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FOUNDATION FOR ANCIENT RESEARCH AND MORMON STUDIES

Hugh W. Nibley

## Some Significant Statements by Leading Scientists on the Scope of Scientific Authority

### Summary:

This is a collection of statements by scientists on the following topics: how scientists have become impatient with religion, how science has all the answers, how difficult it is to truly understand the past, the question of whether science is a cause or a pretext, the assertion that science is not based on purely inductive reasoning, and the illusion of already knowing as the greatest enemy to serious research.

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## SOME SIGNIFICANT STATEMENTS BY LEADING SCIENTISTS

The basic scientific proposition that all things can ultimately be explained on purely physical principles has made many scientists impatient with Religion.

The new physics, Plutarch explains, taught people "to despise all the superstitious fears which the awe-inspiring signs in the heavens arouse in those who are ignorant of the real causes of things." (Plutarch, Pericles).

The same claim is made for modern science: "The doctrine of geological uniformitarianism . . . widened the recognized reign of natural law [and] . . . reduced the sway of superstition in the conceptual world of human lives." (G.G. Simpson, in Science, 131 [1920], p. 967) "In the evolutionary pattern of thought there is no longer need or room for the supernatural. The earth was not created: it evolved. So did all the animals and plants . . . mind and souls, as well as brain and body. So did religion." (Simpson, quoted in J.C. Whitcomb, The Genesis Flood, [Philadelphia, 1961], p. 443).

"Of all possible schemes of the universe the one most hostile to religion was that sponsored by the sciences of the 19th and 20th centuries . . . . Because of its practical triumphs, there grew up an almost mystical faith in the omniscience of science." (C.E.M. Joad, God and Evil [Harpers, 1943], p. 108).

"No less severe was his [Lamarck's] philosophical hostility, amounting to hatred, for the tradition of the Deluge and the Biblical creation story, indeed for everything which recalled the Christian theory of nature." (C.C. Gillispie, in The American Scientist, 46 [1958], p. 397).

Darwin writes of himself in his twenties, when he was still a theology student and had not begun his great researches: "I had gradually come, by this time, to see that the Old Testament, for its manifestly false history of the world and from its attributing to God the feelings of a revengeful tyrant, was no more to be trusted than the sacred books of the Hindus, or the beliefs of any barbarian . . . . By further reflecting . . . that the more we know of the fixed laws of nature the more incredible do miracles become -- that men at that time were ignorant and credulous to a degree almost incomprehensible to us . . . . This disbelief crept over me at a very slow rate, but at last it was complete . . . . I felt no distress, and have never since doubted for a single second that my conclusion was correct." (Ch. Darwin, Autobiography [1959 ed.], p. 85f).

"Darwin himself avoided attacking the Bible, but for Huxley, his doughty champion against all comers, the battle against the doctrine of inspiration, whether plenitary or otherwise, was the crucial engagement in the fight for evolution . . . ." (J.C. Greene, in Proceedings of the American Philos. Soc., 103).



"The old man was happy. He felt as though back in the Cambridge of the Nineties when unbelief, rude, positive unbelief, was fun." (C.P. Snow, The Affair, p. 271).

"Of all antagonisms of belief, the oldest, the widest, the most profound, and the most important, is that between Religion and Science. It commenced when the recognition of the simplest uniformities in surrounding things set the limit to the once universal superstition." (H. Spencer, First Principles, I, i, 3).

"One-hundred years ago Charles Darwin, in what was undoubtedly the greatest scientific book of all time, presented the evidence . . . for the theory of evolution by natural selection . . . . The failure of our people to take evolution seriously can be traced to . . . our domination by antiquated religious traditions." (H.J. Miller, in The Humanist, 19 [1959], p. 139f).

"After the publication of the Origin of the Species a controversy arose in Europe and America. It was a struggle between the Christian theological conception of man and the conception held by science . . . [I]f you were in this controversy you were on one side or the other; you were either for religion or you were for science." (L.A. White, in American Anthropologist, 49 [1947], p. 402).

"The most important responsibilities of the geologists involve the effect of their findings on the mental and spiritual lives of mankind. Early geologists fought to free people from the myths of Biblical creation. Many millions still live in mental bondage controlled by ignorant ranters who accept the Bible as the last word in science . . . . Attempts to reconcile Genesis with geology lead to numerous contradictions." (D. Hager, Presidential Address before the Utah Geol. Soc., in Geotimes, 2 [Aug. 1957], p. 12).

"Darwin's supreme achievement was to make compelling the inference . . . providing a basis for mechanistic interpretation . . . to free biology of animistic influence." (T.N. George, Evolution in Outline, [London: Watts, 1951], p. 19).

"Moreover, in the evolution and adaptations of plants and animals, if there was design, purpose, or guidance, it so frequently led to disaster that it is utterly out of place to invoke Providence to account for them." (Sir Gavin de Beer, in The Listener, [July 3, 1958], p. 12).

All of this was standard doctrine with the ancient Sophists. It led to the purest authoritarianisms. Science and Science alone knew all the answers:

"So science has, it seems, been so successful that it has inevitably earned a great and strange reputation. If it has never been defeated, presumably it is all-powerful. And since science is, after all, the work of scientists . . . then presumably these scientists are both so clever and so wise that they can do anything. Perhaps we

should turn the world over to this superbreed . . . . The sad fact is that some scientists themselves appear to believe precisely this." (W. Weaver, in Amer. Scientist, [March 1961], p. 101).

"It would be an illusion to suppose that we could get anywhere else what Science cannot give us." (S. Freud, The Future of an Illusion [N.Y. Doubleday Anchor, 1957], p. 102).

"He who declares that they (any problems) can never be solved by the scientific method is to my mind as rash as the man of the early 16th century would have been had he declared it utterly impossible that the problem of talking across the Atlantic Ocean should ever be solved." (T. W. Organ, The Examined Life, [Boston, 1956], p. 119). "Whenever, therefore, we are tempted to desert the scientific method of seeking truth, whenever the silence of science suggests that some other gateway must be sought to knowledge, we should resist the temptation." (l.c.)

