

SCIENCE

VOL. LXI

MARCH 6, 1925

No. 1575

DARWIN AND BRYAN—A STUDY IN METHOD¹

CONTENTS

<i>The American Association for the Advancement of Science:</i>	
<i>Darwin and Bryan—A Study in Method:</i> PROFESSOR EDWARD L. RICE	243
<i>William Francis Hillebrand:</i> DR. C. E. WATERS	251
<i>Scientific Events:</i>	
<i>The Drift of the "Maud"; The Baltimore Meeting of the American Chemical Society; University of Michigan Biological Station; Memorial to Dr. Thomas L. Watson</i>	253
<i>Scientific Notes and News</i>	256
<i>University and Educational Notes</i>	259
<i>Discussion and Correspondence:</i>	
<i>Hemerarch and Feralarch, Two Additional Terms in Ecology:</i> PROFESSOR FRANK C. GATES. <i>The Effect of Noise on Hearing:</i> B. <i>On Student Misinformation:</i> DEAN ROSCOE POUND, DR. KIRK BRYAN. <i>Anthropological Studies on the Natives of the Yenisei River:</i> DR. A. HRDLIČKA	260
<i>Scientific Books:</i>	
<i>Lewis's Handbook of Solar Eclipses:</i> PROFESSOR FREDERICK SLOCUM	262
<i>Laboratory Apparatus and Methods:</i>	
<i>A Method of Demonstrating Mesonephric Tubules:</i> PROFESSOR ALDEN B. DAWSON	262
<i>Special Articles:</i>	
<i>Wave-Length Shifts in the Scattering of Light:</i> DR. PAUL D. FOOTE AND A. E. RUARK	263
<i>The American Association for the Advancement of Science:</i>	
<i>Botanical Sciences at the Washington Meeting</i>	264
<i>Science News</i>	x

SCIENCE: A Weekly Journal devoted to the Advancement of Science, edited by J. McKeen Cattell and published every Friday by

THE SCIENCE PRESS

Lancaster, Pa.

Garrison, N. Y.

New York City: Grand Central Terminal.

Annual Subscription, \$6.00. Single Copies, 15 Cts.

SCIENCE is the official organ of the American Association for the Advancement of Science. Information regarding membership in the association may be secured from the office of the permanent secretary, in the Smithsonian Institution Building, Washington, D. C.

Entered as second-class matter July 18, 1923, at the Post Office at Lancaster, Pa., under the Act of March 3, 1879.

A FEW days ago a friend, with whom I was discussing the subject of this address, turned to me with the quick remark, "What I can not understand is why you, a scientist, should pay any attention to the attitude toward evolution of Mr. Bryan or any other layman." Others may be raising the same question, and an *apologia pro argumento meo* may be in order.

If I were only a scientist, I think I should pay no attention, beyond a smile, to writings like those of Mr. Bryan on evolution. Scientifically, it is of little moment whether Mr. Bryan or any other individual does or does not believe in evolution or in any other scientific theory.

But I am not merely a scientist; in common with the majority of the members of Section F, I am a teacher. As teachers, we may well be jealous of that freedom of investigation and freedom of teaching through which the intellectual progress of the past has been won and through which the intellectual progress of the future must come. There must, of course, be limits to this freedom—liberty must not become license; but undue restriction can lead only to mental stagnation. Mr. Bryan's proposition to delegate to state legislature or church council the determination of the orthodoxy of scientific theory savors of the Middle Ages rather than of twentieth century America. And Mr. Bryan wields an influence not to be ignored. Tremendous moral earnestness and extraordinary oratorical power make a combination potent for right, but equally potent for error if misdirected—in no case to be disregarded.

To most of us the matter may have no personal bearing; to others the crisis is immediate. The par-

¹ Address of the vice-president and chairman of Section F—Zoology—American Association for the Advancement of Science, Washington, D. C., December, 1924. This criticism of Mr. Bryan's method is based on a rather careful study of the following authentic publications: "The Bible and Its Enemies," 1921; "In His Image," 1922; "God and Evolution," in *New York Times*, February 26, 1922; "Moses vs. Darwin," in *Homiletic Review*, June, 1922; "Orthodox Christianity versus Modernism," 1923; "Is the Bible True?" in *The Bridal Call Foursquare*, November, 1924. No attention is paid to unconfirmed newspaper reports of his multitudinous speeches. References to Darwin and Huxley are based upon the following editions: "Life and Letters of Charles Darwin," Appleton, 1901; "More Letters of Charles Darwin," Appleton, 1903; "Darwiniana," Volume 2 of Huxley's *Collected Essays*, Appleton, 1893.

ticularly picturesque attack in the Kentucky legislature was lost by a single vote. Some states have already passed more or less extensive restrictive laws; the question is now pending in other states; and Mr. Bryan promises that the campaign is to be carried into every state legislature.

