SAMUEL BUTLER

EVOLUTION, OLD & NEW

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Or, the Theories of Buffon, Dr. Erasmus Darwin and Lamarck, / as compared with that of Charles Darwin

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CHAPTER I.

STATEMENT OF THE QUESTION. CURRENT OPINION ADVERSE TO TELEOLOGY.

Of all the questions now engaging the attention of those whose destiny has commanded them to take more or less exercise of mind, I know of none more interesting than that which deals with what is called teleology—that is to say, with design or purpose, as evidenced by the different parts of animals and plants.

The question may be briefly stated thus:—

Can we or can we not see signs in the structure of animals and plants, of something which carries with it the idea of contrivance so strongly that it is impossible for us to think of the structure, without at the same time thinking of contrivance, or design, in connection with it?

It is my object in the present work to answer this question in the affirmative, and to lead my reader to agree with me, perhaps mainly, by following the history of that opinion which is now supposed to be fatal to a purposive view of animal and vegetable organs. I refer to the theory of evolution or descent with modification.

Let me state the question more at large.

When we see organs, or living tools—for there is no well-developed organ of any living being which is not used by its possessor as an instrument or tool for the effecting of some purpose which he considers or has considered for his advantage—when we see living tools which are as admirably fitted for the work required of them, as is the carpenter's plane for planing, or the blacksmith's hammer

and anvil for the hammering of iron, or the tailor's needle for sewing, what conclusion shall we adopt concerning them?

Shall we hold that they must have been designed or contrived, not perhaps by mental processes indistinguishable from those by which the carpenter's saw or the watch has been designed, but still by processes so closely resembling these that no word can be found to express the facts of the case so nearly as the word "design"? That is to say, shall we imagine that they were arrived at by a living mind as the result of scheming and contriving, and thinking (not without occasional mistakes) which of the courses open to it seemed best fitted for the occasion, or are we to regard the apparent connection between such an organ, we will say, as the eye, and the sight which is affected by it, as in no way due to the design or plan of a living intelligent being, but as caused simply by the accumulation, one upon another, of an almost infinite series of small pieces of good fortune?

In other words, shall we see something for which, as Professor Mivart has well said, "to us the word 'mind' is the least inadequate and misleading symbol," as having given to the eagle an eyesight which can pierce the sun, but which, in the night is powerless; while to the owl it has given eyes which shun even the full moon, but find a soft brilliancy in darkness? Or shall we deny that there has been any purpose or design in the fashioning of these different kinds of eyes, and see nothing to make us believe that any living being made the eagle's eye out of something which was not an eye nor anything like one, or that this living

being implanted this particular eye of all others in the eagle's head, as being most in accordance with the habits of the creature, and as therefore most likely to enable it to live contentedly and leave plenitude of offspring? And shall we then go on to maintain that the eagle's eye was formed little by little by a series of accidental variations, each one of which was thrown for, as it were, with dice?

We shall most of us feel that there must have been a little cheating somewhere with these accidental variations before the eagle could have become so great a winner.

I believe I have now stated the question at issue so plainly that there can be no mistake about its nature, I will therefore proceed to show as briefly as possible what have been the positions taken in regard to it by our forefathers, by the leaders of opinion now living, and what I believe will be the next conclusion that will be adopted for any length of time by any considerable number of people.

In the times of the ancients the preponderance of opinion was in favour of teleology, though impugners were not wanting. Aristotle[1] leant towards a denial of purpose, while Plato[2] was a firm believer in design. From the days of Plato to our own times, there have been but few objectors to the teleological or purposive view of nature. If an animal had an eye, that eye was regarded as something which had been designed in order to enable its owner to see after such fashion as should be most to its advantage.

This, however, is now no longer the prevailing opinion either in this country or in Germany.

Professor Haeckel holds a high place among the leaders of German philosophy at the present day. He declares a

belief in evolution and in purposiveness to be incompatible, and denies purpose in language which holds out little prospect of a compromise.

