that the belief in gods and miracles and the inexplicable and the wonderful did not die out because of the teaching of even a great philosopher. It is almost a truism that the more technical a philosophy, the fewer the people who will see its reasonableness. Intellectual history shows an interplay between folklore and science, religion and philosophy, and there
is never any saying which will predominate. By incorporating into their methodologies the element of purposiveness, Plato and Aristotle became acceptable to the early Christian fathers, and in fact, after the time of Eusebius, his phrase, the *praeparatio evangelica*, was taken in all seriousness. *Timaeus* became Christian evidence, though the Demiurge was far from being the Biblical God.⁹ Aristotle's *Metaphysics*, when it was rediscovered in the Middle Ages, turned into Christian theology, though his Unmoved Mover created nothing and his cosmos had neither beginning nor end. But the philosophy of the atomists, much more in keeping with post-Renaissance science, went underground after the eclipse of Roman civilization. The very name of the greatest atomist, Epicurus, became a synonym for all that was reprehensible in morals and religion.

III

Whereas Plato thought that human life was of no great moment and that his fellow Athenians were of less than average intelligence, Aristotle on the contrary seems to have been fairly well satisfied with things as they were. He recognized the existence of evil, but he thought that he could eliminate it in the life which was of interest to him, namely the life of leisure. In fact that life was the only life worth living. The child, the woman, the slave, the barbarian, were all beyond the pale. Though he may be said to have thought of the state in organic terms, the lower orders existed for the sake of the higher, and not, as in both the *Republic* and the *Laws*, for the sake of an ideal justice of more than human value.

There is no feeling in Aristotle of the tragedy of life. Though his chapters on tragedy are of the greatest interest historically, at

⁹ For the differences between the two, see F. M. Cornford, *Plato’s Cosmology* (London: Paul, Trench, Trubner, 1952), pp. 35 ff. In this connection it might be worth recalling that even serious scholars have interpreted Vergil's Fourth Eclogue as a Messianic prophecy.
least in their influence on Renaissance literary criticism, via Horace, even they exhibit no sense of the inevitability of suffering, no sense that the very fact of being born into a world inherently hostile to human aspirations is pregnant with tragedy, no world-weariness, no pity for the sufferings of others, no insight into the vanity of human wishes. He was capable of pronouncing one of the most fatuously optimistic of assertions: “In the natural course of events the true and just are stronger than their opposites” (*Rhetoric* 1355a 20). But if the natural course of events is the ideal order of nature, there is no distinction between truth and falsity, justice and injustice, which is relevant to it. And if it means that human history as it develops exhibits more and more truth and justice, one cannot but marvel at his blindness to Athenian history. Was Philip’s conquest of Athens a revelation of greater truth and justice? Was the history of that city after the Peloponnesian War a march toward greater truth and justice? Or was Aristotle simply talking for the sake of saying something encouraging, as some nineteenth-century writers looked forward to the effect of evolution on social misery?

There can be little doubt that to Aristotle the life of the Athenian gentleman was in no need of critical appraisal. It was a standard by which all life could be judged. Since some men were born incapable of reasoning, nature intended them to be slaves. Since some men, mechanics and laborers, have souls “perverted, as it were, from their natural condition” (*Politics* 1342a 22), let them work for men whose souls are not perverted. Even the kind of music which should be played to them and to free man should be different. Manual work is fit only for slaves (1277a 35) and furthermore no man can live a virtuous life who engages in it (1278a 20). This is attenuated by his opposition to legal slavery, as it existed in his civilization. He was presumably always talking of natural slaves, those men who are born without reason.

What then does he admire? He has laid down certain axioms defining his set of values and they are worth listing here.

10 *Cf.* *Metaphysics* 981a 30 and 981b 17.
First, the superiority of the final cause and end of a thing (Politics 1252b 34; Metaphysics 982a 14). If the end of man is the life of reason, then the fact of its being the end confers value on the life of reason. This will be the life which is lived “in accordance with nature,” for it is the nature of man to be a rational animal. The Nichomachean Ethics tells us what such a life would be like. The program gives us a good example of taking a traditional slogan and endowing it with rational significance. Goodness then is woven into the texture of the things and is not given to them by human desires and aversions. Our failure to achieve goodness is attributable to our failure to understand the essential nature of humanity. This entails the idea that goodness is a value uniform through the whole of a class. What is good for the class of men is good for all men, as it is in Plato, and the claims of the individual are nullified. The reasonableness of the ethics which follows is based on the possibility of the unnatural. If all men were natural, regardless of their peculiarities, then each man would have the right to be whatever he is. Alcibiades, Crito, Phaedrus, Charmides, are all different, perhaps radically different, yet each would be as good as his neighbor and it would be absurd to dispraise Alcibiades for his intemperance or Phaedrus for his love of sophistc rhetoric. If some of these differences on the other hand were unnatural, and if the unnatural is bad, then one could condemn them justly and strive for their elimination. To thine own self be true, is not an Aristotelian slogan.

