DARWIN'S DILEMMA *

DARWIN reared his theory of Natural Selection upon the basis of three observable facts in the world of living things, and two deductions which he made from these observations. The first two observations are the following: organisms tend to increase their numbers in a geometrical ratio such that, if unchecked, the individuals of a given type of organism would quickly become so great in number that no country could support them. On the other hand, and this is the second observation, the numbers of a given type of organism do in fact remain relatively constant.

The first deduction made from these first two observations to account for them is what Darwin called " the struggle for existence." For if nature produces more individuals than can survive, the greater number of them must, for some reason or other, be destroyed. Now this Darwin accounted for by competition between organisms, resulting in survival of those that are sufficiently equipped by their quality, or are favored by circumstances, such as the seed that falls on fertile ground.

Darwin's third observation was that organisms tend to vary. His first example is that of variation under domestication, of wheat, for instance, of pigeons, of horses, and of hounds. Now this is attributed to man's power of selection. These variations are intended by man. However deliberate the choice, not all of these variations that are brought about are actually the result of a deliberate selection—not all. Deliberate choice, improvement of environment, or cross-breeding, are not all there is to this selection. Darwin pointed out that,

> . . . eminent breeders try by methodical selection, with a distinct object in view, to make a new strain or sub-breed, superior to any kind in the country. But for our purposes, a form of Selection, which may be called Unconscious, and which results from everyone

* These pages are the transcript of a recording.

trying to possess and breed from the best individual animals, is more important. [Notice, the breeding or deliberate improvement of, say, the quality of wheat or the quality of horses is accompanied by an improvement that was not intended; that is not deliberate, an unconscious selection is taking place.] Thus, a man who intends keeping pointers naturally tries to get as good dogs as he can, and afterwards breeds from his own best dogs, but he has no wish or expectation of permanently altering the breed. Nevertheless we may infer that this process continued during centuries, would improve and modify any breed, in the same way as Bakewell, Collins, etc., by this very same process, only carried on more methodically, did greatly modify, even during their lifetimes, the forms and qualities of their cattle.[1]

I have quoted this long passage because of the importance of what Darwin calls "Unconscious Selection," unconscious "insofar that the breeder could never have expected, or even wished to produce the result that ensued—namely the production of two distinct strains." This unconscious selection is important to Darwin's second deduction, namely, Natural Selection. The distinction which he makes brings us face to face with two different types of selection; the first is deliberate, with a distinct object in view; the second was unintended unexpected, nor even wished for. So far as man's purpose in this particular intervention is concerned, the new strains produced by the second type are fortuitous. Actually, they are products of nature. The natural principle, as distinguished from the conscious, deliberate one, is called Natural Selection.

There is no doubt that Darwin was reasoning here on the basis of an analogy or proportion between art and nature, and that the term for transition was selection. In other words, unconscious selection is first revealed as a by-product, so to speak, of conscious selection, and an unconscious selection is going on in nature all the time. This was sound reasoning, it seems to me, given the observations—particularly the one that all organisms tend to vary considerably—which should in fact

[1] Charles Darwin, *The Origin of Species*, chap. I (New York: Modern Library, n. d.), p. 32.

be warranted by experience, and in some measure they are. (Whether they are or not warranted is none of our concern at this moment or in this particular paper.) The point is that I see no problem in unconscious selection going on in domestication and in nature untouched by man. Right now I am particularly interested in the analogy and the more so because Darwin himself dwells upon it. Between conscious selection, and that natural selection which accompanies it but lies outside man's intention, Darwin sees a proportion. He makes a tight case of it. Listen to this from Chapter Three of *The Origin of Species.*

> I have called this principle, by which each slight variation, if useful, is preserved, by the term Natural Selection, in order to mark its relation to man's power of selection. But the expression often used by Herbert Spencer of the Survival of the fittest is more accurate, and is sometimes equally convenient. We have seen that man by selection can certainly produce great results, and can adapt organic beings to his own uses, through the accumulation of slight but useful variations, given to him by the hand of Nature. But Natural Selection, as we shall hereafter see, is a power incessantly ready for action, and is as immeasurably superior to man's feeble efforts, as the works of Nature are to those of Art.

