THE NATURE OF EVOLUTIONARY THOUGHT

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The argument that modern science is objective, and that the Christian must therefore accept its conclusions with regard to the fact of evolution is answered from the standpoint of the philosophy of science. Scientific method is examined in order to highlight the hierarchy of explanatory frameworks which guide the scientist in his research. Paleo- and neo-science are then analyzed in order to reveal the radical differences between them in regard to these frameworks.

It is concluded that the frameworks of paleo-science (of which Darwinism is a prime example) cannot be scientifically proven or disproven. In order to gain empirical import these frameworks must be combined with frameworks of neo-science, and it is only the latter which can be scientifically tested. In the adoption and retention of paleo-scientific frameworks, philosophical and religious commitments are primary. The implications of this situation are discussed.

Introduction

In the debate over evolution one particular argument is often put forward against the creationist position. It can be set out as follows:

> Science as we know it took root in Christian soil. The early scientists recognized that Nature is also God's book, and that they must go and humbly study His Creation, if they would learn its secrets.
>
> In this way they by-passed the sterile controversies of (scholastic) philosophy and developed an objective procedure which is neutral with regard to philosophical and religious beliefs.
>
> Even T. H. Huxley wrote that "the great truth which is embodied in the Christian conception of entire surrender to the will of God" is "Sit down before fact as a little child, be prepared to give up every preconceived notion, follow humbly wherever and to whatever abysses nature leads, or you shall learn nothing."[1]
>
> Thus if the present-day heirs of this Christian tradition tell us that their research demonstrates evolution to be a fact, then we must humbly accept this. We must rather devote our energies to the more important task of attacking the materialist philosophy of evolutionism which has been built upon the scientific data.
>
> We must certainly not fall into the same trap as the humanist by introducing philosophical and religious considerations into the discussion of biological theories.

The very fact that such an argument can be seriously put forward is, I believe, a major indictment of our educational systems. Our scientific education is all but designed to restrict our critical ability. In particular the *history* and *philosophy* of science are almost completely neglected.

There is thus, for example, no attempt to see just how Christian the early scientists really were in their thinking, or even to discuss just what "Christian thinking" actually means in practice. The effect of this deficiency in our education is plain to see in the debate on evolution.

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Scientific Method

Since most scientists have little or no philosophical background it is not surprising that the philosophy of science is generally regarded as irrelevant. Indeed it is often portrayed as the mere speculation of the scientifically incompetent! This deeply rooted prejudice prompts many scientists to embrace a naively empiricist view of scientific method.

Thus the scientist is said to begin his task by collecting facts through observation and experiment. The inspection of these facts will reveal some features of order, some tendency, allowing the scientist to formulate a tentative hypothesis. Finally, if this hypothesis survives testing, the scientist will announce the discovery of a new theory or new law of nature.[2]

If true to life, such a procedure would clearly guarantee the objectivity and neutrality of science. But it is as mythical as it is popular. *However restricted the area of investigation may be, the scientist always faces such an avalanche of facts that if he sat down before them as a little child he would be crushed.* The scientist *must* come to his work with a (tentative) *theory* which will allow him to *select* those facts which are *relevant* to his problem. He has, as it were, a net with a certain mesh and what his net doesn't catch isn't fact.

But, his net is also a system of co-ordinates, for it *interprets* the facts. Without the context it provides he would not know what he was looking at. Indeed, on a naive empiricist base there is simply no room for a scientific problem: if I know what I'm looking for, there is no problem; if I don't know what I'm looking for, how can I ever hope to find anything?![3]

Conceptual Frameworks (C.F.)