"As soon, in fact," he writes, "as we acknowledge the exclusive activity of the physico-chemical causes in living (organic) bodies as well as in so-called inanimate (inorganic) nature,"—and this is what Professor Haeckel holds we are bound to do if we accept the theory of descent with modification—"we concede exclusive dominion to that view of the universe, which we may designate as *mechanical*, and which is opposed to the teleological conception. If we compare all the ideas of the universe prevalent among different nations at different times, we can divide them all into two sharply contrasted groups—a *causal* or *mechanical*, and a *teleological* or *vitalistic*. The latter has prevailed generally in biology until now, and accordingly the animal and vegetable kingdoms have been considered as the products of a creative power, acting for a definite purpose. In the contemplation of every organism, the unavoidable conviction seemed to press itself upon us, that such a wonderful machine, so complicated an apparatus for motion as exists in the organism, could only be produced by a power analogous to, but infinitely more powerful than the power of man in the construction of his machines."[3]

A little lower down he continues:—

"*I maintain with regard to*" this "*much talked of 'purpose in nature' that it has no existence but for those persons who observe phenomena in plants and animals in the most superficial manner*. Without going more deeply into the matter, we can see at once that the rudimentary organs are

a formidable obstacle to this theory. And, indeed, anyone who makes a really close study of the organization and mode of life of the various animals and plants, ... must necessarily come to the conclusion, that this 'purposiveness' no more exists than the much talked of 'beneficence' of the Creator."[4]

Professor Haeckel justly sees no alternative between, upon the one hand, the creation of independent species by a Personal God—by a "Creator," in fact, who "becomes an organism, who designs a plan, reflects upon and varies this plan, and finally forms creatures according to it, as a human architect would construct his building,"[5]—and the denial of all plan or purpose whatever. There can be no question but that he is right here. To talk of a "designer" who has no tangible existence, no organism with which to think, no bodily mechanism with which to carry his purposes into effect; whose design is not design inasmuch as it has to contend with no impediments from ignorance or impotence, and who thus contrives but by a sort of make-believe in which there is no contrivance; who has a familiar name, but nothing beyond a name which any human sense has ever been able to perceive—this is an abuse of words—an attempt to palm off a shadow upon our understandings as though it were a substance. It is plain therefore that there must either be a designer who "becomes an organism, designs a plan, &c.," or that there can be no designer at all and hence no design.

We have seen which of these alternatives Professor Haeckel has adopted. He holds that those who accept evolution are bound to reject all "purposiveness." And here,

as I have intimated, I differ from him, for reasons which will appear presently. I believe in an organic and tangible designer of every complex structure, for so long a time past, as that reasonable people will be incurious about all that occurred at any earlier time.

Professor Clifford, again, is a fair representative of opinions which are finding favour with the majority of our own thinkers. He writes:—

"There are here some words, however, which require careful definition. And first the word purpose. A thing serves a purpose when it is adapted for some end; thus a corkscrew is adapted to the end of extracting corks from bottles, and our lungs are adapted to the end of respiration. We may say that the extraction of corks is the purpose of the corkscrew, and that respiration is the purpose of the lungs, but here we shall have used the word in two different senses. A man made the corkscrew with a purpose in his mind, and he knew and intended that it should be used for pulling out corks. *But nobody made our lungs with a purpose in his mind and intended that they should be used for breathing.* The respiratory apparatus was adapted to its purpose by natural selection, namely, by the gradual preservation of better and better adaptations, and by the killing-off of the worse and imperfect adaptations."[6]

No denial of anything like design could be more explicit. For Professor Clifford is well aware that the very essence of the "Natural Selection" theory, is that the variations shall have been mainly accidental and without design of any sort, but that the adaptations of structure to need shall have

come about by the accumulation, through natural selection, of any variation that *happened* to be favourable.

It will be my business on a later page not only to show that the lungs are as purposive as the corkscrew, but furthermore that if drawing corks had been a matter of as much importance to us as breathing is, the list of our organs would have been found to comprise one corkscrew at the least, and possibly two, twenty, or ten thousand; even as we see that the trowel without which the beaver cannot plaster its habitation in such fashion as alone satisfies it, is incorporate into the beaver's own body by way of a tail, the like of which is to be found in no other animal.

To take a name which carries with it a far greater authority, that of Mr. Charles Darwin. He writes:—

"It is scarcely possible to avoid comparing the eye with a telescope. We know that this instrument has been perfected by the long-continued efforts of the highest human intellects; and we naturally infer that the eye has been formed by a somewhat analogous process. But may not this inference be presumptuous? Have we any right to declare that the Creator works by intellectual powers like those of man?"[7]

Here purposiveness is not indeed denied point-blank, but the intention of the author is unmistakable, it is to refer the wonderful result to the gradual accumulation of small accidental improvements which were not due as a rule, if at all, to anything "analogous" to design.

