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THE EVOLUTION THEORY TO-DAY

I

WHAT is the present position of the Evolution theory, how does it stand to-day? The answer of the present writer is that there is very little of it left to-day, and what little there is is being increasingly discredited. This is a startling proposition, even for 1933, and calls for some elaboration.

There are two uses of the term "evolution": a popular one and a technical one. In its popular use it simply means development, in the widest sense, so that we talk with equal ease of the evolution of the steam engine, of the motor-car, of Parliamentary government, or of higher education for women. This use is universal and is accepted without question.

The technical meaning of the term concerns living things and living things alone. "By evolution we mean the descent from living beings in the past of other widely different living beings"¹; and Professor MacBride is equally crisp and emphatic: "Evolution for us is a phenomenon pertaining to living things and to these alone."² There was a time, at the beginning of the nineteenth century, when the term had a much wider scope, when the transformism of Lamarck (1809), the uniformitarian theory of Lyell, and the nebular hypothesis of Laplace (1796) were all combined by Herbert Spencer into his materialistic "Synthetic Philosophy" (1860-96), deriving everything, organic and inorganic, physical and mental, even aesthetic and religious, from a primeval nebula created by nobody knew whom and rotating nobody knew how. To this all-embracing principle Spencer gave the name "evolution," which is now all that remains of his great scheme, now dubbed "plausible and superficial."³ The doctrine of spontaneous generation has long been dead, and so is Laplace's nebular hypothesis of the solar system, killed by the mathematicians. Chemistry has shown that all chemical or inorganic change is downhill, towards simpler and simpler forms, and continuous degradation of energy seems to

¹ J. B. S. Haldane: *The Causes of Evolution*, 1932, p. 4.

² MacBride: *Evolution*, 1927, p. 9.

³ MacBride, p. 8.

be the normal history of our universe, unless somewhere there is being carried on the compensatory transformation of radiation into matter. So the last refuge of evolution is in the world of life, as already mentioned.

II

As a matter of fact, Science can give no account of origins. It cannot tell the origin of matter ; indeed to-day it is not sure whether there is such a thing as matter. As Sir William Bragg humorously put it, we work with the classical (wave) theory on Mondays, Wednesdays and Fridays, and with the quantum theory on Tuesdays, Thursdays and Saturdays ; fortunately, there is always Sunday left on which to recover mental balance. "As to the origin of life on the earth we know nothing whatever. Speculation about it is more or less futile."¹ "There is only one kind of life in our world, viz. protoplasmic organization. Just what this is we do not know." "All life, so far as we know, starts from life." "So far as we know there is no 'chaos' in the universe, nor was there ever any."² "Creation must be taken in its broadest sense as the aggregation of the intelligences and the energies which enter into the development of the universe." "The theory of (organic) evolution is, in brief, that in our world no living thing and no succession of living things remain exactly the same for any period of time, long or short ; and furthermore, to repeat, that all change is *orderly*, never the result of accident or caprice or favouritism. In Huxley's words : 'Nothing endures save the flow of energy and the rational order that pervades it.'"³ This is a complete abandonment of the old nineteenth century claims, and more recent writers, notably Berg, have contradicted these claims on every count.

These ancient schools of evolution may be classified as

1. Atheistic : represented by Carl Vogt, Buchner, and Moleschott.
2. Agnostic : Huxley, Tyndall, and Spencer.
3. Theistic : Dana, Gray, Owen, Dawson, Carpenter, Sir J. Herschel, Kelvin ; St. George Mivart, A. Russell Wallace, and probably Darwin, to begin and end with.

¹ D. S. Jordan : *Creation by Evolution*, 1928, p. 4.

² *Ibid.*, p. 11.

³ Jordan : *op. cit.*, p. 2.

This theistic action, however, has been construed in three different ways : first, limited to the creation of a few primordial cells, and logically to one single cell ; secondly, the origin of species may be mainly indirect or through natural causes, yet sometimes direct, by special creation ; thirdly, God is immanent in *all* natural law. The nineteenth century saw at least seven different evolution theories before its close, according to the following scheme :

1. Self-elevation by appetency, or use and effort : Monboddo, Lamarck, Cope.
2. Modification by environment : St. Hilaire, Quatrefages, Draper, Spencer.
3. Natural selection and survival of the fittest : Darwin, Haeckel.
4. Pre-ordained succession under *innate* tendency : Owen, Mivart.
5. Unconscious intelligence : Morell, Laycock, Murphy.
6. Creative evolution without breaks : Gray, Powell, Duke of Argyll.
7. Divine immanence with special interventions, notably in the case of Man : Dana, Wallace.

