though he recovered to a certain extent, yet his active powers were much diminished. He was unable to attend the last confirmation at Hursley; but wrote a touching letter to the newly-confirmed, closing with words almost prophetic of his own coming end. 'So doing you will abide in Christ, and be sure He will abide in you. There may be sorrow on the road, but all will go right in the end, for you will see His face with joy.'

So doubtless it was with him; on the 29th of March, 1866, he fell asleep; on the 11th of May his wife followed him. Their graves are in that quiet churchyard at Hursley, which looked 'so beautiful and calm' to Dr. Newman as he gazed on it with Keble but a few months before. In the Church of England, we cannot write it without shame, he was but the Vicar of Hursley. Once only by any patron was there offered to the author of the 'Christian Year' one distant dignity, the Archdeaconry of Barbadoes, which he could not forsake his father to accept. His only Church preferment was the gift of a lay friend, upon whose tomb—may it be years before it can be written—amongst many honourable memories not far from the highest might well be graven, 'The sole patron of John Keble.'

Such he was: so he lived amongst us: so he passed away from us. Never aiming at acquiring influence, he exerted it in its highest measures on every one who came within his reach, and widely beyond his immediate sphere upon the Church at large. He took a resolute part in all the most stirring controversies of his time; and yet no one could ever point to a word of his, written or spoken, which had inflicted one needless wound upon any one opposed to him. He gave England's sacred literature the high boon of 'The Christian Year.' He gave England's Church the learning of a deep divine, the love and trust of a loyal son, the labours of a devoted priest, and the pattern of a saint; and he died, as he had lived, the Vicar of Hursley.

ART. V.—1. *Mr. Darwin's Hypotheses.* By George Henry Lewes. The 'Fortnightly Review,' April, June, July, 1868.

2. *Le Matérialisme Contemporain.* Par Paul Janet, Membre de l'Institut.

IT may seem extraordinary, after the Argument of Design in Nature has been discussed in the world for two thousand years, that we who accept and uphold it—should have to explain what we mean by the Argument of Design; but such curious descriptions are given of it in some quarters, and we are saddled with such unintelligible and preposterous conclusions in maintaining

maintaining it, that this preliminary step becomes necessary. A plain man lately, on turning over the pages of the 'Fortnightly,' would have been somewhat astonished to find that, as a believer in the evidences of design in Nature, he necessarily held one or other of some half-dozen singular theories, of not one of which he had ever even heard the name. He was asked, 'Do you hold the Aristotelian theory of Potential Existence? Do you hold the theory of Preformation? Do you hold the theory of *emboîtement*?' And if he said that he had never heard of the existence of any of these theories, another heading was still reserved for him, 'You are certainly an anthropomorphist?' He had, in his simplicity, thought that facts were his strong point; but the tables are completely turned upon him on that head, and he is asked summarily to apologise for gratuitous speculation, for holding a capricious, arbitrary, and wanton hypothesis, a rationale wholly in nubibus, and concocted out of his own head in contempt of facts. A bold surprise at a belief is sometimes the best argument against it; the imagination is affected by it, and for a moment weak Nature really thinks it must have made a great mistake. We shall, however, resist the impulse, and, considering the mistake to be on the other side, call attention to the real basis of the Argument of Design.

The Argument of Design is, that there is a certain construction which the facts of Nature of themselves call for and necessitate, not admitting of any other: the construction, viz., of design which attaches to visible arrangement, system, and adaptation. This construction, we say, *adheres to the facts*, is cemented to them, and cannot be separated from them. That is our position. Look into the inside of an animal body. Is it not, as a matter of fact, a machine? Yes, the apparatus of organs, pipes, vessels is simple *fact;* design is the construction, which, we say, cleaves to that fact. We have not gone to the clouds, then, for design; we have not invented the notion; we have not coined it; it has not been spun out of our brain; it has come *to* us out of plain, solid, external, material, tangible facts. It is stamped upon those facts. We have not sought it by speculation, but outward Nature has forced it upon us. We have not first conceived the idea independently of Nature and Nature got the impress from our fancy, but the idea has been got out of Nature in the first instance, and we are only the recipients of it. People would draw us aside from this position, and ask a number of irrelevant questions, which we shall deal with further on. 'Who is the Designer?' they ask; 'what is the nature of His mind? You must settle as to the designer before you assert design.' But we say, No: the construction adheres to the phenomena. Were we obliged

obliged to discover all about our designer before we asserted design, there would be an end of the Argument of Design. But we say we are not obliged to find out that, because reason attaches the conclusion of design straight to the *facts:* the facts of concurrence, system, mechanism; to certain combinations and juxtapositions of matter. By the constitution of our minds and by the laws of thought, we cannot but construe facts as we do construe them, interpret plain and palpable mechanism as indicating intention and purpose.

How do we argue in the case of—what is not indeed exactly the same with, but has something in common with, the idea of design—Law, physical law? The idea of Law, while an indistinct idea of the mind, is at the same time a most simple one; it is the idea of something which *makes* something else to occur, as distinguished from that something happening by chance. What we mean by this making something else to happen, a *cause* of its happening, we do not know; the idea is lodged amid the obscure foundations of our intellectual system, from which it never will be extricated. The evidence or *criterion*, however, of 'law' is very plain—simple recurrence; the same fact being repeated again. Upon what argument then does this criterion of law depend? Have we any demonstration that, because an occurrence in Nature happens again and again, it happens by law? None. It might occur two or three times, by chance. Why, then, when it goes on occurring, does it occur by law? A man throws double six once. It is a chance. He throws them again. It still might be a chance. He throws them a third time. Still we would not say for a positive certainty, that it could not be by chance. But if he threw them fifty times running, we should then be certain that it could not be by chance. We should be sure that it was by *law.* He might at each throw say—'It is true I have thrown double six so many times, but why should that prevent me throwing it again this time? Chance is still free; it is not bound by the past; there is no physical obstruction, there is no mathematical obstruction, to the throw. It may therefore be thrown again, and thrown by chance this very next time.' This argument might be repeated at every throw, but a practical principle in our nature would still decide, and decide beyond all manner of doubt, that if double six were thrown fifty times running, they were not thrown by chance, but by law, *i.e.* that there was something which *made* the throw thus to recur and be repeated. It would, however, be a practical principle within our minds, which ruled this question, and not a mathematical or demonstrative one. The matter is thus decided in the case of Law, and the same decision applies

applies to the case of *design*, so far as this, that it is a practical principle within us that decides that too. The disposition, the arrangement of certain particles of matter, is no demonstration. But when there is manifold coincidence and adaptation to an end, we say it is morally impossible that such machinery should not be by design; just as we say that, where there is uniform recurrence, it is morally impossible that such repetition should not be by law.

In the Argument of Design, however, the *end* is the great consideration which appeals to the reason, and demands the verdict that such work is by design. There must be a distinct perception of an end—something which all this machinery is for, and without which indeed this machinery is not machinery at all, but an unmeaning labyrinth of parts, such as an intricate engine looks to a man who does not understand it. It is this end beyond the machinery, but at once the complement and interpretation of it, which makes design. Blind material law can produce form and figure, curves and angles, which superficially simulate design, and have the look to the eye of having been moulded artificially. Crystallization makes squares and pyramids, and gravitation with propulsion circles and ellipses. But crystallization is not mechanism, because there is no *end* connected with it; its squares and pyramids end with themselves, and there is nothing beyond their squareness and conicalness. In design, on the other hand, there is an end which the mechanism accomplishes, out of and beyond the mechanism itself.

And here we come to a consideration of the utmost possible importance in the structure of the Argument of Design. There is wanted undoubtedly for the full and perfect establishment of the argument, for its completion and clear hold of our convictions, the admission of a spiritual principle; because nothing but this spiritual principle can give us that strong pointed and masterly *end* of the physical apparatus, which our reason wants in order to crown that apparatus with design. There are approaches to an end indeed before we come to a spiritual principle, but they do not satisfy the mind to the extent which is required for a full and penetrating proof of an intelligent designer. The machinery of a plant or tree has in a sense an end attaching to it, which is the growth of that plant or tree; but how can a mere vegetable life satisfy the mind as an *end?* It cannot; for there is no importance whatever in such an end. It cannot signify in the slightest degree to the vegetable whether it exists or not; the plant terminates with its own material structure, and possesses no self or soul, or sentient being which benefits by that structure,

i.e. exists

i.e. exists in consequence of it. The vegetable is only endowed with a transposed end, coming up across the great chasm and division of Nature, in the animal kingdom, where it presents itself to us in the shape of animal nutrition. The plant assumes the existence of another nature, viz., the animal, in order to be invested with an end. In moving a step upward, however, we find that the animal apparatus is connected with a direct concomitant end in the life of a sentient being who benefits and exists by it, who is capable of pleasure and satisfaction in some or other degree, and whose existence is therefore of consequence to itself. But in the brutes, though even these exhibit an ascending scale, the end is so much on a level with the machinery, the life is to so large an extent *one with* the material frame, simply consisting in the enjoyment or use of it; there is so little individuality in the existence of the brute, that the end is not satisfying. It is only when we come to man, that an end in immediate connexion with an animal machinery shines forth with such overpowering intrinsic evidence, and stands out in so conspicuous and irresistible a light, that the completing stroke and finish is given to the evidence of design. In man the end is so distinctly superior to the machine, the end is so clearly beyond the machine, that the argument strikes home.

What indeed can be more utterly different from, more *not* akin to an apparatus of flesh and bones, than a self-conscious human existence, with conscience, will, sense of moral obligation? The heterogeneousness is startling. When I think of myself, the conviction that *I* am a different being from any part or the whole of my solid material frame forces itself upon me with an overpowering weight which I cannot resist; I cannot think of any single organ, of any one sense, or of all of them together, as being myself. My consciousness, my understanding, my will, everything that comes under that great head of *I*, constitute a spiritual unity which does not touch, which is divided whole worlds from, my corporate structure. I know, I perceive, that *I* and *matter* are distinct ideas. Can we conceive any greater and more absolute diversity than that between a personal consciousness involving the highest moral, the subtlest intellectual perceptions on the one hand, and a structure of organs, stomach, heart, liver, muscles, tendons, sinews, arteries, veins, on the other? There is something in the junction of two such dissimilarities which, if we could represent it in any visible mode, and imagine ourselves meeting it amid the curiosities of productive power, would strike us as an enormous and prodigious freak of Nature; they have so utterly nothing to do with

with one another. But in proportion to the strangeness of the juxtaposition,—the heterogeneousness of the end of the bodily apparatus, as compared with the apparatus itself, is the absolute distinctness and pointedness of that end; the certainty that this corporate machinery has a positive scope and purpose fulfilled in that end. The greater the moral interval between the instrument and the result, the more pronounced is design in that instrument. Can anything exceed the conviction with which any man, when he really thinks of himself, and thinks of his body, must say—this body exists for the sake of *me:* I am its end, all this machinery is nothing without myself as an explanation? A man cannot rid himself of this sense of the object of his own body, that it is for the sake of *him*—that personal self of which he is conscious; the purpose clings to the machine and cannot be parted from it. And therefore, inasmuch as *he* is a different thing from the machine, he sees distinctly that this machine exists for an end *beyond* itself, which is the coping stone of the Argument of Design.