"To cry 'We are ignorant' is safe and healthy. But to cry 'Ignorabimus' -- we shall be ignorant, is not permissible." (K. Pearson, in T. W. Organ, op. cit., p. 118).

"Science has not only progressively reduced the competence of philosophy, but it has also attempted to suppress it altogether and to replace it by its own claim to universality." (M. Berdyaw, Sol. & Society).

"[T]here is no possibility of going outside of science, as we can enlarge the bounds of science without knowing the limits, in search for structure." (A. Korzyski, Science and Sanity, [N.Y., 1933], p. 154).

Part of the Baconian mystique is the myth of the Open Mind, which is now being questioned:

"The idea that we can at will, and preparatory to scientific discovery, purge our minds from prejudices -- that is, from preconceived ideas or theories -- is naive and mistaken." It is only **after** the discovery has been made that we know which of our ideas were prejudices, "and there is no criterion by which we can recognize prejudices in anticipation of this advance." (Popper, "Science: Problems, Aims, Responsibilities," Federation of the American Societies for Experimental Biology 22 (1963), p. 962).

"There is no such thing as unprejudiced observation. Every act of observation we make is biased . . . . All scientific work connected with experimentation or exploration started with some expectation [that] governs its actual form . . . ." (Medawar in Jnl. of Human Relations, 13 [1965], p. 3f).

"How odd it is that anyone should not see that all observation must

be for or against something." (C. Darwin, quoted by K. Popper, op. cit., p. 966).

"Reviewing our present state of knowledge, we will call attention to the intrinsic relationship between expectation and discovery, find and interpretation theory and conviction, which adds so much color and life to a science composed of . . . facts and fantasy." (G. von Koenigswald, Jnl. Royal Anthropol. Soc., 94 [1964], p. 67).

"What is called a 'knowledge of facts' is usually merely a subjective realization that the old hypothesis is still sufficiently elastic to serve in some domain . . . ." (G. B. Halstead, cited by W. Weaver, in American Scientist, [March 1961], p. 110).

The scientist supposedly must keep himself out of the picture -- but how? When "the evolutionary paleontologist" is marshaling "his observable facts . . . evolutionary ideas must not be put into the classification to begin with." How do they get there? "The ability to select the most satisfactory and comprehensive classification is a measure of the skill of the investigator . . . . All hypothetical elements being rigorously excluded, the paleontologist is now perfectly free to reason and speculate as to . . . evolutionary lines, speculate on what if not hypothetical grounds? . . . . The true phylogenetic grouping . . . must always remain more or less hypothetical . . . ." (This after the exclusion of all hypothetical elements!). Finally, questions of classification "which are to a certain extent subjective, must be decided by the paleontologist in the light of his general training and experience." (J. Challinor, in P. R. Bell, ed., Darwin's Biological Work, [Cambridge Univ., 1959], p. 66f).

Already Bacon recognized the dilemma of every scientist, who cannot help but interpret whatever he observes in the light of what he already knows -- and believes. "Men become attached to certain particular sciences and speculations, either because they fancy themselves the authors and inventors thereof, or because they have bestowed the greatest pains upon them and become most habituated to them. But men of this kind . . . distort and color . . . in obedience to their former fancies . . . ." (Bacon, Novum Organum, Liv.). For Bacon the escape from this was in the sublime integrity of Science and the corresponding integrity of its practitioners. So we get the image of the Scientist which has been so effective in bringing the public into line and over-awing all opposition.

"The Scientific revolution . . . by denying the relevance, if not the possibility, of non-empirical, non-instrumental knowledge . . . made man the intellectual summit of the universe . . . . Pride of physical place was replaced by autodeification in the order of knowing." (C. R. Dechert, Internat. Philos. Quart., 5 [1965], p.32f).

"God's omnipotence and omniscience were replaced by the omnipotence of nature and by the virtual omniscience of natural science . . . . All that was needed was to approach the goddess Nature with a pure

mind, free of prejudices, and she would readily yield her secrets." (Popper, op. cit., p. 961).

"The foundation principle of science is that it concerns itself exclusively with what can be demonstrated, and does not allow itself to be influenced by personal opinions or sayings of anybody. This is why the motto of the Royal Society of London is 'Nullus in verba': we take no man's word for anything." (G. de Beer, in The Listener, July 3, 1958).

"For scientific procedure it is important to discard elements of metaphysical character and to consider observable facts always as the ultimate source of notions and construction . . . . [T]hat may be a psychological hardship for naive enthusiasts, but in fact it was one of the most fruitful turns in modern thinking . . . . Some of the greatest achievements in physics have come as a reward for courageous adherence to the principle of eliminating metaphysics." Science is concerned **solely** with physics (observation), **not** with metaphysics (logical demonstration). (R. Courant & H. Robbins, What is Mathematics?, p. xvii).

"We have the right and duty to examine critically the assertions of every prophet that ever arose . . . . A living truth is not afraid of the most searching test. Proving -- probing -- all things is the privilege of ardent faith, the freedom that belongs to the children of light." (A. Querard, Fossils and Presences, p. 34).

"A world in which man must rely on himself . . . is by no means congenial to the immature or wishful thinkers . . . . Life may conceivably be happier for some people in other worlds of superstition. It is possible that some children are made happier by a belief in Santa Claus, but adults should prefer to live in a world of reality and reason." (G. G. Simpson, in Science, 131 [1960], p. 969).

Today the Scientist's flattering image of himself is being drastically corrected:

"Any suggestion that scientists so dearly love truth that they have not the slightest hesitation in jettisoning their beliefs is a mean perversion of the facts. It is a form of scientific idolatry, supposing that scientists are entirely free from the passions that direct men's actions, and we should have little patience with it." (I. B. Cohen, Proc. Am. Phil. Soc., 96 [1952], p. 505ff).