In some church colleges the crisis is also acute. Permit me to quote, without names, a letter received by the president of my own institution within the current college year:

Do your professors present the facts of evolution to students in lectures? Do they use text-books which have the theory of evolution in them?

If so, do you regard this policy injurious to the esteem in which the Bible is held by students? Are students more or less Christian on account of such tuition?

In what sense, if any, could evolution and the Bible conflict?

Ludicrous as these questions appear in your environment, I hope you will render me the service which the replies to these questions will bring. We are having down south here a rather heated fight among the different branches of the _____ church. The fight is very hot in _____ [name of state], and especially at _____ University.

As educators it behooves us to take notice of the trend of events and not to sit in smug security.

But, in common with many members of this section, I am not simply a scientist and a teacher but also a Christian. I recognize and respect the various shades of belief and unbelief represented in this company. The scientific spirit, which recognizes the fallibility of all belief, should exclude the spirit of dogmatism and intolerance toward honest differences in belief. You will not all agree with me, but I hope you will respect my position when I say that it is precisely as a Christian that I most resent the attitude of Mr. Bryan.

Mr. Bryan's scientific belief and religious belief are matters personal to Mr. Bryan; but when Mr. Bryan uses his moral earnestness and his oratorical genius to proclaim to the world that belief in evolution precludes belief in God or, at least, is seriously hostile to religious belief, he becomes fundamentally dangerous, not to science, but to religion. Evolution is the universal belief of science to-day; and modern youth in America is essentially scientific. Confronted with Mr. Bryan's alternative, some young men will give up science; this is unfortunate, but relatively unimportant. Others (more, I believe) will feel themselves compelled to give up religion; this I regard as an inestimable loss to them and to the Christian church. In this day of the world's desperate need of religion, I can not look with equanimity upon any movement which tends to split the forces of the church

rather than to bring them into harmony, or upon any attempt to read essentially religious men out of the church because of non-essential differences in scientific or theological belief.

For these reasons I have decided, albeit with some misgivings, to attempt to discuss one phase of this age-old conflict which has been fanned into new flame by the oratory of Mr. Bryan. I shall not attempt a comprehensive defense of evolution nor a systematic harmonizing of evolution and religion; I ask your attention only to the comparison of the methods used by Mr. Darwin and Mr. Bryan in reaching their conclusions and in expounding their views. For an exhaustive treatment of this one phase of the question I have neither the time nor the requisite philosophical training. I can only hope to bring together some interesting and useful items, many of which are familiar to you and all of which are within easy reach. In the snowball fights of our boyhood the snow was available to all alike; but it was found good military tactics to delegate certain individuals to manufacture snowballs for the use of those on the firing line. Similarly, it is my hope to be able to collect material and to shape some scientific snowballs which I trust others may be able to use to good purpose.

During the last few years Mr. Bryan has been repeating to the world in most categorical form that the work of Darwin is mere guessing. Now emphatic repetition may have a marked psychological effect alike upon the speaker and the hearers, as suggested by the health formula of Coué and the organized cheering of the stadium and the all-too-familiar "pep rally." "Hypothesis equals guess" has a catchy sound; moreover, it has a considerable element of truth, particularly if "to guess" be interpreted according to the second definition of Webster (following New England dialect, but with the added authority of Milton and Dryden) as "to judge or form an opinion of, from reasons that seem preponderating, but are not decisive." In passing, it may be noted that the synonymy of the "guess" with the scientific hypothesis is not new with Mr. Bryan; the same parallel was pointed out by Huxley years ago, with the pungent comment—"The guess of the fool will be folly, while the guess of the wise man will contain wisdom."² The hypothesis (or "guess") has its place in Mr. Darwin's work, as in all scientific method.