And hence the necessity, as we said above, of the admission of a spiritual principle in Nature, in order to the just completion and finish of the Argument of Design. A speculator who has forced himself to think—if, indeed, it is possible that he can think—that the personal being is the same identical fact with, and not a different fact from, his bodily apparatus—that matter and I are *not* distinct ideas—such a philosopher discards that end of the machine beyond the machine itself, which completes the Argument of Design; because the personal being, whom *we* call the end of the machine, is with him the same with the machine itself. And therefore the recognition of a difference between the two ideas of 'matter' and 'I,' or an admission of a spiritual principle, is a postulate in the Argument of Design which must precede the full stroke of that argument.

One observation, which we will make in passing, bears upon this subject. Two great representatives of science concur in the refusal to assert the existence of a soul.* The position

* Philosophy, according to Mr. Owen, does not recognise 'an immaterial entity, mental principle, or soul.' 'Matter and spirit,' says Mr. Huxley, 'are both names for imaginary substrata of groups of natural phenomena.' The latter thinks the asserter of a spiritual principle or soul in man is placed in a peculiar difficulty by the discovery of 'protoplasm.' We do not see the difficulty. We do not understand why a common 'physical basis and matter of life' with the vegetable, contradicts the existence of a soul in man, any more than does a community of the same with brutes; or why protoplasm is more materialistic than flesh. Whatever be the common matter in the three orders of beings, there are characteristic differences which distinguish them; and what is common cannot account for what is different. Man is an animal on the old hypothesis; he is fundamentally a vegetable

position which Professor Owen and Professor Huxley have taken is an equal and impartial certainty of matter and spirit as impressions, and an equal and impartial uncertainty of them as substances or real things. This formula of parallelism is not a just representation of the fact of consciousness. My own substance, *i.e.* I myself, stands in a relation to my consciousness, in which the substratum of an outward object does not stand. *Cogito ergo sum* is an argument which I can apply to myself; but I cannot apply it to a cabbage, nor can the cabbage apply it to itself. Mr. Huxley objects to 'systematic materialism,' or the dogmatic position of the non-existence of soul, as not only unphilosophical, but practically injurious—what 'may paralyse the energies and destroy the beauty of a life.' But if the denial of the individual that he has a soul is injurious to him, the systematic doubt whether he has a soul or not cannot be advantageous. A man must first believe that he exists, before he thinks it a matter of vital importance that he should be good. If we take those glorious and immortal men whose words and acts have renovated and converted mankind, the fount whence their goodness proceeded was the conviction that they themselves had souls. They felt, to begin with, that they had a substantial being; this certainty invested all their actions with an infinite and eternal importance to themselves, and this vital interest in them brought out their whole power. But without that first conviction they would have been paralysed.

It follows, then, that Man is the great disclosure of design in Nature; that man lets out the great secret of the authorship of Nature; and that man is the revelation of a God in Nature. In him a corporate structure is *for* a distinct personality—man himself. A final cause is declared in Nature, and the interpretation is pronounced. Had we to stop with the plant, the interpretation of Nature would be defective, because there is no end which satisfies the mind in connexion with the plant itself, and her constructive power might have been explained as an intricate working of mere material law—a mechanical art or

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vegetable upon the new; but if his animal nature did not preclude the existence in him of a rational soul, why should this be precluded by his vegetable nature? The greater the identity of the physical basis in all three orders, the less its capacity of accounting for the differences between them. If man has what the brute has not, and the brute has what the vegetable has not, there is something which enters in as cause here which is not protoplasm, which *all* have. But Mr. Huxley asserts that thought is the effect of protoplasm; while at the same time protoplasm exists without thought:—a position which violates the very grammar of induction, and the first rule of that grammar, viz., that the cause of a fact must not only always precede it when it does take place, but always omit this precedence when it does not.

solertia,

solertia, such as the ancient Hylozoists and Kosmoplastic philosophers attributed to her. But man as an instance of design differs widely from a plant as an instance of the same; here is the immediate contiguity of a decisive end—viz. man himself. Does not the great argument of Paley derive its real pungency from the reader having always, consciously or unconsciously, *man* in his mind in connexion with the machinery of Nature? In the description of the eye, he thinks of man, of himself, who sees. The complex operations are conducted to a satisfactory terminus, and he is penetrated with the proof of design, because he has, directly or indirectly, this pronounced end of design before him.

And here one thing may be noted. There appears to be an inexorable law, some deep necessity in Nature, which demands that a subtle and intricate animal machinery should always accompany the higher forms of animal life; so that that life cannot be produced without these complex mechanical means and conditions. We do not know the rationale of this law, or why such higher animal existence cannot be possessed without the adjunct of this elaboration and artifice; nor is it a law which keeps step with the ascent in the scale of life; it includes man, but does not coincide with man. Still why is it so? Our own consciousness of life is not in the least connected with the idea of mechanism or contrivance; we *feel* life, we think, we move, we are what we are, without the slightest inward thought of a subtle apparatus which is necessary for this result. Nay, we had a great deal rather—but that these were imperative conditions of being alive—be without all these details; so far from wanting to feel the manifold organisation by which we live, the more unconscious we are of it the better; anything that reminds us of its existence annoys us; we wish it away; *not* to know by sensation any part of this intricate machinery would be a happy, a truly paradisal privilege; and there are, fortunately for some favoured sons of Nature, blissful states of health in the world, which almost attain this spiritual climax. Some men live till they are fifty without being the least aware by inward feeling that they have a heart, liver, or stomach, trachea, arteries, or nerves. Their physical perfection almost emulates an ethereal existence; so little experience have they of the struggle with matter, and the inward entanglements of a physical frame. A perfectly healthy child is thus almost in his feelings a spirit; he *sees* he has a body, but, beyond that fact, all is a volatile essential life, consisting of motion, joy, love, anger, exultation; effervescences of the vital spirits which might belong to aerial natures, and show no contact with a disquieting or depressing frame. As far as the conscious sensation of life is concerned, then, we might

might have bodies as simple as crystals in their formation, or almost, we might say, no bodies at all. But, as a matter of fact, the complexer mechanism is the means to, and condition of, the higher animal life; and this law of Nature is accompanied by this valuable result—that we are surrounded on every side by *proofs* of design, which otherwise we should be without. The intricacy of our bodily structure is at once our trial and our lesson, both of which objects fit into each other, and harmonise with the purpose and end of life.

Now, then, to revert to the position which we have laid down with respect to the evidence of design, viz., that it is a construction which adheres to the *facts* of arrangement, system, and machinery in Nature, and comes out of those facts themselves. If we keep this fundamental point of view clearly in our minds, we have in it at once an answer to sundry objections to the Argument of Design.

Let us take first the objection of the unmeaning and incongruous insertions in Nature: its eccentricities, its superfluities, its abnormal appendages. This is in essence a Manichæan objection, but it has assumed lately a more scientific shape and been equipped with fresh weapons and a more exact bill of accusation by recent anatomical discovery. This has brought to light a number of what are called 'rudimental organs' in different animals: organs which never come out of a rudimental state, and are therefore without known purpose—alien interpolations in the structure, whether remaining in it or passing away from it.* We need hardly refer to a well-known list of 'atrophied or aborted organs,' which Mr. Darwin gives as a sample, asserting the fact to be 'extremely common throughout Nature:' 'the rudimentary mammæ, very general in the males of mammals; the 'bastard wing' of birds, which 'may be safely considered to be a rudimental digit;' the rudimentary lobe of the lungs in snakes; the rudimentary pelvis and hind limbs in snakes; the teeth in fœtal whales, 'which when grown up have not a tooth in their heads;' the teeth in the upper jaws of unborn calves, which never cut through the gums; the rudimentary teeth which can, it is stated by some, be detected in the beaks of certain embryonic birds; the reduced wings of many insects, lying soldered together under cases; the rudimentary wings in some beetles; the rudimentary pistils in plants.

Recent investigation into the embryonic stages of animal life

* 'A very strong case has been made out by Mr. Paget, in his Hunterian Lectures at the College of Surgeons, in favour of the rudimental development of organs being necessary to withdraw from the blood some element of nutrition, which, if retained in it, would be positively injurious, like a retained excretion.'—MS. Notes of a Physiologist in Vestiges of Natural History of Creation.

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has enlarged the stock of anomalies in Nature. Mr. Lewes, after deciding that 'rudimentary organs are perhaps the strongest case against Final Causes,' carries the inquiry into this department:—

'What rational interpretation,' he asks '(on the hypothesis of a creative plan), can be given to the succession of phases each embryo is forced to pass through? He will observe 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; many of them have no adaptation even to its embryonic state. What does the fact imply? There is not a single known 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, which distinguish the structures of organisms lower in the series. On the hypothesis of a plan which pre-arranged the organic world, nothing could be more unworthy of a Supreme Intelligence than this inability to construct an organism at once, without previously making several tentative efforts, undoing to-day what was so carefully done yesterday, and repeating for centuries the same tentatives, and the same corrections in the same succession. Do not let us blink this consideration. There is a traditional phrase which is in vogue among anthropomorphists —a phrase which has become 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 shall 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 re-building them as a cottage, then adding storey to storey and room to room, *not* with any reference to the ultimate purposes of a palace, but wholly with reference to the way in which houses were constructed in ancient times? Would there be a chorus of applause from the Institute of Architects, and "favourable notices in the newspapers" of this profound wisdom? 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?'

Mr. Lewes then objects to the existence of Design in Nature, upon the ground of certain irregularities in Nature: but if design adheres to the facts of adjustment, arrangement, machinery, and these facts are seen, what avails it to bring forward instances of *want* of adjustment, want of arrangement, defect of machinery in Nature; the affirmative facts decide here, not the negative. The question is, can you tear from those facts of arrangement which do exist, the construction that cleaves to them, and that is united to them by the laws of thought? If you cannot, design adheres to those facts, and no want of the same argument from *other* facts can cancel the conclusion from *those*. The discordances, the abortive insertions in Nature, in

in a word, those parts of Nature which are *not* evidences of design, may fairly come in in a further stage of the argument, when we have to deal with the attributes or with the conditions of the Designer; but upon the primary question of the existence of design in Nature, such objections are, in the very nature of the case, inoperative. The positive evidence of design determines the conclusion; no negative facts can undo the effect of the positive; they have no contradictory function. No exceptional outbreak of the apparent undesigned, can disprove the result which is drawn from the apparently designed. Because, whatever may be the case with the other facts, these facts must be accounted for; and this is the only way of accounting for them.

Let, *e.g.*, Mr. Lewes describe as he will the subtle transitions of the embryonic stage of life—let him call them the corrections and retractations of Nature, alterations of her plan, successive adoptions at first of types which are afterwards cast aside—in what way can this enigmatical side of the introductory stage of life interfere with the plain evidence of contrivance in it, its adaptations and provisions for the support of the fœtus during its sheltered growth, while it is gradually acquiring the proper figure and conformation of its species, and before it comes to its birth? That obvious economy of the embryonic state remains, the conduciveness of its arrangements to a particular end remains, and the success of these arrangements in birth of the offspring and continuation of the race remains.

But these mutations in the introduction to life are, we are told, traces of old laws, and vestiges of successive past landmarks in the formation of the species; as Nature raised the species from one step in the scale to another, she ought to have, at each successive new stage, obliterated the traces of the former one; and the circumstance of her not having done so shows that she does not proceed by design.