"I have known intimately a number of creative scientists and I have studied the behavior of a great many more as revealed by the record of history. I have never encountered one of any importance whatever who would welcome with joy and satisfaction the publication of a new theory, explanation, or conceptual scheme that would replace and render superfluous his own creation." (l.c.)

"So far are they (science majors) from having learned any humility, they are known in every high school and among the freshmen and sophomores of every college as the most insufferable, cock-sure know-it-alls . . . . They know the electron, and they seem to think they are entitled to pour scorn on other subjects from a very great height . . . . They are uneducated in the fullest sense of the word." (A. Standen, Science is a Sacred Cow, [N.Y.: Dutton, 1950], p. 18).

"The rule 'purge yourself from prejudice' can therefore have only the dangerous result that, after having made an attempt or two, you think you are now free of prejudices -- which means, of course, that you will stick only more tenaciously to your unconscious prejudices and dogmas. Moreover . . . the mind purged of all theories would not be a pure mind -- it would be an empty mind." (K. Popper, op. cit., p. 962).

"We humans . . . have a tendency to make static, definite, and, in a way, absolutistic one-valued statements. But when we fight absolutism we quite often establish, instead, some other dogma equally silly and harmful. For instance, an active atheist is psychologically as unsound as a rabid theist." (A. Korzybski, Science and Sanity, p. 140).

"Man's brain corrupts the revelation of his senses. His output of information is but one part in a million of his input. He is a sink rather than a source of information. The creative flights of his imagination are but distortions of a fraction of his data. Finally . . . ultimate universal truths are beyond his ken. The future . . . he may never know." (W. S. McCulloch, Scientific Monthly, [June 1955], p. 39).

"As our knowledge of earlier civilizations increases, as our sweep of history is extended further backward, today's ideological conflicts are carried with it, deeper and deeper into the study of mankind." (E. Hirshler, in Compar. Studies in Society and History, 7 [1964], p. 97). Instead of ridding us of ideologies, Science involves us in them.

"What is called 'a knowledge of facts' is usually merely a subjective realization that the old hypothesis is still sufficiently elastic to serve in some domain; that is, with a sufficiency of conscious or unconscious omissions and doctorings and fudgings more or less willful." (W. Weaver, American Scientist, March 1961, p. 110).

"So long as we, like good empiricists, remember that it is an act of faith to believe our senses, that we corrupt but do not generate information, and that our most respectable hypotheses are but guesses open to refutation, so long may we 'rest assured' that God has not given us over to thralldom under that mystery of iniquity, of sinful man aspiring to the place of God." (W. C. McCulloch, Sci. Monthly, Jan. 1955, p. 39).



Humans have always seen the moral implications in a view that limits all existence to the "physical" world. Where matter is everything, human behavior is devoid of significance and hence of any moral quality. Whether or not this view is inescapable, many scientists have insisted on laying great emphasis upon it:

"Thus it comes about, fantastic though it may sound, that men lie with their neighbors' wives denuded of the last shred of a guilty conscience because observations of the changes of Mercury's perihelion enabled Einstein to alter our ideas about space-time." (J. Langdon-Davies, Man and His Universe, p. 319).

Is Science a cause or merely a pretext? Is Einstein really to blame for this?

"We must in all circumstances learn to accept the fact that . . . in the longest run, the sum of all human endeavor had no recognizable significance." (Ostwald, quoted by S. Toulmin, Metaphysical Beliefs, p. 30). This is an immoral statement: is it characteristic of Science?

If the premises of Science are followed to their conclusions "human behavior could also be predicted [and that, incidentally, would be the end of the freedom of choice and hence the end of our feeling of moral responsibility]. The rigid determinism desiccating the world actually follows from the equations of mechanics and is the essence of its laws." (N. Kozyrev, in Soviet Life, Nov. 1965, p. 43). Here an eminent Russian mathematical physicist insists that Science itself **does** preach an immoral doctrine.

Thanks to Darwin, "instead of the gracious half-divine figures of the Golden Age . . . we are shown a breed of hairy gorilla-like creatures, huddling and gibbering in caves and tearing each other in the blind struggle for life." (M. Bevan, Hellenism and Christianity, p. 191). The objection to the picture is not only that it is a false one, but no less that it is a debasing one.

"There is no morality in life, no truth, no goodness, and no beauty. Life in all its adaptability and elasticity is as elemental as iron or sulfur or oxygen or carbon. This is the **correct** perspective of life. It would indeed save much trouble and avoid many unnecessary errors if philosophers and scientists could look at life in the correct perspective." (R. Jordan, The New Perspective, p. 144).

"Darwinism has come, and has conquered, and a vital influence in the spiritual life, has gone." (G. H. Skipwith, Jew. Qt. Rev., 12 [1900], p. 381).

"In such a rich and varied context of evolutionary lines it is impossible to discern a single overriding motif in evolution. A scientific explanation of the course of evolution therefore avoids reference to either purpose or progress in its recognition of the

factors of change. So far as it is scientific, it falls back on the empirical evidence." (T. N. George, Evolution in Outline, p. 118).

"The clearest expression of the world-view of Darwinism is Tyndal's statement in the 1874 meeting of the British Association that science would be able to survey the 'ultimately purely natural and inevitable march of evolution from the atoms . . . to . . . the British Association for the Advancement of Science.' In a universe so conceived, life is of profound unimportance . . . merely an eddy in the primeval slime." (C. Joad, Guide to Philosophy, p. 525).

"The great Darwinian movement . . . has seemed to me to constitute the major indication that man, if he is indeed nothing but an improved beast, can by one more easy step be nothing more than a mere machine -- and thus surely an object which science can wholly analyze, wholly capture within its special framework." (W. Weaver, Am. Scientist, 1961, p. 101).

