

From Causality to Creative Freedom

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Natural science came into being when reason took the place of superstition. "Superstition" means personification of the forces of nature, the belief that nature is ruled by super-human forces, imperceptible to men. "Reason" is the dismissal of this mythological, anthropomorphic-animistic conception of nature. Scientists of the age of reason wanted to deal with observable facts only, describing the phenomena of nature, uncovering their causal relations, the laws of nature, and studying physical and chemical forces.

With the help of this program the science of inorganic nature and its application to technology and engineering went through a momentous development. Thus, scientists felt encouraged to use the same method for the study of organic nature. But here the results lag far behind those of physics and chemistry. This might be expected, for the science of organic nature is in its early phase and organic phenomena are much more complex than are the inorganic.

However, there may be a still deeper reason for the slow progress of the study of organic nature; namely, the method of research, a method which has been meeting with growing dissatisfaction. In this paper an attempt will be made to show that the problems of organic nature are not only highly complex, but also differ essentially from inorganic problems. Effective theories of organic nature are entirely different from the conventional inorganic theories, and every level of life calls for its specific type of theory.

To find an adequate approach to the study of organic phenomena, certain anthropomorphic concepts have to be reintroduced, though in a scientific way. The science of human nature especially—and this is the gist of Alfred Adler's Individual Psychology—has to be based on the Biblical conception of human nature: man endowed with creative spirit, knowing good from evil, responsible for his conduct, achievements, and failures.

Efficacy versus Certainty

Scientists of the age of reason held that science should offer certainty. No evidence, they said, could be produced for a mythological explanation of nature, while a "rational" explanation could be verified by experience. When, for example, the movement of a falling body is explained as the result of gravitation, the law of gravitation helps to compute many other phenomena as well, such as the movements of bodies rolling down inclined planes or the oscillation of a pendulum.

However, a phenomenon can be explained in various ways. The history of science shows a continuous change of explanations, and each was verified. In a hundred years, many of the present theories of physics and chemistry may be superseded by quite different theories.

A theory, even though verified, cannot offer absolute certainty. A verification is not a perfect proof. Only facts can be proved, not their explanations. Today, theories are judged by efficacy rather than certainty. No longer is the prediction of new facts considered as a means to an end—to verify an explanation—but as an end in itself. Conversely, explanation of phenomena is no longer an end in itself but has become a means to discover new facts, particularly those which could hardly be discovered empirically, e.g., the findings of organic chemistry which concern a multitude of carbon compounds whose syntheses have been derived through theories rather than from direct observation.

Contemporary theories of physics are much more complex, abstract, and speculative than were the theories of classical physics. The new theories do not necessarily invalidate the old. The old ones with their simplicity may offer even a higher degree of certainty, but the newer theories cover a wider range of phenomena and lead to discoveries that can not be derived from classical theories.

When scientists applied the methods of physics and chemistry to the study of organic nature, they did so because these methods offered a high degree of certainty. But in the field of organic science, these theories have yielded meager results. Thus it now seems reasonable to approach the study of organic nature with different types of theories which may be far from the ideal of certainty but promise to be more effective.

This idea will be discussed for each level of life separately.

Mechanism and Organism

In organisms, chains of coinciding, subsequent, and interacting physico-chemical reactions take place continuously. These processes,

called "physiological," resemble the chain reactions of machines, but are far more complex. Many physiological processes have been studied and uncovered; many compounds that are the constituents of living substances have been made synthetically; biochemists have imitated physiological processes in test tubes. Thus, an organism has been considered as a machine of enormous complexity.

However, the complexity of the smallest unit of life, the cell, is of a higher order than the most intricate mechanism, say a robot, that runs an entire factory. And even if biochemists should eventually succeed in uncovering the physiological processes in their totality, they would not have solved all the problems concerning the organisms.

To find a complete solution, one has to look for the essential difference between a living organism and a man-made machine. These differences cannot be realized from an analytic viewpoint, i.e., by looking at their parts, at their substances and energies.

Causal explanation is analytic; physics and chemistry, and so physiology, deal only with isolated phenomena and processes. Actually, machines as well as organisms are not only the sums of parts, but also *integrated wholes*. What makes the parts form a whole is the *function* or *aim* to which the whole is directed. Wholeness and function are correlated: every whole has a function and every function is bound to a whole. If an organism is a whole, it must have a function. Yet while a machine serves a *specific* purpose that is *outside* of it, i.e., in the mind of its constructor, the function of an organism is *inherent* in it, and is a *general* concept, such as preservation of the individual and species. Also, while a machine is driven by *external* forces whose supply is provided by man, an organism makes its own effort to supply itself with the substances and energies it needs to preserve its functions. In other words, an organism develops *activity*. A layman would say, "It moves by itself," meaning that an organism governs its energies while a machine is governed by energies.