If Darwin's analogy holds good, it implies that both art and nature proceed by determinate ways or means to produce some final product. Another point worthy of attention is that to Darwin's mind the works of nature are immeasurably superior to those of our art or craft. We must not interpret Darwin as believing that art cannot produce certain works that nature could not bring about, in which respect art is superior to nature. Nature does not amputate a gangrenous foot, supply spectacles, or false teeth. Here we can do something that is useful and that nature cannot do. Darwin only meant that nature's ways, in producing her own works, are immeasurably more subtle, and relatively obscure to us, than our own ways and means in producing artifacts. Nature's selection is superior to our own. That is Darwin's position, and notice that he still calls it selection.

Before dwelling on this second deduction, namely natural selection, let us return for a moment to the first, the struggle for existence, which Darwin attributes to every organism. And here is where we will encounter our dilemma. We all know what the expression " struggle for existence " means as referring to man's activity, as when he struggles to get somewhere, say, physically, to get up a hill, or against an enemy, or to make a living, or to get a job. In this context the word " struggle " is quite clear. It can be verified immediately. But what does it mean when applied to *all* organisms, to beasts, and even to plants as Darwin holds? He was keenly aware that he was not using the expression in its readily verified meaning. And here I quote from the very same Chapter Three.

> I should premise that I use this term in a large and metaphorical sense including dependence of one being on another, and including (which is more important) not only the life of the individual, but success in leaving behind progeny. Two canine animals, in a time of dearth, may be *truly* said to struggle with each other which shall eat food and live. But a plant on the edge of a desert is said to struggle for life against the drought, [and here the meaning of " struggle " is going to be somewhat diminished], though more properly it should be said to be dependent on the moisture. A plant which annually produces a thousand seeds, of which only one of an average comes to maturity, may be more truly said to struggle with the plants of the same and other kinds which already clothe the ground. The mistletoe is dependent on the apple and a few other trees, but can only in a far-fetched sense be said to struggle with these trees, for, if too many of these parasites grow on the same tree, it languishes and dies. But several seedling mistletoes, growing close together on the same branch, may *more truly* be said to struggle with each other. As the mistletoe is disseminated by birds, its existence depends on them; and it may methodically be said to struggle with other fruit bearing plants, in tempting birds to devour and thus disseminate its seeds. In these several senses, *which pass into each other*, I use for convenience' sake the general term Struggle for Existence. [Italics added.]

There stands the dilemma. The first one is clearly expressed when he says, " I use this term in a large and metaphorical sense." This is nonetheless most equivocal. The second is the

example of the plant. He allows that a plant struggles, but of course a plant does not struggle in the way a dog does; and a dog does not struggle in the way a man does to solve a problem. Further, we must notice that, still within the realm of plants, in one case we can say more truly that they struggle than in other cases. But a meaning of struggle is still retained somewhat. It is not quite the struggle of a man, it is not quite that of a beast, but it is not confined to that of a plant merely needing moisture either. One plant can somehow compete with another and, as a result, the most favored, either by quality or by circumstance, will survive, or its progeny. " The mistletoe . . . may methodically be said to struggle with other fruit-bearing plants." So that the plants, in a sense, truly struggle after all.

This passage from the *Origin of Species* reminds us of Aristotle's caution in using the simple term " life." If we compare plants to animals, he says, they are not alive; but compared with other forms of matter, they are indeed alive. So " alive " or " life " are equivocal terms, they have many meanings. There is a meaning of life verified in a beast, not verifiable in the plant; and one of man, that is not verifiable in a beast. Aristotle held that such terms are homonymous by design, not by chance (as the word " seal "). Terms or expressions that are equivocal by design are called analogous. Bertrand Russell speaks of " systematic ambiguity." But Darwin said that he was using " struggle for existence " in a large and metaphorical sense. Now analogy and metaphor are not the same. I mean that a " large sense," and a " metaphorical sense " are not necessarily the same, and that is where we run into difficulty.[2] Take for instance the word " light," or the word " to see." " To see " means first of all, " to see with my eyes." But when you explain to me some problem