Today the scientific journals are full of articles pointing out that it is not true that scientific conclusions are based on purely inductive reasoning, i.e., that the scientist first acquires his facts and only then draws his conclusions from them.

"Science begins with observations, says Bacon . . . . Science, we may tentatively say, begins with theories, with prejudices, superstitions, myths, i.e., . . . with problems. Einstein . . . in his Herbert Spencer Lecture . . . told his audience not to believe those scientists who say that their methods are inductive . . . . We do not start from observation, but always from problems . . . from a theory . . . which has raised, and disappointed, some expectations." (K. Popper, op. cit., p. 966).

Whereas most scientists maintain that "the ultimate in criteria of credibility is scientific objectivity . . . careful thinkers have long been skeptical about the supposed objectivity of so-called scientific facts." (W. Weaver, in American Scientist, March 1961, p. 110).

"No 'facts' are ever free from 'doctrines': so whoever fancies he can free himself from 'doctrines', as expressed in the structure of the language he uses, simply cherishes a delusion, usually with strong affective components." (A. Korzybski, Science and Sanity, p. 87).

"Bacon, quite consistently, was an enemy of the Copernican hypothesis. Don't theorize, he said, but open your eyes and observe without prejudice, and you cannot doubt that the Sun moves and that the Earth is at rest." (Popper, op. cit., p. 962).

"[O]ur language is made up only of preconceived ideas and cannot be otherwise. Only these our unconscious preconceived ideas, are a

thousand times more dangerous than the others." (H. Poincare, The Foundations of Science).

Galileo, the greatest observer of them all, was completely blinded by preconceptions; he refused to believe in the existence of rings about Saturn or their changing phases, and his argument was that of pure observation: "I have resolved not to put anything around Saturn except what I have already observed. I who have observed it a thousand times at different periods with an excellent instrument, can assure you that no change whatever is to be seen in it. And reason, based upon our experience of all other stellar motions, renders us certain that none ever will be seen." (S. Drake, Discoveries and Opinions of Galileo, [N.Y.: Doubleday Anchor, 1957], pp. 101f). The rings were, and are, clearly visible in his telescope!

"Our evidence can acquire its proper importance only if it comes before us marshalled by general ideas. These ideas we inherit -- they come from the tradition of our civilization." (A. N. Whitehead, Science in the Mod. World, Chapter on Science and Religion).

The illusion of already knowing is the greatest enemy to serious research:

"Social theorists . . . find themselves able to set forth in a few pages or phrases the very essence of the most complex phenomena . . . . [T]he sociologist seems to move in a sphere perfectly transparent to his view, so great is the ease with which the most obscure questions are resolved . . . . As far as social facts are concerned, we still have the mentality of primitives." (E. Durkheim, quoted by L. A. White, Anthropology 1964: "Retrospect and Prospect", American Anthropologist, 67 [1965], p. 632).

"The prevailing attitude tends to blind the so-called hard-nosed social scientist to the really great problems of men and society and often focuses his attention upon relatively unimportant issues. It helps to explain the monumental accumulation of trivia and the ponderous elaboration of platitudes that characterize so much contemporary social science." (P. K. Odegard, quoted by White, op. cit., p. 636, n. 2).

"It is assumed that the principles of genetics now so widely known and given in all texts are of universal application. Hence students refuse to investigate exceptions: 'Ever since 1919 . . . I have urged geneticists to study heredity in lichens, but thus far none has been willing to do so.'" (A. W. Heere, in Amer. Inst. of Biol. Sciences, Bulletin, Dec. 1960).

"But we are so made that we find it hard to conceive the reality of some fact that is in disagreement with the ideas that are deeply rooted in our minds. Now the standard recognized geology that we are taught at the university, is quite opposed to the doctrine of catastrophism . . . [hence] I still could not make myself believe that an immense stretch of land, 12 to 18 miles wide and 300 long,

could all at once have sunk . . . dropped six feet in ten seconds or so. It was beyond my imagination; and a geologist's imagination, God knows, is pretty strong . . . . Undoubtedly our professions knew these facts (of past catastrophes; but they only knew them in an abstract manner, because they had been as it were weaned upon the normal phenomena of mountain-building) . . . . Our revered masters were doubly wrong . . . although every day's investigation brought me new proofs, my mind still could not acknowledge the reality of so astonishing a fact as the yielding of an enormous piece of the continent, its sinking ten feet in the space of a minute . . . . [F]amiliarity in no way lessened the feeling of wonder that slowly invaded my mind, as step by step it managed to conceive the inconceivable." In other words, the author's training had closed his mind to the facts before him. (J. Tazieff, When the Earth Trembles, [N. Y.: Harcourt, Brace, 1962], pp. 27-31).

Why can't one extrapolate present life-forms into the past? "[W]hat right have we to make such an extrapolation? [This] may in fact be the closing of our eyes to as yet undiscovered factors which may remain undiscovered for many years if we believe that the answer has already been found." (G. A. Kerkut, Implicat. of Evolu., p. 195).

"Darwin's great achievement was to supplant "purposeful adaption . . . by some mechanism . . . . But once it was shown that a mechanism of this kind is possible, we ought to try to construct alternative mechanisms, and then try to find some crucial experiments to decide between them, rather than foster the belief that the Darwinism mechanization is the only possible one." (Popper, op. cit., p. 964).

Many scientists are pointing out today that this authoritarianism is having the same crippling effect on research in scientific fields that it has had in the past in other fields:

"It is important to combat the assumption [that we know what the primitive conditions of life were], since "as long as this is assumed, insufficient effort will be put into the attempt to find ways to obtain genuine evidence." (N. Pirie, "Some Assumptions Underlying Discussion of the Origins of Life, in Annals of the N. Y. Academy of Sciences, 1959, p. 373).