In his volume entitled "The Method of Darwin," Frank Cramer has given an interesting and illuminating analysis of Darwin's work as a conspicuous illustration of scientific method. The inductive method of science includes the use of hypothesis, but does not stop there—except in the judgment of Mr. Bryan. The initial hypothesis may be the result of

² "Darwiniana," p. 375.

a long and laborious collection of individual facts, their careful comparison and the selection of the elements common to the series—an induction in the narrower sense of the word; it may come as a flash of inspiration with few data as a foundation—a happy “guess”; or, lastly, an old but unsupported hypothesis may be adopted and rehabilitated. However derived, the hypothesis is only the hypothesis—perhaps that of wisdom, perhaps of folly.

In the case of evolution Darwin found the rival hypotheses of creation and derivation already in the field; but the evolution hypothesis, as worked out, for example, by his own grandfather or by Lamarck, appealed to him but little at the beginning of his scientific career. In common with his scientific friends, he was a strict creationist. But the *Beagle* voyage brought the young Darwin in contact with a wealth of new facts; and to Darwin a new fact was a new starting point for hypothesis—“I can not resist forming one on every subject.”³

Evolution was still hypothesis to him, but becoming ever more attractive. Instead of accepting it and dogmatizing, he opened that “first note-book” in 1837, which, with its successors, was to shake the thought of the world. And note the direction taken in this investigation—not a hit-or-miss collection of data, but an instinctive dash at the crux of the matter. Animals and plants under domestication are particularly subject to variation; here, if anywhere, might suggestions be expected as to the character and cause of variation in nature. Fifteen months of careful collection of data concerning domesticated animals and plants, and the accidental reading of Malthus brought him to a new hypothesis—not an alternative nor an equivalent, but a supplementary hypothesis concerning the method of evolution. Evidently a reasonable explanation of the method of evolution would make more probable the original hypothesis of evolution; historically it was this hypothesis of natural selection which brought evolution into the forefront of scientific and popular discussion.

Again another man might have stopped and dogmatized—not Darwin. It may fairly be said that the balance of his life was given to the verification of these two hypotheses. In part the verification consisted simply in the collection and correlation of more data similar to those already gathered; but, in greater degree, it included the carrying out of one deduction after another from his theory—not as ends in themselves but for verification of the main thesis. Assuming the truth of derivative origin, what was to be expected in the geological succession of the fossils? Then to the rocks for corroboration or contradiction. On the basis of evolution, what was to be expected in

the relations of the faunas of Europe, North America, Africa, Australia, the Galapagos? And, again, to the maps, the museums and the journals of explorers for corroboration or contradiction. One after another the most diverse series of data were found, with singular uniformity, to confirm the main hypothesis; and thus was gradually built up that structure of interlocking hypothesis and verification which convinced Darwin himself, made speedy converts of Huxley, Lyell, Hooker, Gray and others of his intimate friends, threw the thought of the third quarter of the nineteenth century into turmoil and to-day dominates the whole scientific world.

It is to the evolution theory in general, not the theory of natural selection, that I refer as dominating the scientific world. In the nature of the case, the inductive method (the method of everyday life as well as of science) can never arrive at a demonstration; it must always remain a matter of less or greater probability. As the testing of a hypothesis brings one and another line of seemingly unrelated data into harmony, its probability increases to that of a theory; the more numerous and the more diverse the correlated data, the greater the probability of the theory, until, finally, practical certainty is attained. In the almost unanimous judgment of biologists the evolution theory has reached this status.

Of the two subsidiary theories to which the name “Darwinism” or “Darwinian theory” is properly restricted, natural selection is accepted by most biologists, although often with decided restrictions, while sexual selection is relegated by many to the rank of a somewhat doubtful hypothesis rather than theory. Note carefully, however, that the evolution theory stands upon its own evidence, independent of the subsidiary theories. Like scaffolding, useful in the work of construction but unnecessary to the permanent edifice, natural selection and sexual selection might conceivably be torn down without materially affecting the evolution theory. Parenthetically, I may add my personal conviction that the destruction of the theory of natural selection is hardly less improbable than that of the general evolution theory.

I have laid emphasis upon these familiar distinctions because they are largely ignored by Mr. Bryan. In his writings he refers indiscriminately to evolution in general, human evolution and Darwinism; in at least one passage he explicitly states that he has “used ‘evolution’ and ‘Darwinism’ as synonymous terms.”⁴ If I understand him correctly, Mr. Bryan’s objection is not to Darwinism in its technical meaning, but to evolution in any form as applied to man. Evolution of the lower animals and of plants interests him only “as the acceptance of an unsupported hy-

³ “Life and Letters,” Vol. 1, p. 83.

