SOME QUERIES ABOUT EVOLUTION

An Open Letter to Professor Vernon Kellogg.

GEORGE HANSON

Dear Sir:—

I venture to send you a letter in criticism of some features of your book on "Evolution", and I hope you will not count my approach to you an intrusion, or my comments on your work the coloured judgments of the partizan. I am not a mere fault-finder, nor do I write in any censorious spirit. I am, however, becoming more and more dissatisfied with the arguments usually urged in favour of monophyletic evolution. This does not mean that I am opposed to the doctrine in itself, for I recognize the grandeur of so comprehensive a theory, and I am disposed to believe in polyphyletic evolution; but I see so many difficulties in the way of accepting the dogma as you present it, and the hitherto orthodox explanations have been proved so inadequate, where they have not been wholly discarded, that I am honestly staggered and cannot find any rational basis for my scientific faith. I procured your book with considerable expectations, for I knew your ability, and I felt sure I could rely on your candour and courage, no less than on your competence, in dealing with so vast, complex, and thorny a subject.

Frankly, I am disappointed with your contribution to present-day controversy. You appear to me to be too much of a special pleader, a lawyer with a brief, rather than a lover of truth and of nothing but truth. You do not present and discuss, with any thoroughness, the objections commonly urged. You give as facts some things that are very dubious, if not discredited. You draw huge conclusions from very slight premises. You ignore the tremendous gaps that undeniably exist in the palaeontological record, and try to make it appear that there is a practically unbroken series of gradually ascending forms from the lowliest organisms up to man. You do not give Mendel and his followers the place to which they are entitled, and you write as if Morgan and Bateson had not shattered or even shaken some traditional evolutionary opinions. Nothing could be less conducive to the final settlement of the question than this glossing over or minimizing of difficulties and objections, and this picture of the story of evolution as a completed,

easily decipherable narrative, which only the ignorant or prejudiced can fail to accept. Long ago Huxley in his address on "The Coming of Age of *The Origin of Species*" made a prophecy which I think is finding fulfilment to-day. He said: "History warns us that it is the customary fate of new truths to begin as heresies and end as superstition; and, as matters now stand, it is hardly rash to anticipate that in another twenty years the new generation—educated under the influences of the present day—will be in danger of accepting the main doctrines of *The Origin of Species* with as little reflection, and it may be with as little justification, as so many of our contemporaries twenty years ago rejected them."

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Let me set forth some of the objections I take to your line of argument.

First of all, on logical and philosophic ground I object to the position which you constantly assume, that orderly succession of flora and fauna, even if you were able to present the development of organic life in definitely gradual ascent from simple to complex, would not necessarily imply genetic relationship between one stage and another. I suppose Le Conte's definition of the evolutionary theory is as clear as any I know. He puts it thus: "All things come (1) by continuous progressive changes, (2) according to certain laws, (3) by means of resident forces." These "resident forces" include exterior influences.

You appear to hold Le Conte's view, and you emphasize a good deal the genetic connection existing between organism and organism. If his idea and yours be correct, than a vast number of so-called evolutionary parallels must be declared null and void. Thus, e. g., in Floyd L. Darrow's *Through Science to God* there is a quotation, given with his approval, which is taken from *The Forum* (July 1923): "Slowly the thorn apple becomes the Winesap and the Golden Pippin. Slowly the wild rice becomes the Fife wheat. Slowly the hut becomes the home: the forked stick, the steam plough: the hollow log, the *Mauretania*. Slowly the ochre on the cheek of the savage becomes the canvas on the wall, etc., etc." All that popular stuff is not evolution, as you understand and present it. Such evolution, of course, everybody believes in, but it is not the evolution of the *things* mentioned, by means of "resident forces", which produces the gradually improved varieties. It is the evolution of *man's mind* which finds expression in the *things* which he creates. They do not make themselves; man makes them. They are not the fruit of genetic connection.

How absurd, as an example of evolution often used, and given—if I remember rightly—in *Thomson and Geddes*, is that taken from a collection of arms, ancient and modern, from an old blunderbuss to a modern rifle, to be found in an arsenal. In that example you have the very same confusion of thought that is so patent in Darrow's quotation from *The Forum*. The blunderbuss did not produce the musket, nor did the musket give birth to the rifle. So you might be able to arrange the whole order of nature in due succession by exact and well-defined transitional stages from lower to higher, and you might even be able to show a close similarity in general plan and in not a few details between this stage and that immediately preceding or succeeding it. But that would not prove genetic relationship. The blunderbuss, musket and rifle shade by slow degrees into one another, and have many points of likeness; but it is the designing mind of man that constitutes the link of connection binding all together. The argument which you urge is that the fossils appear in the strata of the earth in advancing order, the simpler first, and the more complex afterwards. You suppose that the higher came from the lower by a chain of infinitesimal changes through a long series of ages. That is a pure assumption, even if the links of the chain were as closely knit as you allege. Mere succession, however orderly, is not necessarily evolution. The coming in orderly succession, whether the items in the upward moving series be weapons in the arsenal, or instruments of music, or drawings, or paintings, or garden produce, or domestic animals, or aught else—organic or inorganic—is evidence of some plan, but not of evolution by "resident forces."