Second, we have the superiority of the self-sufficient (Politics 1253a 1). This again is an absorption of a traditional value into a theory of value. The self-sufficient, the autarkic, as a mark of superiority is found throughout Greek ethics, and is one of the marks of God’s pre-eminent superiority in Plato. As a standard of goodness it appears even in Christianity (Acts 17:25). To reach self-sufficiency became the goal of all the ethical schools, and they differed only in their techniques of reaching it. But there was a curious paradox involved in preaching both conformity to the natural end of a class and self-sufficiency as well. Man in
Aristotle was defined as a social animal. If he was to live a natural life, he must live in a society. Aristotle's society was an organization of social and economic classes in which the lower orders, as I have said, existed for the sake of the higher. But just as no form can be realized apart from its appropriate matter, just as the reason depends upon sensation and appetite, so the higher orders of society depend for their very existence on the lower. How then can any member of such an order be self-sufficient? The later moralists, as I trust we shall see, understood this problem and advocated withdrawal from society. Aristotle does not seem to be aware of the conflict.

Third, we find him asserting the superiority of the whole to the part (Politics 1288a 26). In Stoic philosophy this was to lead to the inference that an individual must play his part in the cosmic drama and submit to his fate. In Plato's Republic the same principle implied that each man was to fit into the class for which his psychical nature had best equipped him. But Plato's state, though an organic whole, was a whole composed of groups and not of individuals. Aristotle's state might have been any one of three types, monarchy, aristocracy, or constitutional democracy; he was not engaged in setting up one ideal republic. But he always thought of society as a collection of households and was bitterly critical of the totalitarianism of Plato. Within each household there was a head, a petty monarch, very much like the man of the family according to Saint Paul (Eph. 5:22-24). These heads of households were all equal and their relations to one another are left unorganized. Aristotle uses this principle of the superiority of the whole in discussing monarchy (Politics iii. 17), where he says that the man of great virtue who is fit to rule is as the whole to the part. The active reason, since it is the final cause of the human being, and the Unmoved Mover, the final cause of the cosmos, are both in the position of kings and thus represent the whole. But in the Metaphysics (1023b 26) he distinguishes between natural wholes, none of whose parts are missing, and "a universal which contains its members so that they form a unity." A natural whole
would be exemplified by individual plants and animals. The whole man is better than any of his parts and Aristotle probably was thinking here of the parts as the three parts of the soul, not the various parts of the body. For it is the soul's unity which composes the man who may be considered to be good or bad.

His fourth criterion of goodness is naturalness. For a man to be natural or to live in accordance with nature was for him to realize that end which was his essence, namely rational animality. The technique of discovering that which is natural is twofold: (1) you look for that which happens on the whole or for the most part, as we have already seen; (2) you look for the genus and differentia of the class of beings in which you are interested. We have already spoken of the difficulties involved in applying the first technique. The second contains as many, if it is supposed that genera and differentiae are determined by nature rather than by convention. For how is one to discover to what natural class human beings belong, unless one has already a preconceived classification of things from which men are to be differentiated? To common sense it is obvious nowadays that men are a kind of animal. Yet there are still people who would pronounce such a classification monstrous. Men, they would say, are between the angels and the animals and the differences between men and beasts are such that each forms a class by itself. If men are sui generis, they are indefinable. If they are a kind of animal, then we start with the idea of a class to which they may be naturally assigned. But then how do we discover their differentia? The ancients themselves knew this problem. Was man a featherless biped, an animal which laughs, a tool-making animal, the one animal perpetually in rut, the one animal with a sense of sin? These and more have been used as definitions of man, though not all by the ancients. Which type of differentia is one to choose? If Aristotle chose rationality as man's differentia, it was because of tradition to begin with and because he was interested in psychical data. When he was writing his Politics, he could define man as a social animal. In any event man's rational animality was his essence, determined, Aris-
totle thought, by nature, not by convention, and hence to live in accordance with nature was to live a life controlled by reason. This he thought was a realizable ideal. Presumably one had simply to know psychology, political science, and logic to become aware of sophistic fallacies and the dangers of a passionate life, and then one could live rationally. For the rational life would be the happy life.

Aristotle's final criterion of goodness was the mean. That one should do nothing in excess was an inherent part of the Greek tradition, but Aristotle saw that the determination of the excessive is no simple problem. One's natural tendency is to give in to a desire or appetite. He also knew that the tendency to give in fed upon itself. He pointed out in so many words that ethics is not an exact science, and one sees his standards of the good life more clearly here than elsewhere. The *Republic* follows the lead of reason to the bitter end. If private property and the accumulation of wealth induce men to buy power, though they do not know how to use it properly, then private property must be done away with. But, says Aristotle, how can a generous man make gifts to his friends if he has no private property? If pride in family, says Plato, induces men to put their sons in positions for which they are unsuited, then away with family life. But the family is the element of society, retorts Aristotle, and cannot be done away with without wrecking society. Wreck it then, says Plato, for it does more harm than good. But such logical constructions apparently repelled a man like Aristotle. The Middle Way is the safest—and therefore the best. At this point a knife-edge was inserted into the heart of rationalism, a knife-edge which would go deeper and deeper as the years went by until the whole technique was destroyed.

