

## FINAL CAUSES.\*

THE argument from design, which proved so fascinating a subject to writers on teleology of the last century has been thought to have received its death-blow from Evolution.† This doctrine, as propounded by Mr. Darwin, has now “come of age,” and nearly coeval with that epoch has appeared probably the most elaborate work on *Final Causes* which has ever issued from the Press. It contains two books. The first treats of the Law of Finality, the second of the First Cause of Finality. This term is defined as follows: “It signifies the end (*finis*) for which one acts, or towards which one tends, and which may consequently be considered as a cause of action or of motion.”‡ Hence, it would seem that a sharp distinction should be drawn between *Finality* and *Causality*; that while every phenomenon demands a *cause* of some sort, it is only a certain number which have an *end*, this notion being “produced with an imperious and irresistible force.” Thus, for example, that a pebble should be round and smooth is a result of friction; but we see no “end” in its roundness or smoothness. The eye-ball is also round and smooth, and we rightly or wrongly *do* infer an end in its spherical form; for we recognise its use for rotation. This “imperiousness,” however, is not argument, and the question may be asked,

\* *Final Causes*. By Paul Janet, Member of the Institute, Professor at the Faculté des Lettres of Paris. Translated from the French by William Affleck, B.D., with Preface, by Robert Flint, D.D., LL.D., Professor of Divinity, University of Edinburgh. T. and T. Clark, Edinburgh. 1878.

† *Lay Sermons*. By T. H. Huxley. P. 330.

‡ P. 1.

How is any supposed end to be distinguished from a mere result?

The reply is, that in every case where an end is recognised, there is a multiplicity of coincidences which have by their mutual interaction brought about that end; while the probability of their occurring at haphazard, or as uncorrelated coincidences, and yet collectively producing such a structure as the eye, is one to infinity that such should be the case. It is on these grounds that the order of the planetary system, as well as the organs of animals and plants, imply ends; but we cannot recognise any end in the way a stream of lava pours down one side of a volcano rather than the other.

We may, however, here ask what degree of complexity is requisite to constitute or illustrate an end? If there is an indubitable end in the human eye, is there not a like end in a pigment cell attached to a nerve? or, if there is an end in the limbs of a vertebrate, is there no end in the shapeless pseudopodia of an *amæba*?

Now, the formation of pseudopodia may be claimed by the Positivists as illustrating the inherent properties of sarcode, and as such they are simply *results* and not *ends*.

Even sex, so obviously an end, as Janet thinks, if traced to elementary forms, is foreshadowed in the accidental fusion of two vegetative zoospores. Hence, although ends may seem very apparent in highly-organised beings, the organs exhibiting these ends may be traced back to states where those "ends," by a gradual process of minimisation, seem to pass into accidental "results," and so one cannot at last draw any sharp line between them.

Mr. Herbert Spencer, in tracing conduct from such random motions as are executed by pseudopodia to the actions of higher animals, which seem to show definite ends, points out how the gradations are complete—say, from the swimming of an infusorium to the habits of a cephalopod,

or from those of an ascidian to an elephant. It is just this which renders the attempts to limit finality with any degree of precision so difficult a task.

This difficulty, if I mistake not, is scarcely brought out with sufficient precision by M. Janet. It may, therefore, indicate a line of objection to finality, as it undoubtedly would be to the old views of teleology.

In his sixth chapter of the first book on "Objections and Difficulties," Janet refers to M. Littré's view that "the property of matter of accommodating itself to ends—of *adjusting itself*, as he says—is one of the properties of organised matter. It is of the essence of this matter to adapt itself to ends, as it is of its essence to contract or expand, to move or to feel."\* Our author takes M. Littré to task for this expression.

There must be, however, an underlying truth in it. Otherwise the very existence of the animal and vegetable kingdoms, as they now are, cannot be accounted for. If Littré meant that animal matter, say, of some reptile, through some inherent properties of adaptation, developed wings instead of forelegs, and so produced a bird, such a description may sound absurd; yet every evidence yet discovered goes to prove it true, though the process may have been a gradual one, and only perfected through very many generations.