"Variation," he says, "will cause the slight alterations;" that is to say, the slight successive variations whose accumulation results in such a marvellous structure as the

eye, are caused by—variation; or in other words, they are indefinite, due to nothing that we can lay our hands upon, and therefore certainly not due to design. "Generation," continues Mr. Darwin, "will multiply them almost infinitely, and natural selection will pick out with unerring skill each improvement. Let this process go on for millions of years, and during each year on millions of individuals of many kinds; and may we not believe that a living optical instrument might be thus formed as superior to one of glass, as the works of the Creator are to those of man?"[8]

The reader will observe that the only skill—and this involves design—supposed by Mr. Darwin to be exercised in the foregoing process, is the "unerring skill" of natural selection. Natural selection, however, is, as he himself tells us, a synonym for the survival of the fittest, which last he declares to be the "more accurate" expression, and to be "sometimes" equally convenient.[9] It is clear then that he only speaks metaphorically when he here assigns "unerring skill" to the fact that the fittest individuals commonly live longest and transmit most offspring, and that he sees no evidence of design in the numerous slight successive "alterations"—or variations—which are "caused by variation."

It were easy to multiply quotations which should prove that the denial of "purposiveness" is commonly conceived to be the inevitable accompaniment of a belief in evolution. I will, however, content myself with but one more—from Isidore Geoffroy St. Hilaire.

"Whoever," says this author, "holds the doctrine of final causes, will, if he is consistent, hold also that of the

immutability of species; and again, the opponent of the one doctrine will oppose the other also."[10]

Nothing can be plainer; I believe, however, that even without quotation the reader would have recognized the accuracy of my contention that a belief in the purposiveness or design of animal and vegetable organs is commonly held to be incompatible with the belief that they have all been evolved from one, or at any rate, from not many original, and low, forms of life. Generally, however, as this incompatibility is accepted, it is not unchallenged. From time to time a voice is uplifted in protest, whose tones cannot be disregarded.

"I have always felt," says Sir William Thomson, in his address to the British Association, 1871, "that this hypothesis" (natural selection) "does not contain the true theory of evolution, if indeed evolution there has been, in biology. Sir John Herschel, in expressing a favourable judgment on the hypothesis of zoological evolution (with however some reservation in respect to the origin of man), objected to the doctrine of natural selection on the ground that it was too like the Laputan method of making books, and that it did not sufficiently take into account a continually guiding and controlling intelligence. This seems to me a most valuable and instructive criticism. *I feel profoundly convinced that the argument of design has been greatly too much lost sight of in recent zoological speculations.* Reaction against the frivolities of teleology such as are to be found in the notes of the learned commentators on Paley's 'Natural Theology,' has, I believe, had a temporary effect in turning attention from the solid

and irrefragable argument so well put forward in that excellent old book. But overpoweringly strong proofs of intelligent and benevolent design lie all around us,"[11] &c. Sir William Thomson goes on to infer that all living beings depend on an ever-acting Creator and Ruler—meaning, I am afraid, a Creator who is not an organism. Here I cannot follow him, but while gladly accepting his testimony to the omnipresence of intelligent design in almost every structure, whether of animal or plant, I shall content myself with observing the manner in which plants and animals act and with the consequences that are legitimately deducible from their action.

Footnote

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[1] See note to Mr. Darwin, Historical Sketch, &c., 'Origin of Species, p. xiii. ed. 1876, and Arist. 'Physicæ Auscultationes,' lib. ii. cap. viii. s. 2.

[2] See Phædo and Timæus.

[3] 'History of Creation,' vol. i. p. 18 (H. S. King and Co., 1876).

[4] Ibid. p. 19.

[5] 'History of Creation,' vol. i. p. 73 (H. S. King and Co., 1876).

[6] 'Fortnightly Review,' new series, vol. xviii. p. 795.

[7] 'Origin of Species,' p. 146, ed. 1876.

[8] 'Origin of Species,' p. 146, ed. 1876.

[9] Page 49.

[10] 'Vie et Doctrine scientifique d'Étienne Geoffroy St. Hilaire,' by Isidore Geoffroy St. Hilaire. Paris, 1847, p. 344.