But so far we have only deferred the problem. If there are a myriad facts that could be relevant to a given problem, there are also a myriad theories which could explain the myriad facts. Yet if we ignore, for the moment, periods of crisis,

it is clear that a scientist will consider only a certain type of theory and may even have to be a genius to think of a single one. *At this level also the scientist wears blinkers in order to progress.*

Just as he selects those facts that are relevant to a theory, so he selects those theories that are specified by a theoretical framework—a *conceptual frame of reference for theories*[4] (hereafter represented by C.F.) As examples of such C.F.s, we have logicism, intuitionism, and formalism in mathematics; atomic, thermodynamic, and quantum theory in physics and chemistry; and Weismannism, Mendelism, and Cell Theory in biology.

In other words, the theory that we bring to our work is a particular articulation of our (or someone else's) prior ideas about the nature of things. C.F.s in turn are informed by a philosophical view of reality.

But, rather than continue this analysis immediately, I now want to pass to the question of scientific status: how do we determine whether a theory, or C.F., belongs to science? That is, by what criteria can we distinguish between the concepts of chemistry and alchemy, or astronomy and astrology? I wish to restrict the discussion to Popper's criterion-falsifiability.[5] This criterion is not at all adequate, but it does bring to light features of theories which are extremely relevant to an analysis of evolution.

The Status of Theories

In terms of Popper's criterion, we admit a theory as scientific if its logical structure is such that we can indicate observations that would *refute* it. This requirement is based on the logical asymmetry between verification and falsification—we can never verify a theory by observations (since another theory may also account for these), but we can refute it by observations.

The Status of Conceptual Frameworks

Here Popper's criterion reveals an important point: *C.F.s cannot be refuted by observation.* A law such as Boyle's—that the pressure and volume of a as vary inversely at a given temperature—is refutable because the concepts employed are *instantiative,*[6] i.e., the concepts "pressure," "volume," "gas" refer to things we can observe or experience (the *instances).* To test this law we derive a simple prediction:

(1) This object is a gas.

(2) Therefore this object will obey Boyle's law.

A C.F. law such as the first law of thermodynamics (that energy is always conserved, i.e., that it can be neither created nor destroyed) is much less tangible. "Energy" is a *non-instantiative* concept.[7] This is an important point so it may help if I try to explain this distinction in another way.

Our everyday experience is of *concrete* things and events. Our experience of a dog is not cut up into separate experiences of its mathematical oneness, its physical mass, its biological growth, its aesthetic shapeliness, etc. Our experience of the dog (as of everything else) is quite integral and seamless.

However, in the sciences, we investigate such *first-order abstractions* as those which have been mentioned—the various physical, biological, etc., qualities or functions. Further we find that each of these types of function has a common denominator which enables us to derive *second-order abstractions,* such as "number" (mathematical), "motion" (kinetical), "energy" (physical), "life" (biological)—which denote that in our experience of the world which enables us to distinguish any type of quality from all other types.[8]

Now, because of this, any framework which contains only second-order, or non-instantiative, concepts cannot be refuted by observation. In order to work with the first law of thermodynamics we have to formulate specific *theories* dealing with known (i.e., specified) forms of energy-effect (mechanical, thermal (heat), etc. (Note that these are *first-order* concepts).

If any of these theories should be refuted, then the C.F. will tell us how to construct a new theory (possibly assuming the existence of a new form of energy—this actually happened in the case of nuclear energy). In the normal course of events the C.F. itself will not even be questioned.

Refutation of Conceptual Frameworks

The programmatic or regulative function enables us to formulate a (Popperian) criterion of scientific status. To be admitted as scientific, a C.F. must be capable of empirical interpretation; i.e., we must be able to tie down its terms and concepts to practical application within the context of specific refutable theories. Thus we are unable to accept Driesch's concept of "entelechy," but we are able to accept Newton's equally mystical "gravitational force."

If a C.F. allows the formulation of testable theories, then it can be refuted; namely, by *theories,* theories which are independently based.[9] Thus Schrodinger's formulation of the wave-equation (which predicts the emission spectrum of the hydrogen atom) provides a theory which refutes the C.F. principle that energy occurs in all possible quantities.