Secondly, let me say there is no such orderly succession as you picture, by clearly evident transitional development. There are huge, unbridged gaps in the record, which no theories of evolution can explain away and no lover of truth should treat as unimportant. Conn tells us in his *Evolution of To-day* that "In the earliest records geology discloses, we find not a few generalized types but well differentiated forms, nearly all the sub-kingdoms as they now exist, five-sixths of our orders, nearly an equal proportion of sub-orders, a great many families and some of our present species. All this is a surprise and an unexplained problem." Such a result is not, he says, what evolution would lead us to expect. The Secondary and Mesozoic rocks are practically devoid of mammalian remains, exhibiting only a few small marsupials. Whence, then, came the huge and terrible beasts that were the Eocene contemporaries of Phenacodus, said to be "the most primitive Eocene mammal yet discovered"? By what process did *they* spring instantaneously from

other forms of which not a solitary trace exists amongst their own abundant skeletal remains? There are many such gaps confronting every honest thinker. For example, there is the gap between the living and the non-living. You can assemble every element known to exist in a grain of wheat—proteins, fats, phosphorus, iodine, etc., etc., including the extraordinary substances known as vitamines; but you cannot make the combination sprout in the ground.

There are also gaps in the plant world, just as definite and just as puzzling as any in the world of animals. I have before me Dr. Dukenfield Henry Scott's book, *Extinct Plants and Problems of Evolution*. He writes as an evolutionist, eager to discover evidence in favour of the theory that he champions, but he frankly admits his bewilderment at various stages of his review of the palaeobotanical record. You in your chapter on "Evolution of Plants" appear to think that the chain of evolution is unbroken from the algae up. Dr. Scott labours bravely to make the facts, brought to light, fit into his scientific, evolutionary creed; but he confesses again and again in the course of his lectures that the gaps between the flora of one age and those of another age are abysmal, and exceedingly difficult if not impossible to harmonize with the evolutionary hypothesis. For example, in chap. IV, page 213, he writes as follows: "There is a sharp break between the Palaeozoic and Mesozoic floras." He proceeds to quote the views of Professor Seward, whom he describes as "an eminent palaeobotanist", and admits "If the conclusions, which he suggests, were justified, it would be futile to seek for any genetic connection between Palaeozoic and Mesozoic land plants." He goes on to cite some sentences from Seward's "Hooker Lecture", and a later address. Seward says: "It is not my aim to connect the Mesozoic record with the Palaeozoic; between the two there appears to be a wide gulf." Seward adds, "It may be that we shall never piece together the links in the chain of life, not because the missing links elude our search, but because the unfolding of terrestrial life in all its phases cannot be compared to a single chain. Continuity in some degree there must have been, but it is conceivable that plant life, viewed as a whole, may best be represented by separate and independent lines of evolution or disconnected chains that were never united, each being initiated by some revolution in the organic world." Dr. Scott welcomes Seward's "bold suggestion": "It brings home to us the fact that the evolution of plants, so far as the record shows, does not present a uniform progression, but rather a series of diverse periods of vegetation, each with a character of its own." Scott then quotes a passage from a later address of Seward: "Persistence

of type, and from time to time the apparently sudden influx of new types, rather than a steady progress in development, are among the outstanding features of the history of plant-evolution." All through his book, Scott frankly recognizes the difficulty of bridging, on evolutionary principles, the chasms that he sees and that Seward sees in the history of the development of land-plants. In his Preface he confesses that "the greatest problems regarding the evolution of the plant-world remain open." At page 67 he declares: "We may say that angiosperms are unknown before the Cretaceous. They seem to appear suddenly in their full strength, like Athene sprung from the brain of Zeus." He concludes his survey in these words: "We know a good deal about extinct plants, but not enough as yet to throw much light on the problems of their evolution. New discoveries constantly raise new questions, and seldom solve those which were already before our minds." Of course Scott still declares himself an evolutionist, "while not favouring any exaggerated Darwinian ideas."