"[T]he serious undergraduate of the previous centuries was brought up on a theological diet from which he would learn to have faith and to quote authorities when he was in doubt. Intelligent understanding was the last thing required. The undergraduate of today is just as bad; he is still the same opinion-swallowing grub . . . . Regardless of his subject, be it Engineering, Physics, English or Biology, he will have faith in theories that he only dimly follows and will call upon various authorities to support what he does not understand. In this he differs not one bit from the irrational theology student of the bygone age. But what is worse, the present-day student claims to be different from his predecessor in that he thinks scientifically

and despises dogma . . . ." (G. A. Kerkut, Implications of Evolution, [Oxford, 1960], p. 3).

"It seems at times as if many of our modern writers on evolution have had their views by some sort of revelation . . . it is premature, not to say arrogant, on our part if we make any dogmatic assertion as to the mode of evolution or the major branches of the animal kingdom . . . Much of what we learn today are only half truths or less . . . . An incorrect view can . . . successfully displace the correct view for many years . . . . Most students become acquainted with the current concepts . . . at an age when most people are . . . uncritical . . . . [T]hey have in their minds several half truths and misconceptions," but having "a uniform pattern of education (with their fellow students) . . . in conversation and discussion they accept common fallacies and agree on matters based on these fallacies." (Ibid., p. 155).

"The main objections (to evolution) were clearly stated in its very early days. But . . . their force then was very easy to blunt. For instance, most of them came from people who were not trained biologists . . . and their objections could be countered summarily on grounds of ignorance, despite the fact that Darwin's hypothesis appealed too largely to the evidence of common observation and experience." That is, the Doctors pulled their rank and closed the doors to discussion and investigation. (R. Good, in The Listener, May 7, 1959, p. 797).

"Because of the sterility of its concepts, historical geology . . . has become static and unproductive . . . . The findings of historical geology are suspect because the principles on which they are based are either inadequate, in which case they should be reformulated, or false, in which case they should be discarded. Most of us refuse to discard or reformulate, and the result is the present deplorable state of our discipline." (R. S. Allen, in Bull. of the Geological Society of America, 59 [Jan. 1948], p. 2).

"The public has become willing to accept, with the respect accorded scientific conclusions, the scientist's view on numerous topics that have nothing to do with his special area of competence, or with science as a whole . . . . [T]heir appearance in the guise of scientific decisions may shield them from such [very necessary] scrutiny." (Report of an AAAS Committee in The American Scientist, 53 [1965], p. 195).

In dealing with the past we are all in the same boat . . . . What can we actually know about the past? Nothing! We can only imagine the past, and any picture of the past we produce will be 100% the product of our imagination. Today scientists are becoming increasingly aware that this fact is no mere quibble -- it is fundamental to all our knowledge of man's life upon the earth.

"There are many schemes by which biogenesis could have occurred but these are still suggestive schemes and nothing more. They may



indicate experiments that may be performed, but they tell us nothing about what actually happened some 1000 million years ago. It is therefore a matter of faith . . . that biogenesis did occur and he [the biologist] can choose whatever method of biogenesis happens to suit him personally; the evidence for what did happen is not available." (G. A. Kerkut, Implications of Evolution, p. 150). "It is a convenient assumption that life arose only once . . . but because a theory is convenient or simple it does not mean that it is necessarily correct . . . . The simplest explanation is not always the right one even in biology." (Ibid., p. 151). Even if we could produce life in the laboratory "we could not say from our experiments that the living material of the universe arose in this way. The assumption that life arose only once and that all living things are inter-related is a useful assumption . . . . But because a concept is useful it does not mean that it is necessarily correct." (Ibid., p. 8).

"[S]tudying present-day organisms . . . does not tell us . . . all the ways in which they have ever operated; many types of metabolism may have died out. Still less does it tell us that these are all the ways in which they could have worked . . . it is not possible to assert that we have foreseen all of the arrangements . . . . No one has suggested a valid means for telling whether the organisms we already know had one origin or many." And if life was organized by chance, "do we know to what kind of substance this chance happened, or to what kind of substance it could have happened? I maintain that we do not." (N. W. Pirie, Annals, N. Y. Acad. of Sci., [1959], p. 371).

"The proponents of Neo-Darwinism claim that there is no known instance of evolution which they cannot explain. This is actually untrue. What is true is that no such instance clearly contradicts their theory, but this is not surprising when we realize how little the theory actually explains. To say that the known changes could have been brought about by the described machinery does not explain these changes . . . . An adequate explanation is one which would have enabled us to predict the outcome, before it took place. But none of the present evolutionary theories enables us to make such predictions. There is no doubt that the horse could have evolved in the manner described. But had Mr. Darwin lived 50 million years ago, he would not have been able to predict that these changes would occur, even if he had known how the environment was going to change. Since his theory would not have served for predictions then, it is not adequate for an explanation now." (J. G. Kemeny, A Philosopher Looks at Science, [Princeton: Van Nostrand, 1959], p. 199f).

"We may surmise from general principles -- as I do personally -- that the formation of planetary systems may well be fairly common in the universe, and, further that the creation of conditions which favor the spontaneous origin of life may also be quite common. But this does **not** mean that such life must necessarily exist. I firmly believe that the only proper scientific conclusion at the present is

. . . that as yet we do not know." (W. J. Luyten, in Discovery, Sept. 1965, p. 14).

We have at present no means of checking any statements we might make about the past or any images we might construct of it:

"The past no longer exists for us, even the past of yesterday . . . . This means that we can never have any direct knowledge of the past. We have only information or evidence from which we can construct a picture . . . . The historian or prehistorian had the evidence of the past to interpret, and so he, like the scientist, makes a working hypothesis to explain it. This will be as near to a historical 'truth' as can be attained, and like the scientist he will modify or even abandon it if new evidence demands it." (S. Piggott, The Dawn of Civilization [N. Y.: McGraw-Hill, 1961], p. 1).

