

CHAPTER I

EVOLUTION AND BEGINNINGS

Evolution the working hypothesis of scientific men—Evolution as a dogmatic faith—Truth of evolution—The primitive nebulousity—Spectrum analysis—Star systems—Professor Karl Pearson on lifeless chaotic mass—Chaos unthinkable—Homogeneousness—Evolution must commence somewhere—Its commencement a relative unity.

EVOOLUTION is the working hypothesis of most scientific men at the present time. In no branch of science is it without influence, and in the sciences which deal with life it is dominant. We cannot escape from it. Its technical phrases have become parts of current common speech; and such words as “natural selection,” the “struggle for existence,” and “the survival of the fittest” are on the lips of every one. It does not matter to what sphere of human work we turn, for in all alike we meet with the same mental atmosphere. Are we students of physics or chemistry, we have no sooner mastered the elements of the science than we are plunged into questions which deal with the “evolution” of the “atom” or the “molecule” from simpler forms of matter. Do we study mechanics, then we are brought into a sphere where men talk of the evolution of the steam engine or of some other

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machine which has slowly grown from less to more till it has reached its present state. Are we students of man, then we become accustomed to inquiries into the evolution of the family, of marriage, of the community, of the state. Morality is evolved, religion also. On all hands men are busy tracing out the lines of evolution from the general to the particular, from the simple to the complex, until it is affirmed "that the whole world, living and not living, is the result of the mutual interaction, according to definite laws, of the powers possessed by the molecules of which the primitive nebulosity of the universe was composed" (Huxley, *Life of Darwin*, vol. ii., p. 210). It is evident enough that, in these views of Professor Huxley, evolution has passed beyond the stage of a working hypothesis, and has become both a philosophy and a dogmatic faith. We are restricted to molecules, their powers, and the interactions of their powers for the explanation of the universe; when the molecules are given in their primitive nebulosity, the whole result follows. There can be no increment from without, no guidance from above, nor any leading along a definite line to a predetermined end. The molecules and their interactions must be competent to produce all that has come out in the process. We need not say how great is the issue involved in this claim, nor how strenuously it is to be resisted. It is something gained, however, to have the claims of evolution considered as a dogmatic faith stated so clearly, and to know with what we have to deal.

Manifestly evolution as a working hypothesis and evolution as a dogmatic faith mean very different

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things. Even if we grant that it is more than a working hypothesis—let us grant that it is the highest scientific generalisation to which the human mind has yet attained; that in it we have a law of the widest working which is operative in all the realm of nature, animate and inanimate—yet this concession falls far short of the immeasurable demand which Professor Huxley makes in the name of evolution. Let us suppose it proved as a scientific generalisation, and we may still say, with Professor Fraser, “evolution itself, if proved, would be only an expression of physical causation—of phenomenal significance and interpretability—though it may yet turn out to be the most comprehensive of all merely phenomenal laws, and the highest expression of the sense symbolism, a physical causation, which Berkeley has so emphatically contrasted with spiritual and transcendent causality” (*Fraser on Berkeley*, p. 227). But the advocates of evolution are not content with the concession that it is the most comprehensive of all phenomenal laws; they demand absolute submission. Evolution must reign without a rival; everything must bend to its sway.

The imperious demands which Professor Huxley, Mr. Herbert Spencer, and others make in the name of evolution must not be allowed, however, to frighten us away from the name, or to blind us to the truth which is contained in it. Extravagant claims must not be allowed to discredit legitimate demands. In fact, the real work done by evolution, the truth set forth by it, the grandeur of its generalisation, and its consistency with scientific truth generally,

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make one sorry when the theory is pushed to an extreme which makes it untrue and inadequate. We are not surprised when the expounders of this theory of the universe are filled with cosmic emotion at the greatness and grandeur of the process they describe; nor do we wonder that they are carried away with the rapture into which they are thrown: for no reader can withhold his sympathy and admiration. It is grand and ennobling to sweep back in thought across the hundred million years or so which separate us from the time when our earth was only vapour, and to be led on from that point of time, through all the intervening ages, as one science after another guides our footsteps, until we arrive at the complex, differentiated, integrated world of the present time, with its life, intelligence, ethics, religion, science, art, and to have some understanding of the process whereby this has come out of that. But we may still have the rapture and the admiration: we may admire and so far revere and be thankful for the work done in the service of evolution, and yet withhold that final sacrifice demanded in her name.