III

The real begetter of the theory of evolution as it has come down to us is Lamarck, who in 1809 in his *Philosophic Zoologique* enunciated the principle of what he called "transformism," modification due to environment and an internal urge in response to this. In popular language, the giraffe got its long neck by continually stretching up to reach the more tender and succulent leaves at the top of the trees. Change of environment produced a change of habit in the animal ; change of habit resulted in adaptation, the development or suppression of certain organs through use or disuse ; and, lastly, these habits and anatomical changes were transmitted to the offspring. Unfortunately, this last assumption is vital to the whole position. "It was once thought that all differences due to variations of environment were inherited. *We now know that this is not true.*"¹ "These, as a matter of fact, are just the class of changes in favour of the inheritance of which there is the least evidence."²

¹ J. B. S. Haldane : *Causes of Evolution*, 1932, p. 11.

² C. H. Parker : *Biology and Social Problems*, 1914, p. 103.

It is not worth while wasting time on Spencer. His theory is open to two fundamental objections: his failure to account for life, and the fundamental similarity of all living things, plants included, as well as his abuse of the term "heredity," an abuse still common in popular talk. As MacBride points out, a child does not receive its *body* from its parents, only a microscopic germ; it makes its own body.

To most people the evolution theory means Darwin, and the substance of his *Origin of Species* (1859) is easily and clearly summarized.

All organisms multiply so rapidly that in a short time the whole earth could not contain, much less sustain, their offspring. Thus the common thrush lays eggs at one year old and lives on an average for ten years. Two broods are hatched every year, of four eggs each. Assuming no deaths before the age of ten, this would give at the death of the original pair a population of $19\frac{1}{2}$ millions; this after other ten years would grow to 200 billions (2×10^{14}), and at the end of the third decade to 1,200 trillions (12×10^{20}). Even if this huge army of thrushes stood shoulder to shoulder, there would not be room on the entire globe for more than the $\frac{1}{150,000}$ part of them. But it is notorious that the total number of thrushes in the world has not increased within human history, rather the reverse, and we all know that various thinning processes are in operation, natural enemies, want of food, fall in temperature, etc., so that only a few, and those the hardiest, survive. This is what Darwin called the struggle for existence leading to the survival of the fittest.

Now all organisms vary, however slightly, through changes in the environment such as climate, food-supply, and other causes. Such variations are infinite in direction and random in character, but those which happen to be beneficial will be preserved and transmitted to the next generation, while those which are injurious will disappear. The great majority of individuals will perish in the struggle, but the fortunate few who have accidental handicaps in their favour, will survive, and hand on to their descendants their own resistant and energetic nature. This is what Darwin called Natural Selection, and Spencer the Survival of the Fittest. On this theory when the lower leaves were exhausted only the longer-necked giraffes were still able to find food and so survive.

The theory thus demands :

1. Variations so numerous as to include among new characters such as may chance to be useful ;
2. That those useful characters be transmitted by heredity ;
3. That the survivors be distinguished by some useful characters from those which have perished, i.e. that mortality be not accidental but selective ;
4. That the number of such survivors be relatively small in proportion to those which perish, otherwise evolution would work in the reverse direction, viz. degeneration.

IV

Darwin supplemented this by his theory of Sexual Selection, on the ground that many females choose their mates, and the males endeavoured to attract the females by display ; and secondly, that in other species the males fought with each other for the females who fell as spoils to the victors. MacBride's comment on this is simple and crushing. " Darwin's theory is in reality no explanation at all, but one great and striking instance of the ' reification of words,' the conversion of mere general terms into imaginary things."¹ " To put the matter in a nutshell, the fact that James is killed can make no difference to the structure of Tom " ; still less can it affect the germ-cells of Tom. " The implicit assumption in Darwin's hypothesis is that continuous inheritable variation occurs constantly in all directions, but to assume this is to beg the whole question. . . . Natural selection is the pruning-knife which trims the buds of the tree of life, but it does not account for the sprouting of the buds nor for the directions in which they grow."² J. B. S. Haldane is even more emphatic. Speaking of so-called sexual selection characters, he says : " Their value to the species as a whole is doubtful"³ and reiterates a much-needed warning when he calls attention⁴ to " a fallacy which has been responsible for a great deal of the *poisonous nonsense* which has been written on ethics in Darwin's name, especially in Germany before the

¹ MacBride, p. 19.

² *Ibid.*, p. 20.

³ *Causes of Evolution*, p. 128.

⁴ *Ibid.*, p. 119.

war and in America and England since. The fallacy is that Natural Selection will always make an organism *fitter* in its struggle with the environment." "On the contrary, it seems likely that they (the biological effects of competition) render the species as a whole *less successful* in coping with the environment."¹ We are painfully aware of that in the human race, for everyone knows that the classes which are breeding most rapidly in most human societies to-day are the least intelligent classes, the unskilled labourers.