Concerning the Seven Basic Assumptions of Evolution: "The first point that I should like to make is that these seven assumptions by their nature are not capable of experimental verification. They assume that a certain series of events has occurred in the past. Thus though it may be possible to mimic . . . under present-day conditions, this does not mean that these events must therefore have taken place in the past. All that we know is that it is possible for such a change to take place. Thus to change a present-day reptile into a mammal, though of great interest, would not show the way in which the mammals did arise. Unfortunately, we cannot bring about even this change; instead we have to depend upon limited circumstantial evidence for our assumptions." (G. A. Kerkut, Implications of Evolution, p. 7).

"[E]very geologist who, visiting for the first time regions about which he may have heard or read extensively, finds that his mental picture was still very nebulous . . . . You will hear man enthuse about his luck to be able to see these areas at last for himself, and so to check by personal inspection his own incomplete and unbalanced impressions from the literature." (M. Rutten, Geol. Aspects of the Origin of Life . . . , p. 8). But it is never possible for him thus to check his impressions of the past: "The geologist never sees the life he describes. He only finds its remnants, not only dead, but fossilized . . . . Only very rarely do we have some idea of how these forms died . . . . [W]e also have only the vaguest ideas of why and how they were preserved . . . and . . . make a considered guess about the environment in which the organism . . . lived." (Ibid., p. 43f).

"There are fires [in America] which man may, or may not, have lit -- animals he may, or may not have killed -- and crudely flaked stone objects, which those most qualified to judge think he did not make. By weight of numbers these finds have been built up into an impression of probability, but the idol has feet of clay . . . ." (G. H. S. Bushnell, in S. Piggott, ed., Dawn of Civilization, p. 377).

Of Neanderthal man, so vividly depicted in our elementary school text-books: "The truth is that we have no way of telling anything about the color of his skin, hair, or eyes, or the form or abundance of his hair, for none of these perishable parts has remained." (C. S. Coon, Story of Man, p. ?).

Our confidence in reconstructing the past has heretofore rested in the assumed validity of analogy and extrapolation. But such devices are actually worthless as proof.

"In studying the life of ape-man . . . we have only existing primitive forms of Homo Sapiens and living monkeys and apes to work with." (C. S. Coon, The Story of Man, p. 64). These are not past forms, however, but present forms only.

"This discussion . . . considers events that occurred a million years ago, in places not specifically determined, under circumstances known only by informed speculation. It will therefore be an exercise in inference, not in observation. This means juxtaposing the social life of man's closest relation . . . with the organization of known primitive societies . . . . [T]he gap that remains is then bridged by the mind." (M. D. Sahlens, in Scientific American, Jan. 1960, p. 76). Australian Bushmen, Andaman Islanders, Shoshoni Indians, Pygmies, and Malayan natives are all alike; since they are also found far apart they must represent the society of the Stone Age. (Ibid., p. 77).

But this kind of extrapolation is dangerous: "[W]hat right have we to make such an extrapolation?" This "may in fact be the closing of our eyes to as yet undiscovered factors which may remain undiscovered for many years if we believe that the answer has already been found." (G. A. Kerkut, Implications of Evolution, p. 154).

Another trick of extrapolation is to "cite a few of the well-known cases of evolutionary series as if they were merely representative of a host that might be quoted, instead of stressing the fact that the records of such cases are rare." (J. Callinor, in P. R. Bell, ed., Darwin's Biological Work, [Cambridge Univ., 1959], p. 124). The evolution of the horse is the favorite exhibit in perpetuating this trick.

Yet another practice which "one meets more and more" today is the free-wheeling use of the word "primitive": "I want to warn against . . . the basic assumption . . . that what is more simple in metabolism, biochemically, is more primitive and consequently older in the history of life. This assumption is entirely unjustified. It has never been tested, and will be very difficult to test. Also, quite possibly, it is false. Geology has seen similar reasoning in comparative anatomy, where 'simple' has also been largely confused with 'primitive' and with 'early' . . . . Imaginary forefathers are supposed to have sired entirely non-related offspring, sometimes tens of millions of years their elder, not because of paleontological

proof of paternity, but only because they looked 'simpler' . . . . 'Simple' is no proof either for 'primitive' or 'early', and arranging our present-day anaerobic bacteria in such an ascending order gives the false impression that we know much more about the origins of life than we actually do." (M. Rutten, Geol. Aspects of the Origin of Life . . . , p. 124f).

"The greatest pitfall in evolutionary thinking stems from the keenness of hindsight." (C. Hockett & R. Ascher, in Amer. Scientist, Mar. 1964, p. 72).

"The most useful approach to explaining evolutionary changes is still teleology, an uncomfortable state of affairs for the school-book logic which poses as philosophy of science . . . . Today, biologists are ashamed of teleology. 'Much modern botanical research . . . has attained an ateleological attitude which verges on sterility, and indeed might signify such, were it not that teleological reasoning is substantially more common in the laboratory and field than in the research papers.' These words of Heslop-Harrison apply to all biology, I think." (H. Grundfest, in Science and Society, 24: 152).

"The archaeologist may find the tub but altogether miss Diogenes." (M. Wheeler, Archaeology From the Earth, [London: Penguin, 1956], p. 243).

"If we use purely archaeological evidence . . . we will get only one sort of view of the past . . . . Our picture of the past will in fact be a materialistic one. If on the other hand we have written documents of some kind, we can give added dimension to our view of the past." (S. Piggott, Dawn of Civilization, p. 12). "The first thing that must be remembered is the fact . . . that material evidence will give material results. You cannot, from archaeological evidence, inform yourself on man's ideas, beliefs, fears or aspirations. You cannot understand what his works of art or craftsmanship signified to him: . . . without a written word, and one in some detail, you can have no knowledge of social or political systems, of ethical or legal codes . . . ." (Ibid., p. 15).