A whole is not determined by its parts; the parts depend on the whole. The parts may change while the whole and its function persevere. The whole is prior to the parts: the idea and function of a machine exist in the mind of its constructor before he works out its details. Similarly the function of an organism is prior to its development, inherent already in its germ.

Causal thought does not include the concepts of wholeness and function or goal and therefore does not differentiate between inner and outer forces nor between internal and external goals. Further,

causal laws imply determination by the *past*. Determination by a function or goal means determination by the *future*, by *teleological* laws. Wholeness and teleology characterize the "organistic" or "vitalistic" versus the causalistic or mechanistic conception of life. Only from a teleological viewpoint can we realize that the parts (organs) of an organism and their activities are vital, i.e., coordinated to achieve the functions of an organism.

To attribute functions to an organism, similar to the goals that men pursue consciously, is indeed an anthropomorphism. Yet the functions of an organism can be well defined and expressed through definite laws: the general law of life preservation and the specific laws of germination and growth, assimilation and metabolism, self-adjustment and self-regeneration, propagation and heredity. These laws, called "biological," are natural laws, though teleological rather than causal.

An understanding of biological laws helps us in predicting the reactions of organisms and these predictions have a wider range than those derived from physiological (causal) knowledge. For example, from a physiological study of digestion it may be foreseen that unwholesome food will cause gastric indigestion; but hardly can the processes be foreseen that afterwards restore digestion to normalcy. Only teleological laws help us foresee that a damaged organism will seek and probably find the means to repair the damage. This prediction can be made even without physiological analysis.

So far biological processes have been studied mainly physiologically. A teleological explanation of vital processes is more simple and may be more satisfactory. Yet biology based on teleological thought is only in its beginning. A detailed teleological theory of life has yet to be worked out. Specific teleological laws will probably emerge that will help us make new discoveries beyond those which can be derived from physiology.

Plants and Animals

With regard to external features and observable functions, plants and animals show only gradual differences. Morphologically and physiologically, the lowest animal species, such as sponges and coral animals, are closer to plants than to higher animals. Nor is mobility the monopoly of animals. Some movements of plants, particularly of petals, are visible to the unaided eye; and time-lapse photographs show that all plants are in a continuous though very slow motion.

To find an essential difference between plants and animals, we have to examine the *causes* of their movements. All movements of plants are "reflexes," i.e., reactions to definite external or internal physico-chemical stimuli. Thus, a plant responds to light by turning its leaves toward it. Reflexes of living organisms are more complex than the physico-chemical reactions of lifeless matter; also, most (or perhaps all) reflexes imply activity and vital functions.

Animals, too, show various reflexes; thus, an animal adjusts the pupils of its eyes to the intensity of light. Yet in addition to such reflexes, animals show movements and reactions of a higher order. When, for example, a dog and a cat meet, the dog barks at the cat and the cat hisses back or flees. These reactions hardly can be understood as the direct effects of optical or acoustic stimuli. We rather will assume that both dog and cat receive from each other visual and other sensual impressions which cause emotional and mental chain reactions, ending up with an impulse, which in turn is the immediate cause of the bark, the hiss, and other bodily movements.

This kind of explanation, however, is not accepted by a scientist who believes only in physico-chemical reactions as objects of scientific research. He opposes a psychological explanation as anthropomorphic; he refuses to deal with psychological processes as not observable; he denies that a mental, i.e., a non-material process, can cause somatic movements. He prefers a physiological explanation, such as this: External physico-chemical stimuli cause definite physiological reactions in an animal's sense organs; these reactions are conducted through nerves to brain cells, causing cerebral chain reactions; the last of them is conducted through nerves to external organs, setting these in motion.

This assumption rests on the fact that an animal fails to show the usual reactions when certain regions of its nervous system are damaged. Whether *all* psychic processes have a physiological basis is still an unanswered question. Thus far we have not found the means to study the physiological processes in brain and nerves. Thus, the physiological explanation of animal reactions is as far from being verified as it is from being described. By no means can physiology explain irregularities in animal reactions, nor the fact that different individuals of the same species, and at different times even one individual, will respond differently to the same stimulus—e.g., the variety of mutual response between dog and cat.