[2] Not even those of Darwin's followers who opt for sheer metaphor quite succeed in circumventing such words as " good," " favorable," " advantageous," " better," " improvement," and the like. This is strikingly borne out in an excellent paper, " Darwin and Religion," by Prof. John C. Greene, which appeared in the *Proceedings of the American Philosophical Society*, CII (1959), 716-725.

and I say, " Oh I see," I do not mean that I see with my eyes, since the figures on the blackboard I see with my eyes are not exactly what it is that I understand. Seeing is said here of *understanding*. So " seeing "—the word—is still materially the same, but it has a prior meaning, and we use the same word because this sameness expresses the passage that our mind makes from what we know less to what we know more. " To see " is an analogous term.

Take the word " light " for a second instance: " sunlight," " candlelight," " the light of reason," or, " to examine a problem in the light of calculus." Is " light " used as a metaphor, or as an analogous term? It all depends. If you have changed the meaning of the term " light "—extending it to identify this new kind of thing that you want to designate by it—if you have actually stretched the meaning of the word, then it is an analogous term. But if you retain exclusively the first meaning of the word as in " candlelight " or " sunlight," and have not changed what we call the imposition, then your application of this word in the " light of geometry " is a metaphor. An analogous term may have first been used as a metaphor, such as the word " tongue " when meant of speech. But eventually the word was intended to mean both organ and language. " The English tongue," or " la langue française " are not metaphors. But not all metaphors can become analogical terms. " Brief candle " is a fine metaphor for human life, but we would hardly say that our life is such in a large sense of " brief candle "; or that a heart is of stone in the large sense of stone. Nonetheless Darwin, explaining why he uses a metaphor, is actually giving reasons which, to an Aristotelian, make the expression an analogous one, although Darwin calls it metaphorical. It is actually analogy and I will show you why. We should say " in a large, extended sense," as distinguished from a metaphor whose sense has not changed when applied to something else, although the mode of signifying does change.

You may now wonder what the purpose is in going into the question of naming as I do. It is my simple intention to show what strange views we may be led to, unless we clear up this particular problem of naming in connection with the theory of evolution—with the theory of evolution, at least as it was begun by Darwin. Theories of evolution were around long before then, but Darwin can be said to have begun the scientific investigation of the problem and to have proposed a scientifically sound theory, at least for his time.

One of these strange views—and I should not use the word " strange " in too forceful a way—we find in Sir Julian Huxley's interpretation of general Darwinian theory. Darwin allowed that one plant may be said to struggle " more truly " than another plant, according to circumstances, or according to kind, or according to the kind of plant or kinds of plants with which it has to struggle. Now this is surely very different from saying that a stone is more truly a stone than a heart of stone, because in the latter case we have not changed the imposition of the word " stone "; we have retained the first meaning and applied it without imposing a new meaning upon it. There is a change in the mode of signifying, but not in the significance of the word. For the " heart of stone " is in no sense truly a stone at all. But Sir Julian takes Darwin's " metaphorical sense " quite literally. Take, for instance, the term tending in " tendency of all organisms to increase in geometrical ratio." Is the word " tendency " used here as a metaphor, or is it taken as an analogous term? For instance, it is a metaphor in " the tendency of a variable to its limit." This is not tendency by which a man tends to do this, or tends to do that; or by which a dog intends to get the bone. The " tendency of a variable to a limit " is in this context plainly a metaphor.

Sir Julian Huxley writes that " at first sight, the biological sector seems full of purpose. Organisms are built as if in purposeful pursuit of a conscious aim." But the truth, he adds, " lies in those two words 'as if.' As the genius of Darwin showed, the purpose is only an apparent one." Darwin's contribution, according to Sir Julian, consists precisely in this—

in the discovery that there is no purposeful activity going on in nature and that everything must be explained without having any resort whatsoever to purpose; and that if there appears to be purpose in nature it is only in appearance, so that when you use terms that are related to purpose in beasts or plants, you are using the term as a sheer metaphor. There is no room for a "large" sense of purpose.

