CHAPTER 2

The Possible Answers

(1)

THE simplicity or complexity of a question derives from the range of answers that can be given to it. When we ask how man differs, the first pair of opposed answers that we can think of leaves the question in a relatively simple condition. Let me begin with that first pair of answers and then subsequently complicate the question by introducing variations on each of the two answers.

The two initial answers that we tend to give when we ask how any two things differ are that they differ in *kind* and that they differ in *degree*. To explain these answers in principle, I will first use mathematical objects as examples.

In the series of regular plane figures, distinguishable figures—a triangle and a quadrangle, let us say—differ in kind. So, too, in the series of integral numbers, odd and even numbers differ in kind. What are the properties of this mode of difference? They are twofold: (1) One of the objects compared possesses a defining characteristic *not possessed by the other*—three-sidedness or four-sidedness, in the case of triangles and quadrangles; divisibility by two or indivisibility by two, in the case of even and odd numbers. (2) There is no intermediate object possible—nothing which is a little more than three-sided or a little less than four-sided, nothing which is somehow in between odd and even numbers.

Intermediates are, of course, possible in the series of plane figures differing in kind; for example, a quadrangle is intermediate between a triangle and a pentagon; as, in the series of whole num-

bers, four is intermediate between three and five. But in such series, intermediates are not possible between proximate members —between triangle and quadrangle there is no three-and-one-half-sided figure; between three and four there is no other whole number. Odd and even represents a distinction between kinds of whole numbers without regard to their serial order; and so in this case we can say that intermediates are impossible without reference to serial order.

The impossibility of intermediates constitutes the discontinuity or discreteness of kinds: only things that differ in kind differ discretely or discontinuously. Another way of saying this is to say that the law of excluded middle holds for things that differ in kind and *only* for things that differ in kind. Thus, for example, a whole number is either odd or even. There is no third possibility or *tertium quid.*

So much for difference in kind. Let us now consider the following examples of difference in degree: a series of straight lines differing in length, or the achromatic series of light intensities from white to black through all shades of gray. The properties of this mode of difference are also twofold; and they are also exactly opposite to the aforementioned two properties of difference in kind. (1) Both of the objects being compared *possess a common characteristic, but one has more of it and the other less.* Both a two-inch line and a three-inch line have length, but one is longer and the other shorter; one has more, the other less, of their common property—length. Of any two light intensities that we select in the achromatic series from white to black, one is brighter and the other duller; one is more, the other less, intense. (2) Between any two straight lines or any two light intensities, no matter how proximate, no matter how small the difference in quantity, an intermediate is always possible.

The possibility of an intermediate—in fact, of an indefinite number of intermediates—between any two objects that differ in degree confers upon things that differ in this way the trait of continuity. Two things that differ in degree differ continuously, not discretely. Here the law of excluded middle does not apply. We cannot say of light intensities that they must be either white or black, or this shade or gray or that. The light intensity may be neither white nor black, but gray. It may be neither this nor that shade of gray, but a shade intermediate between them.

When, in what follows, I speak of a continuum of degrees, I will not be using the word "continuum" in the mathematical sense, but rather to signify continuous variation—the mode of difference to which the law of excluded middle does not apply—as contrasted with discrete differences, to which it does apply.

Let me now summarize the distinction between difference in kind and difference in degree by reminding you of their opposite properties. In doing so, I will replace the mathematical or physical examples used above with biological ones.

Two things differ in *kind* if one possesses a characteristic totally lacked by the other, or if one can do something that the other cannot do at all. Thus, vertebrate and invertebrate animals differ in kind, for the one has a bony skeletal structure totally lacked by the other. Similarly, viviparous and oviparous animals differ in kind, for the one gives birth to living offspring and the other reproduces itself by laying eggs; and since these two methods of reproduction exclude each other, it follows that viviparous animals cannot lay eggs and that oviparous animals cannot give birth to living offspring. Two things differ in *degree* if, with respect to some characteristic that they both possess, one has more of it and the other less. Thus, one species of bird may differ in degree from another with respect to the speed with which it can fly; or to shift the comparison, one species of reptile may differ in degree from another with respect to length (e.g., the python and the garter snake).