In fact, Evolution is based on the principle that protoplasm *has* an infinite potentiality of adaptation; and when our author objects to Littré's expression about organised matter having the power of adapting or adjusting itself, he does not refute it by saying, "Let men but think of it, and they will own that there does not exist a sort of entity called organised matter, endowed, one knows not why or how, with the property of attaining ends; what really exists is a totality of solids, liquids, tissues,

canals, hard parts and soft parts—in a word, an incalculable totality of second causes and blind agents, that all unite in a common action, which is life.”\* Now, this is true; but it is not one whit the less true that it is, so to say, a plastic whole; for, although when a creature is once born into the world, and has grown to maturity, it can rarely change its form much after that, any more than the leopard its spots; † yet, by its power of hereditary adaptability, it can impress upon its yet unborn offspring a form and structure different in some degree from itself; and so after several generations can produce new species and genera, abounding in so-called “ends,” which were not to be found in the original ancestral form.

It is, in fact, just this plasticity of organised matter (for want of a better expression), to which is due the marvellous results which, *per se*, have all the appearance of ends. Janet finally asks: “Wherein is it more absurd to admit in matter the property of healing itself than the property of adjusting itself to ends?” Neither one nor the other is absurd, for both are equally true. To the famous argument of the watch, it might be added that, if a watch could heal up an injury to its wheels, it would imply a vastly-increased skill in its artificer. But this is just what the highest kinds of organised matter *can* do, and *are* doing, every day!

Hence, if, on the one hand, a large class of phenomena do not instantly convey to our mind the idea of end, whereas another large class imperatively force it upon us, we must bear in mind that the doctrine of Evolution, without destroying that force as far as it acts *per se*, has proved that, in all instances, we can actually or presumedly pass from the highly-complex organ, or organism, so to say, *crammed*

\* P. 221.

† This expression, as symbolical of fixity, is singularly inappropriate, for the colour of the skin of even one and the same animal is extremely variable, according to circumstances, as is the case with trout, frogs, and, above all, the chameleon.

*with ends*, to a homogeneous lump of jelly, with, seemingly, none at all; and that by development, whether studied historically in palæontology or in embryology, we pass by many gradations from what we *à priori* call "results," to what we *à priori* call "ends." It is this discovery which has (it is supposed) given the death-blow to teleology. For tracking them up from below, who can say where "ends" begin? And we may therefore, and finally, ask, Is it not somewhat arbitrary to assert such or such a structure to be an end and not a result?

Before attempting to reply to this, let us return to our author. He gives, as another basis of finality, *the correlation of the end with the future*, which implies the existence of the future phenomenon as the efficient cause, and adopts the old illustration of the eye being fully developed in the womb, though the use of it is solely for the future.

It seems to me that a line of argument may be followed which will eliminate this dilemma. It is based on the fact that *function precedes structure*, by which I mean that functions, *now* performed by well-differentiated and specific organs, *were* undertaken by more generalised structures before these organs existed; just as, for example, the membrane of a sea-anemone performs functions of both digestion and respiration.

Again, when a new function is required by even a highly-organised being, that function is, so to say, undertaken for a time by some existing organ (of totally different function) until such modifications have occurred in successive generations as will ultimately enable the organ (thus metamorphosed into a new form) to execute its new functions exclusively. For example, the tendrils of *Naravelia* are foreshadowed in the sensitive climbing petioles of *Clematis*, and the seed-carrying expanded leaf of *Cycas* is preliminary to the ordinary closed seed-vessel, such as the pod of a pea.

Now, these principles of differentiation and metamorphosis

which run through the organised world, imply a universal *potentiality* of acquiring new functions, which, at the same time, proceeds to modify structure, and so gives rise to new organs.

May we not, then, legitimately pass from a consideration of finality in the actual organ to a finality in this very power and potency inherent in organised matter? Whence it comes is unsearchable and past finding out. All we can say is, that inorganic matter shows no signs of it whatever, whereas organised matter, or its ultimate elements, protoplasm and sarcode, would appear to have it to an infinite degree.