Almost every book on evolution and every magazine article devoted to the subject tries to hark back to the "primitive nebulosity." Not many of them, however, commit themselves to any definite theory on the question of the nebular view. Some, indeed, with a courage which we cannot sufficiently admire, speak as if Kant or Laplace had left nothing for their followers to do. Mr. Fiske is quite sure on the matter. "In the slow concentration of the matter constituting this solar nebula," he says, "as both Kant and

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Laplace have elaborately proved, the most prominent peculiarities of the solar system find their complete explanation" (*Cosmic Philosophy*, vol. i., p. 360). We shall have something to say of this later on. At present we may observe that Professor Huxley's statement does not limit itself to the solar system; it extends to the universe. The progress of science has made it much more probable that some form of the nebular theory is true. While this is so, any tenable view of the nebular hypothesis, or any view consistent with facts, has presented that hypothesis in a form which is not available for the purposes of evolution. Professor Huxley assumes "a primitive nebulousness of the universe." If this has any meaning, we must try to imagine all the matter of the universe dispersed equally through space, and in a uniform physical condition. If we were to trace the process backwards from the present hour, and try to follow the various steps by which the star systems came to their present condition, we should finally arrive at the primitive nebulousness. But then we should have to explain the fact that there are so many systems that have not yet emerged from their first estate.

Spectrum analysis has made us acquainted with the physical condition of many kinds of stars. If we study such works as Schellen's *Spectrum Analysis*, or Miss Clerke's *System of the Stars*, we shall become acquainted with worlds at all stages of their history. "We can indeed hesitate to admit neither the fundamental identity of the material elements of the universe, nor the nebulous origin of stars. The

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transition from one to the other of the two great families of the sidereal kingdom is so gradual as to afford a rational conviction that what we see contemporaneously in different objects has been exhibited successively in the same objects. Planetary nebulae pass into gaseous stars on one side, into nebulous stars on the other, the greater nebulae into clusters. The present state of the Pleiades refers us inevitably to an antecedent condition closely resembling that of the Orion nebula; the Andromeda nebula may represent the nascent stage of a splendid collection of suns. But even though stars without exception have sprung from nebulae, it does not follow that nebulae without exception grow into stars. The requisite conditions need not invariably have been present. Other ends than that of star production are perhaps subserved by the chief part of the present nebulous contents of the heavens. The contrast between stellar and nebular distribution is intelligible only as expressing a definitive separation of the life-histories of the two classes—a divergence destined to be perpetual along their lines of growth.” (*System of the Stars*, p. 396.) Thus we see how naturally astronomy uses the language of evolution, and how the new astronomy with the aid of the mighty instrument of spectrum analysis has added to our knowledge and increased our wonder. A cross section seems to give us also the line of the life-history of a star or a system of stars. And the theory of Kant with regard to the solar system seems to have reference also to the sidereal system. May we by an act of faith go back to the primitive

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nebulousity of the universe, and, assuming a primitive nebulousity, with known qualities and laws, seek thus to account for the universe? We must start somewhere, and perhaps for some purposes a primitive nebulousity is as good a starting-place as we can have. But we should observe how many things we have assumed, and how much we have taken for granted. We have assumed "molecules possessed of definite powers," that these powers work according to definite laws, and that out of their mutual interaction a definite world of order will arise. Now these are large assumptions, and if granted have raised many important questions. What has been assumed is something definite, and yet the attempt is constantly made to make it indefinite. There is nothing more common than to call the "primitive nebulousity" chaos. "Suppose," says Professor Karl Pearson, "the highly developed reason of some future man to start, say, with clear conceptions of the lifeless chaotic mass of 60,000,000 years ago, which now forms our planetary system, then from these conceptions alone he will be able to *think* out the 60,000,000 years' history of the world with every finite phase which it had passed through; each will have its necessary place, its necessary course in this thought system. And this total history he has thought out? It will be identical with the actual history of the world; for that history has evolved in the sole way conceivable." (*The Ethics of Freethought*, p. 29.)