It is difficult for me to reconcile your chapter on the "Evolution of Plants" with Scott's and Seward's statements about "revolutions in the plant-world", "sudden influxes", "wide gaps", "separate and independent lines of evolution", "disconnected chains that were never united." I can harmonize them with polyphyletic evolution; I could even find room for "special creations" in the scheme suggested by Scott's and Seward's presentations of the evidence, more easily than I could see any warrant for your monophyletic contentions. Nothing is gained by presenting as an unbroken chain a line of development which is so broken that Seward postulates "separate and independent lines of evolution."

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Yet again, the gap between man and the brute is enormous. Even Professor Arthur (now Sir Arthur) Keith (*Human Body*, p. 41) declares: "The skeleton of the gorilla is not at all human in appearance. The massive brute-like crests on the skull, the massive jaws and face, the long stout arms, the short lower limbs, with a thumb-like great toe (never seen on any human foot even in the foetus) seem to assure us that even this most man-like of apes is a long way off from man." What is the good of minimizing almost to vanishing point the differences that exist between the "most man-like of apes" and man? To me it is simply insincere or stupid for anyone to try to dismiss the distinction between man and beast by such a sentence as this: "There is a greater difference between a Newton and a Hottentot than between the Hottentot

and the ourang-outang." Such a sentence is doubly wrong. It is a pure begging of the question, even if the facts, as given, could not be challenged.

Permit me, again, to enter a respectful protest against your persistent endeavour to present certain fragmentary remains as providing data for believing in the existence of ape-men, who are supposed to link up *homo sapiens* with his hypothetical ape ancestors. "Palaeontology tells us nothing on the subject—it knows no ancestors of man." So says Professor W. Braneo, of the Geological and Palaeontological Institute of Berlin. To be specific, how can you justify the stress you lay on *Pithecanthropus Erectus*? How can you describe it as "one of the most important finds"? How can you pin your faith to the *Piltdown Eoanthropus*? How can you write this with a grave face? "As we survey the imposing array of human fossils now on exhibition before the wondering eyes of modern man, running from ape-man Pithecanthropus through Heidelberg man and Piltdown Dawn man on through Neanderthal and Cro-magnon man up to man of to-day, we can plainly see man's physical evolution"? You know perfectly well that it is exceedingly doubtful whether the few fragments found in Java, to wit, a small section of a brain pan, two molar teeth and a piece of thigh bone, belonged to the same creature or not. Even Osborn (*Men of the Old Stone Age*, p. 77) admits that "it is a question whether the femur and the skull belong to the same individual or even to the same race." In spite of this initial doubt, he gives eleven or twelve pages of letter-press descriptive of a fearsome "missing link", with several photographs of its horrific face and bust as reconstructed by J. H. McGregor, and one less hideous, indeed almost pious-looking, upward-gazing "restoration", modelled by the Belgian artist Mascré under the direction of Professor A. Rutot, of Brussels, Belgium. Do you call that sort of thing "Science"? If it is, please tell me, what is nescience? Similarly, why do you attach any importance to the Piltdown remains, viz., a piece of jawbone, another small piece of occipital bone from the skull, and a canine tooth, and the "reconstruction" called Eoanthropus, based on these fragments? Have not Professor W. K. Gregory and Professor G. S. Miller pointed out the fact that the tooth described as the right lower canine was no lower tooth of any kind at all, and no right tooth either, but a left tooth and an upper tooth at that? Did not even Osborn (*Men of the Old Stone Age*) after informing us that the "dawn man" is "the most ancient human type, in which the form of the head and size of the brain are known" (p. 130), and giving us pictures of flints and eoliths, found in the same bed as the bones,

and of the Piltdown man, as "restored" by J. H. McGregor—an illustrated account covering no fewer than fourteen pages—admit, in a note (p. 512) at the end of the second edition of his much lauded work that "the recent exhaustive comparative study made by Gerrit S. Miller, Jr., of the United States National Museum . . . deprives the Piltdown specimen of its jaw, and compels us to refer the skull to the genus *Homo* rather than to the supposed more ancient genus *Eoanthropus*"? What becomes of Osborn's confident statement at the very beginning of his discussion of the "Piltdown Race" about the form of the head and size of the brain being known? What is the worth of his whole discussion from p. 130 to p. 144? And why should you lend your countenance to the perpetuation of a legend about a mythical personage, whose existence is denied now by even so solomonic an anthropologist as Osborn? Is it not high time that we buried out of sight for ever those hoary superstitions, *Pithecanthropus* and *Eoanthropus*? Or to express the opinion in the more guarded words of Professor E. G. McCurdy, of Yale who (*Science*, February 18, 1916) demolishes the Piltdown imposition in a sentence or two thus: "Regarding the Piltdown specimens we have at last reached a position that is tenable. The cranium is human, as was recognized by all in the beginning. On the other hand, the mandible and the canine tooth are those of a fossil chimpanzee. This means that in place of *Eoanthropus Dawsoni* (The Piltdown Missing Link) we have two individuals belonging to different genera." Farewell, a long farewell, to "The Dawn Man." R. I. P.