[11] Address to the British Association, 1871.

CHAPTER II

THE TELEOLOGY OF PALEY AND THE THEOLOGIANS.

Let us turn for a while to Paley, to whom Sir W. Thomson has referred us. His work should be so well known that an apology is almost due for quoting it, yet I think it likely that at least nine out of ten of my readers will (like myself till reminded of it by Sir W. Thomson's address) have forgotten its existence.

"In crossing a heath," says Paley, "suppose I pitched my foot against a stone, and were asked how the stone came to be there; I might possibly answer that for anything I knew to the contrary, it had lain there for ever; nor would it perhaps be very easy to show the absurdity of this answer. But suppose I had found a *watch* upon the ground, and it should be inquired how the watch happened to be in that place; I should hardly think of the answer I had before given—that for anything I knew the watch might have been always there. Yet, why should not this answer serve for the watch as well as for the stone? Why is it not as admissible in the second case as in the first? For this reason, and for no other, viz. that when we come to inspect the watch, we perceive (what we could not discover in the stone) that its several parts are framed and put together for a purpose, e. g. that they are so formed and adjusted as to produce motion, and that motion so regulated as to point out the hour of the day: that if the different parts had been differently shaped from what they are, of a different size from what they are, or placed after any other manner, or in any other order, than that in which they are placed, either no motion at all would have been carried on in the machine, or none that would

have answered the use which is now served by it. To reckon up a few of the plainest of these parts, and of their offices all tending to one result: we see a cylindrical box containing a coiled elastic spring, which, by its endeavours to relax itself, turns round the box. We next observe a flexible chain (artificially wrought for the sake of flexure) communicating the action of the spring from the box to the fusee. We then find a series of wheels the teeth of which catch in, and apply to each other, conducting the motion from the fusee to the balance, and from the balance to the pointer; and at the same time by the size and shape of those wheels so regulating the motion as to terminate in causing an index, by an equable and measured progression, to pass over a given space in a given time. We take notice that the wheels are made of brass in order to keep them from rust; the springs of steel, no other metal being so elastic; that over the face of the watch there is placed a glass, a material employed on no other part of the work, but in the room of which if there had been any other than a transparent substance, the hour could not have been observed without opening the case. This mechanism being observed, ... the inference, we think, is inevitable that the watch must have had a maker; that there must have existed, at *some time, and at some place or other, an artificer* or artificers who formed it for the purpose which we find it actually to answer; who comprehended its construction and designed its use."[12]

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"That an animal is a machine, is a proposition neither correctly true nor wholly false.... I contend that there is a

mechanism in animals; that this mechanism is as properly such, as it is in machines made by art; that this mechanism is intelligible and certain; that it is not the less so because it often begins and terminates with something which is not mechanical; that wherever it is intelligible and certain, it demonstrates intention and contrivance, as well in the works of nature as in those of art; and that it is the best demonstration which either can afford."[13]

There is only one legitimate inference deducible from these premises if they are admitted as sound, namely, that there must have existed "*at some time, and in some place, an artificer*" who formed the animal mechanism after much the same mental processes of observation, endeavour, successful contrivance, and after a not wholly unlike succession of bodily actions, as those with which a watchmaker has made a watch. Otherwise the conclusion is impotent, and the whole argument becomes a mere juggle of words.

"Now, supposing or admitting," continues Paley, "that we know nothing of the proper internal constitution of a gland, or of the mode of its acting upon the blood; then our situation is precisely like that of an unmechanical looker-on who stands by a stocking loom, a corn mill, a carding machine, or a threshing machine, at work, the fabric and mechanism of which, as well as all that passes within, is hidden from his sight by the outside case; or if seen, would be too complicated for his uninformed, uninstructed understanding to comprehend. And what is that situation? This spectator, ignorant as he is, sees at one end a material enter the machine, as unground grain the mill, raw cotton

the carding machine, sheaves of unthreshed corn the threshing machine, and when he casts his eye to the other end of the apparatus, he sees the material issuing from it in a new state and what is more, a state manifestly adapted for its future uses: the grain in meal fit for the making of bread, the wool in rovings fit for the spinning into threads, the sheaf in corn fit for the mill. Is it necessary that this man, in order to be convinced that design, that intention, that contrivance has been employed about the machine, should be allowed to pull it to pieces, should be enabled to examine the parts separately, explore their action upon one another, or their operation, whether simultaneous or successive, upon the material which is presented to them? He may long to do this to satisfy his curiosity; he may desire to do it to improve his theoretic knowledge; ... but for the purpose of ascertaining the existence of counsel and design in the formation of the machine, he wants no such intromission or privity. The effect upon the material, the change produced in it, the utility of the change for future applications, abundantly testify, be the concealed part of the machine, or of its construction, what it will, *the hand and agency of a contriver*."[14]