This example reveals a crucial point. Our discussion so far might imply that falsification operates in *vacuo,* i.e., that it *must* lead to rejection. This is rarely the case. A refutation has the necessary power to eliminate a theory or C.F. only when it has the support of an *acceptable* alternative. In the absence of such an alternative, discordant observations are simply ignored,

shelved or explained away. Thus Schrodinger's wave-equation was developed *after* the quantum C.F. came into being and used the concepts which it provides.[10]

The Origin of Conceptual Frameworks

Adoption of a C.F. (i.e., the determination of acceptability) involves a decision in philosophy, not merely a decision in science. Alternative theories are generally being compared with respect to the same conceptual background (i.e., the same C.F.) which guarantees a stable meaning for the terms employed. *But alternative C.F.s may not have a single scientific statement in common.* Opposing C.F.s can never incorporate the same scientific data, because these will be completely permeated by the differing conceptual pattern.[11]

Consider, for example, the different meanings given to the terms "space," "time," "motion," "matter" and "force" in Newtonian and Einsteinian physics. When the proponents of different C.F.s argue, they are bound to be fundamentally at cross-purposes, because neither side will grant the extra-scientific assumptions the other needs to make his case.

Evolutionary Conceptual Frameworks

The "theory of evolution" itself is, in fact, neither a theory nor a C.F., but a philosophical dogma of continuity. Within this philosophical view three main C.F.s have been articulated: Darwinism, Saltationism, and Lamarckism. It must be stressed that these are C.F.s—they cannot be either proven or disproven by observation.

Therefore, it is rather entertaining when evolutionists write that "we reject special creation as an adequate explanation because we can think of no means by which we can put it to a valid test, because we can imagine no observation falling outside the capabilities of a Creator possessing unlimited ability."[12] Precisely the same is, of course, true of Darwinism: "A lover of paradox could say that the main objection to selection theory is that it cannot be disproved . . . it appears impossible to indicate any biological phenomenon that would plainly refute it."[13]

Paleo- and Neo-science

It would follow from our previous analysis that although we cannot test Darwinism by means of *observations,* yet we can do so by means of *theories.* But in fact this is not so. We have tacitly assumed that scientific frameworks are all of a kind. This assumption is in fact false.

In this context we can distinguish two particular classes of framework: (1) those in neo-science, and (2) those in paleo-science. In the theories of neo-science (i.e., those dealing with present-day phenomena), there is a logical symmetry between explanation and prediction, i.e., if an event can be explained deductively by a set of premises after it has occurred, then it could also, in principle, have been predicted from the same premises beforehand.

In these cases our explanation can be set out in the form of a statement of general laws and initial conditions, e.g., we can predict the amount of extension of a spring if we know, firstly, Hooke's law and, secondly, the load to be applied and the force-constant of the spring (the initial conditions). In other words neo-science depends upon two things: (a) there must be a repetition of events, and (b) there must be a system of laws to account for the repetition.

But evolutionary theories are "historical interpretations"[14]; i.e., they show that the phenomena (species distribution and diversity; homologies; fossil succession, etc.) can be explained as the outcome of an historical process. The events cannot be set forth in accord with general laws as instances of a kind; they are individual phenomena between which individual relations hold and they will not recur.[15] Since these theories operate only *ex post facto,* they provide a basis for neither prediction *nor for the refutation of another C.F.*

Darwinism

The basic propositions of this C.F. are:

(1) Random inheritable variation is constantly arising (Random = no correlation with the organism's adaptive needs).

(2) Relevant variation is continuous, i.e., variational differences are small.

(3) Natural selection is effective in utilizing this variation to bring about the adaptation of the organism to its environment.

The C.F. is untestable because the key concepts "variation," "adaptation," "selection" and "environment" are *second-order,* e.g., "variation" is a biological analogy of "motion" (i.e., *change* of character) and "environment" is a biological analogy of "space."[16] The presence of these concepts in the C.F. and the C.F.'s position in paleo-science, thus ensure that Darwinism is scientifically irrefutable. It does not formulate any laws, but simply provides the categories under which the independent variables involved in the evolutionary process are to be arranged, and shows how these categories are conceptually related to one another.