There was no place in Aristotle's logical or metaphysical system for the mean. As we have said, the Law of Excluded Middle annihilated means. A thing must be positive or negative, good or bad, black or not-black. Consequently, when faced with the status of the mean, he said that it stood as an extreme to each of the
extremes. This of course would not do logically, since the extremes are in opposition, and if, to take one of his examples, courage is a mean between foolhardiness and cowardice, then it cannot be the antithesis of both. The whole idea of a mean, derived from arithmetic and applied to morals, is a metaphor and doubtless a useful one, but Aristotle is not too proud of it. He introduces it apologetically (Nichomachean Ethics 1104a 10). But he does use it here and there in the form of related standards, such as excessive size, symmetry, regularity, when he says that revolutions spring from a disproportionate increase in any part of the state (Politics 1302b 34), when he speaks of the self-destructiveness of extreme democracy and oligarchy (1309b 23) and the planning of cities (1330b 22). Its use is further evidence of his conservatism: he disliked the idea of both the plutocrat and the pauper, of the roaring boor and the long-faced anaesthetic spoil-sport. His discussion of the virtues is the revelation of a man justifying his prejudices with an air of rationality. And since his prejudices are also shared by most of us, these treatises seem to us to be among his best.

IV

The end of life is happiness, according to Aristotle, and the purpose of his ethics is to lay down the rules for attaining it. Happiness is identified with the realization of man's essence and that, as we have said, is his rational animality. Man is a recapitulation of the animate kingdoms, vegetable, animal, and human. His vegetative nature appears in his appetitive and nutritive faculties: like a plant he feeds and reproduces his kind. His animal nature appears in his sense organs. His human nature is expressed in the development of these faculties into reason. Thus the human soul has both rational and irrational parts and, as all virtue is excellence in the sense that one's inherent potentialities are realized, each of the two parts of the soul has its peculiar virtues.
The vegetative and animal souls have their excellence in the right habits. These habits are instilled by drill, not by sermonizing, for neither plants nor animals understand sermons. So the child who has not attained the age of reason must be drilled into forming the right habits, not reasoned with. We have two tendencies in regard to our lower nature, the tendency to give in and the tendency to refrain from giving in. When we satisfy our natural appetites properly, we are being liberal, and when we refrain from doing so, we are temperate. These two tendencies in later ethical writings were to be called desire and aversion, and the emotions accompanying them were called love and hate. The virtues of the irrational soul were called by Aristotle the ethical virtues as contrasted with those of the rational soul, called intellectual.

The rational soul had two functions, that of reasoning about truth and falsity and that of reasoning about future conduct. When the soul speaks the truth, knows how to reach the truth, can make the proper inferences, it has the virtue of wisdom. When it plans properly for the future, it has prudence. Thus the four cardinal virtues for Aristotle were liberality, temperance, wisdom, and prudence. The two intellectual virtues were fostered not by habit but by teaching. And, in the strict sense of the word “logic,” the treatises on how to instill the intellectual virtues are in the Organon. Hence the major hortatory parts of the ethical books deal with the ethical virtues, not with the intellectual. When then people speak of logic as the art of thinking, they are talking good Aristotelian. Thinking for him had a moral value; it was not moving little black marks, unrelated to fact, about on a piece of paper. It was in no sense of the word what would nowadays be called pure or formal logic.

In forming the right habits, we are urged to avoid extremes. This appears even in satisfying those desires which are given to us by nature, such as hunger, sexuality, play, irascibility, and so on. As we have said above, all such virtues are a mean between two extremes. Temperance is a mean between licentiousness and
insensibility, wittiness a mean between buffoonery and boorish-
ness, just as courage is a mean between foolhardiness and coward-
ice. But these means are not mathematically determined, since
some extremes are closer to the mean than others. Foolhardiness,
for instance, is more opposed to courage than cowardice, licen-
tiousness more opposed to temperance than insensibility. To reach
the mean involves experiencing the emotions indicated (1) at the
right times, (2) on the right occasions, (3) toward the right per-
sons, (4) for the right causes, and (5) in the right manner. The
truly courageous man learns through habit to act in the right way,
to recognize the right times, occasions, persons, causes, and man-
ers, by second nature, that is, automatically. He learns to know
what is and what is not done. He absorbs the code of a society
and does not have to think when an occasion or cause calls for a
display of courage, wit, or any other virtue. A contemporary
American, for instance, who is courageous will not participate in
every movement for reform, but if he is properly educated, he
will support, let us say, the Bill of Rights, regardless of appeals
which are made to him to refrain and let well enough alone. The
Jew or Christian who believes in his religion will not steal either
ideas or property from his fellows. Thus a well-knit society is
constituted in which a set of standards for good conduct is
drummed into one from babyhood on, and when one reaches
maturity one is no longer aware of what one's standards are. One
simply lives in accordance with them. This, I gather, is the Greek
idea of a gentleman, the man who is fair and good, and it is far
from being a contemptible ideal in any society. For if every situa-
tion demands rational analysis before action is taken, there will be
no action.