This is admirably put, but it will apply to the mechanism of animal and vegetable bodies only, if it is used to show that they too must have had a contriver who has a hand, or something tantamount to one; who does act; who, being a contriver, has what all other contrivers must have, if they are to be called contrivers—a body which can suffer more or less pain or chagrin if the contrivance is unsuccessful. If this is what Paley means, his argument is indeed irrefragable;

but if he does not intend this, his words are frivolous, as so clear and acute a reasoner must have perfectly well known.

Whether Paley's argument will prove a source of lasting strength to himself or no, is a point which my readers will decide presently; but I am very clear about its usefulness to my own position. I know few writers whom I would willingly quote more largely, or from whom I find it harder to leave off quoting when I have once begun. A few more passages, however, must suffice.

"I challenge any man to produce in the joints and pivots of the most complicated or the most flexible machine that ever was contrived, a construction *more artificial*" (here we have it again), "or more evidently artificial than the human neck. Two things were to be done. The head was to have the power of bending forward and backward as in the act of nodding, stooping, looking upwards or downwards; and at the same time of turning itself round upon the body to a certain extent, the quadrant, we will say, or rather perhaps a hundred and twenty degrees of a circle. For these two purposes two distinct contrivances are employed. First the head rests immediately upon the uppermost part of the vertebra, and is united to it by a hinge-joint; upon this joint the head plays freely backward and forward as far either way as is necessary or as the ligaments allow, which was the first thing required.

"But then the rotatory motion is thus unprovided for; therefore, secondly, to make the head capable of this a further mechanism is introduced, not between the head and the uppermost bone of the neck, where the hinge is, but between that bone and the next underneath it. It is a

mechanism resembling a tenon and mortise. This second or uppermost bone but one has what the anatomists call a process, viz. a projection somewhat similar in size and shape to a tooth, which tooth, entering a corresponding hollow socket in the bone above it, forms a pivot or axle, upon which that upper bone, together with the head which it supports, turns freely in a circle, and as far in the circle as the attached muscles permit the head to turn. Thus are both motions perfect without interfering with each other. When we nod the head we use the hinge-joint, which lies between the head and the first bone of the neck. When we turn the head round, we use the tenon and mortise, which runs between the first bone of the neck and the second. We see the same contrivance and the same principle employed in the frame or mounting of a telescope. It is occasionally requisite that the object end of the instrument be moved up and down as well as horizontally or equatorially. For the vertical motion there is a hinge upon which the telescope plays, for the horizontal or equatorial motion, an axis upon which the telescope and the hinge turn round together. And this is exactly the mechanism which is applied to the action of the head, nor will anyone here doubt of the existence of counsel and design, except it be by that debility of mind which can trust to its own reasonings in nothing."[15]

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"The patella, or knee-pan, is a curious little bone; in its form and office unlike any other bone in the body. It is circular, the size of a crown-piece, pretty thick, a little convex on both sides, and covered with a smooth cartilage. It lies upon the front of the knee, and the powerful tendons

by which the leg is brought forward pass through it (or rather make it a part of their continuation) from their origin in the thigh to their insertion in the tibia. It protects both the tendon and the joint from any injury which either might suffer by the rubbing of one against the other, or by the pressure of unequal surfaces. It also gives to the tendons a very considerable mechanical advantage by altering the line of their direction, and by advancing it farther out of the centre of motion; and this upon the principles of the resolution of force, upon which all machinery is founded. These are its uses. But what is most observable in it is that it appears to be supplemental, as it were, to the frame; added, as it should almost seem, afterwards; not quite necessary, but very convenient. It is separate from the other bones; that is, it is not connected with any other bones by the common mode of union. It is soft, or hardly formed in infancy; and is produced by an ossification, of the inception or progress of which no account can be given from the structure or exercise of the part."[16]

It is positively painful to me to pass over Paley's description of the joints, but I must content myself with a single passage from this admirable chapter.