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In the third place, some of the arguments that you urge appear to me to have very little, if any, weight.

May I ask how you can set such store by the "recapitulation theory?" Does the embryo, in its growth, really recapitulate the ancestral history of the particular organism which has produced it? Is antogeny actually an abbreviated record of phylogeny? Surely the "recapitulation" argument is of very doubtful validity. Conn (*Evolution of to-day*) declares that embryology alone is not a safe guide. "The parallel is largely a delusion." Thomson (*Outline of Zoology*) says: "Recapitulation is due to no dead hands of the past, but to physiological conditions that we are unable to discover."

In the article on "Embryology" in *The Encyclopaedia Britannica* (11th edition) there is a very painstaking and thorough discussion of the subject by Professor Adam Sedgwick, and the conclusion of the writer is expressed thus. "The explanation, which is a

deduction from the theory of evolution. . .can only be entertained on the assumption that the evolution theory is true, has been still further extended by embryologists in a remarkable and frequently unjustifiable manner, and has been applied to all embryonic processes, finally leading to the so-called recapitulation theory. . . When we look for the facts on which it is based, we find that they are non-existent, for the ancestors of all living animals are dead, and we have no means of knowing what they are like. The view then that embryonic development is virtually a recapitulation of ancestral history must be given up: it contains only a few references to ancestral history, namely, those which have been preserved probably in a much modified form by previous larvae." In view of such opinions, how can you possibly make so much of the recapitulation argument? Not only are the facts on which the theory is based "non-existent"; but it proceeds on the *assumption* of the truth of the theory of evolution. It is an excellent example of the logical fallacy of *petitio principii*. It assumes what it undertakes to prove. How very mildly you speak of Haeckel, when you write that he is one "who with characteristic optimism saw in it (the recapitulation theory) more than the actual facts warranted. . . and by his too detailed interpretation of the evolutionary history of various animal kinds and groups, on the basis of it, brought it into some disrepute." Even without him it has no great repute, and he brought *himself* into disrepute by his conscienceless manipulation of the evidence.

You are aware, moreover, that in the human body organs described as "rudimentary" have been found to fulfil most important functions. The thyroid gland, the thymus gland, and the pineal gland used to be classified as "rudimentary" organs. A new school of medicine has developed, as a result of the discovery of the significance of these very glands to metabolism and the maintenance of physiological equilibrium. You refer to the vermiform appendix. Many physicians are now recognizing the fact that "a diseased appendix is the result of hypercivilization, over-milled white flour and the like, and not at all due to the so-called 'rudimentary' character of the appendix." The truth is that Huxley's words (*Darwininism and Design*, p. 151) still hold good: "Either these rudiments are of no use, in which case they should have disappeared; or they are of use, in which case they are arguments for teleology." If it could be shown that there is some use in the so-called "gill-slits" in the embryo, where would your argument be? Are you prepared to affirm that there is no use for them? What do you make of the fact that the salamander brings forth its young without

gills, though prior to birth they have gills relatively large? The gills were useless to the salamander's life in the water after birth, but were altogether essential to the condition of life before birth. Surely Carl Vogt, that ardent evolutionist, ought to be heeded when he says: "Attentive study to embryology shows us, in fact, that embryos have their own conditions suitable to themselves, very different from those of adults."

Yet again, may I point out that you fail to notice the argument against evolution, based on persistence of type? The fact that there is no evidence to compel the intellect to admit the evolutionary change of even one single species into another, and that certain types have persisted unchanged through millions of years, is one of the biggest stumbling blocks, a very "rock of offence", in the way of the evolution theory. How do you explain it in accordance with your evolutionary philosophy? In *The Life and Letters of Charles Darwin*, (Vol. 1, p. 210) is the famous letter to Bentham, in which Darwin expressly states: "When we descend to details, we can prove that not one species has changed." On the following page Darwin says: "I, for one, can conscientiously declare that I never feel surprised at any one sticking to the belief in immutability." You yourself (*Darwinism To-day*, page 18) use these words: "Speaking by and large, we only tell the general truth when we declare that no indubitable cases of species-forming or transforming, that is, of descent, have been observed."