⁴ “Orthodox Christianity versus Modernism,” p. 35.

pothesis as to these would be used to support a similar hypothesis as to man."⁵ Human evolution and the evolution of the lower forms rest upon similar evidence; and Mr. Bryan denies one as categorically as the other. I believe I am doing him no injustice in limiting my further discussion to evolution in its general sense, applying alike to man and the lower forms of life, but independent of any theories as to its method.

Mr. Bryan outlines the matter as follows:

The issue can be presented in two questions: First, is Darwin's hypothesis (evolution applied to man) true or false? Second, if false, is it harmful?⁶

Granting, in common with theistic evolutionists, that God "could make man by the long-drawn-out process called evolution just as easily as he could make him by separate act," Mr. Bryan continues: "The question is narrowed down to one of fact—Did God create man by evolution or by separate act?"⁷

Eliminating Mr. Bryan's restriction to man and his confusion of evolution and Darwinism, the first of his questions becomes—Is evolution true? This question Mr. Bryan answers as follows:

In order that there may be no misunderstanding as to the position of those who believe as I do, let me say that the evidence is not sufficient to establish evolution as the process employed by the Almighty in either plant life or in animal life below man. I am aware that many scientists deal with evolution as if it were an established fact, but no one is compelled to accept any scientist as an authority except as the facts support him. The world can not be warned away from investigation by a scientific gesture. The scientist should be the last to ask that opinion be accepted as a substitute for fact.⁸

But Mr. Darwin has collected a library of facts, and it is Mr. Bryan who is doing the gesticulation, although I grant that it is hardly a "scientific gesture."

As Mr. Bryan demands facts rather than opinions, let us note briefly the main lines of evidence in favor of the evolution theory. This evidence was summarized by Huxley for the ninth edition of the *Encyclopaedia Britannica* in a statement which is valid to-day as well as in 1878. The seven categories of Huxley's summary (all of which were mapped out in Darwin's "Origin of Species") are so familiar to every biologist that they may be mentioned by title only, as the evidence from

- (1) Embryology
- (2) Homologies
- (3) Geographical distribution
- (4) Rudimentary organs
- (5) Classification
- (6) Modification under varying conditions
- (7) Geological succession.

Let us see how Mr. Bryan meets these various lines of evidence. The numbering corresponds to that of the preceding list.

(1 to 3) To the first three of these items (embryology, homologies and geographical distribution) I find no reference in Mr. Bryan's writings, unless a mere mention of Darwin's emphasis on the similarity of human and simian embryos may be construed as a reference to the argument from embryology.

(4) To the evidence from rudimentary organs he gives hardly more attention—merely a sarcastic reference to a young collegian, whose faith is shaken when his "attention is called to a point in the ear that is like a point in the ear of the ourang, to canine teeth, to muscles like those by which a horse moves his ears."⁹ This is hardly an adequate treatment of the one hundred and fifty and more rudimentary organs found in man alone.

(5) Similarity of structure as between man and the apes Mr. Bryan does admit; in fact he says that "the whole case in favor of evolution is based on physical resemblances."¹⁰ But he evidences no appreciation of the universality of gradations in structure upon which the classification of both animals and plants depends.

(6) Mr. Bryan's discussion of modifications is rather astounding—a flat denial, on Biblical authority, that there can be such modifications. The italics of the following quotation are his own:

Evolution joins issue with the Mosaic account of creation. God's law, as stated in Genesis, is *reproduction according to kind*; evolution implies reproduction *not* according to kind. While the process of change implied in evolution is covered up in endless eons of time it is *change* nevertheless. The Bible does not say that reproduction shall be *nearly* according to kind or *seemingly* according to kind. The statement is positive that it is *according to kind*, and that does not leave any room for the *changes* however gradual or imperceptible that are necessary to support the evolutionary hypothesis.¹¹

Such changes as have been actually observed in pigeons and cabbages are calmly ignored by Mr. Bryan; he also appears oblivious of the rather palpable fact that not all the present diverse human races

⁵ "God and Evolution."

⁶ "Moses vs. Darwin," p. 446.

⁷ "Moses vs. Darwin," p. 447.

⁸ "Moses vs. Darwin," p. 447.

⁹ "In His Image," pp. 111, 112.

¹⁰ "Orthodox Christianity versus Modernism," p. 35.