"The joints, or rather the ends of the bones which form them, display also in their configuration another use. The nerves, blood-vessels, and tendons which are necessary to the life, or for the motion of the limbs, must, it is evident in their way from the trunk of the body to the place of their destination, travel over the moveable joints; and it is no less evident that in this part of their course they will have from sudden motions, and from abrupt changes of curvature, to

encounter the danger of compression, attrition, or laceration. To guard fibres so tender against consequences so injurious, their path is in those parts protected with peculiar care; and that by a provision in the figure of the bones themselves. The nerves which supply the fore arm, especially the inferior cubital nerves, are at the elbow conducted by a kind of covered way, between the condyle, or rather under the inner extuberances, of the bone which composes the upper part of the arm. At the knee the extremity of the thigh-bone is divided by a sinus or cliff into two heads or protuberances; and these heads on the back part stand out beyond the cylinder of the bone. Through the hollow which lies between the hind parts of these two heads, that is to say, under the ham, between the ham strings, and within the concave recess of the bone formed by the extuberances on either side; in a word, along a defile between rocks pass the great vessels and nerves which go to the leg. Who led these vessels by a road so defended and secured? In the joint at the shoulder, in the edge of the cup which receives the head of the bone, is a notch which is covered at the top with a ligament. Through this hole thus guarded the blood-vessels steal to their destination in the arm instead of mounting over the edge of the concavity." [17]

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"What contrivance can be more mechanical than the following, viz.: a slit in one tendon to let another tendon pass through it? This structure is found in the tendons which move the toes and fingers. The long tendon, as it is called in the foot, which bends the first joint of the toe, passes

through the short tendon which bends the second joint; which course allows to the sinews more liberty and a more commodious action than it would otherwise have been capable of exerting. There is nothing, I believe, in a silk or cotton mill, in the belts or straps or ropes by which the motion is communicated from one part of the machine to another that is more artificial, or more evidently so, than this perforation.

"The next circumstance which I shall mention under this head of muscular arrangement, is so decidedly a mark of intention, that it always appeared to me to supersede in some measure the necessity of seeking for any other observation upon the subject; and that circumstance is the tendons which pass from the leg to the foot being bound down by a ligament at the ankle, the foot is placed at a considerable angle with the leg. It is manifest, therefore, that flexible strings passing along the interior of the angle, if left to themselves, would, when stretched, start from it. The obvious" (and it must not be forgotten that the preventive *was* obvious) "preventive is to tie them down. And this is done in fact. Across the instep, or rather just above it, the anatomist finds a strong ligament, under which the tendons pass to the foot. The effect of the ligament as a bandage can be made evident to the senses, for if it be cut the tendons start up. The simplicity, yet the clearness of this contrivance, its exact resemblance to established resources of art, place it amongst the most indubitable manifestations of design with which we are acquainted."

Then follows a passage which is interesting, as being the earliest attempt I know of to bring forward an argument

against evolution, which was, even in Paley's day, called "Darwinism," after Dr. Erasmus Darwin its propounder.[18] The argument, I mean, which is drawn from the difficulty of accounting for the incipiency of complex structures. This has been used with greater force by the Rev. J. J. Murphy, Professor Mivart, and others, against that (as I believe) erroneous view of evolution which is now generally received as Darwinism.

"There is also a further use," says Paley, "to be made of this present example, and that is as it precisely contradicts the opinion, that the parts of animals may have been all formed by what is called appetency, i. e. endeavour, perpetuated and imperceptibly working its effect through an incalculable series of generations. We have here no endeavour, but the reverse of it; a constant resistency and reluctance. The endeavour is all the other way. The pressure of the ligament constrains the tendons; the tendons react upon the pressure of the ligament. It is impossible that the ligament should ever have been generated by the exercise of the tendons, or in the course of that exercise, forasmuch as the force of the tendon perpendicularly resists the fibre which confines it, and is constantly endeavouring not to form but to rupture and displace the threads of which the ligament is composed."[19]

This must suffice.