So it is. To use another's words:—Artificial hybrids can be forced under certain circumstances for a single generation, but they do not perpetuate themselves. The lion and the tiger, even the chimpanzee and gorilla, will not mate. Jacques Loeb, of the Rockfeller Institute tells us (*The Organism as a Whole*, p. 43) that W. M. Wheeler in his investigation of ants enclosed in amber was able to identify some of them with forms living to-day, though the ants observed in the amber must have been 2,000,000 years old. The constancy of species, i. e. the permanence of specificity, may therefore be considered as established as far back as two, or possibly three, hundred million years. Definiteness and constancy of each species must be determined by something equally definite and constant in the ape, since in the latter the species is already fixed irrevocably. This is a "hard saying" for evolutionists. Kindly explain how "nature, though loving evolutionary processes, according to believers in evolution, absolutely refuses to permit any confounding of her main types, and rigidly declines to countenance the transmutation of species".

In this connection I may say that I cannot reconcile your mild views on Mendelism with the opinions expressed by Dr. Dukinfield Scott. You say: "Despite the sweeping claims of the Mendelians, there is undoubtedly much heredity that is not Mendelian in character." Your unsupported *ipse dixit* is scarcely sufficient to overthrow the demonstrations of Mendelism. Dr. Scott tells us in his lectures, *Extinct Plants and Problems of Evolution* (page 10), "Mendelian experiment has established the existence of definite unit characters which do not appear to be subject to change. This result is opposed to the Darwinian idea of the gradual accumulation of minute differences, under the influence of Natural Selection. . . In fact, the origin and nature of species, which Darwinians thought had been satisfactorily explained, are now seen to remain utterly mysterious. . . Thus the great growth of our knowledge of genetic constitution, derived from Mendelian experiment, so far from clearing up the question of the origin of species, has only shown that the old Darwinian conceptions are unproven and that all again is in the melting pot." What is the good of trying to give the impression that all is well, in the main, within the evolution camp? All is not well, despite your *ex cathedra* deliverances to the contrary. You and Osborn and others may try to hold back the rising tide of dissatisfaction, but soon or syne it will burst the barriers that scientific unwillingness to admit any weakness or incompleteness in the once supposedly irrefragable argument for monophyletic evolution has reared to stay its advance.

You yourself present me with an apt illustration of scientific determination to maintain traditional views, despite any facts that make for a contrary or qualified conclusion. You say (pp. 250-1) "If the human brain has not increased perceptibly in size since the time of the Cro-magnon man, twenty-five thousand years ago—and it has not—and if inherent human mental capacity has not increased perceptibly since the days of the Egyptians of six thousand years ago, or of the Greeks of Homer's time—and this is generally admitted—it is easy to see that the anthropologist cannot say positively that the evolution of the human mind is still going on. And if he cannot say this, equally he cannot say that it will go on in future time." All that is good and true. Yet you go on: "But, on the other hand, that anthropologist or psychologist who would presume to declare, taking into account the brief period, from a geologic and evolutionary point of view, during which no perceptible biological evolution of the human brain and mind has been apparent, that no such evolution was in course, and that the human mind had reached its limit of development, would be a brave—or foolish—

person." All the comment I shall make on that second passage is this, that he is a still braver—or more foolish—person, who is so obsessed by a theory that he tilts against any evidence that does not accord with, indeed—*so far as it goes*—contradicts, his foregone conclusions, and substitutes for actual fact his own vivid fancy of what might have been during incalculable periods of time, and ought to have been, if the theory, to which he clings tenaciously, were as true as he claims, and, venturing without warrant into the realm of unverifiable prediction, dares any one to doubt his prophethood. Why not frankly admit that the evidence, *so far as it goes*, does not support your views? And why call those who differ from you and your speculations presumptuous fools? What is the difference in spirit between a bigoted evolutionist and a bigoted anti-evolutionist?

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I must close, for my letter has already run to greater length that I had planned when I began to write. I think I have given you enough material in the way of criticism to show that the old orthodox methods of presenting the argument in favour of evolution are eminently unsatisfactory to men, like myself, who know a little of natural science, and a fair amount of logic and philosophy, and who labour under the impression that they are quite capable of estimating the accuracy of your data and the soundness of your reasoning. I trust I am not an obscurantist, nor do I find fault with your book because of inveterate prejudice against the theory that you champion. If it were established beyond all cavil, even in its extreme form, it would not in the least affect my spiritual interpretation of nature or my faith in God. To me it would be only the divine method of working, and would not impair one jot or tittle the argument from design.

If I seem thus critical of your positions, it is because I am profoundly interested in the subject you discuss. I mean no discourtesy, but I do long to get at the truth.

With apologies for inflicting this long letter on you, I am,

Yours, etc.,

GEORGE HANSON.