Now whether we do or do not adopt this hypothesis of Nature, and of the traces of former species, let us suppose it to be true;—to say that it disproves Design is a forced artificial inference, and shows a critic straining for an objection. How can we say that, a descent supposed, traces of that descent simply left in a stage in which they do no kind of injury, are in any sense mistakes? Why are they mistakes? They are mistakes on the supposition that all history is a mistake, but upon no other supposition that we know of. They are records of the past. Why should there not be such records? They simply accompany and do not interrupt the life-germ, which, as Professor Owen

Owen says, 'takes *ab initio* its own course to the full manifestation of its specific characters; each step of development moving to that consummation as its end and aim.' Though, supposing we allowed that there were real incumbering superfluities remaining from an old apparatus, how could they undo and negative the fact of the visible machinery of the new one? Suppose we had before us some engine which had been improved by long progress, but retained in corners of its structure awkward remains of the old make, would that stand in the way of our seeing what the engine was, that it was an engine, and that it was constructed and contrived for a special purpose? Mr. Lewes says 'the embryo is not the adult in miniature,' as if it could signify what it was so long as it grew, and grew into the form into which it does grow. But Mr. Lewes looks upon the variations of outer form as indications of a want of fixed intention in Nature to produce the specific being which is ultimately produced. He speaks of her 'instability,' her 'blunderings,' her 'missings of the path,' her 'feeling her way,' her 'tentative acts and after corrections.' His charge grows as he reflects upon the perversity and dogged obstinacy of Nature in going on repeating this inconsistent process without cessation. She '*repeats*,' is his charge, 'the same tentatives and the same corrections *for centuries*.' It might occur to the objector that if Nature does commit an inconsistency in any part of her system, to withdraw it with a handsome apology after the first act, is not the conduct that we expect from Nature. With her to do a thing and to do it uniformly, is one and the same act; and a mistake once is identical with a mistake always. But we wonder that Mr. Lewes should consider a record to be a mistake at all; still more, that he should consider it a proof of instability of mind in Nature. We know no better proof of a fixed intention than a uniform result; and even a mistake which is always made and always corrected is, however enigmatical a proceeding, as certain an indication of a fixed purpose, as the straightest of roads could be; for the final law of correction shows to a certainty that Nature is in favour of what she retains, and against what she discards.

And even if the whole of the rudimentary stage of Nature was an enigma, how could that cancel the machinery of her mature work? Whatever the introductory period may be, Nature leaves it very soon behind her, and presents to us a magnificent and consistent structure. Regarded as knowledge, the more accurate an acquaintance with Nature is, and the more minute it is, the more admirable it is. And therefore if the embryo of the Neritina Fluviatilis has not a shell, while the Neritina Fluviatilis has,

has, that is an observation of true value. We accept it, we record it, we give the apparent aberration a place; and yet the great vital fabric of the Universe stands before us, not wholly eclipsed. Yet Mr. Lewes is overpowered and transfixed with astonishment that we *can* talk of an Architect of Nature when the tadpole of a land salamander has aquatic gills, and the embryo Nudibranch has a shell, which is rejected by the Nudibranch mature.

We do not object to notice being challenged to the enigmatical parts of Nature; what we only demand is that they should be introduced upon the proper question, and in the right stage of the argument. To bring them into the arena upon the primary question of the *existence* of design in Nature, is somewhat the same mistake as if a democratic lawyer were to bring forward the irregularities, the qualifications, the curious modifications of the royal supremacy, in order to urge them as objections, when the question before him was simply whether there was a King, and whether he had a supremacy. It is the same mistake as if a scholar were doggedly to fasten his mind upon some of the most subordinate of the side clauses of a constructed sentence, and insist upon disposing of them, before he had dealt with or settled or thought of the grammatical backbone of the sentence. The enigmatical parts of Nature may legitimately be brought into discussion, a design in Nature being assumed, upon the question of the attributes of the Designer, His Omniscience, Omnipotence, Perfect Goodness; but they are brought in prematurely and out of place when they are brought in upon the primary question of there being design in Nature. Mr. Lewes buries himself so in the anomalies and curious irregular corners of Nature, that he fails to grasp the great interpretation of Nature—the interpretation of her as a whole. Nature has what may be called her backbone construction, analogous to the grammatical backbone of a sentence, which may still contain a clause of ambiguous government. We meet many such a sentence in our best old writers; Mr. Lewes upon the strength of the ambiguous clause, reads the whole sentence as a parish boy, half way up the school, reads his part. We see the parish schoolboy making his slow interrupted passage through his apportioned sentence; he is an instance of a person who does not grasp the backbone of that structure with which he has to deal; and the results are gloomy; he has hardly advanced a step when there is a wavering; a small side clause receives him, and, we need not add, detains him; he tarries there, stays in it long and tentatively, carrying on a minor contest with the tougher syllables. He issues out of the inclosure with the main clue somewhat entangled: a few more painful

painful steps, and now the great beacon light of the nominative case is evidently vanishing; about half way, the earth yawns and fairly engulfs him; he has dropped into an abyss; he emerges again, but plainly all is lost, nominative, verb and everything; the low level monotone betrays the impartiality with which he treats all parts of speech, nouns, adjectives, verbs, and adverbs, conjunctions, prepositions, and interjections; he passes through a succession of syllabical cavities, and he only sees the one in which he at the time is; no whole exists, and the sentence comes to an end like an addition sum. This is one instance of the loss of a backbone construction. But that which is the helpless failure of the parish schoolboy, is the systematic philosophy of Mr. Lewes, who construes Nature as the other construes a sentence. He immures himself in some of the petty clauses of Nature which are obscure, and will not see the great construction of Nature's sentence, which is plain. He incarcerates himself in the odd corners of Nature with rudimentary organs, with incipient lobes, with fœtal teeth, with elementary digits, with aborted hind legs, with unfinished commencements of gills, and with shells that are bestowed without being promised, and that are promised without being bestowed; and he forgets that that which is enigmatical cannot cancel that which is perspicuous—the facts of organic structure and the visible machinery of life.

Let us not be misunderstood. We appreciate the mysteries of Nature; but we only say that we must not reject her light. Mr. Lewes is not only an explorer of physical secrets, he is a successful biographer, a man of the world, acquainted with life and society. Will he tell us in what possible way anything can be proved in history, in politics, or on any subject, unless we allow a discriminative faculty in the human understanding which can distinguish between objections which are difficulties and objections which are disproofs; which can not only see objections but estimate their proportion, and which can clear a substantial line of proof from amid minor opposition and protest. Was ever case carried into a court of justice in which, however strong the evidence was on one side, there was nothing to be said on the other? Is all the counter evidence which comes forth in our trials against even certain verdicts *mock* evidence? Is it a nonentity? No; some of it is real: that is to say, it possesses an opposing force more or less. How, then, is it overcome, and so completely overcome that nobody doubts the result? Because its proportion is estimated. It is seen that there is a main structure of proof, rising out of and amid the facts of the case, which dominates. This discriminating faculty is the cement which builds the whole fabric of knowledge and of truth. With

no condition of proportion to satisfy, any objection would prevent any proof; yet Mr. Lewes frees himself from this condition in his argument against the proof of design. His rule is not Sir Roger de Coverley's, that there is much to be said on both sides; but a rule much more diluent of all certainty, viz., that there is no proof in any case in which there is anything to be said on the other side. We may theorise on paper upon such a principle, but the application of it to practice would be the destruction of knowledge and the collapse of society.

The objection, then, of the superfluities, the incumbrances, and the irregularities of Nature is not relevant upon the question of the existence of design in Nature, but must be reserved for the question of the attributes of the Designer.* Observe, however, upon what a vantage-ground such questions relating to His attributes are treated as soon as we have decided on the existence of the Being; because the existence of an Infinite Being becomes at once a valid reason for not pressing objections which are met by the answer of our ignorance. If we admit an Infinite Being, it need be no matter of surprise if we find that He does not work altogether after the type of a human artificer; if a world which comes out of mystery contains modes of procedure which we cannot account for. Manichæanism has thus, as a theory, perished. A God assumed, common sense has refused to see in such facts as these reasons for denying His power and goodness. Their inadequacy was plain upon such a standing-ground, and the belief in the attributes has been carried practically by the belief in the Being. Manichæanism is obsolete, and Atheism or Pantheism is modern unbelief.

And this brings us to another head of objections to design, viz., those drawn from the Infinity of the Deity. Design is a human conception, it is said: the essential offspring of a mode of thinking which belongs to a limited intelligence: we cannot attribute it to an Infinite Being. Mr. Lewes asks how we obtain our 'knowledge of the Divine mind—very enviable knowledge, but needing some guarantee for its genuineness.' This objection, then, comes out of the general Pantheistic arsenal, and only applies to design in common with all the moral attributes of an Infinite Being. Descartes, however, who was not a Pantheist, but demonstrated the existence of a God out of our innate ideas, still objected to the Argument of Design on the ground that we must know God before we can attribute design to Him.

* Hume does introduce the objection of the imperfections of the system of Nature in this place, upon the question of the attributes of the Author of the universe, not upon the question of the existence of an Author of the universe. See further no.

The

The force of this objection, then, lies in the overpowering vastness of the idea of infinity, which makes it inconceivable that this infinite world should go back to such a unity as a mental design. We cannot contemplate the life with which the universe teems, its countless types and structures, without at first sight a kind of despair that its *Cause* should be a personal Being. All seems to evaporate in immensity. Take even any of those great exhibitions which bring out and place before the eye of the spectator the inexhaustibleness of Nature, animal and vegetable,—that interminable labyrinth of variability which, like the Cretan, lets no one out again that has ever once got in. When he has seen hundreds of varieties of hundreds of species, which never, perhaps, challenged his eye before, what is his first sensation? It is, of course, that of wonder; but there is something which enters in with wonder, and is not so pleasant: it is perplexity. Is it more than perplexity? Yes; it is dejection. A disturber has crept into our home; there is an ominous stir as if upon an unwelcome arrival; some alien thought has come into collision with the mind's faith—the thought of an impersonal life of the universe. Can the Being that coincides with this boundless life be personal? Is there a congruity between the truth of fact and the truth of religion? The idea of personality is strong in the home of our own hearts; but let us be brought face to face with the infinity of Nature in one of these astonishing and vivid spectacles of her multiplicity, and for a moment it totters. The vastness, the boundlessness of Nature is not only an overwhelming thought, a prostrating thought: it is a benumbing thought. Infinity is a cold idea, thus forced upon us; and there is a refrigeration of the mind as the notion of a paternal Being gives place to pure immensity.

And this momentary effect from a great spectacle is only an anticipation of the great power of the idea when systematically cherished. The idea of infinity combines two great and startling opposites, viz., that of being the most religious, and that of being the most sceptical, idea of the human mind. On the one hand, it is the foundation of all that is transcendental and aspiring in human prospects; on the other hand, it is the destruction of it all. It has been the favourite idea of religious minds on the one side. One religious philosopher, especially, who lifts up the curtain and discloses the realms of metaphysics in all their solemnity and grandeur, has pursued the idea with an insatiable affection and longing. Pascal is supreme master of those domains of mystical logic in which the conclusions, not of a venturous faith, but of a pure reason, are more eccentric and abnormal than the most extravagant creations of romance and the

the oddest misconceptions of a dream—a universe which is not a whole, number which is neither odd nor even, and time which never began. The prodigious speculative births, the sphynxes and chimæras of reason that rise up in his world of thought, and haunt, like the awful shapes of classical legend, the boundless solitudes over which the mind of Pascal ranges, prove the overpowering sense of infinity which pervaded his mind. The strength of the idea in him made it fructify and multiply into this ghostly imagery, this brood of logical apparitions. The idea even of *material* infinity fascinated him—the idea of simple sidereal space, because it bordered on the supernatural, and converted even this world of fact into such an incomprehensible problem. The vivid conceptions of immensity which his metaphysical imagination raised, inspired him with an ever-fresh amazement, awe, and dread. In the region of the idea he felt himself on the threshold of a higher world; and the spiral coils of the great enigma, though they ascended endlessly, still pointed up to heaven.