Whenever, with respect to two things being compared, it is said that *only* one of them has a certain property or is capable of a certain performance, a difference in kind is being asserted. Just as the word "only" is indicative of difference in kind (whenever it is said of two things that *only* one of them has a certain characteristic), so the words "more" and "less" are indicative of difference in degree. Aristotle made this elementary observation centuries ago when he pointed out that "the difference between ruler and subject is a difference of kind, which the difference of more and less never is." [1] Darwin, who manifests an admirable and exceptional consistency in his defense of the position that all the differences between men and other animals are differences in degree, always accompanies any reference to what looks like a unique characteristic of man, such as propositional speech, by adding the qualification that other animals have rudimentary

forms of the same characteristic, and so it cannot be said that *only* man has any characteristic not possessed in some degree, however slight, by other animals.

When two things differ in *kind*, no intermediate is possible; the law of excluded middle applies; and the two things can be said to differ discretely or discontinuously. Thus, for example, an animal either is able to fly or not; there is no intermediate between flying and not flying. When two things differ in *degree*, intermediates are always possible; the law of excluded middle does not apply; and the two things can be said to differ continuously. Thus, for example, between any two species of reptile differing in length, a third species, having an intermediate length, is always possible. The fact that no fossil or extant species may have this intermediate length does not remove the possibility of there being one.

(2)

Before I complicate this analysis of the modes of difference by introducing distinctions subordinate to that between difference in degree and difference in kind, let me apply what I have said so far to the case of man.

If man differs in degree from all other physical things, he does so with respect to whatever characteristics are common to man and these other things; and, in each of these respects, man has either more or less of the common trait. If man differs in kind from all other physical things, he does so by virtue of possessing one or more characteristics totally absent from or lacking in these other things.

The two modes of difference, as thus far stated, are not exclusive. Man can differ in both ways from other things. A triangle and a quadrangle differ in kind with respect to many-sidedness; but, with respect to plane area, a given triangle can also be larger or smaller than a given quadrangle, from which, then, it differs both in degree and in kind, though in different respects. The important point to note here is that when things differ both in degree and in kind, the two concurrent modes of difference have reference to distinct respects in which the two things are being compared.

It is, of course, possible to say that man does not differ at all from other physical things—neither in degree nor in kind—but, in the history of Western thought, *this extreme view is seldom if ever seriously held.*

The distinction between difference in kind and difference in degree is neutral with respect to the question of superiority or inferiority—the status of being higher or lower in a scale or gradation of beings. To say that man differs in degree from other things leaves open the question whether he is superior or inferior to them in all the respects in which he is compared with them in degree—or superior in some respects and inferior in others. To say that man differs in kind from other things similarly leaves open the question whether he is superior or inferior in kind to them, i.e., whether he stands higher or lower in the scale or gradation of beings.

It is, of course, possible to say that man is inferior in degree to other things in all respects, *but no one has ever said this; as no one has ever said that man is superior in degree in all respects.* It is also possible to say that man is inferior in kind to other things, *but, in fact, no one (except, perhaps, a few satirical poets) has ever said this; on the contrary, everyone who has asserted that man differs in kind from other things has also asserted that man is superior in kind.*

It is now necessary to complicate the question of how man differs by introducing, first, a minor distinction between two ways in which things can differ in degree; and second, a major distinction between two ways in which things can differ in kind.

(3)

The first and minor distinction turns on the recognition that some differences that are treated as differences in kind are only *apparently* so, and are *really* masked or concealed differences in degree.