"True theories," says M. Flourens, inspired by a passage from Fontenelle, which he proceeds to quote, "true theories make themselves," they are not made, but are born and grow; they cannot be stopped from insisting upon their vitality by anything short of intellectual violence, nor will a

little violence only suffice to kill them. "True theories," he continues, "are but the spontaneous mental coming together of facts, which have combined with one another by virtue only of their own natural affinity."[20]

When a number of isolated facts, says Fontenelle, take form, group themselves together coherently, and present the mind so vividly with an idea of their interdependence and mutual bearing upon each other, that no matter how violently we tear them asunder they insist on coming together again; then, and not till then, have we a theory.

Now I submit that there is hardly one of my readers who can be considered as free from bias or prejudice, who will not feel that the idea of design—or perception by an intelligent living being, of ends to be obtained and of the means of obtaining them—and the idea of the tendons of the foot and of the ligament which binds them down, come together so forcibly, that no matter how strongly Professors Haeckel and Clifford and Mr. Darwin may try to separate them, they are no sooner pulled asunder than they straightway fly together again of themselves.

I shall argue, therefore, no further upon this head, but shall assume it as settled, and shall proceed at once to the consideration that next suggests itself.

Footnote

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[12] 'Natural Theology,' ch. i. § 1.

[13] Ch. vii.

[14] Ch. vii.

[15] 'Natural Theology.' ch. viii.

[16] 'Natural Theology,' ch. viii.

[17] 'Natural Theology,' ch. viii.

[18] "What!" says Coleridge, in a note on Stillingfleet, to which Mr. Garnett, of the British Museum, has kindly called my attention, "Did Sir Walter Raleigh believe that a male and female ounce (and if so why not two tigers and lions, &c.?) would have produced in course of generations a cat, or a cat a lion? This is Darwinising with a vengeance."—See 'Athenæum,' March 27, 1875, p. 423.

[19] 'Natural Theology,' ch. ix.

[20] "La vraie théorie n'est que l'enchaînement naturel des faits, qui dès qu'ils sont assez nombreux, se touchent, et se lient, les uns aux autres par leur seule vertu propre."—Flourens, 'Buffon, Hist. de ses Travaux.' Paris, 1844, p. 82.

CHAPTER III.

IMPOTENCE OF PALEY'S CONCLUSION. THE TELEOLOGY OF THE EVOLUTIONIST.

Though the ideas of design, and of the foot, have come together in our minds with sufficient spontaneity, we yet feel that there is a difference—and a wide difference if we could only lay our hands upon it—between the design and manufacture of the ligament and tendons of the foot on the one hand, and on the other the design, manufacture, and combination of artificial strings, pieces of wood, and

bandages, whereby a model of the foot might be constructed.

If we conceive of ourselves as looking simultaneously upon a real foot, and upon an admirably constructed artificial one, placed by the side of it, the idea of design, and design by an intelligent living being with a body and soul (without which, as has been already insisted on, the use of the word design is delusive), will present itself strongly to our minds in connection both with the true foot, and with the model; but we find another idea asserting itself with even greater strength, namely, that the design of the true foot is far more intricate, and yet is carried into execution in far more masterly manner than that of the model. We not only feel that there is a wider difference between the ability, time, and care which have been lavished on the real foot and upon the model, than there is between the skill and the time taken to produce Westminster Abbey, and that bestowed upon a gingerbread cake stuck with sugar plums so as to represent it, but also that these two objects must have been manufactured on different principles. We do not for a moment doubt that the real foot was designed, but we are so astonished at the dexterity of the designer that we are at a loss for some time to think who could have designed it, where he can live, in what manner he studied, for how long, and by what processes he carried out his design, when matured, into actual practice. Until recently it was thought that there was no answer to many of these questions, more especially to those which bear upon the mode of manufacture. For the last hundred years, however, the importance of a study has been recognized which does

actually reveal to us in no small degree the processes by which the human foot is manufactured, so that in the endeavour to lay our hands upon the points of difference between the kind of design with which the foot itself is designed, and the design of the model, we turn naturally to the guidance of those who have made this study their specialty; and a very wide difference does this study, embryology, at once reveal to us.