"What has happened in the past? It is of course the business of the archaeologists and historians to find out. But they have not done so. At least not convincingly, and we do not know why former civilizations have withered . . . . A thousand explanations have been offered." (A. V. Kidder, in Expedition 2, [Winter 1960], p. 19).

"[I]llusions of grandeur take a number of forms. To these another must be added, that which exalts our own age at the expense of all past ages. The cure for this present-mindedness is that form of humility known as historical-mindedness." (R. L. Schuyler, Proc. Am. Phil. Soc., 92 [1948], p. 50).

"The sterile 'stern skepticism' [eherne Skepsis] of which they [Biblical scholars] are so proud forgets that in history nothing can

be proven; they forget that the burden of proof always falls on the one who undertakes to expose and remove the 'unhistorical elements' . . . and that a rigorous proof of the truth and authenticity of a record . . . can in no wise ever be produced . . . and that the simplest and most immediate explanation for the origin of any historical remains is always the initial assumption that it is authentic." They think that merely to say "No" is to be sound, conservative scholars. (R. Eisler, Iesous Basileus, I, p. xiv).

Twenty years after Erman and others made their reconstructions of early Egyptian history an abundance of confirmatory documents was discovered. "The evidence showed that he had frequently been drawn into error by our overdone skepticism." (Ed. Meyer, Sitzber. d. Berl. Akad., 1908, p. 652). "No" may be as misleading as "yes".

"We must honestly strive to be entirely unprejudiced and to rid ourselves of the pious superstition of our grandfathers that we have made splendid progress and that the pitiful early centuries lie, to their misfortune, in the dense fog of their own imperfection." (P. Herrmann, Conquest by Man, p. 9).

"The further we proceed into the gloom of the prehistoric, the clearer our vision . . . . [W]ith regard to remote prehistoric men we can make inferences on much less abundant, and much less clear evidence than would suffice if we were dealing with contemporary men." (W. D. Wallis).

It is now being objected that this picture is not only bleak, hopeless and repellent, but also **false**. Science has consciously or unconsciously led us into a completely unrealistic world. The world which science gives us is a highly defective and therefore deceptive one. The damage lies not in the existence of this scientific half-world, but in the constant insistence that it is the whole world -- the **only** world.

"However, despite its significance and progress, theoretical mechanics seems a dry or even dull science. Perhaps this is an emotional indicator of the incompleteness of the principles of the exact sciences. The trouble here lies not in the incompleteness of knowledge . . . but in the deep discrepancy between the world of the exact sciences and the real world in which we live. This discrepancy is so deep that the exact sciences cannot ever hope to convey the great harmony of life basic to our own world. Having violated this harmony, the exact sciences can only investigate the processes of decay." For example:

"Statistical mechanics indicates that any system made up of a large number of elements must go over from a little probable initial state into the most probable state . . . the equilibrium state . . . . From this point of view, the transition of the world into the equilibrium state, and hence its death, is inevitable and irreversible . . . . Thus the world is to become a sheer desert-like monotony.



Even this one conclusion, which contradicts so vividly the picture of the world actually observed, may suggest the incompleteness of the principles of the exact sciences . . . . In other words, some processes unobserved by mechanics, and preventing the death of the world are at work everywhere, maintaining the variety of life."

"A child's little world is ontological, expedient, purposeful . . . . It is not easy for a child to abandon the purposeful perception of the world so dear to his heart and go over to the grim causality of natural science. However, he is prepared for this transition by the discipline of school studies which . . . [tame] the spirit of man and [lace] it into the Spanish boots of logical thinking.'" In the end, "The question which begins a child's cognition of the world may also prove legitimate in the exact sciences." (N. Kozyrev, in Soviet Life, Nov. 1965, pp. 27 and 45).

In the life of sciences "progress has only been possible by again and again returning to the observation of the world as it is, by stepping out of the laboratory and dissecting room (and I would add the study) into the open air, forgetting for the time at least the abstract methods, the images and models, the selected and prepared specimens of the scientific student." (A. P. Elking, quoting J. T. Metz, in Mankind, 5 [1959], p. 333).

"Nature does obey a set of laws of her own which are precise, complete, and consistent. But if this is so, then their inner formulation must be of some kind quite different from any that we know; and at present, we have no idea how to conceive it." (J. Bronowski, American Scientist, Mar. 1966, p. 5).

"Biology must treat the organism as if it worked like a machine . . . . Thus it is not accident that field and laboratory workers in biology are strongly mechanistic in sympathy and outlook . . . . These are the only lines along which science can proceed . . . . Materialism is inconsistent with the freedom of men's actions in any of the senses in which they have been held to be free." (C. E. M. Joad, Guide to Philos., p. 530).

"The favorite child of Darwinism is blind chance. But this is ruled out by the amazing perfection and complexity of biological processes . . . . If a man will permit the transcendence of every organic phenomenon to get through to him, what he will behold is the exact opposite of mere chance." (H. Schirmbeck, Merkur, 14: 523).

The "scientific" view of life has been for many scientists and others a negative and depressing one, in which the "thrill of discovery" is largely a matter of whistling in the dark, since nothing **can** be discovered but just more senseless matter.

"There is no longer a philosophy of nature; the whole field of knowledge of sensible nature is given over to the sciences of

phenomena, to empiriological science" . . . . Science is "now without superior direction or light, is abandoned to empirical and quantitative law, and is entirely separated from the whole order of wisdom." (J. Maritain, Science and Wisdom, p. 49).

"The scientific view of the universe had three main foundations: 1) matter as the only form of reality, 2) mechanical as the only kind of law and 3) evolution as an automatic process. Discouraging for humanity, the implications are disastrous for religion. There is no God, there is not even a purpose which makes for good at the heart of the universe. For the universe has no heart. There is no world other than the world of things that appear . . . . Religion, then, is a myth, and expression of wish fulfillment." (C. Joad, God and Evol., p. 113).