When, between two things being compared, the difference in degree in a certain respect is large, and when, in addition, in that same respect, the intermediate degrees which are always possible are in fact absent or missing (i.e., not realized by actual specimens), then the large gap in the series of degrees may confer upon the two things being compared the *appearance* of a difference in kind.

Thus, for example, the chromatic spectrum is thought to be a continuous series of chromatic qualities, and one, moreover, that is correlated with a continuous series of degrees of wave length. But when interference bands or blackouts are introduced into the spectrum, the colors separated by the interference bands *appear to differ in kind*, i.e., discontinuously. However, we know that this is only apparent, because we know that the discontinuity can be removed by removing the interference bands or blackouts, thus reinstating the continuum of chromatic qualities differing in degree of wave length.

Another and more pertinent example is afforded by the classification of plants or animals, in which—both before and after the eighteenth century—it was thought that the real order of nature was a continuum of forms differing only in degree. Nevertheless, the absence of intermediate forms, introducing gaps or breaks in the continuum, permitted the taxonomist to classify certain plants or animals as belonging to different kinds. If all the *possible* intermediate forms were *actually* to co-exist with the forms being classified, the differences in kind among the latter would be abolished, for they only obtain when the possible intermediates are absent or non-existent.

I will henceforth refer to this mode of difference as an *apparent* —and *only apparent*—difference in kind. When two things are said to differ in this way, they really differ in degree, and *not* in kind. Hence, an apparent difference in kind is really a subordinate mode of difference in degree, not of difference in kind. Anyone who holds the view that, in the domain of living things, only differences in degree obtain, must regard all manifest differences in kind as apparent, not real.

The second and major distinction turns on what underlies and explains a manifest difference in kind that is recognized to be real, not merely apparent.

An observable or manifest difference in kind may be based on and explained by an underlying difference in degree, in which one degree is above and the other is below *a critical threshold* in a continuum of degrees. I will call such differences in kind "superficial" to indicate that what underlies and explains them is a difference in degree involving a critical threshold. I beg the reader to observe—and henceforth remember—that the word "super-

ficial" is here being used in a purely descriptive sense, *with no pejorative connotation.*

An observable or manifest difference in kind may be based on and explained by the fact that one of the two things being compared has a factor or element in its constitution that is totally absent from the constitution of the other; in consequence of which the two things, with respect to their fundamental constitution or make-up, can also be said to differ in kind. I will call such difference in kind "radical" to indicate that the observable or manifest difference in kind is itself rooted in an underlying difference in kind. Like the word "superficial," the word "radical" is also here used in a purely descriptive sense, *not eulogistically.*

A superficial difference in kind is, as a manifest or observable difference, no less a real difference in kind than a radical difference in kind. If one does not go below the observable differences to explain them in terms of the factors from which they arise, all real differences in kind are alike. It is only when we do try to explain them in terms of underlying factors that they can be distinguished and recognized as superficial or as radical differences in kind.

The words "apparent" and "superficial" have enough affinity of meaning in ordinary speech to cause confusion. I, therefore, beg the reader to observe—and henceforth remember—that the distinction between superficial and radical difference in kind applies only to manifest differences in kind that are real, not apparent (i.e., not reducible to differences in degree by the introduction of intermediate forms to fill the gap or break in the series that made the things being compared appear to differ in kind). The fact that a superficial difference in kind is one that can be explained by an underlying difference in degree does not reduce that difference in kind to a difference in degree. Even when so explained, the difference in kind remains; for between the two things being compared, one of which has certain property totally lacked by the other, no intermediates are possible with respect to the property in question. The fact that intermediates are always possible in the underlying series of degrees that makes this real difference in kind superficial does not alter the picture; for a given degree is either above or below the critical threshold and so is correlated with either the possession or the lack of the

property in question, and it is this that constitutes the superficial difference in kind. If this is remembered, the reader will not be likely to confuse a superficial difference in kind, which is really a difference in kind, with an apparent difference in kind, which is really a difference in degree.