To form such habits, to acquire such an education, demands
that there be teachers, and somewhere or other there must have
been someone or other who thought out the code and put it in
order. That someone for us is Aristotle, but for the men who were
trying to live according to the code it had to be someone no
longer known, so that it would have the sanctity of tradition.
Regardless of who it was, an intellect was needed to think out the kind of times, occasions, causes, persons, and manners on which the virtuous emotions could be indulged in, so that the ethical virtues were in the long run as determined by the intellect as the intellectual virtues were. The fact that my courage is not planned or stimulated by me but by my teacher, does not imply that a reason, and not simply instinct, was guiding me. The arrow which finds the target, as Thomas Aquinas says somewhere, is guided by the reason of the archer and the beast which acts rationally is guided by the reason of the Creator. So the gentleman who acts spontaneously, doing the right thing without stopping to take thought, is substituting his masters' reason for his own—his masters', his ancestors', or his gods'. By doing so he preserves the integrity of his society and, when he says that something is right or wrong, he knows that dates and places have nothing to do with it. This kind of gentleman is as faultless as a machine; ethical commands turn into descriptions when applied to him.

Unfortunately such exquisite perfection is helpless when the ancestral situation changes. One can walk in the path of one's fathers only so long as the path is level and has no turning. Any codification of laws, whether statutory or customary, eliminates dates and places, and raises the historical to the heights of the eternal. Ethics is usually distinguished from both psychology and sociology; the ethicist searches for those standards which are binding on all men and all societies. It was the Sophist who emphasized the relativity of standards, but the course of European ethical thinking has been opposed to relativism. Aristotle was apparently not aware that he was rationalizing either his own desires or those of his social class. When he noted a difference of opinion among Greeks and Persians or Greeks and Barbarians, the Greeks were right and the others were wrong. According to classical ethics, both pagan and Christian, one man could be right and the whole world wrong. This may be the reason why no system of ethics has ever been practiced. When this remark is made, however, the ethicist replies that he is describing what ought to be, not what is.
Let us suppose that he is right and that Aristotle, since we are
talking about him, was also right in his particular description of
what ought to be. What is to happen when times change and radic­
ally new problems confront men? Suppose it were true that
private property had been abolished. Could a man be generous
then? Would the fact that generosity would no longer be needed,
in the sense that all men's needs were satisfied, be a substitute for
the feeling of generosity, the willingness to give things away in
order to please a friend? Is there no inherent value in the making
of gifts? Is the regret that one is unable to confer pleasure on
someone of whom one is fond an ignoble or trivial emotion? To
take another example, suppose the time came when some theory
of eugenics were put into practice. Only the beautiful, the strong,
the very intelligent, are allowed to have children and the rest of
us are sterilized. We have the compensation of dreaming of a
beautiful, strong, intelligent race of men coming along to take our
place—if the laws of probability work out as the eugenicists are
optimistic enough to think they will—but we also live a dreary
life, with no children to comfort our old age or to work for. We
become halfmen. But so far we have been speaking only of the
possible goods which might be lost. How is the virtuous man to
meet new problems when he has been drilled only in the solution
of old ones? How can he challenge the totalitarian state if he has
been accustomed to living in a democratic state? How did Aris­
totle's ethics fit men to adjust to the Macedonian conquest? How
would it fit men to meet the challenge of Christianity, of the
industrial revolution, of the present Age of Belligerency?

It is clear that Aristotle never faced this type of problem, for
he probably thought, as most of us do, that we are the human
race and that our civilization is human civilization. Yet the dis­
covery of the revolutionary changes of history is not new. The
ancients believed that there had been a succession of very different
ages in their past. Some believed in progressive deterioration of
moral and other values, some in progressive improvement. Ari­
totle himself indicates a belief in cycles in which all ideas are
rediscovered. Yet it is hard to find a philosopher whose literary remains show any serious use made of such ideas. On the contrary, those of whom we know anything always assumed that the end of life was the same for all men and that the good would always be the same in the future as it had been in the past. This is all the stranger in that when they were talking about foreigners, Egyptians or Persians or Scythians, they saw very clearly that their goods were not the Greek goods. Yet they had such superb confidence in the rightness of their own ways of thinking that they concluded that civilizations which were different from their own were just ignorant or wrong. Moreover not even the Sophists, so far as we know, who capitalized on such moral diversity as was expressed in the *Double Words*, ever asked why people should disagree so profoundly. The remaining evidence shows only that they knew of the differences and decided that the good was determined by Custom, not by Nature.

So it may not be surprising that Aristotle contented himself with a life for the sophisticated Athenian. The life of reason could be attained by following a few simple rules. First, depart from the extreme which is the more opposed to the mean. Second, pull away from your natural inclination. Third, when the attainment of the mean is impossible, choose the lesser evil. This amounts to little more than the first rule, except that sometimes one is confronted with two possible courses of action and can actually see that one is the better, whereas in following the first rule, one does not see the alternative with any clarity and knows only that one has a tendency toward an extreme which is more opposed to the mean than its opposite is. Thus a man may have an appetite for strong drink which he knows will lead to alcoholism if satisfied. He can choose between indulgence or self-denial, both of which are extremes. He should choose self-denial, since it would lead to a state closer to temperance than self-indulgence would.