Writing of the successive changes through which each embryo is forced to pass, the late Mr. G. H. Lewes says that "none of these phases have any adaptation to the future state of the animal, but are in positive contradiction to it or are simply purposeless; whereas all show stamped on them the unmistakable characters of *ancestral* adaptation, and the progressions of organic evolution. What does the fact imply? There is not a single known example of a complex organism which is not developed out of simpler forms. Before it can attain the complex structure which distinguishes it, there must be an evolution of forms similar to those which distinguish the structure of organisms lower in the series. On the hypothesis of a plan which prearranged the organic world, nothing could be more unworthy of a supreme intelligence than this inability to construct an organism at once, without making several previous tentative efforts, undoing to-day what was so carefully done yesterday, and *repeating for centuries the same tentatives in the same succession*. Do not let us blink this consideration. There is a traditional phrase much in vogue among the anthropomorphists, which arose naturally enough from a tendency to take human methods as an

explanation of the Divine—a phrase which becomes a sort of argument—'The Great Architect.' But if we are to admit the human point of view, a glance at the facts of embryology must produce very uncomfortable reflections. For what should we say to an architect who was unable, or being able was obstinately unwilling, to erect a palace except by first using his materials in the shape of a hut, then pulling them down and rebuilding them as a cottage, then adding story to story and room to room, *not* with any reference to the ultimate purposes of the palace, but wholly with reference to the way in which houses were constructed in ancient times? What should we say to the architect who could not form a museum out of bricks and mortar, but was forced to begin as if going to construct a mansion, and after proceeding some way in this direction, altered his plan into a palace, and that again into a museum? Yet this is the sort of succession on which organisms are constructed. The fact has long been familiar; how has it been reconciled with infinite wisdom? Let the following passage answer for a thousand:—'The embryo is nothing like the miniature of the adult. For a long while the body in its entirety and in its details, presents the strangest of spectacles. Day by day and hour by hour, the aspect of the scene changes, and this instability is exhibited by the most essential parts no less than by the accessory parts. One would say that nature feels her way, and only reaches the goal after many times missing the path' (on dirait que la nature tâtonne et ne conduit son œuvre à bon fin, qu'après s'être souvent trompée)."[21]

The above passage does not, I think, affect the evidence for design which we adduced in the preceding chapter. However strange the process of manufacture may appear, when the work comes to be turned out the design is too manifest to be doubted.

If the reader were to come upon some lawyer's deed which dealt with matters of such unspeakable intricacy, that it baffled his imagination to conceive how it could ever have been drafted, and if in spite of this he were to find the intricacy of the provisions to be made, exceeded only by the ease and simplicity with which the deed providing for them was found to work in practice; and after this, if he were to discover that the deed, by whomsoever drawn, had nevertheless been drafted upon principles which at first seemed very foreign to any according to which he was in the habit of drafting deeds himself, as for example, that the draftsman had begun to draft a will as a marriage settlement, and so forth—yet an observer would not, I take it, do either of two things. He would not in the face of the result deny the design, making himself judge rather of the method of procedure than of the achievement. Nor yet after insisting in the manner of Paley, on the wonderful proofs of intention and on the exquisite provisions which were to be found in every syllable—thus leading us up to the highest pitch of expectation—would he present us with such an impotent conclusion as that the designer, though a living person and a true designer, was yet immaterial and intangible, a something, in fact, which proves to be a nothing: an omniscient and omnipotent vacuum.

Our observer would feel he need not have been at such pains to establish his design if this was to be the upshot of his reasoning. He would therefore admit the design, and by consequence the designer, but would probably ask a little time for reflection before he ventured to say who, or what, or where the designer was. Then gaining some insight into the manner in which the deed had been drawn, he would conclude that the draftsman was a specialist who had had long practice in this particular kind of work, but who now worked almost as it might be said automatically and without consciousness, and found it difficult to depart from a habitual method of procedure.

We turn, then, on Paley, and say to him: "We have admitted your design and your designer. Where is he? Show him to us. If you cannot show him to us as flesh and blood, show him as flesh and sap; show him as a living cell; show him as protoplasm. Lower than this we should not fairly go; it is not in the bond or *nexus* of our ideas that something utterly inanimate and inorganic should scheme, design, contrive, and elaborate structures which can make mistakes: it may elaborate low unerring things, like crystals, but it cannot elaborate those which have the power to err. Nevertheless, we will commit such abuse with our understandings as to waive this point, and we will ask you to show him to us as air which, if it cannot be seen, yet can be felt, weighed, handled, transferred from place to place, be judged by its effects, and so forth; or if this may not be, give us half a grain of hydrogen, diffused through all space and invested with some of the minor attributes of matter; or if you cannot do this, give us an imponderable like