A few examples, illustrating this distinction, may help to fortify our understanding of it.

Consider the three states of matter: solid, liquid, and gaseous. We all recognize that ice has certain manifest physical properties lacked by water and by steam; that water has certain manifest properties lacked by ice and steam; and that steam has certain manifest properties lacked by ice and water. By virtue of the fact that each possesses certain observable characteristics lacked by the others, we would therefore say that they differ in kind. But when we know that the difference in kind can be explained by an underlying quantitative difference in the motion of molecules and further, when, by measurement, we ascertain the critical threshold in the continuum of degrees at which ice turns into water, or water into steam, we must regard this difference in kind as superficial, not radical. We need not be concerned here with the problem of determining the boiling point or freezing point. Suffice it to say that such points exist and function as critical thresholds in a continuum of degrees.

Consider the difference between inert or inanimate bodies and living organisms. We all recognize that living organisms manifest certain behavioral characteristics not to be found in the behavior of inert or inanimate bodies. By virtue of this fact, we would, therefore, say that they differ in kind. But according to the way in which this observable difference in kind is explained, it is regarded either as a radical or as a superficial difference in kind. If, for example, we accept the explanation of the vitalists, that there is a soul or vital principle in the make-up of living organisms, totally lacking in the constitution of inert bodies, then we treat the difference in kind as radical. But if we accept the explanation of the mechanists, that living organisms are merely more complex organizations of matter and that the degree of their material complexity lies above a certain critical threshold, then we treat the difference in kind as superficial. Thus we see that the same manifest difference in kind may be regarded as radical or as superficial according to the way in which it is interpreted; that is, according

to the explanation given of it, or according to the underlying factors or conditions posited to explain it.

(4)

Now let us apply this distinction between superficial and radical differences in kind to the question about man. Let us suppose for the moment—without begging any questions about matters later to be discussed—that we find one or more observable differences in kind between man and other things, and that we regard them as real differences in kind, not as merely apparent. If any of these differences can be explained, let us say, in terms of the magnitude and complexity of the human brain and by the fact that in a continuum of degrees of magnitude and complexity the brain lies above an ascertainable critical threshold, then that difference in kind is seen to be superficial. But if there is an observable difference in kind that cannot be so explained—if, in other words, the explanation of the given difference in kind requires us to posit a factor in the constitution of man that is totally absent from the things with which he is being compared—then that difference in kind must be regarded as radical.

Looked at one way, we have four possible answers to the question of how man differs from everything else on earth: (1) in degree only; (2) apparently in kind as well as in degree; (3) really in kind as well as in degree, but only superficially in kind; (4) really in kind as well as in degree, but, in some if not all respects, radically in kind. Looked at another way, we have only three irreducible alternatives, since all the apparent differences in kind always mask or conceal differences in degree and are—in principle at least—reducible thereto. With apparent differences in kind thus dismissed, we are left with three possible answers about the real state of affairs; and these three answers are, in my judgment, both exhaustive and exclusive. If one of these answers is true, the other two are false; and one of these answers must be true, for beyond these three there are no other answers to consider.

Of the three possible answers to the question, the first and second—difference in degree and superficial difference in kind—are compatible with the general continuity of nature, and with

the special evolutionary principle of phylogenetic continuity. To understand human traits and human behavior, no additional explanatory factors or causes are needed over and above those employed to explain the traits and behavior of all other living things. It is true that the second answer—superficial difference in kind—involves both continuity and discontinuity; for here we have an underlying continuum of degrees together with the manifest discontinuity, or difference in kind, that it explains. But while this is true, it also remains true that a superficial difference in kind is compatible with the general principle of continuity in nature and with the special principle of phylogenetic continuity precisely because the manifest discontinuity, or difference in kind, is only superficial and can be explained by an underlying continuum of degrees in which a critical threshold is operative.