But all this implies that one has the power to choose in accordance with rules whose reasonableness one can understand. To see the better and follow the worse was a psychological possibility to
Aristotle, as it was to Plato, since the only determinism which they recognized, outside of the material world, was that of actual corporeal restraint. If you cannot swim, you cannot survive for long in the water, nor can you be blamed for not jumping in to rescue a man struggling in the waves. And if you are fettered, you cannot move. But so long as you are not in chains, there is no reason why you should not make any decision which seems right to you. If you really see the better, you can pursue it. Your will in other words, not very clear words however, is free. The feeling of man's impotence had not as yet weakened the moral fiber of the Greeks, though it was soon to come. The Choice of Heracles was a free choice, neither inevitable nor predictable. Furthermore, as will perhaps be clearer when we come to discuss the contributions of Stoicism, if society or family or friends were a burden to your freedom of choice, you could always shake them off. In Aristotle this last possibility was no problem, for he was talking only about the man who was already free and an absolute monarch in his little world.

Happiness, which is the end of the moral life, is in the first place an activity of the *Nous*, the reason. The reason is that mental faculty for which all the other faculties exist. It is the end of man, his final cause. Moreover, when a man is thinking, he is not utilizing any of his bodily organs and is thus liberated from the body. Since it is activity, it is inherently good, for to act is better than to be acted upon (*De anima* 430a 18). To be acted upon is obviously to be subjected to external influences and it would appear that the ideal of Aristotle was to provide for a maximum of freedom from such influences. They for their part have their function fulfilled in bringing us messages from the objective world in the form of sensations. But the sensations themselves turn into ideas, once they enter the human mind and the active reason combines and distinguishes between them to make the material of thinking. When, however, Aristotle comes to describe the processes of thought and of knowledge, we find that to know is to know the causes of things (*Metaphysics* 994b 29). These causes,
as everyone knows, exhaust all possibilities of cognition, and when we know them, we need search no further for the truth. But Aristotle also realized that it is impossible to find a single premise from which all knowledge might be deduced, for the sciences, each of which "deals with a single genus" (*Posterior Analytics* 87a 38), are as distinct in their subject matters as are the genera themselves. At the same time, when we are engaged in thinking rather than in sensing, we are confronted with universals, not with particulars, and we contemplate a set of ideas which are more widely applicable than any others. We know, in other words, the most abstract ideas that exist. It is this contemplation of the general ideas which is the activity of the *nous*. It is not doing anything in the sense of acting upon anything, as an efficient cause might act upon matter; it is simply looking, so to speak, and seeing.

The active reason, moreover, is completely separate from the body. In the famous passage in the *De anima* (430a 10) which describes it, it is said to be separate, impassive, and unmixed in its essential nature. It thus when active amounts to man's entire liberation from all terrestrial concerns except that of understanding, for it is understanding. This being so, happiness as the activity of the *nous* is the most continuous activity. Strictly speaking, it ought to be thoroughly continuous without interruption, for since it is timeless, it should not appear now and then disappear. Aristotle does not, so far as I know, ever explain the paradox of turning on and off our intellectual powers. That we can contemplate the eternal ideas now and not contemplate them later can only be explained in the assumption that contemplation is a temporal affair. But Aristotle will not permit the ingression into the mind's pure activity of anything temporal. Similarly, when he says that the active reason—the term is not his—is immortal, he must mean, if he is consistent, that while we are active, we enter into a timeless world. But that means only that we are, while in a temporal world, capable of thinking about eternal objects. Thus a mathematician may think about his mathematical beings,
which are certainly not subject to change, while still carried along on the stream of history. But if there is a distinction between the knower and the known, it might be possible for the former to be in time and the latter to be eternal. Unfortunately Aristotle takes the position that when the \textit{nous} knows, it is identical with its objects. Hence both ought to be in the realm of the timeless. But in that case the problem remains of how it would ever suspect that temporal things also existed. And if the \textit{nous} becomes identical with its objects, does it become fused with the Unmoved Mover when it knows Him?

In the third place, happiness, such as he describes it, is the most pleasant form of activity. There is a clue to why this should be so in an observation in the \textit{Nicomachean Ethics} (1157b 16), to the effect that “nature seems especially to flee from the painful and to seek the pleasant.” This dictum is not developed in Aristotle, as it was in Spinoza, and he makes little use of the hedonistic norm. Nevertheless, if he is to be taken seriously, one has a right to infer that, since the reason is the final cause of man and therefore his nature, to bring it to realization ought to prove especially pleasant. He distinguishes between psychic and bodily pleasures (1117b 28) and argues that the bodily are worse than the psychic because they bring us closer to the beasts (1118b 2), and this may be evidence that he took his dictum as seriously as we do. On the other hand, since a good many men prefer an animal to a specifically human life, and prefer it because it is pleasanter, on the principle that nature is what happens on the whole, they might be thought of as more natural than the Sages. Praise and blame are properly given only to acts, he says (1109b 30), which are within our control and psychic pleasures accompany only voluntary acts. Perhaps he means to say that when we are living the life of reason, we are more in control of ourselves than when we act as beasts.