¹¹ "In His Image," p. 104.

can be exactly like the traditional ancestors demanded by his theory.¹²

(7) Mr. Bryan's attitude on geological succession is set forth in a series of statements, not perfectly clear in all points, but apparently intended as a categorical denial of the presence of connecting forms among the fossils. The following passage is representative:

Wherever there is found living to-day any species of which an ancestor has been found in the rocks the living descendant is like the fossil ancestor. If this is what the evidence proves, why should we assume the truth of an hypothesis which is contradicted by everything which has been found and supported by nothing?

Darwin insisted that his hypothesis should be accepted even tho the missing links had not been found, and evolutionists still insist that the hypothesis should be accepted even tho the missing links have not yet been found. They boldly demand that we substitute a guess for the Word of God even tho the guess has not been proven—in fact, has been disproven by all the evidence.¹³

Mr. Bryan can see no evidence for evolution in the marvelous wealth of fossil forms, some of them obviously intermediate in character between distinct species, genera or larger groups of to-day, and others forming unbroken gradational series between earlier and later fossil forms or between fossil and recent species. Darwin, in 1859, counted the scarcity (not absence) of connecting forms the greatest objection to his theory, and met it with his characteristic frankness. Twenty-one years later conditions had so changed as to justify Huxley's exclamation:

If the doctrine of evolution had not existed, palaeontologists must have invented it, so irresistibly is it forced upon the mind by the study of the remains of the Tertiary mammalia which have been brought to light since 1859.¹⁴

And H. F. Osborn expresses himself even more strongly in 1910:

The complete geologic succession of the vast ancient life of the American continent was destined to demonstrate the evolution law.¹⁵

This difference in reaction of Mr. Bryan and the paleontologists to the evidence of the fossils is exactly paralleled by the difference in reaction of Mr. Bryan and biologists in general to other lines of evi-

¹² For fuller discussion see Piper, C. V., "Does the Bible teach evolution?" *SCIENCE*, Vol. 56, p. 109, July 28, 1922.

¹³ "Moses vs. Darwin," p. 447.

¹⁴ "Darwiniana," p. 241.

¹⁵ "The Age of Mammals," p. 10.

dence for evolution. Mr. Bryan advances no new evidence; the data collected by scientists he ignores or denies. To the biologists the evidence seems conclusive for evolution; to Mr. Bryan it has no significance. In large part, doubtless, this difference is due to Mr. Bryan's simple ignorance of the facts. Ignorance of the details of biology is no disgrace to a lawyer; but a lawyer should be slow to pronounce a judicial decision upon technical evidence which he does not understand.

In larger part, however, Mr. Bryan's hostile attitude is due to the fact that he does not approach the matter with an open mind. In theory he recognizes that the "hypotheses of scientists should be considered with an open mind. Their theories should be carefully examined and their arguments fairly weighed";¹⁶ practically the whole matter is decided for him in advance without reference to the scientific data. "The Bible," he writes, "not only does not support Darwin's hypothesis but directly and expressly contradicts it."¹⁷ Further, the Bible, according to Mr. Bryan, is "the revealed will of God, and therefore infallible";¹⁸ and other statements imply very clearly that Bible interpretation must be strictly literal throughout.

Here is no scientific method in induction—hypothesis tested out by deduction and verification. Here is no question of greater or less probability; in such deductive reasoning correct logic must lead to a correct conclusion, *provided*, of course, that the first assumption is correct; evolution must be false, *provided* the first two chapters of Genesis are literal and accurate science. But what is Mr. Bryan's guarantee of the literal infallibility of the Bible? This view has not been universally held by the leaders of religious thought in past centuries; it was not accepted, for example, by Luther or Calvin, by Augustine or Jerome. Going back to New Testament times, it was a theologian, not a scientist, who warned the Corinthian Church that "the letter killeth, the spirit giveth life." And, going still a step further back, to the author of our faith, note how whole sections of the Old Testament code are amended in the brusque and authoritative formula, "It was said to those of old time . . . ; but I say unto you . . ." In him the Law and the Prophets were fulfilled; but how unique and unexpected the form of the fulfilment! Jesus Christ was a Modernist, not a Fundamentalist, in the matter of Old Testament criticism; and the Gospels are full of his efforts to overcome the deadly literalism even of his own disciples. Take, for ex-

¹⁶ "In His Image," p. 93.

¹⁷ "God and Evolution."