Grant finality in this marvellous power, and the whole question would seem to at once meet with its ultimate solution!

Further illustrations will not be inadvisable.

If one contemplates the eye as it is, without regard to its evolutionary history, the idea of finality, if not design, is very "imperious"; but by tracing that history from a mere pigment cell in contact with a nerve, and then by imagining almost microscopic improvements, so to say, to have taken place, the idea of finality seems frittered away, while the notion of design vanishes altogether.

But it seems to return again under the aspect now considered; for granting the pigment cell and a nerve, beyond which analysis is unable to proceed, and mere sensation as a result, "we maintain that, what occurs first as an *effect* takes thereupon the character of an *end*, by reason of the number and the complexity of the combinations which have rendered it possible;"\* and we may ask, Why should the more complex eye issue at all out of the simpler condition? Finality, as expressed by the inherent potentiality of protoplasm, seems to be the sole answer.

Again our author lays stress upon the sexes, as illus-

trating the most remarkable fact of co-ordination ; for it is not merely a case of adaptation of one organ to its function, but of one organ to another. Neither is one the effect of the other. "Those two organs are two distinct and independent effects, and yet they can only be explained the one by the other, which is precisely the relation of finality."\*

"It cannot be said," Janet observes, "that this adaptation has been made in course of time ; for as the species could not subsist without it, it would have perished before it had been formed."†

No doubt, existing species could not exist without their full amount of correlative structures ; but it is just because the sexes have been, as it is believed, differentiated in course of time, that the supposed finality becomes, like that of the eye, attenuated by being prolonged backwards into history ; for by travelling historically backwards we can theoretically, if not always practically, see species getting simpler and simpler, and more and more generalised, till in every organism the sexual process would be represented by a mere accidental fusion of two identically similar protoplasmic masses ; while one stage further brings us to an entire independence of such conjugations, and the being propagates by fission of its vegetative system only.

Instead, however, of thus eliminating by degrees every trace of finality in sexuality till we merge into merely mechanical results, is it not just as logical to say that the sexuality of mammalia and flowering plants was potentially visible in the conjugation of monera and plasmodia ? and that the "sexual idea" has reigned throughout, function ever dominating structure till the latter had conformed to the more complete function by becoming specialised more and more ; or, in the words of Janet, "The agreement of several phenomena, bound together with a future deter-

\* P. 52.

† P. 53.

minate phenomenon, supposes a cause in which that future phenomenon is ideally represented, and the probability of this presumption increases with the complexity of the concordant phenomena, and the number of the relations which unite them to the final phenomenon." \*

M. Janet devotes the second chapter to an elaborate investigation of the structure of the eye, ear, tooth, &c., and sees finality in all, just as the older teleologists saw design, in "that when a complex combination of heterogeneous phenomena is found to agree with the possibility of a future act, which was not contained beforehand in any of these phenomena in particular, this agreement can only be comprehended by the human mind by a kind of pre-existence in an ideal form of the future act itself, which transforms it from a result into an end—that is to say, into a final cause." †

If this be a correct account of finality, then the inter-crossing of flowers would be a most pertinent illustration of it. For the conclusion Mr. Darwin and others have arrived at is, that plants, to be perpetuated, *must* be crossed at least occasionally, that nature "abhors perpetual self-fertilisation," that "self-fertilisation is injurious," &c., such being expressions to be found in Mr. Darwin's writings. ‡ We have "a complex combination of phenomena" in the structure of the flower of an *orchis*. This structure is correlated to an insect which *must* convey the pollen-mass from one flower to another, or the seed will not be set. Here, then, is exactly what Janet defines as finality; for the structure is found to agree with the possibility—nay, necessity—of a future act, that performed by the insect, which was certainly not contained beforehand in the structure itself. Such, then, is clearly finality in the

\* P. 55.

† P. 85.

‡ As, for example, repeatedly in his work "Cross and Self-Fertilisation of Plants." I have given reasons elsewhere for dissenting strongly from these expressions.



structure of many flowers as they now exist. *How* their peculiar structures were obtained is another question, which we will not discuss at present.