Finally, and here the traditional criterion of goodness enters, happiness is the most self-sufficient of our activities. When we are thinking about thinking, we are independent of everything
external to us. Even our subject matter is absorbed into ourselves and we are at last free. We are in need of nothing; we possess all desiderata. But—and unfortunately there is always a but—only a few men within a society can ever attain such happiness. Mechanics and laborers, as we have seen, are excluded. So are children and natural slaves. For the activity of the nous requires leisure and, he says (Politics 1269a 34), it is generally granted that in a well-governed state there should be leisure from the necessities of life. Hence only a few people within a state can ever be happy, and the very structure of the state, since the end of states is happiness, is determined by the needs of a very small part of the population. This does not prevent his saying that the good forms of government have regard for the common interest, but apparently he believes it to be to the common interest that free men with leisure should be allowed to spend their time in abstract thought. There is no passage in the corpus which explains why this should be so, and since few men outside of the Lyceum cared much about his opinions, living their lives as they saw fit, I suppose that he was never faced with this question. Since philosophy seems to have been practiced, as it is today, in cloistered communities, it seldom touched the people whose interests it analyzed, whose practices it often condemned, whose desires it deprecated. The gap between ethics and cultural anthropology is as wide today as it was in the fourth century B.C. and ethical conclusions are as unrealistic. The nineteenth century, for instance, because of the industrial revolution, the spread of colonialism, the growth of cities, was a time when moral problems took on a cogency which they never had had before. Up to that time the teachings of the Church sufficed to remind men of the possibility of sinning. But in the nineteenth century philosophers became aware of new sins, the sin of permitting one's brothers to live in degradation and misery, the sin of mass warfare, the sin of exploiting helpless savages, the sin of keeping women in servitude, and the sin of attaching privilege to birth. Yet the influence of the books was very slow in making
itself felt and ethics remained a topic of classroom conversation rather than an exhortation to reform.

V

The ethics and politics of Aristotle remained within the school but his logic gained widespread influence very soon after its promulgation. It was based, as everyone knows, upon the subject-attribute proposition and the problems which it arouses lie rooted in that form of discourse. For when we say that *All men are mortal*, we are not merely attributing a property to a class of beings, but by one of those puns of which philosophers have always been fond, we also classify the group called men within the group called mortals. The Greek anti-intellectuals saw this difficulty and some of the Sophists apparently utilized it in their arguments. If you say, *This apple is red*, you may be made to identify this apple with the color red; you may be made to classify this apple in the class of red things; you may simply attribute the property of redness to the subject, this apple. Even when men saw the nonsense of identifying the subject with the attribute, they still argued over whether the copula, *is*, meant inclusion in—or when negative, exclusion from—a class or whether it was simply the announcement of the subject's possessing a given attribute.

As far as the special forms of argument elaborated by Aristotle go, the syllogism, the confusion was of little importance. For whether one says that all men belong to the class of mortal things or that they have the attribute of mortality, anything which can be said about the class of mortal beings or which is implied in being mortal can be said about men. Similarly with two classes which are mutually exclusive, such as the class of mammals and the class of invertebrates or the proper attributes of each kind of being, if *No S is P*, then clearly nothing implied in the predicate can be attributed to the subject, nor can any member of the ap-
propriate class be also a member of the class to which the subject belongs. This formulation gave one the basis of classification. And Aristotle, who was a great inventor of names, established a relationship between certain classes, the species and the genus, which has survived to our own day. A genus was a class of classes and the included classes were the species. It should be noted that Aristotle did not classify genera into "higher" groups such as families or orders. That came later. The species were differentiated from one another by a definite property called the *differentia*. Thus *man* belonged to the genus *animal* and was differentiated from the other members of the genus by the property of *rationality*. Though no man is a horse and no horse is a man, they do share the common generic property of animality.\(^{11}\)

The two propositions mentioned are universals. But there were also two particular propositions, one affirmative and one negative: *Some men are wise* and *Some men are not tall*. These immediately invoke doubts. Does the assertion that some men are wise imply the assertion that only some men are wise and that therefore some are not wise? Or, if it is known that some men are wise, can it also be true that all men are wise? At this point experience enters into play and logic as a purely formal enterprise loses its purity. For the predicate *wisdom* in itself gives one no ground for inferring its presence or absence anywhere whatsoever. To assert that some men are wise is not to contradict the assertion that all men are wise, nor does the assertion that some men are not wise imply that none are wise. "Some" here seems to mean something like "as far as I know," or "within the limits of my experience." But what have you or I to do with the case, since all that we are doing is to pronounce the assertion? Is the logician trying to tell the truth in the sense of factual truth, or is he simply trying to see the implications of certain ideas regardless of what we may or may not think about them? It is likely that for Aristotle logic was a guide

\(^{11}\) To avoid a possible, if not probable, misunderstanding, I am not identifying this classification with that of Linnaeus or any other modern taxonomist.
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to correct thinking and not a formal science, a nonempirical
identification or differentiation or interrelating of terms. For there
seems to be no recognition on his part of the distinction between
formal and material truth, except when he is discussing fallacies.
He wants the premises of his syllogism to be true to fact and not
simply possible forms of propositions. The question of how we
know that all $S$ is $P$ is for him a reasonable question, especially
since experience gives us only particular propositions. Our "alls"
are always restricted to what we have discovered. As we have
seen, even when he is speaking of that which is natural, he is care­
ful to say that the natural is that which happens for the most part.
And furthermore he restricts knowledge to the apprehension of
universals and maintains that though particulars can be observed,
they cannot be known.