But in order to work within this C.F. the scientist must give it empirical import; i.e., he must be able to articulate *theories* which specify concrete forms of the concepts employed. For example, he must be able to specify that gene mutation is to be regarded as the relevant form of variation, or that resting sites (such as blackened tree trunks) are the relevant form of environment. In other words he must *combine* Darwinism with C.F.s of neo-biology, especially with a

C.F. dealing with heredity. Thus the original Darwinian C.F. was based on the following postulates:[17]

(1) The heredity system is characterized by "blending inheritance" (To this Darwin added his Theory of Pangenesis).

(2) The relevant variation is the continuous, fluctuating variation seen in all organisms.

(3) This variation is inherited.

This combination entails that the C.F. is refutable, i.e., refutable in the sense that its neo-biological components are open to falsification. Thus Darwin's C.F. was refuted when the rediscovery of Mendelian *theory* led to the rejection of the neo-biological components.

During the 1890s an alternative C.F.[18] to the Darwinian began to appear (Saltationism), and it was not until about 1930 that a new Darwinian C.F. emerged.[19] This *neo-Darwinian* or *Synthetic Theory of Evolution*[20] is based on the neo-biological C.F.s of Mendelism and Weismannism:

(1) Heredity is atomic, i.e., the hereditary system has the property of dependence on discrete alternative states ("alleles") of the hereditary factors ("genes") which can segregate and recombine (Mendelism). In the C.F., this doctrine is transferred from the individual level to the population level (the gene pool concept).

(2) The relevant variation is produced by random gene mutation in the germ cells.

(3) Changes in the hereditary material are independent of, or only arbitrarily related to, changes in the soma (Weismannism). In the C.F., this doctrine is also transferred to the population level.

From our analysis it follows that neo-Darwinism is open to falsification in the sense that Mendelism and Weismannism may be falsified.[21] This is certainly true and I hope to indicate in a later article one way in which this can be done. But here it should be noted that the internal development of Mendelism and of the neo-Darwinian combination has led to neo-Darwinism becoming a completely fossilized metaphysic (Darwinism itself has been this all along!).

Mendelism Explicated

C.F.s of neo-science are philosophically informed just as much as those of paleo-science. The philosophies available are primarily those of mechanism, vitalism and organicism, and it is in terms of the first that Mendelism is usually presented. It thus contains the following postulates:

(1) Organisms ultimately consist of genes which have purely physico-chemical properties.

(2) The body of an organism is a complex physico-chemical system whose molecular parts are causally linked to the molecular structure of the genes.

(3) Heredity is ultimately the physico-chemical process of gene duplication.

(4) Hereditary changes are brought about by the physico-chemical processes of gene recombination and mutation.

The dominance of this viewpoint is indicated by Hershey's reference[22] to "the unwritten dogma, according to which biological evolution is solely the evolution of nucleotide sequences." Mendelism is what it is, not because of the facts, but because of the mechanistic philosophy in which it is set.

In order to support evolutionary continuity, invariance of species is replaced by invariance of genic processes. If species are the sum of genes, then by genic changes, species can be changed and the continuity of evolution can be explained. At least that has been the hope.

Classical Mendelism

The original Mendelian theory was based on the postulates that the gene: (1) is a corpuscle on the chromosome; (2) has a definite function; (3) has the capacity to mutate; and (4) is the smallest unit of recombination. That is, the gene was stated to be a unit of function, mutation and recombination, which stands in a 1:1 correspondence with an adult character. On this basis the elementary evolutionary process could be regarded as a systematic change of gene frequency in a local population.