One of the most patent facts in Darwin's expositions is that almost every detail of structure is presumed to have a use, excepting, of course, "rudimentary organs," whose use is now gone, as it is superseded by that of other organs, notably so in the structure of flowers; and he sets himself the task of discovering such use. This is an *à priori* conclusion which he then proceeds to test by trying to discover the use.\* His language could be very appropriately adopted by a teleologist; but we know he does not believe in direct design. All the minute details of structure which seem so "imperiously" to force finality, if not design, upon the mind, have been acquired, according to Mr. Darwin, by the unintentional acts of natural selection. All the characters by which a specific form is known he compares to chance fragments of stone, broken from a mountain rock, but of which natural selection has picked out and preserved those most suited to render the creature the fittest to survive; just as a man may select stones of different shapes wherewith to build his house, without having previously shaped them himself. These are his words:—"The fragments of stone, though indispensable to the architect, bear to the edifice built by him the same relation which the fluctuating variations of each organic being bear to the varied and admirable structures ultimately acquired by its modified descendants." †

There has always seemed to me to be a strange oblivion underlying this simile. What sort of a house, much less a palace or cathedral, *could* possibly be constructed out of unhewn and unworked stones, if the architect were merely

\* See, for example, his remarks on "*Momordae Ignea*" in "*Fertilisation of Orchids*," p. 249; First Ed.

† "*Animals and Plants under Domestication*," vol. ii., p. 430.

to content himself with the rough fragments with which the weather or accident supplied him ?

The exquisite details of structure of a flower of the field, like to which Solomon in all his glory was not arrayed, is much more comparable to a highly-finished and beautifully-designed architectural pile than to such a rough building as that to which Darwin would have us liken it. If it be necessary to *intentionally* prepare each stone for its future position in the structure, so by analogy it might be reasoned that Nature had intentionally caused each detail to develop with the ultimate end of forming " a complex heterogeneous whole." No doubt Darwin's simile is correctly apposite to *his* theory of unlimited variations, out of which natural selection takes the best ; but, as already stated, naturalists are by no means at one in adopting that view. Another is that variations do not occur until external conditions have incited them to appear ; and that when they do, it is in response to, and they are then consequently correlated with, the environment ; in other words, the organism becomes more and more adapted to the environment, so that natural selection has little or nothing to do.

Mr. Darwin would seem to lay much more stress upon the inherent, spontaneous powers of variation than upon the environment as an inciting cause ; for he expresses himself as inclined " to lay less weight on the direct action of the surrounding conditions than on a tendency to vary, due to causes of which we are quite ignorant." \*

I have always adhered to the opposite view, and regarded the environment as by far the most important " cause " of variation, in that it influences the organism which, by its inherent but latent power to vary, responds to the external stimulus, and then varies accordingly.

This view has lately been very strongly insisted upon by Dr. Aug. Weismann, who thus speaks :—" A species is only

\* "Origin of Species," p. 107 ; Sixth Ed. ; 1878.

caused to change through the influence of changing external conditions of life, this change being in a fixed direction which entirely depends on the physical nature of the varying organism, and is different in different species, or even in the two sexes of the same species. According to my view, transmutation by purely internal causes is not to be entertained. If we could absolutely suspend the changes of the external conditions of life, existing species would remain stationary. The action of external inciting causes in the widest sense of the word is alone able to produce modifications." Mr. Alfred R. Wallace, who quotes the preceding in his review of Dr. Weismann's work, "Studies in the Theory of Descent," says that he "has arrived at almost exactly similar conclusions to these." \*

Whichever theory be adopted, the outcome is, of course, the same—viz., structures which *per se* imperiously suggest finality or design. But since the special creation hypothesis is out of court, and Evolution of some sort only accepted, design may be excluded, and the question stands, Does finality remain? If Janet's definition be accepted, then as "ends" abound everywhere in organism, finality is also *passim*. We are not concerned, be it remembered, at present with the investigation as to *how* the complex correlated structures *do* arise in response to either an external or internal stimulus.