Since the typical Aristotelian proposition is of the subject­
attribute form, the relational proposition cannot be absorbed into
his system. In daily life we argue that if $X$ is greater than $Y$ and $Y$
is greater than $Z$, then $X$ is greater than $Z$. One can reinterpret
the Aristotelian into relational forms, but the reverse is impossible.
Inclusion in a class, like qualification, is a relation, but some rela­
tions are not either inclusion in a class, or qualification. Plato saw
the difficulty of erecting relations into qualities in Theaetetus and
elsewhere and Aristotle made no attempt to do so. One can see
redness, but what sensation corresponds to redder-than? It was
later maintained, by the English Platonists, that all relational asser­
tions were projections of human judgments into the external
world; the relations might exist between the ideas but could not
in the nature of things exist among objects. Why Aristotle did not
tackle this problem is not known, for he must have realized that
we are constantly judging things to be greater than others, to the
right or left of others, to be better than others, to be equal to
others. He had little knowledge of mathematics or he might have
tried to translate a geometric proof into syllogistic form. And if
he had, he would have failed. The most ordinary operations of
arithmetic, such as addition and subtraction, are not syllogistic.
And surely he must have added and subtracted columns of figures.

The classes of which Aristotle was thinking were set up by nature, not by man, and that is why through logic one could reach conclusions which were true to fact. But there is no natural class of beings which are simply equal to or greater than or to the right of, but all relations involve a term to which a given term stands in the relation in question. Relative or respective words are incomplete without one or more relata and sometimes derive their meaning from their relata. To be the brother of someone implies that one is a male, though the sibling relation obviously may obtain between members of either sex. This of course is simply traditional usage, for just as some languages distinguish between aunts and uncles on the father's side of the family and those on the mother's side, so it would be possible for a language not to distinguish between brothers and sisters linguistically and to call them both siblings indifferently. But in any event relations bind things together regardless of linguistic peculiarities, and cannot be found in the absence of that which they bind. There are no things which have the quality of being brothers and which are only children. There are no things which are great unless there is something than which they are greater. This would cause no difficulties if Aristotle had accepted as the primary form of the sentence the relational sentence, or, better still, had accepted two kinds of primary sentence, the attributive and the relational. The former would assert the possession of attributes such as perceptible qualities, the latter relations which could be observed but which were not perceptible qualities.

The drive for unity was probably the force determining what he could do. Just as incommensurables, such as the diagonal of the square, were scandalous (and in our own time we have retained the term "imaginary numbers" as if they were not so real as integers), so relations seem to have been an intellectual puzzle. I see no way of explaining why this should be so, for after all the ancients showed enough courage in tackling problems worse than
that. We must simply accept it as a fact that they confined their attention on the whole to classes set up largely on the basis of perceptible qualities or properties in the sense of what a subject might do or suffer. Their logic induced them to look for entities which would be of the nature of *things*, not processes or events, and even when they investigated something like light or heat, they had to find a *thinglike* being which would behave as light or heat. The material thing was their intellectual model, and this is especially true of Aristotle, who explained qualitative change as the presence in a material object of a quality which could move about in space, occupying now this position, now that, without undergoing any internal change. The formation of the elements, for instance, is interpreted on this basis, the primary qualities of heat, coldness, wetness, or dryness coming and going instantaneously. No explanation was given for their appearance and disappearance except in the case of the privative qualities, the cold and the wet, which took the place of their respective opposites, the hot and the dry. To be cold was simply to be not-hot, and to be wet was to be not-dry. But why anything should lose its dryness or hotness was left unexplained. That a privation should be perceptible seems curious, but it is worth noting that when it was a question of the problem of evil in early Christian times, this type of answer was given: evil is the absence of good. There is no question but that this mode of thinking greatly simplified science according to the Principle of Parsimony. But it is a question whether it was not oversimplification.

We have frequently said that classes according to both Plato and Aristotle were established by nature, not by convention. This is of special importance in Aristotle's logic, for it meant that definitions were real, not nominal, and that logic was a branch of metaphysics. Aristotle knew that all things fell into a set of categories, as we have mentioned above. These were the most general of all predicates. There are obviously more kinds of things that have quantity of some sort than weigh ten pounds, more kinds of things that are in time than exist at this moment
here. They are known by a special faculty, the somewhat overworked *nous*, which in this context may be named intellectual intuition. The ten categories were logically independent of one another, as we have said above, and this made it impossible for an Aristotelian either to attempt to unify all science under one scientific procedure, or to establish a logical hierarchy with one category at the apex and the others under it in some logical order. Moreover, there is no science of merely spatial beings or merely causal beings or merely passive beings; the sciences each deal with the things included in a single genus. Thus there could be a science of zoology or physics, for these would study respectively animate beings or beings moving in space. Aristotle was neither an epistemological nor a psychophysical nor a substantialistic monist. He accepted difference, as Plato also did, as one of the fundamental features of the universe.