¹⁸ "Orthodox Christianity versus Modernism," p. 5.

ample, this dialogue from the fourth chapter of John: "I have meat to eat that ye know not. . . . Hath any man brought him aught to eat? . . . My meat is to do the will of him that sent me and to accomplish his work." Verily, "the letter killeth; the spirit giveth life." The dogma of a literally inerrant Bible is not Biblical, not Christian. It is not with the Bible, but with Mr. Bryan's interpretation of the Bible that evolution is in conflict.

What are the alternatives? Mr. Bryan says: "The Bible is either the Word of God or merely a man-made book."¹⁹ This method of exclusion is always dangerous. Darwin applied it to the Parallel Roads of Glen Roy to his cost. "My error," he writes, "has been a good lesson to me never again to trust in science to the principle of exclusion."²⁰ There is very likely to be a third alternative hiding somewhere; in the interpretation of the Bible it is exactly this third alternative which is accepted by the theistic evolutionist to-day, as well as by the great majority of intelligent Bible students. To these men the Bible is not the "Word of God" in the sense of verbal dictation from God; no more is it "merely a man-made book"; but it is a progressive, evolving revelation of God's will to man, changing with the evolution of the human race. Moreover, it is a text-book in religion, not in science. A cardinal of the time of Galileo described the Bible as teaching "how to go to Heaven, not how the heavens go." Mr. Bryan writes that "it is more important that one should believe in the Rock of Ages than that he should know the age of the rocks";²¹ he might well have added that it is of the "Rock of Ages" that the Bible treats—not of the "age of the rocks" nor their contained fossils. The lesson of the first chapter of Genesis is the creatorship of God, not details of the method. With Genesis, thus interpreted, evolution has no quarrel.

I do not question that Mr. Bryan is perfectly sincere in his belief in the falsity of the evolution theory and its danger to the Christian religion; but is he perfectly sincere in the character of his argumentation? Certainly he is not frank. His method is that of the lawyer striving to win his case rather than that of the earnest seeker for truth. The contrast with Darwin is most striking and not to the advantage of the professed defender of the faith of the Christ who characterized himself as "the truth."

Three short quotations show three phases of Darwin's attitude to truth:

I believe there exists, and I feel within me, an instinct

¹⁹ "Orthodox Christianity *versus* Modernism," p. 9.

²⁰ "Life and Letters," Vol. 1, p. 57.

²¹ "Moses *vs.* Darwin," p. 452.

for truth . . . of something of the same nature as the instinct of virtue.²²

I have steadily endeavored to keep my mind free so as to give up any hypothesis . . . as soon as facts are shown to be opposed to it.²³

As I am writing my book [The Origin], I try to take as much pains as possible to give the strongest cases opposed to me.²⁴

That he succeeded is seen in the impression made upon those who knew him best. Let Huxley speak for all:

It has often and justly been remarked that what strikes a candid student of Mr. Darwin's works is not so much his industry, his knowledge, or even the surprising fertility of his inventive genius; but that unswerving truthfulness and honesty which never permit him to hide a weak place or gloss over a difficulty, but lead him, on all occasions, to point out the weak places in his own armour, and even sometimes, it appears to me, to make admissions against himself which are quite unnecessary. A critic who desires to attack Mr. Darwin has only to read his works with a desire to observe, not their merits, but their defects, and he will find, ready to hand, more adverse suggestions than are likely ever to have suggested themselves to his sharpness, without Mr. Darwin's self-denying aid.²⁵

In Mr. Bryan's writings, on the other hand, no objections are mentioned, no difficulties suggested; instead we find the *ex-cathedra* statement, oft repeated, that there are no evidences for evolution, therefore no difficulties with Mr. Bryan's position. It is tempting to multiply quotations; one must suffice:

Neither Darwin nor his supporters have been able to find a fact in the universe to support their hypothesis.²⁶

And, in another connection, I have already traced out how the main lines of evidence upon which the evolution theory is based are, one after the other, simply ignored or categorically denied. Very different from the method of Darwin—rather the method of an earlier critic of whom Darwin himself writes:

The reviewer gives no new objections, and, being hostile, passes over every single argument in favor of the doctrine. . . . As advocate, he might think himself justified in giving the argument only on one side.²⁷

As an advocate, yes; as a scientist, no.

Many such omissions of relevant evidence and some

²² "More Letters," Vol. 1, p. 61.

²³ "Life and Letters," Vol. 1, p. 83.

²⁴ "More Letters," Vol. 1, p. 95.

²⁵ "Darwiniana," p. 184.

²⁶ "God and Evolution."