Irregular reactions of animals have been studied more successfully by a different, though still causal-analytic, method which likewise rests

on the assumption that all reactions of animals are reflexes and ought to be examined without psychological reasoning, as if mental processes only *accompanied* the reactions and did not influence them. The followers of this method consider the irregular reactions of animals as reflexes modified by outer conditions—habit-building by association and repetition—and they study simply the effect of association and repetition. Actually, this idea of “conditioned reflexes” does not offer any theoretical explanation at all. The effect of “conditioning” can be realized by experiments only; each finding depends on a particular series of experiments. Many in the large variety of the reactions of higher animals, not to speak of men, can hardly be studied by experiments alone; neither do the results of these experiments allow us to draw new conclusions as to new facts.

Reflexological thought, in avoiding challenging hypotheses, is limited to unsatisfactory results. However, when we attribute to an animal, sensations, feelings, and thoughts similar to those of man, and when, disregarding the underlying physiological processes we consider the mental activity of an animal as the source of its reactions, we can explain them in the simplest way. When, for example, we understand how a dog feels toward his master, we will directly understand his reactions to his master, and we can also foresee his reactions in a new situation. No such predictions can be made from reflexological reasoning.

Psychological thought, unlike reflexological thought, shows us also the *function* of an animal's reactions. And since function is correlated with wholeness, psychological explanation implies the assumption that the totality of an animal's consciously controlled actions and reactions, its total behavior, is a whole directed to an aim. Every species follows indeed a definite pattern of behavior and shows a particular “character” or mode of life, consisting of peculiar habits and abilities most of which develop in the individual's early stage of life.

What is the supreme goal of an animal's behavior? Is it, like the goal suggested by the reactions of plants, simply the preservation of life? True, an animal's vital functions depend also on its mental functions; deprived of them, an animal soon perishes. Still, while an animal has to use its mind for survival, mind does not serve survival exclusively. True, animals living in the wild have plenty to do in supplying food and shelter for themselves and their offspring, in defending themselves against their enemies, and so on. Domesticated animals, and animals living in captivity, being spared all this trouble, are less active.

But domesticated and trained animals develop new activities and skills that can hardly be called vital. A trainer does not treat his animals with force; he does not rely on punishment and reward only, but appeals also to the animal's feelings and intelligence. If an animal were limited to vital needs, it hardly could be trained at all. It is questionable whether the reactions of even freely living animals are solely vital.

Mind is not simply the non-material organ for preservation of life, in addition to the material organs. To be an animate creature means more than just to be alive. Life is the first rather than the last goal of an animal, the last one being preservation of the species' and individual's level of living (character, mode of life). With this assumption, the behavior of animals, particularly of the higher species, is more simply explained than it is from a purely biological viewpoint.

Contemporary study of animal behavior includes a psychological branch: comparative psychology. Thus far, however, this branch has dealt mainly with empirical facts, with experiments on the range of sensual perceptivity, feelings, memory, intelligence, etc., in various species. Important and instructive as these tests are, they are but the first step toward the understanding of animal behavior. What is still needed is an effective *theory* of animal behavior, the formulation of the supreme function of each species, and the psychological laws—natural though teleological and non-material—which govern an animal's behavior, helping it achieve the function of each species. Such a system will offer predictive explanations of animal behavior and help us find new facts: particularly to discover and make effective the potentialities of animals, as yet unknown.

Man and Animal

When we compare man and animal with regard to psychological qualities, behavior, and achievements, we may think at first that there are only gradual differences. In this respect prehistoric man is closer to the highest animal species—apes—than to highly civilized man. Similarly men of the various civilizations differ from each other, even as do individuals of the same civilization.

An essential difference between man and animal is revealed, however, when we look at the *sources* of behavior and achievements. In acting and reacting, animals follow natural instincts and natural intelligence; men follow *plans* in addition. Even an engineering job done by animals—say a beaver dam—or a perfectly coordinated animal so-

ciety—bees—is based on instincts, while even the simplest man-built shack and the most primitive forms of human society are deliberately planned.

It is nature that sets the goals of undomesticated animals; nature also equips them with the means to attain these goals. In flying home, a carrier-pigeon follows a natural inherent urge and finds his way by his natural local sense. Some of an animal's abilities and habits that serve to attain its goals develop automatically; others are transmitted from generation to generation by instruction, which is given and followed by psychological laws. Thus, by the law of imitation a chick learns from its mother to dig out grains and worms. Finally, animals learn also by real reasoning, applying their experiences and the trial-and-error method. This process, as experiments show, likewise follows natural patterns.

Man, in planning his achievements, sets up rules and regulations, and in planning his behavior, establishes ethical laws. Knowledge of them and the urge to follow them are not inborn but acquired through education. Human education, unlike the instruction from animal to animal, is planned. Education of human beings differs also from the training of animals by man, for a human pupil has not only to learn how to behave according to ethical laws, but has also to develop a sense of ethics (duty); that is, he has to understand the ethical laws and believe in them. Human behavior, as far as it is related to ethical laws, we call "conduct."