The ten categories were in the final analysis ten types of order. And though there was no conviction on Aristotle's part, as we have said, that each could be studied separately as a type of order, nevertheless they were intuited separately. Each initiated problems of definition at a minimum and one finds discussions of almost all of them scattered here and there in the corpus. Space, for instance, was finite in extent; time was the measure of motion; change was always the actualization of potencies; there need be no passion correlative with every action, and so on. The kinds of order were all distinct from one another. But just as Socrates heaved a sigh of relief when he discovered that Anaxagoras had introduced a cosmic mind into the world to set things going, so Aristotle said that he seemed like a sober man in comparison with his predecessors. His cosmic mind became the Unmoved Mover in Aristotle, and it was he who kept the world in order by the force of attraction. It will not do to say that the Unmoved Mover is simply a name for the order which is exemplified in nature, that He is a personification of the Order of Nature as contrasted with the world of observation and chance. For Aristotle is definite about the separateness of the Unmoved Mover, as indeed he is
about the separateness of the active reason in man. There must be an agent and a patient wherever there is change and the motions of the planets are a form of change, just as the growth of a seed into a plant is. There must be one agent, since the "world must not be governed badly." The universal agent must be entirely active and incapable of being acted upon. He is the governor of the cosmos and, as a ruler, he must be external to that which he rules. He must have no potentiality in him, since if he had, he would not be complete and perfect. Therefore he must be completely actual. Furthermore, he must be immaterial, for no material thing is eternal. How such a being could cause in any reasonable sense of that word temporal and mutable effects, when one also assumes that there must be some similarity between cause and effect, is mysterious. If the Unmoved Mover were simply that toward which the whole creation moves, He would stand as a sort of Platonic idea of the whole, never realized but always potentially there. That is not, however, Aristotle's point of view. Finally, though the Unmoved Mover turns into God, He is not the creator of the universe, as the Biblical God is, nor is He the Demiurge of Timaeus. He is loved by everything below Him but He gives no love in return. How could he who lacks nothing love his inferiors? The perfect soul could no more love than hate. Like the Gods of Epicurus, He is impassive and totally uninterested in anything beyond Himself. His life is the life engaged in thinking about thinking. The attempt to fuse such a being into the being of a personal, anthropomorphic creator, judge and eternal father of us all, was bound to be an intellectual failure. It was, however, a great emotional success.

12 When he wrote Metaphysics xi. 6, Aristotle either forgot or had not yet said that all potentialities need not be realized. For on that principle a material object, though capable of changing, would not inevitably change.
Supplementary Note

It is always difficult, and sometimes impossible, to prove a universal negative proposition. But I have searched through the works of Aristotle in vain for a proof in which he uses the syllogism. His demonstrations sometimes are based on simple observation, especially when he is criticizing an opponent, sometimes are enthymemes, but I have yet to find a syllogism except as a sample of a type of reasoning. The opening of his *Metaphysics* (xi. 1) is an argument which is of a certain importance in the system. To avoid errors, I am quoting Ross's translation. Chapter 1 begins as follows: "Substance is the subject of our inquiry; for the principles and the causes we are seeking are those of substances." This is his topic sentence. He continues, "For if the universe is of the nature of a whole, substance is its first part; and if it coheres merely by virtue of serial succession, on this view also substance is first, and is succeeded by quality, and then by quantity." The first part of this argument may be rephrased in syllogistic form as: All wholes are such that their first parts are substances; the universe is a whole; therefore the universe is such that its first part is a substance. But this is not the way in which Aristotle actually does argue, and the hypothetical clause which introduces his argument is not used to form even a complete hypothetical syllogism. The second portion of the argument is straightforward dogma and he does not attempt to prove the order of the categories of quality and quantity. He continues, "None of the categories other than substance can exist apart." This is a premise. But this is backed up simply by the opinions of those whom he calls "the old philosophers" and by those of his contemporaries who "tend to rank universals as substances." In other words he is giving some reason, that of authority, for holding to the exclusive ability of substances to exist apart. He then moves on to say that there are three kinds of substance: one that is sensible, which is divided into two kinds, the eternal and the perishable, and a third which is immovable, that is, unchangeable. This classification is
based again on the opinions of other philosophers; it is a restatement of their positions. He then proceeds to say, "Sensible substance is changeable," and asserting that all change proceeds from opposite to opposite from intermediate points and not from all opposites but from contraries, "there must be something underlying which changes into the contrary change." If one ask why, he replies, "For the contraries do not change." This concludes the chapter as we have it.

Again, not one of these arguments is syllogistic, and when they are hypothetical, they are not hypothetical syllogisms. They can all be rephrased in the form of syllogisms, it is true, but then any argument, if one is willing to go to the trouble, can be twisted about to turn predicates into attributes. But the insertion of such words as "such that" or "of the nature of," though useful for the task of rephrasing, are cumbersome and unnecessary if one is thinking of conviction. It is no better to say, All things that change are such that they have an underlying substance which undergoes the change, than it is to say, If a change occurs, it is due to a subject which changes. I do not say that this is very intelligible, for what the underlying subject is which changes is less than clear. But if one understands the meaning of a subject of change, then the simpler sentence is as useful in the argument as the more complex sentence.

This single chapter may not be typical of the corpus as a whole, but I think that it is a fair sample nevertheless of his proofs. Aristotle is one of the few philosophers who is careful to state his premises and he leaves it to his readers to see the relevance of his conclusions to his premises. When one comes to a man like Sextus Empiricus, one sees the various forms of syllogism in use, as well as traditional forms of nonsyllogistic proof. But in what we have of Aristotle, who brought the syllogism into the light of day, it is strange to find him making little or no use of it.