Neo-Mendelism Contrasted

Breeding experiments soon upset the apple-cart, for it was found, for example, that the same phenotypic result could be produced through breeding different strains of plant or animal; i.e., in terms of the C.F., different genes. were causing the same effect. A new theory was necessary. Hence Neo-Mendelism modifies the postulates:

(1) Genes are (still regarded as) discrete.[23]

(2) The units of function, mutation and recombination are rarely co-extensive.

(3) The *interactions* of the genes give rise to the observable characteristics of the organism.[24]

This new theory may save the C.F., but it buries the gene beneath an epicyclic superstructure, if the secular persistence of any relationship between the genes and the characters is denied (as by Huxley,[25] Carter,[26] Waddington,[27] Mayr,[28] etc.). If, that is, the phenotype is the expression of the unspecifiable, changing and unpredictable interactions between the total of mutable genes (which further interact with the environment and even with the changing internal environment during development), then it is strictly meaningless to say that evolution is "*change in gene frequencies.*"[29] The modern interpretation of the gene thickens the fog further:

when the "old-fashioned gene" turns into

> a replicating sequence of bases in DNA which is active in controlling a DNA-RNA-protein sequence, theoretical biologists have little reason for any confidence that there are in existence sound theories of evolution and development waiting to be enriched, rather than thrown into chaos, by the new insight.[30]

Neo-Darwinism and Neo-Mendelism

Modern Mendelism gives precious little clarity to Darwinism, and even the partial clarity is befogged by the importation of *ad hoc* hypotheses which obscure the relationship between Darwinism and Mendelism. The problem is created by the fact that the overwhelming majority of gene-mutations studied in the laboratory are admitted to be deleterious to the organisms concerned.

To obviate this difficulty three supplementary hypotheses have been put forward: (1) Fisher's theory of "suppressor (modifier or buffer) genes" (which render innocuous the effects of deleterious mutations); (2) East's theory that the relevant mutations are infinitesimally minute (i.e., not those normally observed in experimental studies); and (3) Dobzhansky's contention that the deletetriousness of a mutation is relative to the particular environment in which the organism finds itself.[31]

Whatever the truth or otherwise of these supplementary hypotheses, they *all* share the same methodological defect: *they explain away the difficulties created by the contention that gene mutation provides the variation utilized in evolution, without suggesting any novel consequences which can be tested.*[32] This sorry state of affairs is quite typical of modern paleo-science.

Creationist Strategy

The preceding analysis has necessarily been rather involved, but the conclusion is a simple and indeed familiar one: *in the absence of revelation (i.e., the historical report of an eyewitness) we cannot scientifically investigate the past.* When Kerkut wrote, "It seems at times as if many of our modern writers on evolution have had their views by some sort of revelation . . . ,"[33] he was using the right language. Religious and philosophical commitments *are* decisive. There could have been no "evolution" in science without the prior acceptance of an evolutionism in philosophy, and a humanism in religion.

The analysis cannot, however, be closed on a purely negative note. The Christian is called upon to make a response. We must no longer be content with sniping (which evolutionists rightly ignore as irrelevant), Our apologetic must be both integral and all-embracing. We must remember Whose side we are on—and formulate a three-fold attack:

(a) *Attack by unmasking the philosophical structure and religious root of evolutionay thought.*

(b) *Attack by disclosing the self-destructive nature of all such man-centered thinking.*

The very structure of paleo-science precludes a purely scientific refutation of Darwinism. Instead we must cut through the undergrowth to the roots and proclaim their rottenness to the world. We must have the courage of our convictions to maintain that *only* in Christ-centered thought can we have real meaning in any area of life. This is as true in natural science as it is in theological science.[34]

(c) *Attack by articulating comprehensive scientific alternatives to evolution, i.e., C.F.s and theories for cosmogony, historical geology and historical biology.*

Morris and Whitcomb have given us the lead in geology; Mulfinger[36] has provided a basis in astronomy, and it is for all of us to take up the challenge. Our efforts in science must always be tentative and subject to revision, but the Bible provides a solid foundation, and our Lord is not only a Saviour, but also the One who created and upholds the whole universe.