Now, assuming finality to be recognised in Nature, it must be either intentional or not. In the First Book Janet does not concern himself with intentionality. He does not therein raise the question as to how the first cause acts, but whether the second causes, as they are given to us in experience, act for ends or not. Within these limits, then, is the analogy between the industry of man and that of nature legitimate?

Taking as a starting point the consciousness of personal

\* *Nature*, vol. xxii., p. 141.

finality in ourselves, we infer by analogy a similar finality in other men; "from finality in the industrious actions of other men, we pass to finality in the industrious actions of animals, whether these actions present the appearance of some foresight and reflection, or appear to us absolutely automatic. We have now to pass from the external actions of the animal, which are called its *instincts*, to its internal operations, which are called its *functions*. This is the kernel of our whole deduction."\*

In tracking finality thus downwards, the reader will at once perceive that the author considers finality as equally characteristic of the voluntary and the automatic acts of man, as well as the acts of all other animals, whether external and instinctive, or internal and functional.

He notices a "profound difference between functional industry and human—namely, that artificial industry constructs the machines it has need of to perform its operations, while the animal functions are only the operations of machines already constructed. The man makes pumps, but the animal has received from nature a natural pump, the heart. . . . Whatever be the cause that has constructed it . . . is of little consequence; in any case, this cause in constructing this machine has performed a series of operations entirely resembling those of a workman constructing analogous machines."†

The author then pertinently asks, "How could the same machine be considered here as a collection of means and ends, there as a simple coincidence of causes and effects?" Why is a spider's web a mere effect, but a fishing-net an end? "Can we thus assign two absolutely opposite causes to two absolutely identical actions?" And Janet redefines finality under this comparison, observing that "in both cases there is a twofold common character:—1st, the relation of the parts to the whole; 2nd, the relation of the

\* P. 97.

† P. 99.

whole to the external medium. . . . There is no part which has not its reason in the whole. . . . Now, is not that the essential and distinctive character of finality? It is not, then, the more or less of internal activity or of spontaneity that is here in question; it is that *pre-established harmony* of the part and the whole, which, common at once to the works of art and to the works of nature, confers upon them, on the one as on the other, an incontestable character of finality."\*

The two words I have italicised in this quotation may possibly give rise to a misconception; for whatever "pre-established harmony" may be seemingly present in the correlation of organic structures, Evolution will not permit of any correlated structures having been made in *anticipation* of fulfilling a want. They may be made so now in the development of existing species—say the eye in a fœtus—but when originally differentiated, it was in accordance with *immediate* wants, or, as I believe, in response to external stimuli—*e.g.*, light in this case.† But once formed, it becomes hereditary, and *then* ever afterwards will be formed in apparent anticipation.

Finality is certainly not destroyed, whether we believe organs to have been developed by evolution, or to have been created in some analogous manner to the fabrication of a steam-engine by man. For my own part, I still hold to the theory that *uses* cause *adaptations*, on the principle that *function precedes structure*. Thus as a graminivorous animal has its food already (so to say) cut up into slices in grass-blades, it does not require scissors to reduce it to small pieces in order to make a convenient mouthful. But a carnivorous animal has a large lump of flesh in the

\* P. 101.

† If total darkness causes eyes to atrophy, as in fishes, &c., in caves, light is evidently essential to keep the structure of the eye in its normal state. Hence it is legitimately to be inferred that light has "caused" them.

shape of a carcass. It requires to cut it up. The action of biting in order to do this, previous to masticating, has converted its teeth into scissor-like carnassials, and as it can no longer masticate it bolts the pieces whole.

So, too, man would never have thought of making scissors unless he had had something that he wanted to cut up. The object induced the manufacture, "Necessity being the mother of invention." The parallel is complete; only, in the one case it is spontaneously effected by the plasticity and adaptability of living matter; in the other it is artificially produced by the consciousness and skill of man.

Not only, then, do we recognise finality in the functions of the completed organs, but in the very formations of the organs themselves.