Of the three possible answers, only the third—radical difference in kind—makes man fundamentally discontinuous with the rest of nature, not in all respects, of course, but in whatever respect he differs radically in kind. To understand distinctively human traits and distinctively human behavior then requires our having recourse to additional explanatory factors or causes that are not needed in the explanation of the traits and behavior of all other living things.

The three modes of difference can be concurrent. It is possible for man to differ from other things in all three ways, but, of course, *not in the same respect.* If in a particular respect, man differs from other things in degree, he cannot, *in that respect,* also differ from them in kind. Similarly, if, in a particular respect, man differs from other things in kind, that difference must be either superficial or radical; it cannot be both *in that one respect.*

While it is possible for man to differ from other things in all three modes of difference, conflicts of opinion can arise, as we have just seen, in a number of ways. The assertion that man differs *only* in degree conflicts with the assertion that, while differing in degree, man *also,* in certain respects, differs in kind. The assertion that in whatever respect man differs in kind, the difference in kind is superficial conflicts with the assertion that in one or more respects, if not in all, the difference in kind is radical.

The possible conflicts of opinion just stated project the possibility of a three-sided issue about the difference of man, in which

one side takes the position that man differs only in degree; a second side takes the position that, in addition to differing in degree, man also differs in kind, but only superficially; a third side takes the position that in one or more respects man differs radically in kind, in addition to differing in degree and whether or not he also differs superficially in kind in certain respects.

The three-sided issue about man (that I have just projected as a formal possibility) involves, as a corollary, a basic dispute about the continuity of nature. Those who maintain either that man differs only in degree or that man differs in kind as well, but only superficially, affirm the continuity of nature. Those who, on the contrary, maintain that however else man differs, he also differs radically in kind from other things, deny the continuity of nature; for in the respects in which man differs radically in kind, he is discontinuous with the rest of nature.

(5)

Tables I and II provide a convenient summary of the distinctions that we have been considering, and of the corollaries or consequences that follow from making them. In Table I, I have retained the fourfold division that results from regarding an apparent difference in kind as a minor variant of what is really a difference in degree. In Table II, I have stressed this point and indicated the bearing of all these distinctions on continuity or discontinuity in nature. (See pages 30–31.)

In the chapters of Part Two, I will, of course, be at some pains to fill in this abstract picture of the formal possibilities by citing the views of philosophers and scientists that correspond to one or another of these conflicting positions on the difference of man and on the continuity of nature. Projecting the three-sided issue in this formal or abstract way enables us to delineate the kind of evidence required to support each of the possible answers, and to determine the conditions under which evidence might some day decisively favor one answer as against the other two. I will attempt to do this in the next chapter, where I shall also be concerned with the history of the question—its past, its present state, and its likely future.

I have another reason for presenting a purely formal picture of

TABLE I. THE FOUR MODES OF DIFFERENCE

I. *Difference in degree*

X ..... Y
less alpha more alpha

(1) where both X and Y have the property *alpha*, and X has less of it, Y more,

(2) and where an infinite number of Zs are possible between X and Y, the alpha of each being more than the alpha of X and less than the alpha of Y.

II. *Apparent difference in kind*

X .... Y
non-alpha [really less alpha] more alpha

(1) where the manifest difference in kind with respect to alpha is due to the absence of intermediate forms or qualities, which, if they were present, would continuously fill the gap between X and Y that is made by their absence,

(2) and where, if the absent intermediates were introduced to fill the gap, the difference between X and Y would cease to be one in kind and become one of degree or only a difference between individuals rather than between kinds.

III. *Superficial difference in kind*

X || Y
non-alpha alpha

X ..... / ..... Y
less beta more beta

(1) where the underlying difference between X and Y with respect to beta occurs in a continuum of degrees of beta with a threshold or critical point, (/), X being below the threshold in its degree of beta, and Y being above the threshold,

(2) and where the operation of this threshold or critical point accounts for the manifest difference in kind between X and Y with respect to alpha.