It is not my intention to show here that nature acts for a purpose. I merely want to attract your attention to the strange antinomies we are led to when we deny purpose in nature. I am just going to present the antinomies; my present purpose does not extend beyond this. Let me then make four points regarding purposeful activity and nature, in the context of Huxley's assertions which I have just quoted.

(1) Sir Julian, along with Lord Russell, is emphatic that action for a purpose is clearly recognized in human making and behavior. He accepts that man acts for a purpose, acts for the sake of something; and this is verified in man's case unmistakably according to both these authors; they are both quite critical and accept as little as possible, which is in itself a praiseworthy attitude. They say, and allow us to say, that man truly acts for a purpose. Far from denying such action, Huxley asserts that "the future of man, if it is to be progress and not merely a standstill or degeneration, must be guided by a deliberate purpose. And this human purpose can only be formulated in terms of the new attributes achieved by life in becoming human." Purposeful activity is therefore a radically new kind of reality that arises uniquely in the case of man. It is not to be found in nature itself. Man himself cannot be said to have been brought about for the sake of something. Yet man, as we have stressed, is in many respects unique among animals: a purposeful agent is brought about without intent in any possible sense of this word.

Until this purposeful agent appeared on the scene, "The purpose manifested in evolution, whether in adaptation, specialization, or biological progress, is only an apparent purpose.

It is just as much a product of blind forces as is the falling of a stone to earth or the ebb and flow of the tides. It is we who have read purpose into evolution, as earlier men projected will and emotion into inorganic phenomena like storm or earthquake. If we wish to work towards a purpose for the future of man, we must formulate that purpose ourselves. Purposes in life are made, not found."

Sir Julian offers no reason why, though at first sight the biological sector seems full of purpose, the purpose manifested in evolution is only an apparent purpose. He offers no reason for this, but I will explain the seeming plausibility of this hypothesis a bit later.

We must concede that if there is action for a purpose in irrational nature, that is, outside of man, it will be very different from the kind we find in man, to the point where purpose or action for a purpose will have a different meaning when said of man, when said of beast, and when said of a plant. If there *is* that kind of action in nature, if the term purpose is deserved, if it is applicable, it will have to carry a new meaning, but a meaning related to and dependent upon the one we first imposed. If it is stretchable, as it were, if it can be enlarged, then we will have to accept that it will have a different connotation in these different cases.

This we ask of Sir Julian. Is it so obvious that a purpose is either human or no purpose at all? If a purpose is indeed either human or no purpose at all, then of course Sir Julian's position would be quite irrefutable. He suggests that it is we who read purpose into nature, that is, we project into nature certain things that are actually characteristic of, and exclusively found in man. And this is no doubt often the case. But are we not being anthropomorphic, we ask, in a more sophisticated way when we imply that nature's purpose is either human or no purpose at all? Isn't that another kind of anthropomorphism? On the other hand if organisms are built by nature in "purposeful pursuits," does this mean that nature must have a "conscious aim"? I mean, is purposeful action

restricted to conscious action? That is a further assumption and it ought to be justified. Darwin justified it when he spoke of the plant living on the edge of the desert. He showed us that he was stretching the meaning of the word " struggle for existence " and " struggle for survival," a survival, which, of course, is understood as a good. Dogs struggle to acquire food because they like it. But if a plant is going to struggle after its food, can you mean that the plant likes it? We assume that a plant by definition at least has no sensation, so how could the plant like food? Yet plants struggle, as Darwin points out. We have to stretch our words, with Darwin. But Sir Julian refuses to stretch them: he does not allow a new, related, meaning whose difference is based upon a proportion found between the things intended by the same word.