²⁷ "Life and Letters," Vol. 2, pp. 19, 24.

apparent misrepresentations of the evolution theory and its supporters may well be due to Mr. Bryan's unfamiliarity with the facts in the case. A lawyer who does not know law or a doctor who has not studied medicine is a quack and subject to legal control; even a school teacher must be duly certificated. Is there not a moral obligation that a man professing authoritative leadership on evolution should first familiarize himself with the subject?

In some cases it is difficult to believe that Mr. Bryan's omissions are due to ignorance. Mr. Bryan lays the utmost stress upon the verbal accuracy of the Biblical story of creation. But which story? We can hardly believe that his attention has never been called to the fact that there are two such stories in Genesis, the first ending with the third verse of the second chapter. Each has its great moral teaching, different from the other but consistent with it. But, literally interpreted, their mutual inconsistency is no less glaring than the inconsistency of either, thus interpreted, with the observed facts of geological succession. There may be a reference to this contradiction in Mr. Bryan's writings; I have never seen one. Is it conceivable that Charles Darwin would ignore a difficulty of this sort?

Contrast, again, the dogmatic certainty of Mr. Bryan concerning a subject wholly aside from his main professional work with the modesty and caution of Mr. Darwin, whose life was devoted to the study of this problem. A review in a prominent and rather conservative church paper contains these words:

There is something interesting in the naïve notion which Mr. Bryan has of the contrast between the absolute certainty of his own religious opinions and the merely probable opinions of scientific men. He refers to the fact that Darwin is continually using such words and phrases as "apparently," "probably," "we may well suppose." "The eminent scientist," says Mr. Bryan, "is guessing." Because Darwin and other scientific men, in the truly scientific spirit, recognize their beliefs as only more or less probable, and claim for them no absolute certitude, Mr. Bryan considers that their opinions are of no consequence at all. He *knows*. For him it is a matter of absolute certainty that there is a God, that every sentence of the Bible is the word of God, and that he himself understands aright every sentence of the Bible. All his religious opinions are utterly above the realm of probability, dwelling in a serene and heavenly atmosphere of absolute certitude.²⁸

No less certain is he concerning scientific matters. Let me remind you of a sentence already quoted—*"Let me say [the italics are mine] that the evidence is not sufficient to establish evolution as the process*

²⁸ Wm. North Rice, in *The Christian Advocate*, April 20, 1922, p. 478.

employed by the Almighty, etc." Darwin gave twenty years to the collection of material for "The Origin of Species" and "thirteen months and ten days' hard labor" to the preparation of the manuscript.²⁹ Perhaps a similar application to the subject would leave Mr. Bryan, however he might decide the main issue, less sure that he had probed the problem to its utmost depths. Perhaps it would bring him to an appreciation of the meaning of "probably" in scientific argument.

Mr. Bryan's writings are done in a style which can hardly be characterized as calmly scientific. He expresses regret at the "epithets" with which the "liberals" attempt to "terrorize the masses of the church into accepting without proof or even discussion the views of those who put their own authority above the authority of the Bible."³⁰ But his own constant play on the word "guess," his repeated sarcastic parody of the evolution of eyes from "freckles" and of legs from "warts" are hardly conducive to calm discussion; his aphorism that "cousin ape is as objectionable as grandpa ape,"³¹ and his statement that evolution gives Christ "an ape for his ancestor on his mother's side at least,"³² are suggestive of the famous speech of Bishop Wilberforce in 1860, perhaps also deserving of a reply like that of Huxley on that historic occasion. Such rhetoric is entertaining, and, in this day of slogans, may be effective with the masses—perhaps also with state legislatures; but it is not science; nor is it the method of Darwin. Sarcasm and ridicule are as conspicuous for their absence from Darwin's writings as for their presence in Bryan's.

In addition to the question of the truth of the evolution theory, Mr. Bryan raises the second question of its harmfulness. By his own formulation—"If false, is it harmful?"—this question becomes relevant only in case evolution is proven false. Although by no means granting the falsity of evolution, I wish to call your attention briefly to two points in Mr. Bryan's argument concerning its supposed harmfulness.

First, he argues, evolution, if it does not crowd God out of his universe, at least pushes him so far away in space or time as to make him negligible. I quote:

Why should we want to imprison such a God in an impenetrable past? This is a living world; why not a *living* God upon the throne? Why not allow him to work *now*?³³

²⁹ "Life and Letters," Vol. 1, p. 70.

³⁰ "Orthodox Christianity *versus* Modernism," p. 15.