IV. *Radical difference in kind*

$$\begin{cases} X_{\text{non-alpha}} \;\|\; Y_{\text{alpha}} \\ X_{\text{non-beta}} \;\|\; Y_{\text{beta}} \end{cases}$$

(1) where the difference in kind between X and Y is duplex rather than simplex,

(2) and where the manifest difference in kind with respect to alpha is rooted in the underlying difference in kind with respect to beta.

TABLE II. COMPARISON OF
THE FOUR MODES OF DIFFERENCE

A. *Modes of difference I and II*

are really differences in degree,
I manifest,
II latent or concealed.

B. *Modes of difference III and IV*

are really differences in kind,
III simplex, and combined with an underlying difference in degree,
IV duplex, and combined with an underlying difference in kind.

C. *Modes of difference I, II, and III*

are manifestations of
an underlying continuity in nature.

D. *Mode of difference IV*

is the manifestation of
an underlying discontinuity in nature.

the possible answers in advance of documenting the possibilities by reference to positions actually taken by scientists and philosophers who have concerned themselves with the difference of man. Most, if not all, of them have approached the question with too few distinctions explicitly in mind. They use the words "degree" and "kind" without qualifying them by such critical modifiers as "real" and "apparent," "superficial" and "radical." The reader will find that the philosophical and scientific literature on the subject of man's difference is simply not intelligible without these distinctions, especially the distinction between a radical and a superficial difference in kind. He will see that if the only distinction available were the one between difference in kind and difference in degree, the scientists who acknowledge that man differs in kind but who also maintain the continuity of nature and the evolutionary principle of phylogenetic continuity would be unable to do so without contradicting themselves. And he will also see that the failure to employ the distinction between radical and superficial difference in kind leads many writers, philosophers as well as scientists, into the contradiction of asserting, on the one hand, that man differs only in degree from other animals, while acknowledging, on the other hand, that man is able to do certain things that no other animal is able to do at all.

For example, in a recent book co-authored by a Nobel Prize winner in the field of genetics, we find the following statement:

> Not until 50,000 to 75,000 years ago was the biological job complete, and an individual whom we would recognize as kin today—*Homo sapiens*—walked and talked and used his hands and head much as we do. He did not differ from apes in kind (nor do we), but he differed greatly in degree. . . .

That statement appears on page 41. Less than two pages earlier, the same writers make the following observation, without any awareness that they will shortly contradict themselves: ". . . with the initial discovery that one can make tools, our species appeared on the evolutionary horizon. Apes can use tools, but only man can *fabricate* them." [2] The difference between merely *using* tools and *fabricating* them, which is here emphasized, combined with the assertion that *only* man can fabricate tools, plainly points to a difference in kind, flatly denied two pages later when it is

said that men and apes do not differ in kind, however greatly they differ in degree. What the writers wanted to deny was not that man differed in kind from apes, but rather the view that man and ape are biologically discontinuous. Like most biologists and evolutionists, they are committed to the phylogenetic continuity of man with other members of the primate family. This they could have maintained while still acknowledging the difference in kind between man and ape that obtains *if* their observation concerning the uniqueness of man's tool-fabrication is correct; but *only if* they had also understood and employed the distinction between a superficial and a radical difference in kind. A superficial difference in kind, like a difference in degree, is compatible with phylogenetic continuity; a radical difference in kind is not.