Allow me to mention in passing the over-emphasis on change in Darwin and in Huxley, an over-emphasis which has been recently criticized rather ably by Loren Eiseley in a book written on the occasion of Darwin's centenary. These thinkers have so emphasized the passage from one form of life to another that they have lost sight of the remarkable stability that can go along with this change. Now the stability of an organism needs explanation too, and change alone is not going to explain stability. We bring in this example simply to point out the idea of what we mean by action for an end in nature or what is called final cause, although I am wary of the term final cause, so easily misunderstood. It is not found in Aristotle who teaches that things act " for the sake of something." " Causa finalis " is found in scholastic philosophy. St. Thomas uses it, as a matter of fact, but I am wary of it in English because it tends to be technical. With Aristotle a man acts for a purpose and beasts act for a purpose too; and, while plants do also, this is very obscure and we must at any rate extend the meaning of purpose. The term " good " has likewise several meanings—a whole orderly group of them co-ordinated somehow one with the other, all covered by that single term " good "; as for instance in a " good steak," a " good man."

" Good " means something quite different in each case. There is not a unique meaning here, but actually many co-ordinated meanings.

(2) Take an organ such as an eye or a tooth. We say that eyes are for the sake of seeing, that incisors are for the sake of cutting and molars are for grinding. When we say this are we using metaphor? We can go way back to Empedocles who said that we have eyes not for the sake of seeing but we see because we have eyes. Another philosopher said that man is the wisest of animals because he just happens to have hands. It is far more thorough, I think, to hold that man has hands in view of making. Why should one position exclude purpose as a cause—I mean a good as " that for the sake of which "? Nature acts for a purpose; of course, not exactly in the way we do, since there is, after all, a radical difference between nature and reason, but in a proportional way: there is a proportion between the way we act and the way nature acts. There is no true identity, but only a proportion, and an irreducible one, between them. Can we accept this? It is not our problem here. I merely want to show, in a dialectical way, what we are led to when we deny that nature acts for a purpose, even in this remote yet analogous sense of the term.

Now, my question is about this struggle. Does that which finally comes about after a certain activity possess the nature of good? It is good to have the molars in the back (allow me this example from Aristotle) and our cutting teeth in the front. Is this disposition produced by a proportional cause or by chance? Do we understand why the molars should be in the back to grind, why the grinding should go on there and the cutting out in front? Do our teeth make sense? If their disposition were reversed, it would be unreasonable, it would be monstrous. That is how we distinguish monsters from non-monsters.

Now, if we allow that nature produces such end products *because* they are good, we imply that nature acts for a purpose, but in doing so we must be aware that we have extended the meaning of " end " and " action " and " purpose."

(3) Now, once we have recognized goodness in these things, we can still ask whether nature acted " for the sake " of this goodness, or whether it came about for no purpose at all, just by chance, as some of the ancient philosophers held, in common with some more recent ones. The Darwinian philosophers who deny action for a purpose in nature should realize that they have been anticipated by the earliest philosophers; they are somehow regressing to ancient positions.

Sir Julian's view is that all can be rendered intelligible without purpose—by blind forces. Just what is meant by " blind forces," by " blind," on the one hand, and " forces " on the other—not to mention the equivocity or ambiguity of the two words taken together in " blind forces "—is not clear. I know what a " blind man " is, but a " blind stone " is something else—I mean that a stone is not *expected* to see. This makes a considerable difference. I know fairly well what I mean when I say that stones have neither eyesight nor understanding (and even Sir Julian insists upon the uniqueness of man as to understanding and purposeful action).

Remember Darwin's plant struggling at the edge of the desert. Huxley will state that this struggle and its result are the product of blind forces, as in the falling of a stone. Darwin did not say this, although he did leave us with a dilemma when he stated that he was using " struggle for existence " in a *large and metaphorical sense*. Darwin would not have held that stones struggle to fall, and to say that they do would be poor metaphor. But if taken as a mere metaphor apropos of living things, why should it then be good? What does it convey that the fall of a stone does not? If I understand him correctly, Sir Julian would make no distinction here. The result is that " struggle for existence " said of plants and beasts is not only poor metaphor; it is also utterly misleading. We must admit all the same that Darwin made it possible for some people to to hitch on to a metaphorical sense, which, upon closer analysis, turns out to be unfelicitous and unscientific; and for others to allow an extended, large, and yet true meaning. He might have unfolded himself a bit more.