But identified with faith in one mind, the idea of infinity becomes the very antagonist of faith in another. It is now an infidel idea. It is the great undoer, the great reverser, of all the religious verdicts of reason; they are dissolved as soon as they enter this strong diluent. The attributes of the Deity melt in the crucible of this idea; it has the power of converting everything it touches into nothing; eternity and immortality into nothing, *i. e.*, God himself into nothing. All these become human conceptions, which the touchstone of infinity has detected. The forward current in us which goes all toward a personal deity, retires before this great reactionary tide, which carries the whole mind back again into vacuity. Infinity thus becomes Nature's great retractation, her great revocation, her great recantation; whereby she gives up all she once held, withdraws it, and owns herself mistaken and deceived. It is the great destructive idea, the loosener of all that was once fixed. There is a passion for destruction in the mind of man, as strong as that of constructing, which delights in clearances of all kinds, and wherever it goes empties space; even the imagination enlists itself on this side, and makes a poetry of demolition. Infinity which makes a clean sweep of all creeds is thus the creed of the Pantheistic poet, and often of the imaginative man of science.

But if we keep clear in our minds the position that design is a construction which *adheres to the facts*, we can deal sufficiently with this objection of Infinity. If by the constitution of our minds we are compelled to construe actual machinery which effects an end as designed for that end, that compulsion is

is our justification. No insoluble question outside of this act of construction can interfere with or invalidate this act itself. If Descartes then or any one else objects to us that we must know the Divine mind before we can affix design to Nature, we reply, it is falsely put; we need not know God in order to put a construction upon facts; we can put a construction upon facts, if we have the facts. We have nothing to do with the speculative point at the other end of this question; we argue from *this* end of it,—from the facts of contrivance; design is tied to those facts and cannot be divorced from them. If we cannot argue indeed *up* to a God till we can argue *down* from Him, if we cannot interpret any signs that point to Him till we know they come from Him, then certainly the evidences of a God from Nature are impossible until they are useless; and there is no such argument as the Argument of Design. But this is not the state of the case. You mistake our argument; we assume no knowledge of the Divine designing mind; we only argue from facts *towards* one. Whatever be the mystery which lies on the other side of the ocean of infinity, it is consistent with these facts, and with the constitution of our own minds, which obliges this construction of them.

If, indeed, infinity is logically inconsistent with design, we come to a contradiction in Nature; a contradiction between the constitution of our minds which affixes design to Nature, and infinity which withdraws it. But where is the logical contradiction between design and an infinite quantity of design? In affirming human predicates of God, says Mr. Mill, we affirm the same that we do of man, only infinitely 'greater in degree.'

The analogy of human contrivance certainly deserts us in its application to Divine, at one stage. In the use of any human structure, a watch, *e. g.*, we know that the contrivance is traceable to a definite point in some artificer's head; all the constructive power converges to that local spot, and we trace the whole course of design consecutively from its goal to its starting point. But when we come to a contrivance of Nature, we have a piece of mechanism as compact indeed as a watch, but where is the designer? We look around, and see only universal space, and the site of design instead of contracting to a point in the known mechanic's brain, expands into Immensity. The elaborate definiteness of an apparatus of Nature contrasts strangely with the infinity from which alone it can come. There is something indeed in this contrivance without a contriver in Nature, in the high artificiality of physical mechanism, joined with the utter absence of the visible mechanist, which recalls the effects of a certain department of mystery in works of fiction. All motion without

without an apparent agent has a singular power of startling: if a door trembles, if a curtain rustles, we turn quick round, and have a momentary sensation of that which appears to be innate in us, the fear of what is *not* seen. The supernatural story avails itself of these native impulses of the mind, and introduces unexplained motions, sounds, and sights. The effect of Nature, as a great structure, and a great motion going on before us, corresponds to this; it is the mysterious house without a builder; a vast, a perpetual, and a most significant movement without a mover. But though the infinity of the designing mind makes an undoubted difference, it is not such a difference as destroys design. Why should I think that mind ceases to be itself because it is infinite? If I think so, I think so because imagination transports me; I judge like a man under agitation and terror, who supposes that whatever makes a difference, reverses the whole. I am seized with a blind alarm as to the effects of infinity upon the Supreme Being; as if He could be wholly changed from a moral and intellectual being by it. I attribute to this idea an irrational power of transmutation, as I would to some spell of magic. This is not reason, but fancy; not philosophy, but alarmist speculation. Nature gives us a clue to her own Authorship; and the direction of that clue is plain and evident, though its terminus is infinity.

It is remarkable that the Argument of Design was accepted by Hume, whose admission of it, taken in connexion with his scepticism, deserves one or two remarks. Mr. Huxley has lately appealed to this great philosopher as the annihilator of all 'isms.' There was, however, one 'ism' which Hume strongly supported by argument, viz., Theism:

'The whole frame of Nature bespeaks an intelligent author; and no rational inquirer can, after serious reflection, suspend his belief a moment with regard to the primary principles of genuine Theism and Religion.'—*Natural History of Religion.*

Hume's defence of Theism was a defence, indeed, with sinister limits and conditions, which remove it from the head of properly religious arguments. He was profoundly sceptical with respect to the attributes of the Deity, as taught by natural religion; he professed himself unable to reconcile the facts of the world with Infinite Power and Goodness, and as therefore disposed on his own part to accept a more moderate conception of a God. He rejected with scorn the appeal to the solution which another world was to give of the difficulties of this, which he designated 'as building in air, and establishing one hypothesis upon another.'*

* 'Dialogues concerning Natural Religion,' Part X.

He-

He did not assign God any worship other than the knowledge of Him, quoting the saying of Seneca—to know God is to worship Him; but all these irreligious qualifications of the truth still leave Hume maintaining a residuum of Theism, and in Theism of immaterial intelligent Being.

Doubt in Hume did not supersede a strong though hard and narrow common sense, which enabled him when he liked to control the excesses of a speculative imagination and subject it to practical reason, as he understood reason's verdict. He soars in the 'Dialogues concerning Natural Religion' into the empyrean of scepticism, where infinity destroys all parallel between universal contrivance and finite, and where order even in the Divine ideas is no more an ultimate account of Nature than the order of matter itself is; but when he comes to decide, he recalls imagination from its flight to embrace a plain truth. 'The whole chorus of Nature raises one hymn to the praise of its Creator. You alone, or almost alone, disturb this general harmony. You start abstruse doubts, cavils, and objections; you ask me what is the cause of this cause. I know not, I care not; that concerns not me. I have found a Deity; and here I stop my enquiry. Let them go farther who are wiser or more enterprising.*

We now come to the *vexata quæstio* of physical versus final causes. Bacon, as is well known, had to deal with a set of philosophers who, when a fact of Nature was placed before them, refused to recognize the physical cause of that fact as a subject of enquiry, upon the ground that the final cause was enough; that the fact in question answered a useful purpose, and was inserted in Nature by God *for* this purpose. The final cause of the eyebrows, that they might protect the eye from the descending moisture of the forehead; the final cause of the bones, that they might carry the flesh; the final cause of the leaves of trees, that they might give shelter from the sun; the final cause of the earth's soil, that vegetables might grow in it; the final cause of stone, that houses might be built with it; the final cause of iron, copper, and the different metals, that different implements or different ornaments might be made out of them; —these respective purposes and uses of these respective natural materials were the sole account to be given of the existence of these materials in the idea of the scholastic naturalists; and chemical, physiological, geological, and all scientific discovery was thus stopped at the fountain head; every production of Nature being regarded as an immediate creation of God to answer a particular purpose. The maxim, then, which Bacon

* 'Dialogues,' Part IV.

applied

applied to the separate items of Nature was applied by the French philosophers to the mechanism and system of Nature; and because he insisted on a physical cause for the physical facts singly and separately, they quoted him as their authority for attributing only a physical cause to the *collocation* of those facts—their concurrence and adjustment in the organic structures of Nature; and upon the strength of this application of his maxim discarded final causes altogether; whereas, it is the very difference between the separate facts of Nature, and those facts in agreement and concurrence, which constitutes the evidence of final causes. A physical cause can be assigned to every single material of which a house is built—every stone, every beam, the iron, the lead, the glass, the tiles, the plaster; but the separate items are one thing, the agreement and coincidence of these in a fabric is another; and the distinction which is true of a human building, Bacon fully acknowledged with respect to the edifice of Nature.* Those brilliant naturalists, indeed, who penetrated with such acuteness and subtlety the labyrinths of Nature, while they dissect and methodise physical material with the intuition of genius, show at the same time, as soon as ever they get on the other side of the border of their own department, an absence of rigid training in the school of reasoning. Had they been as close logicians as they were keen investigators, they must have seen that physical causes as being only the physical antecedents of particular facts, can only explain the particular facts of which they are the antecedents; that they can perform no other function as reasons, and that it does not belong to them to account for facts as contemplated in their corporate arrangement, in their concurrence in one physical apparatus and system. Physical causes are, indeed, so far from accounting for arrangement in Nature, that they are evidently in themselves common to arrangement and disorder. Were the world a tumultuous and tempestuous chaos, every single component motion of that multitudinous discordant agitation would still have its physical cause in some immediate antecedent. But this crowd of physical forces would want what they have in the existing system of Nature, disposition and arrangement. It is evident that what is common to order and disorder cannot account for order. The physical causes are the same in a steam-engine and a volcano, in waterworks and a deluge, in the ventilation of a room and in a tempest. An excrescence, a wart,

* Dr. Acland draws the distinction in his Harveian Oration—a paper equally distinguished by philosophical candour and discrimination—'We may, therefore, discard the *use* of Final Causes in Science, and yet not necessarily infer, as Comte did, the absence of providential government.

a mole,

a mole, a humpback, has as accurate a train of physical causes as a regular limb. But they work differently in the two cases, and the difference in the working cannot be accounted for by an order of causes which in both cases is the same.