"Probably the most far-reaching implication of those new conceptions of the universe is revealed in a new time perspective . . . . Human life . . . was but an interval" leading to "eternal salvation . . . . This short time perspective fostered the provisional ethics of our traditional teachings . . . . Today we must begin to formulate a long-term ethic." (L. K. Frank, Nature and Human Nature, p. 148).

"The rise of skepticism undoubtedly played an invaluable role in freeing men's minds from the fetters of superstition. It is significant, however, that it required an almost childlike faith in the validity of ancient literature to open the modern era of archaeological discovery." (C. Gordon, in Scientific America, Feb. 1965, p. 102).

"Just as Darwin discovered the law of evolution in organic nature, so Marx discovered the law of evolution in human history." (O. Ruble, Karl Marx, [N. Y.: 1943], p. 366). Marx thought his system was "somehow deducible from Darwin's discoveries. He proposed to acknowledge his indebtedness by dedicating *Das Kapital* to Darwin -- an honor which Darwin politely declined." (T. Dobzhansky, in Science, 127, 1958, p. 1091).

"The fact that many [though not so many biologists as physicists] have come to understand that evolution . . . cannot explain all the spiritual developments has not penetrated the consciousness of the non-scientific masses. It has not even penetrated the minds of many of the more popular writers." (J. Rowland, Hibbert Jnl., 60, 1961, p. 6).

"I like a philosophy which exalts mankind. To degrade it is to encourage men to vice." (Diderot, who adds in the next line): "When I compared man to the immense space which is over their heads and under their feet, I have made them ants that bustle about on an ant-hill . . . . Their vices and virtues, shrinking in the same proportion, are reduced to nothingness." (Quoted by L. G. Crocker, The Age of Crisis, p. 82).

"Modern man . . . is the heir of . . . the skeptical tradition . . . . In the present epoch a large and increasing number of Europeans have expressed a desire to return to . . . the religious tradition . . . . Whenever they take it into their heads to 'return', the shades of all great skeptics, P. Bayle, and Voltaire, E. Renan and S. Freud and the rest, rise up around them and persuade them, with considerable success, that they cannot go back. This is the religious dilemma of 'modern man' . . . ." (F. Baumer, Religion and the Rise of Skepticism, [N. Y.: Harcourt, 1960], p. 19f).

"At the end of the development we find the mute and terrifying world of Pascal's 'libertin', the senseless world of modern scientific philosophy. At the end we find nihilism and despair." (A. Koyre, Closed World . . . ., p. 43).

"Search for a single, inclusive good is doomed to failure. Such happiness as life is capable of comes from the full participation of all our powers in the endeavor to wrest from each changing situation of experience its own full and unique meaning." (J. Dewey, Living Philosophy, p. 27).

"It is especially difficult for us to escape from the older assumption of everything being controlled or regulated by some mysterious power or force or divine fiat. Thus we must make an effort to achieve this new conception of self-regulating, self-governed universe requiring no supreme ruler or ad hoc causes and forces to keep it running." (L. K. Frank, Nature and Human Nature, p. 39).

"The body and personality live together; they grow together; and they die together . . . . The issue of mortality versus immortality is crucial in the argument of Humanism against Supernaturalism." (C. Lamon, The Philosophy of Humanism, p. 67f).

"The origin and growth of organisms has been natural, not in the least supernatural. The primeval lightning played on the primitive rocks, on the gases in the rocks; the ultra-violet sunlight participated in the evolution. And see what happened on Planet Number Three, for here we are." (H. Shapley, in Life and Other Worlds, p. 27).

Question by Mr. Huntley: "If . . . we should open a radio contact with some other planet or star . . . what would [your] first question be to this other body?" Answer by H. Shapley: "Should it be the trite statement: What hath God wrought? No, . . . because they may be humanists, and their money would be wasted . . . no, our first message should be: 'Help!, Help!'" (Life in Other Worlds, p. 42).

"The scientific method was devised by man, and Karl Jaspers has asserted flatly that 'the beginning of modern science was also the beginning of a calamity' . . . . It is obvious to anyone who, like me, has read even a few science-fiction stories that the Wellsian

dream has turned into a nightmare . . . . The all-powerful imp will obey all commands except one. He (technology) will not get back into the battle . . . . Could anything short of the nearly total destruction of our civilization . . . rescue us from our own dangerous devices? . . . . The man in the street thinks of a bright future only in terms of more, rather than less, technology." (J. W. Krutch, in The American Scholar, Spring, 1966, pp. 181, 183).

"For a few hundred years it seemed as though the machines man had invented made him more secure, less at the mercy of nature's caprices. He was ceasing to be . . . 'too dependent on the Almighty' . . . . Now, within a very few years, anyone who cannot program a computer is as dependent upon those who can as primitive man ever was upon his witch doctor. What is perhaps more alarming, is that even the experts depend on other experts and, also, upon the existence of machines that they could not make for themselves . . . . Even engineers would not know how to reconstruct the machinery of our civilization if it somehow collapsed or was destroyed." (Ibid., p. 182f).

"While we cannot return to a simpler life, to a Luddite existence, we are being forced . . . into simpler response patterns. The individual cannot survive and function without accident and mistake; the machine cannot function with accident and mistake . . . . Many people are enticed by security rather than by challenge; many actually yearn after inertia . . . . Capitalism and Communism are meaningless words in a world entering Cybernation -- not only of programmed machines but especially of individuals becoming increasingly more programmed through device-dependence." (Ed. in Man on Earth, 1, 1965, 34, p. 5f).

"It is the revelation of the electronic age that science, investigating Nature exclusively, may have led into a . . . cul-de-sac, long indeed, but whose dead end is now definitely in sight. This is cold comfort, but not as icy as the possibility, now verging toward probability, that the indefinite elaboration of the scientific method may result in the extinction of the human race." (G. W. Johnson, in The American Scholar, Spring 1966, p. 195).