(4) Fourthly, we are faced with two paradoxes, which I will mention briefly. For Sir Julian, Reason ought to be satisfied with a theory which seeks to explain everything, including Reason itself, as arising from something which has nothing in common with Reason, and for a reason no different from the reason stones fall to earth. Notice the different meanings here imposed upon this word " reason." It means one thing in " man is endowed with reason "; it means another in " a man has no reason to do this rather than that "; and something else again when we say " the man fell for the reason that he slipped on a banana peel." Sir Julian does not mean that things occur for no reason at all; he intends that outside human activity all things occur aimlessly and are accounted for without invoking intelligence behind them. He deserves credit for seeing that, if purposeful action be held to exist in nature, this can only be on the supposition that nature is the work of an intellectual agent—that *quodlibet opus naturae est opus alicujus substantiae intelligentis*—which is precisely what we hold (let it be immediately added that the difficulty of our position is not unappreciated by us). In other words, so far as nature is concerned, Sir Julian will understand rational to mean no more than reason in " the reason stones fall "; with the consequence that, compared to human reason or to any other understanding or intellectual agency, all the things and events of nature proceed from utter unreason, and for no other than the reason stones fall to the earth. Human reason itself is sufficiently accounted for as a product of blind agency. " Explanation," " interpreting," " providing proof " can never be more than an attempt to show that everything in nature is the product of aimless " blind forces." Man, then, the avowedly purposeful agent, came about for no purpose at all. This unfortunate animal finds itself in the curious position of being burdened with all the reason or intelligence there is, and with all the purposeful action there is. He alone has reason, for a reason which can only be blind.[3]

[3] " Natural Selection can determine the direction of change, but has no goal.

Now I am all in favor of economy in explanation. If the existence of what Darwin called "good species" (notice his use of the word "good") can be accounted for by, say, random mutations, then random mutations it is. But can these species be so accounted for? And, by the way, just what does this word "random" mean? I know what it means in "to throw dice at random." I deliberately so throw them, just as when I aim randomly distributed pellets at a duck. In these cases there is no opposition between randomness and purpose. If the word must be applied to nature, it will either become a metaphor or acquire an extended meaning. And what do certain biologists intend when saying that all species are the product of random mutations and, in the same breath, that therefore they are products of mere chance? Does randomness mean the same as chance?[4] If so, we are imposing a new meaning on

It pushes evolution blindly from behind." Julian Huxley, "Man's Place in Nature," in *The Destiny of Man* (London: Hodder and Stoughton, 1959), p. 19. In the *Sunday Times* (Feb. 3, 1957) Sir Julian writes: "The real wonder of life is the fact that the automatic and non-purposeful process of biological evolution should eventually have generated true purpose in the person of the human species."

[4] Elsewhere I expressed some difficulty in understanding Sir Julian Huxley's position in this matter. Take, for instance, the following statement: "Natural Selection is an ordering principle. It takes the disorderly material provided by 'random' or 'chance' variation, builds it up into orderly patterns of organization, and guides it into ordered paths of change." ("Man's Place in Nature," *ed. cit.*, p. 14) As J. W. C. Wand remarks in the same booklet (p. 42): we believe "that 'the mechanism which directs the course of evolution' and its 'ordering principle' are guided by a divine mind to a good and beneficent purpose." Plainly, Sir Julian sees no need for such a mind. Still, whether or not randomness and chance are for him the same, whether chance here means pure chance or something less than pure chance, he indeed insists upon an ordering, guiding principle. Might we, in order to avoid all suggestion of purpose, take the "ordering" or "guiding" as having the meaning these words would have when a river-bed is spoken of as channelling, and as directing and guiding its waters to the sea? But the analogy cannot stand. For the river-bed too, was somehow formed at random (we would say *ex necessitate materiae*), and the sea itself, is a random distribution. One ought not to ask Sir Julian "How do you account for the ordering principle?" for the reply would likely be "It's just there." No, we are driven back to the monkeys pounding at random. Now, when they allegedly produce all extant literature, are their random poundings led to this by an "ordering" and "guiding" principle? Sir Julian must surely admit that the terms are now vividly out of place. The principle now cannot be