So much for the appeal to Bacon as an authority for physical in opposition to final causes. Upon this great question, then, we have first to defend against the Enclyclopædist even the *primâ facie* verdict of facts for Design. We say the *primâ facie* of verdict of facts is at any rate for design: he does not admit it. We never saw any argumentative formulas of the Encyclopædists against design in Nature, which did not substantially amount to this, viz. to saying, Shut your eyes to design, and you will not see it. The philosophy involved in this dictum is exactly the same as that which we have in theirs, and it has the advantage of being more plainly expressed. Take their cardinal formula—'Conditions of Existence'*—that the structure of the body is not intended *for* life, but that life follows *from* it, and would not exist *without* it: *i.e.*, that the bodily structure is the condition of existence, and no more. The ingenuity and plausibility, then, of this formula is wholly obtained by an omission, and by the audacity with which that omission is made; by the circumstance that it fastens the mind upon *sequence*, and thrusts aside and ignores the natural, the unavoidable aspect of *provision*. In every system or compages of forces which issues in some particular result, any one of the forces of which the whole is composed is the *condition* of the production of that result. In chemical combination each separate item is the condition of the whole. One pipe or one artery within the body, one single ingredient in the air outside of it, is the condition of existence. But it is evident that an apparatus, as one harmonious whole, stands in a different relation toward the result which it produces, from that of one or other single item of it; and that the relation of *sine quâ non*, though included in, is not the complete and adequate expression of, that aspect of the machinery as a whole. That whole is naturally regarded by the mind not only in this light, viz., that something follows from it, but also in another light, viz., that it is constructed *for* something. We see a concurrent action towards, as well as a sequence from; we see more than conditions of existence, we see a provision for existence. The end does not simply come after the means, but the means intend the end. But the

* 'Les causes finales ne sont, en dépit de leur nom, que les effets évidens, ou les *conditions mêmes de l'existence* de chaque objet.'—'Revue Encyclopædique,' vol. v. p. 231. 'Cuvier seems to have adopted the term in a sense *not* opposed to final causes.'—'Owen's Comparative Anatomy,' vol. iii. p. 787.

formula

formula—'Conditions of Existence'—will only recognise a consequence; only see the retrospective view, not the prospective. It only sees in sentient life the upshot of the bodily combinations, and discards the aspect of it as the end and scope of them. The formula, therefore, attains its purpose by omission. Look only at a sequence, and you will only see a sequence.

Geoffroy St. Hilaire, who carried the art of shutting the eyes to a high point of philosophical perfection, applied a scientific culture to this act of the mind. The point of view which he constructed for the purpose of exactly cutting off the approach of the proposition of common sense, reminds one of some skilful piece of military engineering, which projects the angle of a bastion in the direction which cuts off the assault from one threatening quarter in the country around; and is a curious specimen of the dogged perversity of a man of genius when he does not like one direction in which things are going, and opposes to obtrusive evidence the science of *not* seeing. 'Voir les fonctions d'abord, puis après les instrumens qui les produisent, c'est renverser l'ordre des idées. Pour un naturaliste qui conclut d'après les faits, chaque être est sorti des mains du Créateur, avec de propres conditions matérielles: il peut, selon qu'il lui est attribué de pouvoir: il emploie ses organes selon leur capacité d'action.'* It is a misstatement, then, to say that the advocates of design look at functions first, and at the instruments for the functions afterwards; what they do is to look at both together, and argue from their concurrence. But this, looking at them both, and looking at them in concurrence, is what St. Hilaire prohibits; it is not our seeing one before the other, but seeing the two in relation, which constitutes our offence. He will not allow the instrument to be looked at as agreeing with the work, but only at the work as necessarily coming out of the instrument. That is his point of view. Looking at the case, then, in this accurately limited point of view, design is undoubtedly excluded. Granted the construction of the instrument, the employment of it or the function does not flow from the construction by design,

* Principes de Philosophie Zoologique,' p. 66.—His illustration against design is—'A raisonner de la sorte, vous diriez d'un homme qui fait usage de bequilles, qu'il était originairement destiné au malheur d'avoir l'une de ses jambes paralysée ou amputée.' It is, however, a most gratuitous transposition of the final cause, to fit the man to the crutch, instead of what is much more obvious, the crutch to the man. We cannot but add, with reference to the defect of logical training which these great scientific investigators sometimes show, that it is singular that Cuvier and St. Hilaire should dispute over two hundred pages upon the identity of organs, *e. g.*, whether the fore-hoof of an ox is exactly the 'same organ' with the wing of a bat, without it occurring to either of them to ask, whether they were using 'identity' in the same sense or using it in different senses and different respects.

but

but by necessity. The instrument works, and works according to its make, and according to its component parts. How can it work otherwise? The function is the only action of which the instrument is capable, and therefore is an unavoidable derivation for the instrument. But though, this point of view granted, design is excluded, what right has St. Hilaire to impose this point of view? On what ground does he assert that the instrument works according to its construction, and that *that is all?* We say there is something besides the instrument working according to its construction, viz., that the instrument is constructed for its work; we assert this on the ground of the plain agreement and coincidence of the two. St. Hilaire says, you have no right to see coincidence and correspondence; you have only the right to see the work proceeding from the instrument, you have no right to see the adaptation of the instrument for the work; you are at liberty to perceive the motion derived from the oars and sails, you are forbidden to discern the aptitudes of the oars and sails to produce the motion of the boat. But if there are two relations to be seen, why should we only see one of them?

Some turn round a corner in order that they may not see the evidence of that which they do not care to admit; the Encyclopædist looks it full in the face, and gives it the cut direct. There is in the whole history of philosophy no rougher and more violent despatch of great questions to be found, than the Encyclopædist's method of dealing with design. There is a piece of the Chinese puzzle that will project beyond the figure: abscission is his remedy. There is something in Nature which is not included in his physical plan, and he cuts it off as a workman would cut off an angle of a mass of rough stone that he had to fit into a place. Of two aspects of Nature he simply expunges one. The prospective look of Nature, the aim in her, is set aside as a fictitious idea of the human mind, obtained by a false reflexion of the result, and the transposition of effect and cause; according to the explanation of Lucretius:—

> 'Illud in his rebus vitium vehementer, et istum
> Effugere errorem, vitareque præmeditator,
> Lumina ne facias Oculorum clara creata,
> Prospicere ut possimus; . . . . . .
> Nil adeo quoniam natum'st in corpore, ut uti
> Possemus, sed quod natum'st, id procreat usum.'

But now—and this is the next step in this *vexata quæstio*—if it is once admitted that design is the *primâ facie* interpretation of Nature, that *facts* bear the impress of design; this verdict

verdict of facts can never be subsequently reversed by causes. Upon the great question of design in Nature facts are masters of the position; the actualities of machinery are what must rule the decision. Take any part of the human body where there is a group or system of matter-of-fact functions, *e. g.*, about the eye, where there is the eye itself with its component humours, coats, membranes, muscles, fibres, lubricating fluid, socket, bed of the socket, retina, pigment, the eyelashes, eyelids, eyebrows;—suppose there is a physical cause for every one of these facts, or that each of these facts could be traced farther back to some fact anterior to it: the eyebrows, *e. g.*, to the texture of the flesh upon which they grew, the eyelashes in the same way to their membranous basis, the eyelids to the extension of the skin of the forehead; if even the humours of the eye itself, the muscles, the fibres, could be traced all to some further facts of tissue or fluid—we should still have the *collocation* of these further facts to account for. It is the collocation which is evidence of design in the original facts; but the same collocation meets us in the physical antecedents. And however much farther back we could trace definitely the physical causes, we should have the same collocation to account for. The primary patent facts are represented in the successive stages backward by a corresponding group or system of physical antecedents; and the last traceable physical antecedents can no more explain their own collocation than the original facts could. The resort to design, therefore, if it is necessary in the case of the first facts, is equally necessary at every step of the retrogression; the claim of reason is only pushed further back, and that which had to be explained in the facts has to be explained in the causes. There is co-existence, there is coincidence, there is concurrence to be accounted for at the very close and vanishing point of physical analysis, just as much as there was upon the threshold of the simple phenomenon.

But when we say that the search for physical causes can only push the collocation we see in Nature further back, the reply is that we do not take into account the simplification which physical analysis accomplishes; that the further back it penetrates the greater unity it discovers in Nature, and that in proportion as it discovers physical causes it also reduces or resolves them, till at length it brings us to a unit—to a cause in which there is no collocation because there is no plurality. It is of course true, then, that in pursuing the chain of physical causation we come at last to causes which lie entirely beyond the cognizance of our senses, and in which the powers and the forces by which the mature structure in which they issue is produced

produced, are wholly hidden from us. But then, it must be remembered, if we do not see the cause, if we do not see anything at all, we do not see a unit; this professed simplification of causes or reduction of them to a unit is not proved, and does not appear; and therefore the argument rests exactly on the basis on which it rested before this simplification was attempted or pretended; there is the original fact of collocation, and design cleaves to that fact. When we come to such causes as these, we can only argue as to what they contain from what they produce; and we must, as the only course left to us, conclude that, if the result which they produce is a fabric or a machine, there are, however subtle and latent, methodical forces in them which correspond to such a methodical effect. So far as we can trace Nature visibly there is arrangement; if we come to a point where we can trace her no further, we then see the cause simply as represented in the result, and therefore as in turn reflecting the harmony and system of that result. The elementary leaf-organ, we are told, 'expands into a leaf upon the stem, contracts to make the calyx, expands again to make the petal, to contract once more into sexual organs, and expand for the last time into fruit.'* Be it so; but this elementary leaf-organ must be a cause adequate to produce this manifold system of the flower and fruit which actually comes out of it. Is it then a sensible thing which can be depicted and its composition brought to light? In that case it must show some arrangement and method in its composition, whereby it is enabled to produce what it does. It must exhibit the system of the flower in tendency, in seed. Is it an invisible first element of vegetable life? We must then reason on what it is and contains, from what it produces; and if a systematic production is the result, infer systematic forces in the cause. The phenomenal actualities of the plant, then, are masters of the position. We do not see the concurrent forces in any ordinary seed, but we collect them from the structure of the mature plant.

The Argument of Design is completed, indeed, within the sphere of tangible Nature; its validity is, therefore, not affected by any pursuit of Nature into the intangible: arrangement on the visible side indicates design on the invisible; and there we stop. You say this ultimate invisible cause is a unit, but within the sphere of intangible physics this unit has just as much right to be considered a coalition of a thousand causes as one. When we get to the ultimate forces of Nature we get to something which is so absolutely spiritual, that we cannot impose

* Lewes's 'Life of Goethe,' vol. ii. p. 145.

material

material conditions on it. Can anything be conceived more absolutely immaterial than the primary forces in a grain of wheat? Are heaven or hell, angel or archangel, all the hierarchy of the Empyrean, all the Powers of light or of darkness, more invisible than the productive powers of an acorn? If ten thousand angels, then, according to the scholastic saying, could dance upon the point of a needle, a system of ten thousand invisible physical causes could act in an invisible physical unit.

If we pass from unity of root to unity of plan of Nature—to the theory of unity of composition, according to which the structures of the several species are not separate plans, but all developments, according to circumstances, of one—this distinction is of no relevance as regards the question of design. It can only in the nature of the case affect the number of plans, not the argument from plan. With reference to this argument, one universal plan, which embraces all special plans, is an exact equivalent to all the special plans it embraces; and it matters not whether all specific organs are homologous and radically correspond or not with each other, so long as each shows arrangement in its relation to its own proper frame. St. Hilaire did not reject design because he started the theory of unity of plan, but because he rejeoted *in limine* the argument for plan. Professor Owen maintains the same unity of plan, and infers from it design.

Upon the question of design, then, in Nature, facts are masters of the position; results, those arrangements which meet the eye, are the tests. Causes cannot reverse the argument from facts; they are either sensible causes and correspond to the facts, or invisible ones and reflect them. The argument is thus independent of all theories of elementary formation—Evolution,* Epigenesis, Nomogeny, Thaumatogeny—because facts hold the key, and they are the same, however rudimental theories may conflict. Design once seated in Nature by facts, can thus never be unseated; once in, it can never be out again. If the argument of design is a bad one, as drawn from phenomena, let it be dismissed; but if good from them, it is good for ever.