An ethical law implies *judgment*, i.e., opinion about how man *ought* to behave. This judgment is *critical*, i.e., independent of personal likes and dislikes and often contrary to them. If everyone were allowed to do whatever he pleased, ethical laws would be meaningless.

Judgments are not determined by nature, for nature offers us merely facts and leaves it to us as to how we make use of them. Men, like animals, are endowed by nature with desires and appetites; but men, unlike animals, may approve or disapprove of them and have the choice of following or resisting them.

Behavior and achievements of animals are determined by psychological laws; these are natural laws and therefore rigid. Hence the modes of life of the various animal species persevere under the same outer conditions and as long as man does not interfere by training or domestication. Man's mode of life changes considerably with place and time, also under the same outer conditions, according to ever-changing judgments, ethical laws, and plans.

If critical judgments are not governed by natural laws, man's achievements, his "culture," the world of *values*—comprising language and writing, social order and law, religion and art, science and technology, etc.—is his own creation. This implies that a human being is potentially able to control his conduct and achievements and become responsible for them.

This conclusion contradicts the philosophy of determinism that admits the existence of only one world—nature. The world of nature is determined by permanent laws and leaves no room for free choice, self-determination, or new creations. According to determinism, the behavior and achievements of man, like those of animals, would be determined by natural laws, whether causal or teleological, material or psychological; the idea of a free or critical judgment would be an illusion, and the science of human nature would be concerned with finding the natural laws that govern man's judgments and evaluations.

These laws would have to be formulated in such a way that they would allow us to foresee the ever-changing variety of man's judgments, plans, achievements, and modes of life. Findings of this kind, however, are not yet in sight, and it is questionable whether they are possible. It would be more fruitful to proceed from the simple assumption that man has creative freedom and almost unlimited potentialities.

"Active optimism," the belief in man's creative freedom, is the basic thought of Individual Psychology. This thought implies that man can transcend the laws of nature. Thus a sharp line is drawn between man and all other creatures, and the mastery of human behavior is no longer based on prediction alone, but also on *creation*. The science of human character is a branch of natural science and thus a descriptive-explanatory-predictive discipline only to that point where human behavior is ruled by natural (psychological) laws. Beyond this point, however, human conduct and achievements are self-determined and unpredictable; then the science of human character changes its function and becomes a *normative* discipline, presenting the dynamics of man, pointing out his potentialities, discussing the aims that man ought to pursue and the roads that lead to these aims.

The first system of such a normative discipline of human character is Individual Psychology, establishing as man's ideal aim his inner freedom, emancipation from the natural self-seeking laws of his behavior. Individual Psychology has shown that this ideal cannot be reached by an isolated individual, but only by man as a member of society. Human society, unlike animal society, is not based on static natural instincts

but on dynamic ethical laws, created by man. Since man is the creation of nature, his creations are part of nature; he is influenced by nature and in turn influences nature itself. All aspects of behavior are natural and inherent in himself; hence, through the development of social interest, man can win freedom from the dictates of nature toward selfish aims which tend to operate against his survival.

The Divisions of Nature

In seeking predictive explanations of inorganic phenomena, vital functions, animal behavior, and the conduct of man, we should find the following assumptions helpful:

1. Inorganic nature is determined by causal-analytic (physico-chemical) laws. A living organism is governed in addition by the laws of wholeness and teleology (biological laws); physico-chemical knowledge (physiological analysis) does not suffice to foresee vital functions. Animals are governed in addition by psychological laws; biological knowledge alone does not help us foresee animal behavior. Man can raise himself above all these natural laws; psychological knowledge alone does not fathom human nature and potentialities.

2. Inorganic matter is inactive. Micro-organisms and plants show only reflexes, i.e., reactions to (external or internal) physico-chemical stimuli. Animals show not only reactions but also actions; they have initiative and choose their environment. Higher animals especially also develop constructive activity and show achievements. Man chooses his aims and develops creative activity.

3. Lifeless matter has no function. Micro-organisms and plants aim at life preservation. An animal aims at the preservation of its mode of life (character), characterized by definite habits and abilities. Man's self-set aim is to change his natural character, developing it according to his own plans.

SUMMARY

The concept of creative freedom implies the vitalistic-teleological conception of life as well as the psychological conception of animal behavior. Conversely, neither the causalistic-mechanistic conception of life nor the reflexological-biological conception of animal behavior is compatible with the concept of creative freedom and thus with the thought of Individual Psychology.