either or both of these terms. Upon what grounds? When we throw dice at random, we do not know which sides will in fact turn up, though we know the possible alternatives; when we aim birdshot at a duck, we do not know which of the pellets will actually bring it down, though we may be confident that some of them will do the work. Something is known here, but there is also something unknown: we are blind as to which sides of the dice will turn up, or which pellet or pellets will strike. (Notice that we in fact use the random distribution of many pellets to compensate for the uncertain course of a single bullet.) Now there is also something blind about chance or fortune in human affairs. Socrates did not go to the market this morning to meet the debtor he had been wanting to meet, yet he met him all the same, by chance, for he did not know his debtor would be there. So here too there is blindness. Could this be the reason randomness and chance are said to be one and the same?

I have dwelt for a few moments on Sir Julian's position—not irreverently, I hope—merely to point out its paradoxical nature. Let me add, in all fairness, that whoever holds that nature does act for the sake of something ought to be aware of the obvious difficulties of such a position. If it is maintained, for example, that a bird builds a nest for the sake of offspring as yet unborn, and does so quite unwittingly, it is after all, far from obvious how anything that does not as yet exist can already be a cause—especially in the case of blind agency. Purposeful activity in nature is also readily oversimplified, and made to look like the argument concluding *et voilà pourquoi votre fille est muette*; it is obviously good for a man to have hands, but this does not show how he acquired them. Tele-

anything more than the mere possibility of these particular arrangements of letters, which just happen to be meaningful. In virtue of what principle is "a million monkeys" meaningful, and "the slithy toves" not, if both are arrived at by aimless monkeys? Where is the reason why the former and not the latter arrangement should be judged *favorable?* Cf. *The Hollow Universe* (Oxford University Press: London, 1960), pp. 97-110; "Abstraction from Matter" (III) in *Laval théologique et philosophique*, 1960, n. 2, pp. 174-188.

ological mechanisms may help to explain. Meantime, we must remember that the good was first recognized by Aristotle [5] as a special kind of cause—the first but most obscure of all causes. But though it would be foolish to ignore the difficulties which this doctrine must entail, will it be any less foolish to conclude that it is therefore unscientific? I fail to see why Natural Selection must be understood as devoid of purpose, or why " the struggle for existence " is to be taken as sheer metaphor.

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[5] Plato also considered the good as a cause, but not as a cause *sui generis*.

ΦΤΣΙΣ

The Meaning of 'Nature' in the Aristotelian Philosophy of Nature

SOMETIMES there are many things in a word. If such is the case, it is to the philosopher's advantage to trace out the relation between the various meanings of a word, insofar as the later and secondary significations are to be more fully understood only when seen in the light of a primary imposition, first and best known to us. The extension of the word to include further meanings retaining the relationship to this first and most known can be for the human mind a safeguard from meaningless abstractions and a reminder of the principles and trajectory of our knowing. At the same time, if the order is not seen, the extension can be a source of confusion and error.

The advantage of bearing this order in mind and the danger of ignoring it are of particular importance in the case of the word *nature*; for although it is one of the most common terms in philosophy, many of its possible significations have yet to be explored more fully. The purpose of this article, accordingly, is twofold: (1) to trace out some of the more important meanings of this word with a view to determining its particular use in the Aristotelian and Thomistic philosophy of nature, and (2) to show that even this particular meaning is continually modified within the science of nature. Our order of procedure shall be as follows: I. After a preliminary review of the meanings of *nature* given by Aristotle in Book V of his *Metaphysics*, we shall turn to his *Physics* in order to determine more explicitly which of these meanings are proper to philosophy of nature. II. Next we shall develop certain implications of the definition of nature given in the *Physics* by detailing various ways in which nature can be taken as either an active or a passive principle. III. Finally we shall examine the extended meanings that the word nature assumes as philosophy of nature is elaborated. To my knowledge the possibility of this progressive