We come now to some great hypotheses of the origin of the existing system of Nature, constructed by philosophical naturalists, and we find that these theories require, for simply being started and set going, some principle of design in Nature. Take Lamarck's theory that the animal organs are developed by circumstances—new circumstances creating new needs—new needs

* Upon the theory of Pangenesis, indeed, according to which the whole body reproduces itself, all the component parts of the reproduced body exist ticketed and numbered from the very commencement; and their destination is as marked at the fountain head as it is at the result.

new

new instinctive efforts to satisfy them, and these new efforts new bodily adaptations: that some short-necked bird, by trying to catch fish without wetting itself, converted itself into a heron; that some land-bird, urged to the water by want of food, in its efforts to swim, extended, by repeated separation of the toes, the connecting skin at their roots, and changed itself into a duck. The physiological law, then, that use and exercise strengthen and expand an organ, while disease atrophies it, was the foundation of this theory; the instinct by moving the animal to the exertion of the organ, called this law into operation, and the physical need excited the instinct. The theory, then, at its foundation assumes the existence of organs—of something antecedent to this law of use and exercise to which this law is applied—something which, by the very hypothesis, has the innate capacity of being developed harmoniously and serviceably. A rudimental plan, therefore, pre-exists, which the Lamarckian law causes to develop in concurrence with the variety in the outward constitution in Nature. And the instinctive efforts of the animal are determined in every stage by a pre-existing structure, and only act at the openings and in the channels laid down for them in that structure.

But of the position which we have laid down, viz., that if the facts of Nature are admitted *primâ facie* to show design, no subsequent physical explanation can undo the original verdict of the facts, the Theory of Natural Selection will furnish the most remarkable instance. It is not Mr. Darwin's storehouse of facts chiefly, enormous as that is; it is his searching and elaborate power of reasoning which he applies to these facts, which constitutes his greatness as a naturalist. Mr. Grove is a great physical mathematician; Mr. Darwin is a great probable reasoner —in details. His accumulative arguments might be studied indeed with advantage, simply as specimens. But while he applies this power so strikingly to details, his great conclusion fails remarkably upon this very head. One of his most recent antagonists* is, 'A Graduate of the University of Cambridge,' whose criticism of the theory displays much acute reasoning as well as command of language; though he must allow us to say that his argument would have gained much by compression. We have only to do, however, with Mr. Darwin's theory with reference to the special purpose before us. For this purpose we need not

* Professor Phillips, in his inaugural address to the British Association in 1865, adopts an attitude of suspense. He asks 'what range of variation is indicated' by some classes of facts which he mentions; and adds, 'Specific questions of this kind must be answered before the general proposition that the forms of life are indefinitely variable with time and circumstance can be even examined by the light of adequate evidence.'

say that we do or do not adopt the theory of the Transmutation of Species. Let us assume it to be true; it cannot be worked without a principle of design. And first, what is the place which natural selection has in it? Does it do everything? If it does, then the theory is as a theory complete without the principle of design. But if natural selection, according as Mr. Darwin himself defines its functions, does not do everything, but leaves a void and chasm in the theory which must be filled up by some other principle, what is this other principle, when we come to examine it, but design?

We know Mr. Darwin's own account of natural selection; and from this very account it follows that natural selection is not an agent at all, but a result. It is the effect which proceeds from a favourable modification, or development of structure in one animal in the struggle for existence with another animal not thus additionally endowed, viz., his survivorship and continuance on the field while the other perishes. There is an unknown reservoir and spring of productiveness in Nature; and some improvement or augmentation is supposed to have come out of it, and some animal to have been the recipient of it; this is the *productive* agency in the case. This productive agency having operated then, there is a result, in the particular condition of scarcity of food under which animal life labours, which proceeds from it, which result is the preservation of one animal and the death of another, or natural selection. Natural selection, then, is not an agent, but a result; and it is moreover only a negative or privative result. The favoured party in this struggle, the party that lives, would have lived all the same had there been no struggle for existence, and no natural selection; and he does not owe his existence and continuance to natural selection, he only owes his *sole* existence to it, as distinguished from the fate of a rival who perishes. The difference, therefore, which natural selection makes is not that one of these animals is preserved, but that the other is destroyed, and that is the one sole result in natural selection. Had the supply of food in the world been infinite and inexhaustible, both of these animals would have lived; for both would have had enough to live upon; but the supply being limited, one of them dies. Natural selection, then, has nothing to do with the creation of any favourable addition to Nature; it is only the removal of those who do not possess the addition. They perish, and the scene of creation thus becomes a very different one from what it would have been had there been no natural selection. Could we suppose an innumerable and inexhaustible supply of nutriment in the world, and consequently no struggle for existence, the area of Nature would have been a crowded

crowded field of irregular as well as regular forms of animal life; all those wide interstices which now separate species from species would have been filled up, and the earth would have teemed with a chaotic rabble of animal structures, lower forms and higher, perfect species and imperfect; the ascents of Nature being almost merged and lost in the gradational multitude; all would have survived, because there was food for all. Natural selection clears this ground, interposes intervals, and arranges Nature into groups and masses. But it does this work not as an agent, but only as an effect—the destructive effect of the scarcity of food. Without the struggle for existence regular forms would not have monopolised the ground; Nature would not have been seen upon the unencumbered pedestal upon which she is now, or presented her present structural appearance. But natural selection only weeds, and does not plant; it is the drain of Nature carrying off the irregularities, the monstrosities, the abortions; it comes in after and upon the active developments of Nature to prune and thin them; but it does not create a species; it does not possess one productive or generative function.*

Natural selection figures in language, indeed, as an active and creative power. It 'effects improvement;' it 'checks deviations;' it 'develops structure;' it has 'accumulative action;' it 'works silently and insensibly wherever opportunity offers;' it has made, indeed, every organ and limb of every existing animal. The species are its workmanship; they come out of the hands of this great artificer, who is described as fashioning the clay of life. Natural selection is not only an agent even, it is a designing agent; it 'acts for the good of each creature;' it is 'always trying to economise;' it has always an object before it, and acts with an aim. But all this is only the phraseology of metaphor, summing up and condensing consequences under the figure and impersonation of a cause. We meet an effect under the form of a cause, as we meet our own figure in a shop mirror in the street, departing from the very place at which we are going to arrive. Upon this very account natural selection designs perfectly, because it is, in fact, itself the successful result; it always hits,

* Professor Owen justly calls attention to the distinction between his own suggestion in the volumes of Transactions of the Zoological Society, 1850, of (to anticipate terms) Natural Selection as the 'cause of *extinction* of species,' and Mr. Darwin's theory of Natural Selection, 'which he applies not only to the extinction, but also to the *origin* of species.' Professor Owen's statement in 1850 was that one cause of extinction 'was the contest which each species had to maintain against the surrounding agencies which might militate against its existence.' This, though no adoption—as understood by some Reviewers recently who spoke in ignorance of the date of this statement—of the Darwinian theory of Natural Selection, is a curious anticipation of Natural Selection in that which appears to us its only true function.—*Comparative Anatomy*, vol. iii. p. 798.

because the aimer is, in truth, the mark; its intention is only metamorphosed fact. We have to carry on this interpretation of the action and design of natural selection as we read Mr. Darwin; and though we by no means grudge him the liberty of metaphor, we are sometimes conscious of an exegetical task in extracting the real fact out of the language of figure. Natural selection is superior to human selection. What does this mean? That one is a better exercise of choice than the other? No; it means that whereas human selection is choice, trial, and experiment, and may therefore fail, natural selection is secure because it is the favourable result to begin with. In human selection the choice aims at the event; in natural selection the event makes the choice. Natural selection endows the woodpecker with its instrument—'a striking instance of adaptation'—*i. e.*, it does not give *one* woodpecker its instrument; it has nothing to do with that; it only kills off another woodpecker who has not got it. Natural selection forms the flying squirrel with its parachute; *i. e.*, it makes away with another squirrel who has not got a parachute, and is at a disadvantage in the locality. Natural selection has 'reduced the wings' of some species of beetles in Madeira. That means that those species which *had* reduced or shortened wings were naturally selected or survived, whereas others with full wings, by reason of this very completeness of them, perished, because they flew, and flying, they flew over the sea, and, flying over the sea, got carried away by winds, and could not get back again to land. We have thus to commute the language of natural selection as fast as we receive it, to drive metaphorically forward and really backward at the same time, and at every moment to transpose, by an understanding and arrangement with ourselves, the cart before the horse, into the natural order of the horse first.

If natural selection, then, has nothing to do with the production of favourable variations, but only adopts them when they arise; in the absence of any principle or law to dictate or direct in any way the course of such variations, nothing of which kind is as yet supplied to us; whence does Mr. Darwin get that succession of favourable variations which is necessary for the ultimate formation of a regular and highly organised species? It is obvious that not one or two which chance might give him are enough for this purpose, but that a succession is wanted, and a long succession. The gradual development of an organ or limb implies in the very process a gradual succession of slight advances in its structure, each taking up the work at the point at which the other left off, each fitting in to the different respective stage of the developing organ or limb which preceded.

preceded. This has to be accounted for; more than this, a continuous development in several organs, and several limbs, all expanding in harmony, and growing into a composite and perfect animal whole, has to be accounted for. Natural selection is no account of it, because this assumes the variations, and does not make them. What does account for it?

Now we will take Mr. Darwin as he is popularly understood, and according to this general interpretation of him, we understand him to account for this succession by two agencies—Chance Variation and Time. A rudimentary animal gets, by simply waiting, all the successive additions from this great fund of Nature which it wants for a high organisation. No principle of order or guidance in the efflux from this latent reservoir is needed; there comes out an infinite quantity of augmentations and modifications from it; and among the rest the fitting ones. Why should not they come as well as the rest? They will come, though at the intervals of thousands, of hundreds of thousands, of millions of years. Only let us command an infinity of time, and the proper modification which meets a given stage of development will arrive; and upon the same terms the next will, and the next, till a high species is completed. There is only wanted in addition the preliminary condition that the animal should continue long enough upon the ground to reap the advantage of these successive favours from Nature, and incomings from the stock of variability; and this natural selection provides for. Because each successive favourable variation gives him the advantage in the struggle for existence with his unfavoured rival. He therefore survives, and a complete physical development accumulates and descends by a law of tontine upon the surviving party.

We must observe, then, that such an explanation of species by chance variability is an explanation which violates moral possibility. We do not see how chance, however long a time it had to work in, could possibly account for this succession of steps in Nature, all fitting in with preceding steps; this train of developments of, and additions to, a rudimental organic stock, all respectively joining on to the last one, and at length collectively forming an harmonious whole. Undoubtedly chance variability will give you in an infinity of time certain given variations, but in what character do these variations come? Do they come as fixed and permanent modifications of the structure upon which they light, as the stable and settled acquisitions of a lasting formation? No, they come as passing stages in a perpetual fluctuation of organic form, as vanishing lines in an unceasing tide of change.

change. They come, but they do not stay; they are off again, and others come in their place;—for we must keep faithfully to the hypothesis of a real infinite chance variation as the law of nature. If amid this crowd of changing forms of life, in this ocean of fluctuation and metamorphosis, some structural points stand permanently out as insulations in the scene; if these have a correspondence with each other, and form an harmonious animal fabric; if those arrivals, we say, which are fixed also cohere and agree;—this is not included within the hypothesis, and must be accounted for in some other way. The chances then that you get by the mere infinity of variation, do not construct a species. You only regard your infinite variability on one side, viz., as furnishing your required chance; you do not regard it on the other as taking it away, when it has given it; you do not see that what is gained by chance is also lost by chance. Out of an infinite storehouse of variations you may command a certain number of favourable ones; what you cannot command is that amid universal transition and mutation, those favourable variations should be fixed as well as coinciding, so as to form harmoniously developed structures, *i.e.* species.