The theory of Natural Selection thus assumes two things, both of which are strenuously denied, and with increasing force: first, that variations are continuous and constantly occurring in all directions; and, second, that such variations are inheritable. This, of course, is contradicted at every turn by Berg.² Now it is well known that nature always tends to preserve the average, and that in a world of free competition as distinguished from the artificial world of the breeder abnormalities and sports are speedily eliminated. The son of a tall man is taller than the average, but not so tall as his father, and so on. How many of the fancy breeds of pigeons would survive a twelvemonth under an unrestricted struggle for existence? Breeders who succeed in producing a "pure line" find themselves up against a dead wall against which further progress is impossible, and the results of pure-line experiments such as those of Weldon, Agar, Jennings, and Johannsen "have dealt a deadly blow at the idea that natural selection is the main agent in causing evolution."³ So Professor Haldane, speaking of experiments with *Drosophila melanogaster*, the banana fly, explains that after twenty generations of modification no further progress was made during other forty generations, and goes on to say: "It was shown ten years ago that Darwin had been wrong in supposing that variations due to environment were inheritable,"⁴ and further, "The Lamarckian principle had been even more completely disproved than the Darwinian. Lamarck had believed that just as organs of an individual atrophy from disuse, this atrophy may be transmitted to their descendants. But whenever sufficiently careful experiments have been done, this has been shown *not to occur*."⁵

¹ *Causes of Evolution*, pp. 125-6.

² *Nomogenesis*, 1926.

³ MacBride, p. 23.

⁴ Haldane, p. 18.

⁵ Haldane, p. 20.

V

De Vries, starting from experiments with *Oenothera lamarckiana*, the evening primrose, advanced the "Mutation Theory," according to which new species may have arisen from unpredictable "sports" or mutations, occurring from no assignable causes, from causes which, at any rate, are not to be found in the environment. But to this theory, the favoured one to-day, MacBride finds "insuperable objections." First, sports are very rare indeed, so rare that Darwin declined to consider them as a factor in the case. But, secondly, these sports are not improvements but quite the reverse, diminishing efficiency and lessening viability. Morgan, who is the leading supporter of the mutation theory, admits that all the sports of the banana fly "differ from the wild banana fly in being less viable—that is, in plain language, of less vigorous constitution, dying more easily, and having shorter lives even when carefully tended. The weakness of constitution is proportional to the wideness of the deviation from normal structure exhibited by the mutation. Certainly these 'mutants' do not appear to be promising subjects for natural selection."¹ Another writer dismisses them as "pathological freaks." Reversion is a familiar process tending at once to disprove the mutation theory and to reaffirm the proposition that nature seeks to preserve and restore the normal. Haldane admits that most evolutionary changes have been degenerative,² and the whole theory was scrapped by Bateson in his Toronto address of 1921. "We have no difficulty," he says, "in finding evidence of variation by loss, but variations by addition are rarities, even if there are any such which must be so accounted."³

All these Victorian discussions have been rendered out of date by the rediscovery of Mendel's Law by Bateson, and the verification of Weissmann's theory of germ-plasm by the more recent discoveries of the paramount part played by the chromosomes of the cell-nucleus in reproduction and heredity. To the well-known dictum, *Omne vivum ex vivo*, we have had to add, *Omnis cellula ex cellula* and *Omnis nucleus ex nucleo*, and now *Omne chromosoma ex chromosomate*. As has been said, "If evolution

¹ MacBride, pp. 26, 27.

² p. 139.

³ British Association, Toronto.

has really taken place, in some way the *hereditary* tendencies of the race must have become changed," that is, we are driven back upon the chromosomes and the genes which they contain. Now there is no process known by which *additions* may be made to these. They may be doubled, trebled, quadrupled, but we are merely getting the former elements over again by multiplication, there has been no *addition* of *new* elements. All mutations are seen to be due to loss of genes, never to addition, and "unless originally present in the chromosomes, there is no apparent way in which a mutation factor can enter from without."

VI

A great deal used to be heard about Haeckel's Law of Recapitulation, "*die Ontogenie ist eine kurze Wiederholung der Phylogenie.*" Ontogeny, the development of the individual, is a recapitulation of phylogeny, the development of the race. "It must be granted at once," says MacBride,¹ "that this so-called law is only a daring assumption," an assumption which embryological research has not maintained. Not only did the line of descent obtained on this hypothesis not agree with paleontology and comparative anatomy, but it was quite obvious that many embryonic structures could not possibly represent ancestral animals. "The result is that this so-called 'law' has fallen into general disrepute among scientists." "This law," says Vogt, "which I long held as well-founded, is absolutely and radically false," and Professor Caullery of Paris writes to the same effect: "There can no longer be question of systematically regarding individual development as a repetition of the history of the stock. This conclusion results from the very progress made under the inspiration received from this imaginary law, the law of biogenesis."²

VII

The first impressions of the geological record seem to suggest evolution from simple to more complex forms, but more detailed study contradicts this, and at the present day the testimony of the rocks is absolutely destructive of all evolution theories that have hitherto been advanced. On any such theory we ought to find in the earliest strata nothing but the

¹ p. 37.

