

orderly arrangements of a very simple kind which do not necessarily suggest Mental Purpose. They may be the effect of what we call accident, or of the action of elementary laws under no guidance or direction. Inorganic phenomena furnish many examples of such arrangements," &c., the argument proceeding to the conclusion that "the writers of the last generation were perfectly right in resting the general Argument from Design on the separate instances of adaptation in which the mark of Mind is most signal and conspicuous"—*i.e.* in organic structures. Now until it is shown wherein we are justified in classifying natural laws under two such categories as "elementary laws under no guidance or direction," and laws whose "action" gives rise to "separate pieces of evidence pointing to the operations of special design"—until this is shown I must remain of the opinion that "Mr. Darwin's theory of Natural Selection" does "touch this argument" of scientific teleology. The distinction between two such sets of general laws is clearly not one that can be recognised by science, and if it is conceded that the theory of Natural Selection is competent to explain the proximate or physical causation of "structural adaptations," we have no more right to refer the latter to ultimate or metaphysical causes than we have so to refer "orderly arrangements of a very simple kind which do not necessarily suggest Mental Purpose." For if this concession is made it means that the one set of causes differs from the other only, as I have said, in being somewhat more complex in character and less obvious in operation.

Again, the Duke of Argyll says he is "not able to accept" the distinction which I drew between scientific and metaphysical teleology. The distinction nevertheless remains, and it seems to me so obvious that I must suppose the Duke has in some way failed to appreciate my meaning. However he says, "The fundamental proposition of all arguments from Design is simply this: that the exquisite adaptations to special ends which are conspicuous in organic nature are, and can only be, the work of physical forces when these are under the combination and direction and control of Mind." But this is not "the teaching of the great masters" whom Dr. Carpenter names in his letter.¹ To some of them, at any rate, such a needless restriction of the argument to special adaptations in "organic nature" seemed unwarrantable, and since Mr. Darwin has shown how these special adaptations may be proximately explained by the operation of certain physical causes, the tide of theistic opinion has more than ever turned towards a still more "fundamental proposition" of the argument from Design, viz. that the harmonious uniformity of Nature as a whole demands some one co-ordinating principle as its explanation. And when from this proposition it is argued that the principle in question must be of a psychical character, the argument belongs to the province of what I have called metaphysical teleology. This, indeed, is merely the "Cosmo-theology" of Baden-Powell, who saw very clearly the distinction which I have endeavoured to present, and while inveighing more heartily than I have done against "the narrow and unworthy form in which the reasoning has been too often conducted," maintained that the "fundamental proposition," "the very essence of the whole argument, is the invariable preservation of the principle of order," &c.

Lastly, I do not understand the Duke where he says that I am much mistaken if I "suppose that the present generation is satisfied with the purely materialistic explanations of adapted structures which are erroneously supposed to be the final result of Mr. Darwin's theory." I have not said anything to imply that I supposed these explanations to be "purely materialistic." As a matter of individual opinion I do not think that in themselves they are. I see plainly enough that they have reduced the "exquisite adaptations conspicuous in organic nature" to the same general category of physical causation as all other phenomena in the physical universe; but for this very reason, if for no other, I should fail to see that they can be "purely materialistic" in the sense of touching the transcendental or extra-scientific question of Theism.

Having thus stated my views at some length, I shall take no further part in this correspondence, unless it should appear that some further explanation is desirable.

GEORGE J. ROMANES

¹ Except, perhaps, Mill, who thought highly of this form of teleology. But he also thought that if Mr. Darwin's "remarkable speculation" should be established as a truth of science, it would seriously "touch" the argument, as showing that "creative forethought is not absolutely the only link by which the origin of the wonderful mechanism of the eye may be connected with the fact of sight," &c.

Prof. Stokes's Lectures on Solar Physics

THE subject of these lectures (NATURE, vol. xxiv. pp. 593, 613) related primarily to the sun, and I was concerned with certain magnetic or electrical phenomena which are observed at the earth's surface only in so far as they related to the elucidation of the physics of the sun. Accordingly these collateral subjects were treated only very briefly, and I did not attempt to give anything like a history of the discoveries which have been made in them, even as regards the portions which bear more immediately on the physics of the sun. Indeed in many cases I designedly refrained from mentioning names, lest the hearers should suppose that I was giving a history of the subject, and those whose names might not appear in the very imperfect notice which it would have been should feel aggrieved. When a phenomenon was well known I generally contented myself with referring to it as such. Thus, for example, in alluding to earth-currents I spoke of them as what the progress of telegraphy had made us "familiarly acquainted with"; I said nothing about their discovery by Mr. Barlow, as described in his important paper published in the *Philosophical Transactions* for 1849, though it was a paper I had studied in connection with the lectures. I hope this example may suffice to prevent any one whose name does not appear from feeling annoyed at the omission, and to prevent the readers of NATURE from taking my lectures for what they were not intended to be, namely, a complete history of the subject. I take this opportunity of referring to one passage in my second lecture (NATURE, p. 415, a little above the figure), where I say "we might not have tension enough to produce such a discharge [*i.e.* a flash of lightning], the resistance to the passage of electricity from one portion of the air to another, which at any rate would be comparatively dry compared with what we have in warm latitudes, would prevent it by itself alone." These words, without actually asserting, seem to imply that the resistance to such a discharge through moist air would be less than through dry. My attention has been called by a friend to the fact that it has been found by experiment that moist air insulates as well as dry. I have not met with experiments tending to show whether the resistance to a *disruptive* discharge is the same or not in the two. Be that as it may, it does not affect what follows; for we know as a fact that thunderstorms are absent in high latitudes.

Cambridge, November 8

G. G. STOKES

The Society of Arts Patent Bill

It appears that "the draft of a Bill for the Amendment of the Patent Laws has been prepared by a committee of the Society of Arts, and is published by the Council of that Society for consideration."

From the printed bill so prepared and published the following extracts are made:—

Extract from the Proposed Patents for Inventions Bill.

Section 3. "An invention is deemed new for the purposes of this act if it has not been published or publicly used in the United Kingdom, the Channel Islands, or the Isle of Man within the thirty years immediately preceding the date of the application of a patent for it.

"5. A patent may be granted under this act for:—

"(a) Any manufacture or any product not being a natural product;

"(b) Any machine, or any means of producing any manufacture, product, or result;

"(c) Any process or method of producing any manufacture, product, or result;

"(d) Any part of a machine, means, process, or method of producing any manufacture, product, or result.

"8. *Commissioners of Patents and Examiners.*

"(1) There shall be a Board of Commissioners of Patents for Inventions, in this act referred to as the commissioners:—

"(2) At any time after the passing of this act Her Majesty may, by warrant under the Sign Manual, appoint three persons to be commissioners, of whom one shall be experienced in engineering, one shall be experienced in chemistry, and one shall be experienced in the law.

"9.—(1) The commissioners may from time to time after the passing of this act, subject to the approval of the Treasury, appoint such persons qualified by knowledge of manufactures or science or arts, as they see fit, to be Examiners of Patents.