But now asks Janet, "Is this analogy between human industry and the industry of nature, though justified by theory, also justified by science?" According to the older methods of interpretation, the form of the organs was supposed to imply their function. But at the present day we have reason to believe the reverse, or, as I have expressed it, that *function precedes structure*. In generalised animals different functions are often executed by one and the same organ; and it is not till later—*i.e.*, higher in the scale of life—that differentiation of a common structure into special organs occurs, each organ now taking on its special function, according to the principle of the division of labour.

The present method of investigation does not limit itself to organs, but presses on to the ultimate analysis, till it reaches the fundamental and physical basis of life, or the protoplasmic cell; and science declares that this analysis leaves no room for ends, but can find nothing but causes and effects. Hence once more do we ultimately arrive at the *Potentiality of Protoplasm*, and all we claim is, that, given certain, nay, almost any, combinations of conditions of the

environment, protoplasm will do such or such a work, the outcome of which is an organ adapted to its environment, and finally an organism which then "imperiously" asserts to us its finality.

We thus arrive at the last question, Whence comes this potentiality of protoplasm? or, How is it that orderly differentiation comes out, and not perpetually changing states of chaos? As a fact, the more differentiation has set in, the more wonderful are the structures produced; so that, casting the eye back through the vista of past ages, from the *Eozoon* to man, we see nothing but ascending series in every direction.

Science knows nothing of "must." All that we can say is, that such or such organs do grow in an embryo, and that collectively they do make an organism, but they may at any time make a monster instead.

Thus normally the tissue of a leaf-bud is formed in a certain way; but a *cynips* punctures it and deposits an egg within. The tissues *now* grow abnormally and produce a gall. The inner layers of this contain nutritive food suitable for the grub, and upon which it lives. If the nourishment were not specially provided by the tree, the grub could not live. This is a case which shows how the gall is apparently nothing but an effect or result of a mechanical injury caused by the puncture. But looking at the gall *per se*, we find it furnishes board and residence for the *cynips*. Hence there are at least two "ends" in the structure; and why may we, then, not regard it as one of those "imperious" cases of finality? Yet the whole structure was simply an outgrowth in "response" to, or a "result" of, a minute injury.

This case would seem to furnish a good illustrative example of many others, of which the only interpretation would seem to be that protoplasm is endowed with the property of producing tissues in response to stimuli, and that when

the organ composed of those tissues is completed, it has all the appearance of having had an end in view during its entire structure. And what is true of single organs is true for their totality or a living being.

I have dwelt upon this potentiality of protoplasm, because, contrary to Janet's opinion, it seems to me that it affords the only true resting-ground upon which to base the doctrine of finality. It is an objective fact which is indisputable. Recognise it as such, and then all forms of finality will flow from it.

Having pretty well exhausted the subject of finality as apparent in organs, Janet observes that as animals and plants cannot live without a suitable environment to furnish them with adequate food, "We are thus brought to the notion of *external* or *relative* finality." "It is strange," he adds, in speaking of external finality, "that it did not strike Kant from this point of view that internal finality is in reality inseparable from external, and cannot be understood without it. The organised being, in fact, is not self-sufficient, and it only exists by means of the medium in which it lives. Nature, then, would have done an absurd thing if, in preparing an organism, it had not, at the same time, prepared besides the means necessary for that organism to subsist."\*

But is he not here inverting the process? Nature did not prepare grass *for* herbivorous cattle, nor did she develop herbivorous cattle *for* the carnivora. Every organism was, of course, independent of all others that came into existence after it, as they entered the world in an ever-ascending scale; though each one is *now* dependent upon some other or others if regarded in the reverse order. Thus the lamb was not made for the wolf, but the wolf's teeth have been secured to it as the best adapted for tearing flesh of some kind. Teeth are an internal finality,



but the lamb cannot be regarded as external finality for the teeth.

The oak-gall produced specially by and for the cynips would seem to be a much better case of external finality ; or again, the honey of flowers for insects. Organic internal finality is the result of adaptation to the environment, but the environment cannot adapt itself to the organism.

The eleventh chapter is devoted to the consideration of various forms of objections which the author describes with his usual acumen. He shows, for example, that when Descartes objects because, as he says, we cannot find out God's ends, he confounds *absolute* with *relative* ends. The former, he observes, may well be beyond our reach, but the latter are matters for investigation, and come within the region of experience.