² *Smithson Inst. Rep.* 1916, p. 325.

simplest forms of life, and in the most recent nothing but advanced or more complex forms. Again, any one formation ought to show not only vestigial forms, survivals from the formations below, but nascent forms reaching their fuller development in the formations above. The actual record tells quite a different tale. So far from the Cambrian, the earliest fossiliferous formation, showing only protozoa and the like, it exhibits six out of the seven sub-classes of animals, the only missing member being the vertebrata. The starfish of the Silurian is a complete starfish, as perfect as any one to be seen to-day, and its *Lingula*, which according to Darwin has a history of at least 300,000,000 years, is not a whit behind its living descendant. Consider what tremendous changes such a creature has passed through, and then ask what effect has environment in its most extreme forms had upon the heredity of this mollusc. The warm steamy swamps of the Carboniferous age were succeeded by the dry desert conditions of the Permian, and these again by the greatest and most severe ice-age this planet has ever seen, yet all these varied experiences have not affected these animals one particle. In Lyell's own tables in his *Principles of Geology* nothing is more arresting than to see not only how whole species and genera end as abruptly as if they had been cut off by a knife, but, what is more significant, new species and even classes suddenly appear without any previous intimation. Of the intermediate forms, which according to modern genetics, ought to be at least double the others, the rocks show no traces, and while there are some survivals there are no nascent forms; the new species appear quite suddenly. Indeed in geology as in physics we shall have to rewrite the ancient dictum, *Natura non facit per saltum*, for now it would appear that nature hardly ever does anything else.

Numerous examples of the persistence of living forms from the earliest times are given in such works as Austin Clark's *The New Evolution*, 1930, *Evolution in the Light of Modern Knowledge*, a collective work, 1925, and Dewar's *Difficulties of the Evolution Theory*, 1931. Professor J. B. S. Haldane, modifying the prevalent uniformitarian hypothesis, admits catastrophic action,¹ the sudden extinction of whole groups, and, what is impossible to explain on any theory of slow evolution, the sudden appearance of new groups.

¹ *Causes of Evolution*, p. 117.

In respect of plant life Professor Bower is equally emphatic. "It is significant that a more exact knowledge of the earlier fossil floras has hitherto failed to unite the several divisions (of plants), so as to form that common 'evolutionary tree' that hovered in the minds of those directly influenced by the enthusiastic writing of Haeckel."¹ And so Haldane again says, "We have no really satisfactory evidence of perfectly continuous evolution in plants, where the evidence of abrupt species production is strongest."²

VIII

Great play used to be made with so-called "vestigial" organs in man and other higher animals, but "it is not always easy to determine whether any given structure is vestigial. Most organs usually cited as such are nothing of the kind."³ A great many of them, such as the thyroid, pituitary, pineal gland (which we were told was the survival of a third eye), thymus, etc., are now known to be anything but vestigial, valuable endocrine glands regulating the unimaginably complex organism of the body, and absolutely necessary to life. Others again, like the thymus, have an indispensable function in pre-natal life and childhood, although their function lapses with the advance of youth. "In my early days of anatomy," says Dwight, "I thought I must be very ignorant, because I could not understand how the occasional appearance in man of a peculiarity of some animal outside of any conceivable line of descent could be called a reversion. . . . It was only later that I grasped the fact that the reason I could not understand these things was that there was nothing to understand. It was sham science from beginning to end."

At the Johannesburg meeting of the British Association in 1929 the present position was declared by Professor D. M. S. Watson in his presidential address to the Zoology Section. "While," he said, "evolution is accepted by every biologist, the mode in which it has occurred and the mechanism by which it has been brought about are still disputable. The only two theories of evolution which have gained any general currency—those of Lamarck and Darwin—rest on a most insecure basis;

¹ *Evolution in the Light of Modern Science*, p. 167.

² *loc. cit.*, p. 32.

³ Duvar, p. 27.

the validity of the assumptions on which they rest has seldom been seriously examined, and they do not interest most of the younger zoologists." And he sums up thus: "The present position of zoology is unsatisfactory. We know as surely as we ever shall that evolution has occurred, but we do not know how this evolution has been brought about. The data which we have accumulated are inadequate, not in quantity, but in their character, to allow us to determine what, if any, of the proposed explanations is a *vera causa*."

That is to say, certain zoologists still believe in evolution in the ordinary non-Christian sense, the operation of a blind so-called natural force, but all the evidence they have examined is unsatisfactory, not only in quantity but in quality. Evolution has thus descended to a mere belief, an article of faith, and faith without works is—dead.

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