Take another point of view, which only contains the same reasoning in another shape. An infinite chance variability will give you by waiting for it, a certain given variation or development which would *in itself* be a fit; that is to say, would be such a development as would join on to the pre-existing growth or section of the unfinished organ, supposing the stage of imperfection in the organ itself continued exactly the same throughout this long waiting interval, and met the supplementary addition at the close of the period, just in the shape in which it desiderated it, at the commencement; but how is this interval to be kept wholly clear, and the organ wholly stationary? We have, by the hypothesis, an infinite chance variability, working in all modes and directions, pulling matter about in every way conceivable or inconceivable, agitating and twisting promiscuously the whole universe of body, and keeping the vast framework of the animal world in one perpetual change and fluctuation. How do you keep this chaotic power off for this whole period, which is of course long in proportion to the security of your own advantageous chance at the end of it? How do you keep an oasis of rest immediately around your own organ, while all the world is moving, and guarantee a vacant interval to it, which is counter to the general law of disturbance? It must be remembered that pure chance is the wildest thing possible; for one turn or motion of

of matter that chimes in with a given stage of an organ, there are millions that clash with it, and that are destructive of it.* How do you keep all *these* chances at arm's length, and secure a monopoly of the ground preparatory to the arrival of the other chance, *i.e.* needed variation? But suppose one period of waiting thus kept clear, with the coinciding addition at the end of it, how, according to any laws of probability could you repeat it? Or if you repeated it once, how would you go on repeating it, an indefinite number of times, *i.e.* all the times that were wanted for the structure to be completed? A succession of given variations, *in themselves* making up an order and chain, would be nothing, unless you could also keep the intervals in the succession vacant and clear; but this upon your own hypothesis you cannot do. You cannot keep your organ quiet. It has the constant liabilities resulting from a wild basis of Nature. It is threatened at any time by eccentricity and distortion. Of what use, then, is the guarantee of time for a chance variation coming, if you cannot secure your organ from metamorphose or from actual destruction before the required variation arrives?

The way in which a man conceives and represents to himself the working of chance, when he gets the result now spoken of out of it, seems to be this: he first puts to himself one period of waiting only, and decides that there is nothing counter to moral possibility in supposing that a favourable accretion to an organ or structure may come by chance in that time. Having constituted, then, a first period of waiting with a happy coincidence at the end of it, he proceeds to repeat the same period with the same coincidence, thus, as it were, forcing chance, converting it into an accommodating material, arranging it, and bringing it into harness. But such a negotiation and compact with this wild power is impossible. Is not the advocate of natural selection deceived by the enormous intervals of time which he interposes between the successive steps of the progress, so that he forgets every time the succeeding step comes that it is a coincidence with a preceding one? These successive coinciding developments equally require to be accounted for, whether the intervals between them are minutes or ages. Suppose I throw, in regular series, from one to fifty, the chances against those fifty throws in succession are the same, whether there is a second of time between each two or a million of years. But the advocate of natural selection seems to think that, because he throws with ages between

* 'Si donc vous supposez l'œil se formant par une addition infinie de phénomènes, il y a infiniment plus de chances pour qu'il soit altéré ou détruit que perfectionné.' — *Matérialisme Contemporain. Par Paul Janet, Membre de l'Institut.*

instead

instead of seconds, the coincidence in his successive throws has not to be accounted for.

It is impossible, then, that promiscuous variability could construct the existing species; because under it no fit, no adaptation could be other than a chance coincidence, and this cannot be repeated to the extent of the formation of a species without an absurdity. The theory of natural selection, indeed, would fain make existence itself a ladder of ascent, and constitute a perpetual rise by the perpetual extinction of an inferior. But though natural selection guarantees a superiority in the structure of the surviving party in any given struggle, it cannot guarantee a succession of struggles upon a succession of ascending points in the animal structure. Take an intricate organ, such as the lungs or heart, and the succession of acts of Nature in forming the elaborate existing structure of it out of the asserted original rudiment becomes an insuperable difficulty.

'I can hardly doubt,' says Mr. Darwin, 'that all vertebrate animals having true lungs have descended by ordinary generation from an ancient prototype, of which we know nothing, furnished with a floating apparatus or swim-bladder.

But the transmutation of a mere air-bladder, which contracts and expands, into the full system of the lungs, with the bifurcation of the trachea on the one part, conveying the air first into the large and next into the minute bronchial tubes and cells, and the bifurcation of the pulmonary artery on the other, conveying the blood by a ramification of the finest channels into juxtaposition with those tubes and air-cells; this is a process the successful completion of which, by chance variation, is an accumulated impossibility. The necessity of accounting for such a work of construction is exactly the same upon the theory of transition and the ordinary theory of creation; and some other principle than chance is as much called for upon one hypothesis as upon the other.

Or to take again the crucial test of the eye. Mr. Darwin himself says:—

'To suppose that the eye, with all its inimitable contrivances for adjusting the focus to different distances, for admitting different amounts of light, and for the correction of spherical and chromatic aberration, could have been formed by natural selection, seems, I freely confess, absurd in the highest possible degree.'

But if he thinks the facts of Nature so strong for design—if he thinks there is such an enormous difficulty in accounting for them on any other understanding—if he says any account which dispenses with such an understanding 'seems absurd in the highest possible degree'—why does he gratuitously expose himself to this difficulty?

difficulty? why does he volunteer to dispense with this understanding? The progress of Nature which he supposes may be held just as well *with* an inner law of design as *without* it. Why, then, when Mr. Darwin can hold this progress as designed, does he hold it as undesigned, as he appears to do by this confession of the apparent absurdity and shock to reason which his position contains? He does not, of course, see any absurdity—any apparent shock to reason—in the mere theory of development, as such; that to which the apparent absurdity and shock to reason attach is development without design. The apparent absurdity he sees in the growth of the eye, is its growth by a mere accumulation of chance variations. But why in that case does he hold it as a growth by a mere accumulation of chance variations? Why does Mr. Darwin voluntarily dispense with a rationale by which the execution of his theory is not hindered, and without which his theory does, as he himself admits, 'seem absurd'? * He must remember that he is, as Dr. Acland opportunely hints, under a greater difficulty on this head than M. Comte is. Mr. Darwin is an optimist with respect to Nature; he thinks the result perfectly admirable and unimpeachable: M. Comte does not think so; he criticises and censures Nature. Mr. Darwin's estimate of facts, then, adds to the difficulty of the omission of a providence in the explanation of them: and M. Comte's blame of Nature, if a worse judgment of results, is better fitted to, and corresponds more with, his rationale of the cause.

A pure variability which issues in organisation is in truth nothing but the natural philosophy of Lucretius.

'Primordia rerum
Ex infinito jam tempore percita plagis
Ponderibusque suis consuerunt concita ferri,
Omnimodisque coire, atque omnia pertentare,
Quæcunque inter se possint congressa creare,
Ut non sit mirum si in tales disposituras
Deciderunt.'

Lucretius had not indeed any physical theory to account for the disappearance of intermediate and anomalous forms; but his fount of development is the same as Mr. Darwin's: Time—*ex infinito jam tempore*, &c. In the Epicurean philosophy, time exhausted chance, and inserted a period of organisation in the universal chaos, on the ground that disorder could not upon

* 'Or, je le demande,' says M. Janet, 'à M. Darwin lui-même, quel intérêt a-t-il à soutenir que l'élection naturelle n'est pas guidée, n'est pas dirigée? Quel intérêt a-t-il à remplacer toute cause finale par des causes accidentelles? On ne le voit pas. Qu'il admette que, dans l'élection naturelle aussi bien que dans l'élection artificielle, il peut y avoir un choix et une direction, et son principe devient aussitôt bien autrement fécond.'

the

the mere principle of chance go on always, but wore itself out; and allowed order to have its day. This school thus really thought that it made a complete Eureka when it promulgated as the explanation of the physical world—chance. It congratulated itself on being the first discoverer of this great power, and expressed the utmost surprise that it had never occurred before to anybody to see what a vast fund of causation lay hid in it. For, they argued, chance in *time* can do anything—only give it an infinity of time: things must have some form or other; they have in the infinite past gone through every phase of monstrosity * that was possible; of which state of the world, in the very nature of the case, we know nothing; but now that things have gone through all conceivable eccentric forms, a stage of organisation comes about by the doctrine of chance, and such an insertion in the infinite duration of the world, is a happy coincidence that must take place sooner or later. Such a position is of course absurd, because no time can really exhaust chance. Chance is as infinite as time. Chance, therefore, could never bring the Epicurean his oasis of universal order in any extent of time. Nor could a simple undirected variability, a variability without scope or aim, ever produce the existing world of species; it could never exhaust its stock of incongruities and imperfections.

There is an evident chasm, therefore, in the theory of Natural Selection which we must fill up before it can work; there is something to be accounted for which is not accounted for—the mode in which the variability of Nature, in fact, operates, the succession with which its gifts come out, the adaptation and agreement kept up in a long series of separate additions to and modifications of organs from their rudimental to their final form, the accumulation of the resources of Nature in particular directions, so as to make up at last harmonious structures. The external check of natural selection which comes *after* variation, cannot possibly account for this succession in it; there must be a guiding principle within variability itself, by virtue of which, its additions come out congruously, follow up a line begun, and form a connected string of operations. The contents of the great reservoir (here for the purpose of argument assumed),

* 'Multaque tum Tellus etiam portenta creare
Conata est, mira facie, membrisque coorta;
Orba pedum partim, manuum viduata vicissim,
Muta sine ore etiam, sine voltu cæca reperta,
Vinctaque membrorum per totum corpus adhæsu;
Nec facere ut possent quicquam, nec cedere quoquam,
Nec vitare malum, nec sumere quod foret usus.
Cætera de genere hoc monstra ac portenta creabat;
Nequicquam; quoniam Natura absterruit auctum.'

as

as a matter of fact, come out upon, or so as to make up, a plan, the pieces set together however gradually and at intervals. We ask why? It is slow work indeed, ages are consumed in the progress; one piece comes in ever so long a time after another; but as a matter of fact they have all composed into one plan, which we see. How has all this been going on? As natural selection does not by its very function construct, there must be some prior principle which does; the hypothesis requires another hypothesis to work it; it needs complementing by a scope in Nature, a working toward an end, or a principle of design. 'Nous ne sommes ni pour ni contre la transmutation des espèces,' says M. Janet, 'ni pour ni contre le principe de l'élection naturelle. La seule conclusion positive de notre discussion est celle-ci: aucun principe jusqu'ici, ni l'action des milieux, ni l'habitude, ni l'élection naturelle, ne peut expliquer les appropriations organiques sans l'intervention du principe de finalité.'*

Does not, indeed, the advocate of natural selection, while he thinks he gets everything out of *it*, unconsciously manipulate his material, and supply by an insensible understanding with himself a sort of gradation and method to the issues from variability? Does he not provide out of his own mind, without thinking of it, by reason of the familiarity which he has with order in Nature, a succession and order for these outgoings from the reservoir of Nature?