Another recent book, this one by an eminent technologist who doubles as a philosophical commentator on the meaning of science, reveals the same unclarity about differences that leads to self-contradiction. The author tells us that his fundamental assumption is that "man is a part of nature" and that "there is no break in the continuity of nature." [3] This, he further explains, means that "man is not different in kind from other forms of life; that living matter is not different in kind from dead matter; and therefore that a man is an assembly of atoms that obeys natural laws of the same kind that a star does." [4] After saying this, he is still able to make the following statement without any sense that he has contradicted what he said earlier: "The gift of humanity is precisely that, unlike animals, we form concepts; and we express that gift in our thinking language." [5] The phrase "unlike animals" unmistakably indicates that the writer attributes to man and to man alone the ability to form concepts; yet he fails to see that *if* it is true that only man can form concepts, then what he said earlier must be false; namely, that "man is not different in kind from other forms of life." His fundamental assumption that there is no break in the continuity of nature tells us what the author is trying to say, but does not know how to say clearly: that while there is a difference in kind between man and other animals (viz., concept-formation), this difference in kind must be superficial, not radical, for only such a difference in kind, together with a difference in degree, is compatible with the continuity of nature.

Still another example is afforded by a philosophical treatise,

one chapter of which is devoted to man. Its author, a professor of the history and philosophy of science, can be characterized as an avant-garde thinker, if a philosopher can ever be so described. What he has to say on the subject of man's difference from other animals and from machines appears to assert both that there are only differences of degree, and also that there are some differences in kind—some things that man and man alone can do. Consider the following passage in which both assertions are plainly made.

> Various distinctions between man and other animals have been put forward as the key difference that led to, or now proves, man's superiority. The number of real distinctions to have survived careful analysis is very small. Something can be made of the opposed thumb but not very much of its necessity for tool-using or toolmaking. . . . Something can be made of the brain-weight–body-weight ratio but not enough to put us significantly ahead of the dolphins, and so on with the sense of humor and the use of language. The idea that we are the only rational animal either means that we alone are intelligent, in which interpretation it is false, or it means that only human beings can engage in explicit reasoning, in which case it is true, but it is then very doubtful whether it *explains* man's success.
>
> The fact is that man is just more intelligent than any animal and that his present technology is *highly* dependent upon his use of language in storing and communicating information. But whatever the combination of mutations and environmental stresses that led the strain of tree shrews that are our ancestors to develop that intelligence faster than the competing strains that led to the contemporary monkeys, all that developed was a neural network that is somewhat superior for problem-solving. The problem of communicating is one of the problems at which it has done slightly better than the bees. The use of fire, clothes, and tools to widen man's survival range presents other examples of problem-solving payoff. [6]

The inaccuracy of certain statements of facts in the passage just quoted does not alter the interpretation we must place upon it; namely, that the writer, applying the principle of phylogenetic

continuity to the origin of man, holds that the fundamental differences between men and other animals are all differences in degree, e.g., that man is "just more intelligent," that his neural equipment is "somewhat superior for problem-solving," or that he is only a "slightly better" communicator than the bees. On the other hand, the author also acknowledges that "only human beings can engage in explicit reasoning." This plainly indicates a difference in kind. It does not by itself explain man's biological success in competition with other animals; it may, perhaps, explain the difference in kind between human language and the means of communication used by other animals, including the bees; though even here it must be noted that the author remarks that we are not "significantly ahead" of other animals in the use of language, a remark that is appropriate only with respect to a difference in degree. Add to this the remark with which his book concludes, that "man is not just an animal or a machine, but yet he is an animal and a machine," [7] and one is left in some doubt as to just where the writer does stand, though one is inclined to hazard the guess that he thinks man differs from other things (animal or machines) mainly in degree or, if at all in kind, only superficially in kind and in a manner that is explainable by underlying differences in degree.

The foregoing examples of self-contradiction or at least of unclarity and imprecision can be multiplied many times in the writing of biologists, psychologists, and philosophers who deal with the question of how man differs from other animals. It will be impossible to review and interpret the literature of this subject without calling attention to the inconsistencies or obscurities of statement and thought that arise from want of an adequate framework of analytical distinctions. The few examples given above should suffice to make the reader appreciate how indispensable a careful philosophical analysis of the modes of difference is for an understanding of the literature—an understanding of what scientists and philosophers are trying to say in spite of their inability to say it clearly or even when their use of words belies what they have in mind.