³¹ "In His Image," p. 102.

³² "The Bible and Its Enemies," p. 35.

³³ "In His Image," p. 106.

Is not this exactly the position of the theistic evolutionist, for whom natural law is merely a human attempt to formulate the method of divine activity, and evolution a human attempt to formulate the method of divine creation?

But not all evolutionists are theists; and Mr. Bryan urges that it is evolution which has made them agnostic or atheistic. As his principal illustration he uses the familiar case of Darwin—a gradual drift from an orthodox belief to a condition of agnosticism, albeit with times, even in his later life, when he felt himself “compelled to look to a First Cause having an intelligent mind in some degree analogous to that of man,” and in which he deserved “to be called a theist.”³⁴ But is it so certain that evolution was the sole cause or even the chief cause of Darwin’s change of belief? Other elements should certainly be considered.

First among these is the matter of continued ill health. When one considers the mass of scientific work accomplished, in connection with the bodily weakness which reduced the working day to a minimum and necessitated frequent periods of complete rest and sanitarium treatment, can one wonder that, in his own words, his mind should become a “kind of machine for grinding general laws out of large collections of facts,” and that there should be a corresponding “atrophy of that part of the brain . . . on which the higher tastes depend?”³⁵ All are familiar with the pictures of the boy Darwin reading Shakespeare in the old window of the school, of the young traveller carrying Milton’s “Paradise Lost” on shore trips in South America when only one volume was possible, and the aged scientist realizing with regret that he could no longer “endure to read a line of poetry” and that Shakespeare had become “so intolerably dull that it nauseated” him.³⁶ May it not well be that his loss of formal religious faith was a parallel of this atrophy of the esthetic sense, seen also in the partial loss of the love for music, art, and, in lesser degree, for natural scenery. It may well be questioned, however, whether Darwin’s scientific caution and questioning attitude did not lead him to an over-emphasis of his religious doubts, particularly in reaction against the dogmatic certainty of many of his critics.

There is another element in this problem to which Bryan has not referred. May not the responsibility for Darwin’s loss of religious belief be laid, in part at least, upon the impossible character of the dominant orthodox theology of his day. In the storm of invective which burst upon his head after the publi-

cation of the “Origin,” is it strange that even a man of Darwin’s amazing charity and poise should have turned away from organized religion as well as dogmatic theology?

But neither in 1859 nor in 1924 can the blame for the conflict of evolution and religion be placed wholly on the theologians. There is an *odium scientificum* as well as an *odium theologicum*. In 1859 there were materialistic scientists who seized eagerly upon the evolution theory as a new weapon for attacking Christian faith; among the theologians, on the other hand, were strong men who, from the start, recognized the truth of evolution as an aid to faith. To-day, again, very many leading theologians take issue with Mr. Bryan’s position as sharply as can the scientist; and some biologists are hardly less dogmatic in their support of a materialistic philosophy than is Mr. Bryan in his attack upon evolution. It may fairly be questioned whether the materialistic scientist is not as responsible for the present anti-evolution flareup as is Mr. Bryan himself. It is unfortunate that Mr. Bryan could not have directed his campaign against this materialism of individual evolutionists rather than against the evolution theory itself.

I have tried in this address to emphasize the hopeless inadequacy of the method exhibited in Mr. Bryan’s attack upon the evolution theory, and the illegitimacy of his claim to popular leadership in such an issue. For his religious earnestness and his devotion to moral reform I have profound respect, although I deeply regret the reopening of the age-old conflict of science and religion under his leadership.

From the present phase of this unhappy conflict, two happy results are, however, already becoming apparent. On the one hand, there is an increasing popular interest in evolution and a more intelligent understanding of its significance. On the other hand, an increasing number of our leading scientists are publicly proclaiming their own theistic philosophy, and emphasizing anew the essential harmony of a progressive scientific belief with real religion. I rejoice in the public utterances of such men as Conklin, Coulter, Millikan and Osborn. May their tribe increase! And may their efforts combine with the increasing popular interest in science toward the bringing in of the day when a more scientific religion and a more religious science shall join in a common welcome to truth, whether revealed in nature, in human life, or in the Bible, and shall present an unbroken front in the struggle for the higher evolution of the human race.

³⁴ “Life and Letters,” Vol. 1, p. 282.

³⁵ “Life and Letters,” Vol. 1, p. 81.

³⁶ “Life and Letters,” Vol. 1, p. 81.