The objection of Maupertuis, quoted as follows by Janet, is based upon *the conditions of existence*, and is singularly like Darwinism:—" Might it not be said," he writes, " that in the fortuitous combination of the productions of nature, as it was only those in which certain relations of convenience were found that could exist, it is not wonderful that this convenience is found in all the species that actually exist? Chance, it might be said, had produced an innumerable multitude of individuals ; a small number were found constructed so that the parts of the animal could satisfy their wants ; in an infinitely greater number there was neither convenience nor order ; all these last have perished.

" This hypothesis of a groping of nature, and of a period of disordered parturition, said to have preceded rational productions such as we see them now, is contrary to all that we know of the processes of nature. No trace subsists of this period of chaos, and everything leads to the belief that, if nature had begun by chaos, it would never have come out of it."\*

\* Pp. 205, 206.

His idea appears to have been general in ancient cosmogonies, that as long as a chaotic state of things existed, nothing but monstrous beings could be or were produced. Hence, the strange beings described by Berosus:—"There was a time in which all was darkness and water, and in these were generated monstrous creatures having mixed forms. Men were born with two and some with four wings, bulls were produced having human heads, and dogs with four bodies having fishes' tails. . . and horses with dogs' heads, and other creatures having the shape of all sorts of beasts," &c.\*

But this is only a concrete ideal representation of a fundamental conception, that *order* is incompatible with chaos or chance—*i.e.*, the undesigned and undirected clashing of nature's forces. And although expressed in so quaint a form, it undeniably involves a great truth, which was early grasped by the mind of man.

Darwinism is essentially a similar theory, though in a very different dress. The reader will detect a similar ring in the following tones:—"Of tens and hundreds of thousands of intermediate forms we know nothing by direct observation. They have perished as better fitted forms ousted them in the never-ending conflict." †

The *idea* underlying these words is closely akin to that of Berosus—*viz.*, "intermediate forms unfitted to survive."

The Planetary system furnishes another illustration, and seems ever to have been taken as indicating order. The following is from the fifth tablet of the creation discovered by Mr. G. Smith. In the sixth and seventh lines we read—  
He marked the positions of the wandering stars to shine in their  
courses,  
That they may not do injury and may not trouble any one.

Just as chaos and disorder, or their spiritual representative,

\* Quoted from Max Müller's "Lectures on the Science of Religion," p. 50.

† "Degeneration," by E. Ray Lankester, p. 17.

the great dragon of the sea, are considered as the source of evil, so where *order* reigns no harm follows. Psalm cxxi. 6, 7, has a somewhat similar idea—"The sun shall not smite thee by day, nor the moon by night. The Lord shall preserve thee from all evil: He shall preserve thy soul."

It seems to me that the same problem is offered both by chaos and by Darwinism—namely, How can order and admirable adjustment issue out of either chaos on the one hand, or out of innumerable chance variations on the other? If, however, we recognise in protoplasm (as we must) a power of development in conformity or in adaptation to a changeable environment, *the change in the right direction being set up by the environment*, then the difficulty of the "tens or hundreds of thousands of intermediate forms" vanishes; for they were but the creation of the brain—not of nature.

And we may carry the problem further back, and observe with Janet that "It still remains to explain how a conflict of forces can, at a given moment, have brought about a result so complicated, and requiring so appropriate a mechanism, as life."\* "Everything leads to the belief that if nature had begun by chaos, it would never have come out of it." †

Janet does not seem to be a palæontologist, or probably he would not have misunderstood the expression that "fossils are embryos of actual species," or have said of Aristotle's remark—"the animal is an unfinished man"—"as a metaphorical and hyperbolic expression, this is an admirable thought; as an exact theory, it is very disputable." ‡ Every naturalist will recognise the author's difficulty, which leads him into false inferences; for he says: "No doubt the inferior species have imperfect forms in relation to the superior. It is better to have the wings of the bird than the flaps of reptiles; the brain of man than that of the

\* P. 207.

† P. 206.