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[2] This "inductive" method was defended by J. S. Mill and T. H. Huxley and still persists among scientists as a general belief. See, e.g. Villee. C. A. 1962. Biology. Fourth Edition. W. B. Saunders Co., Philadelphia. p. 3.

[3] This paradox was posed in Plato's *Meno.* See discussion by Polanyi, M. 1967. The tacit dimension. Routledge and Kegan Paul, London, Chapter 1.

[4] Since Kuhn, T. S. 1962. The structure of scientific revolutions. University of Chicago Press, Chicago, the term paradigm has often been used, but this is an illicit use of the word, which, in my experience, leads to confusion.

[5] Popper, K. R. 1963. Conjectures and refutations. Routledge and Kegan Paul. London.

[6] Wisdom, J. O. 1952. Foundations of inference in natural science. Methuen & Co., Ltd.. London and 1957. A reply to Dr. Das's criticisms, *British Journal for the Philosophy of Science.* 8:325-328.

[7] In terms of Dooyeweerd's Christian philosophy these *are modal concepts,* i.e. *analogical concepts* and concepts referring directly to the *modal nuclei.*

[8] Note that despite the noun form. the second-order concepts are not substantives, i.e., "motion," "energy" and "life" are not *whats* (things, substances), but hows (how things function).

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[26]Carter, G. S. 1957. A hundred years of evolution. Sidgwick and Jackson, London, pp. 129-130.
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[30]Waddington, C. H. (Editor). 1968. Towards a theoretical biology. 1. Prolegomena. Edinburgh University Press, Edinburgh, p. 104.
[31]See Ho, W. M. 1965. Methodological issues in evolutionary theory. Doctor of philosophy Thesis, Oxford.
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[35]Morris, H. M. and Whitcomb, J. C. 1961. The Genesis flood. Presbyterian and Reformed Publishing Company, Philadelphia (Evangelical Press, London. 1969.).
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pursuit of the present direction, which Elder believes is likely to result in ecological disaster.

> In moving toward the transcendence stage of Omega, man, to put it bluntly, crunches nature by the means of science and technology. Teilhard puts it more elegantly by saying, "Taken in the full modern sense of the word, science is the twin sister of mankind," for "the march of humanity . . . develops indubitably in the direction of conquest of matter put to the service of mind."

Thus Elder believes that Pierre Teilhard's evolutionary philosophy has led him to justify man's exploitation of the world in which he lives.

There is another aspect to be considered, and that is the creationist's attitude toward the world, as contrasted with the attitude of the evolutionist. The creationist believes that God created originally a perfect world, the intricacies of which show God's wisdom. Because God's wisdom is so superior to man's, it is unlikely that man will be able to improve on the world which God created.

Therefore, the creationist is in no hurry to change natural balances and to seek to alter the world which God has created. To be sure God expects man to serve as a sort of manager; he is not to take his talents and bury them in the ground.

Yet this management must be conducted in keeping with and not contrary to the complex balances which God has created. When the creationist sees how each organism fits into its niche, he marvels at God's wisdom and is reluctant to make any changes until he is certain that he will not be inflicting damage.

The evolutionist, on the other hand, regards these balances as the result of chance evolutionary changes. He believes that he can and ought to control and direct the changes which go on continually. The evolutionist is arrogant enough to believe he can improve on nature. He is hardly likely to hesitate to accelerate changes which he believes are bound to take place; and he counts on impersonal natural selection to guarantee survival of the truly fit.

Conclusion

We do have some problems. Perhaps some of the cries that have been raised are unnecessary calls of alarm. But there is enough evidence that the situation is serious and that it demands our attention. What we need is not a repudiation of Scriptural and creationist principles, but a rejection and repudiation of the evolutionary philosophy and a more wide-spread acceptance of the Biblical and creationist view of the place of man.

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