The parallel which Mr. Darwin institutes between the process of variation and development as an artificial system, and the process in Nature, is not one certainly which goes against this conclusion. In artificial breeding we see a process of variation tending to the improvement and perfection of the species; but it is a process which goes on distinctly by design.

'Le véritable écueil, à notre avis,' says M. Janet, 'de la théorie de M. Darwin, le point périlleux et glissant, c'est le passage de l'élection artificielle à l'élection naturelle: c'est d'établir qu'une Nature aveugle et sans dessein a pu atteindre, par la rencontre des circonstances, le même résultat qu'obtient l'homme par une industrie réfléchie et calculée.'

Natural selection is indeed that result in the field of Nature, which answers to the success of an article in trade. The field of

* 'Un botaniste distingué, M. Naudin (récemment appelé à l'Institut) qui, avant même M. Darwin, a comparé l'action plastique de la Nature dans la formation des espèces végétales à l'élection systématique de l'homme, reconnaît que l'élection naturelle est insuffisante sans le principe de finalité. "Puissance mystérieuse," dit-il, "indéterminée, fatalité pour les uns, pour les autres volonté providentielle, dont l'action incessante sur les êtres vivants détermine à toutes les époques de l'existence du monde la forme, le volume et la durée de chacun d'eux en raison de sa destinée dans l'ordre de choses dont il fait partie!"'—*Matérialisme Contemporain*, p. 180.

trade

trade exhibits a struggle between different goods and pieces of workmanship for existence: the old article goes on being sold till the improved article makes its appearance, when the better production beats the old one out of the market, which consequently disappears and is no more heard of. But it would be absurd to say that the new and improved article was made *by* the old one being beaten out of the market. The natural selection of trade assumes the previous construction of the successful production by contrivance. In the history of the steam engine a hundred improved engines have successively driven a hundred unimproved ones off the field. Civilisation is made up from first to last of conquests of improved methods, arts, manufactures over unimproved ones. Science is a constant progress from defective hypotheses to sounder and more correct ones; and as the correcter ones are discovered, the defective ones are sent to the wall and disappear. But it would be absurd to say that this disappearance of old contrivances *accounted* for human progress; because it is human progress which accounts for that. The perfect steam engine owes to the natural selection of trade the destruction of the imperfect steam engine; and the Copernican hypothesis owes to the natural selection of philosophy the withdrawal of the Ptolemaic one; but both improvements owe *themselves* to constructive power. In civilisation there has been an intelligence taking advantage of each successive stage in the progress to rise to a higher one; the succeeding mind has known the discovery of the preceding one, has fitted on his own to it, and has risen by starting upon its platform; and a unity of design, though the current has used generations as its channels, thus appears in the construction of the work. So on the field of Nature natural selection, supposing Mr. Darwin's theory of Progress to be true, cannot relieve us from the need of some prior principle, some intelligence, however mysterious, which has worked for an end in Nature, and under whose guidance this progress has proceeded.

We have hitherto taken variability in a simple way, without reference to *laws*. But variability, we are told, is governed by laws—laws at present almost wholly unknown to us, and belonging to a region of utter physical mystery, but which nevertheless exist and are laws which produce as their results the whole of the fifth and sixth days of the Mosaic creation; *i.e.*, are the laws by the operation of which the whole existing animal creation has been formed.

Upon which basis, then, do these occult laws, when they produce this result, work—Chance or Design? That is the question. To say that they are laws simply, does not decide that question.

To

To say that they are *laws* simply, does not in the least imply that their issue may not be an utter medley. Laws may be irregular, blind, unmeaning, promiscuous laws, without concurrence or understanding with each other, without consistency or scope, and still be laws, as being each uniform sets of occurrences; they may be mere capricious laws, such as that cats with blue eyes are deaf, and still be laws; they may tend to no structural result whatever, and they may still be laws; they may be a chaos collectively, and laws separately. Law is indeed a midway position between chance and design, at which many minds find it convenient to stop. Chance is an absurdity; design is a mystery; law has, or appears to have, the great advantage of a neutral ground. Stop then at laws, says the Comtist, says the Secularist; acknowledge uniform facts, but do not ask a single question beyond this. It is in vain. Reason cannot be suppressed. Laws are simply facts—only uniform facts. The question then has to be asked about laws, just as it has to be asked about facts—have they issued in what they have issued in, by chance or by design?

To the question, then, whether the existing species can be referred to chance *laws* of variability, the same answer may be given that has been given to the question, put simply, whether they can be referred to chance variability. The insertion of *laws*, in the form of putting the question, does not in fact make the slightest difference; and all the reasons which have been given why chance variability could not have produced the existing animal creation, apply to chance-working laws of variability. If I see an harmonious structure as the result, and you suppose as the cause a quantity of blind unsystematic laws, do you think I can be satisfied with that cause simply because it is law—a number of laws? It cannot be. Then I must suppose something different. I must suppose a system of co-operating laws. If we know nothing about those laws in particular, we know that they must stand in some relation to that which they produce, that they must correspond to that which they produce, and that they must coincide to produce results that coincide. We know that there must be inter-correspondence, that there must be relationship to each other in such laws: but, if there is, then such laws show design; for there can no more be a fortuitous concurrence of laws than a fortuitous concurrence of atoms. Let us throw aside for a moment the philosophical fiction and conventionality of laws, and think only of movements of matter going on, if you will, for ages and countless ages, but going on with a growing and expanding arrangement—a rudimental world disposing itself gradually into intricate system, and separating,

separating, by different directions, into multitudinous forms and shapes of mechanism; this is nothing but the actual fact which Mr. Darwin places before us. But if we could suppose ourselves witnessing this spectacle, and endowed with those extended faculties which would bring the work of ages within a spectator's view and grasp, annihilating the intervals of time between the successive steps of the formation, what would be the effect? Could we possibly suppress the interpretation that there was a mind working behind and underneath such a process?

When we look, indeed, at the two or three fragments of the code of variability which have emerged out of the dark abyss into Mr. Darwin's notice, we cannot but make the observation that, though mere outer laws not concerned with the inner structure of the animal, on the rule of *ex pede Herculem*, they certainly glance significantly in this direction. The law that specific characters are more variable than generic, and extraordinary developed parts than ordinarily developed ones, and the law of reversion, directly minister to the stability of Nature; they supply an invisible anchorage and mooring. The law of 'compensation or balancement of growth,' by which Nature, in order to spend on one side economises on the other, carries, on the face of it, something of the nature of a purpose, because it prevents the vital resources from consuming themselves in the attempt to supply too large a demand. The law of correlation of growth has so obviously the look of an arrangement that it figures in Paley's theology as one of the proofs of design. For correlation of growth in the animal body is a different fact from the correlation of the sides of a crystal; it is correlation in a structure formed for use, and whose use stops half way and waits for correlation to complete it; it is correlation *concurring* and chiming in with another fact, viz., an organic body, and joining in attaining the purpose of that body, and not simple symmetrical correlation. The Duke of Argyle well observes:—

'Two growths might be correlated as regards each other, and might yet be wanting in any corresponding correlation of fitness and of function towards outward things. But the first of these two kinds of correlation would be useless without the last. And this last is obviously the higher and more complex correlation of the two. It is higher, not only in the sense of being more complex, but as involving an idea which lifts us at once from a lower to a higher region of thought, ... from the work of Forces with inherent Polarity of action, to the operation of Forces working under adjustment with a view to purpose.'

Are we then at liberty to interpret Mr. Darwin as maintaining the

the existence of these unknown laws of variability in this *sense*, viz., as constituting collectively a system of laws indicating design? Such an interpretation of himself by Mr. Darwin would be no more than a legitimate consequence of an admission which he makes upon the very threshold of his theory. He admits that the first life-germ was a creation; and if there is design in *his* first organism, that primary design must be credited with the whole of the final issue. It is impossible to suppose that the Creator of the rudimental germ which was to produce as its issue this existing world, could after myriads of years awake out of sleep, and be astonished at the actual result of His own creation-seed:—that it was so much more than He had expected; to conceive this would be to suppose not even the Supreme Being of philosophy, but the idol of the pagan; it would be to imagine a Deity such as that which Elijah mocked at, a Deity like the Zeus of Homer, who could not hear the grievance of Achilles because he had gone to sup with the Ethiopians. But if we cannot suppose a God who is genuinely surprised at His own universe, and startled at the sound which He himself hath made, then, if Mr. Darwin supposes one true original creative act, the universal result must be included in that act. If design has once operated in *rerum natura*, how can it stop operating, and undesigned formation succeed it? It cannot; and intention in Nature having once existed, the test of the amount of that intention is not the commencement but the end, not the first low organism but the climax and consummation of the whole.

We are not at liberty however to interpret Mr. Darwin. *We* say that these laws of variability, if they issue in, if they collectively account for, an elaborate system, as by the hypothesis they do, must contain system themselves, and, therefore, contain design; but we have not the right to say that Mr. Darwin thinks so, and are therefore unable to do more than fall back upon an alternative in treating with him. He must take the choice of two alternatives for his hypothesis to work with—Chance or Design. The intermediate position of laws is no resting place. Does he allow that these *de facto* concurring and co-operating laws of variability contain design? In that case his hypothesis is worked by means of a design in Nature. Does he *not* allow that they contain design? In that case his hypothesis is worked by chance. It is worked by the extraordinary coincidence of these laws or movements of matter *happening* to meet together, so as to have a plastic operation. The laws are laws in respect of the separate uniformity of each; but their concurrence in a constructive effect, not being due to any purpose, not being attributed to any cause, is chance; and the fashioning of animal nature

nature which is conducted by laws which are altogether chance *with respect to* that fashioning process, is as much by chance, as if there were no laws in the case. He must either make his theory rational, then, by the admission of design; or by the omission of design he must leave it a substantially epicurean hypothesis, accounting for the formation of the animal world by chance.

And so we come round to Paley again. Paley had some great wants: he wanted religious imagination; he wanted the sense of mystery; he almost wanted the sense of wonder; he treated the world too much like an instance of ordinary manufacture; but one thing he did do—he brought out with an incomparable perspicacity, and with a power with which no one had done before, the verdict of facts for Design. We append to his great statement the observation that, if the verdict of facts is once given, physical causes can never reverse it—can never extort from those facts a retractation of their sentence. We do not in this article either adopt or reject the principal physical hypothesis with which we have dealt, viz., that of the Transmutation of Species; we have only required for our purpose the supposition of its truth in order to extort from it the confession that Design alone can supply an imperative need in its structure, and fill up a chasm at its very foundation which otherwise paralyses and incapacitates it at the very outset as a working hypothesis.

ART. VI.—*Histoire des Princes de Condé pendant les XVI^e^ et XVII^e^ Siècles.* Par M. le Duc D'Aumale. Tome I.; II. Paris, 1863.

THE national poet of Ireland has strikingly depicted her transport when—

> 'She saw history write, with a pencil of light
> That illumined whole pages, her Wellington's name.'

The name of Condé must always come fraught with yet richer associations to France. It does more than revive one great and glorious memory. It typifies a long line of heroes. It calls up a brilliant throng of warriors, statesmen, and beauties, who stamped their impress on successive ages; and it will certainly not shine with diminished lustre when the pencil of light that inscribes it anew on the book of Fame is held by one to whom the best qualities of the race have been transmitted with their blood. The first of the great Condés, the prisoner of Dreux, was not more distinguished than the exile of Twickenham by the