Apart from the other issues raised by this statement, we concentrate attention on one aspect of it. This we do mainly because Professor Karl Pearson is

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here a representative writer. Many other people, of less ability than he, speak of a primeval chaos out of which somehow order must emerge. But may we ask how we are to have "clear conceptions of a lifeless chaotic mass," whether we consider it as existing a number of years ago or at the present hour? We can only conceive of it just in proportion as we think the chaos away. A mass means something; it has a certain bulk, a certain shape, a certain kind of consistency; and if it has these, to speak of it as chaotic is mere rhetoric. A clear conception is possible only if there is something clear to be apprehended; and to speak of a clear conception of a chaos implies something chaotic in the mind which speaks.

The primitive nebulousity, if it ever existed, was as definite, as much subject to law, as clearly marked by definite qualities, as the universe which is supposed to have evolved out of it. At all events, it existed in a definite material state; it occupied space; molecules or atoms, or the material which afterwards aggregated into atoms or molecules, were there. There were definite laws at work, and there were mutual interactions; and just in proportion as these existed, clear conceptions of the so-called "lifeless chaotic" mass are or were possible.

If the primitive nebulousity had any qualities whatsoever, then all the advantages which were gained by calling it chaotic are lost. Somehow, I do not know how, but there seems to be a hazy idea in the minds of many, that if a start can be made in chaos, and afterwards a cosmos appears, a solution of the problem of creation has been obtained. Given a

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chaotic primitive nebulosity, and given clear conceptions of it, then the universe must arise: such is the problem and its solution. But we have no account of the transition, nor any rational attempt to show why and how chaos should cease and cosmos begin. This difficulty besets the mechanical theory of the universe as it besets every other theory. How to get our starting-point is the perplexity. We cannot begin with chaos; and if we begin with anything definite, where have we got it? We may place the elephant on the back of the tortoise, but what will support the tortoise?

It is amazing that those who assume the primitive nebulosity do not see that it raises precisely those questions concerning order, its source, method, and law, which are raised by the universe as at present constituted. It raises these questions also in a form more difficult of solution. We may not ask how this nebulous mass came to be; if we did ask, we should at once be told that we must not inquire regarding origins. Leaving origins, then, we may ask whether the mass is constituted so and so, and in such a manner as to make a certain result inevitable. If, as Professor Karl Pearson says, "the universe is what it is because *that* is the only conceivable fashion in which it could be—in which it could be thought"—we may conclude that thought has gone to the making of it. If thought has come out of the universe, if the universe is a universe which can be thought, then thought has had something to do with it from the outset. There is thought in the primitive nebulosity, and thought of the most marvellous kind.

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But we can scarcely ascribe the thought to the molecules, Whence has it come? We humbly submit that at this stage we require more thought to make clear what we mean.

If instead of Professor Karl Pearson's chaotic mass we take the indefinite, incoherent homogeneity of Mr. Herbert Spencer, we have not made any advance. Suppose we grant the possibility of such a homogeneity, we cannot get it to act. Mr. Spencer himself recognises this: "One stable homogeneity only is hypothetically possible. If centres of force, absolutely uniform in their powers, were diffused with absolute uniformity through unlimited space, they would remain in equilibrium. This, however, though a verbally intelligible supposition, is one which cannot be represented in thought, since unlimited space is inconceivable. But all finite forms of the homogeneous, all forms of it which we can know or conceive, must inevitably lapse into heterogeneity." (*First Principles*, p. 429.) The homogeneity which his system demands is dismissed as inconceivable, "since unlimited space is inconceivable." And then he proceeds to speak of "all finite forms of the homogeneous"; and by so doing cuts down the only branch on which he can sit. A finite form of the homogeneous is really destructive of his hypothesis. For the finiteness of the form postulates a difference between the homogeneous and its environment; and as that difference is both continuous and active, it will not allow the homogeneous to exist. The very notion of a finite homogeneity is self-destructive.

Another result follows. The objection which is