‡ P. 209.

oyster." Such is, however, *not better if taken alone*. With the conditions of life required by the oyster or the reptile, brains and wings respectively would be utterly useless and superfluous. He is more accurate when he says: "Every being that lives, being even thereby organised to live, be that life humble or powerful, contains relations of finality and design [?]; between this being, however humble, and a purely fortuitous product, a freak of nature, there is already an abyss, and the latter can never have served as a transition to the former. In the polyp I see finality as well as in the vertebrates, and the tentacles by which it siezes its prey are as appropriate to their use as the claws of the tiger or the hand of man." \*

Janet next considers Spinoza's objections. The latter "explains the belief in final causes as he explains the belief in liberty—*i.e.*, by ignorance of causes. When we act without knowing what determines us to act, we think ourselves the masters of our actions, and we say that we act freely. So when we do not know how nature acts, we suppose that it acts voluntarily, and in order to be useful to us." †

No doubt an enormous percentage of our acts are automatic, even though we should know—*if we thought about them*—the cause, in many instances; yet we do these acts spontaneously. But—and this appears to me to lie at the root of so-called free will—we *can make any motive an object of thought*; and so far as we do so, we are *not ignorant* of the cause, as in all cases of deliberate choice. A selection between two acts may be purely automatic, and we may call it unconscious natural selection, and we act purely and simply in obedience to the strongest motive, and we are then automata. But we *can* bring motives to bear upon the question by a determined reflection, and not merely through automatic memory. We then make the selection *an object of deliberate thought*. This is volition, or free will.

\* P. 209.

† P. 211.

Conscious of this, we can, by analogy, infer it in finality.

Spinoza's objection, moreover, would prove too much, for, as Janet observes, "There are thousands of phenomena whose causes are unknown, and which are by no means, therefore, given as examples of finality, such as showers of meteors, volcanoes, &c."

The author next notices M. Littré's objection to finality :—“The property of accommodating itself to ends,” \* to which I have already alluded. . . . “In another writing, M. Littré had opposed with eloquent vivacity the *vis medicatrix* of the school of Hippocrates, Wherein is it more absurd to admit in matter the property of healing itself than the property of adjusting itself to ends?” †

As long as we merely investigate the structure of organised matter—say, protoplasm, or sarcode, which certainly “does exist,”—and record our observations upon *what it can do*, apart from all considerations of finality, it is impossible to escape from either the *vis medicatrix*, or some equivalent expression, or from Littré's “property of adjusting ;” for we find a seemingly homogeneous mass of jelly capable of secreting the most beautifully symmetrical shells conceivable, as in the case of the *Radiolaria*, *Diatomaceæ*, and others ; and when we contemplate a complicated organism, such as one of the Vertebrates, it is simply a highly-differentiated mass of sarcode, every atom of which has furnished its individual quota towards the complex structure of the whole. As the whole is an organism adjusted to its environment in all its organs, so are its organs, and so on, till we have dissected out its ultimate elements of cells and fibres, and come at last to the physical basis of life itself. Nothing is more remarkable in the analogy between nature's organism and man's works, than that whereas the latter cannot spontaneously repair an injury, the former can ; hence the final question of Janet seems singularly inappropriate, for it is just the pro-

\* P. 221.

† P. 222.

perty of healing itself residing in a living organism—at least in the animal kingdom—that stands out as so complete a contrast to the powerlessness of human works of art to repair an injury.

Rudimentary organs, so abundant in nature including man himself, difficult as they are to reconcile with any argument of direct design, are discussed by Janet with ability, and are considered by him as affording no objection to finality, rather the reverse; for they were of use formerly, but have become rudimentary through disuse, other uses having superseded them. “Nothing conforms more to the theory of finality than the gradual disappearance of useless complications.”

Lastly, the production of monsters calls for some attention as bearing upon finality.

The existence of monsters raises no great problem when we consider the *relatively perfect state* in which every organism finds its existence to be.

Were every environment absolutely and perfectly adapted to a being's welfare, and were every condition for the development of a perfect being secured to the parents, then monsters would be impossible. Since, however, under existing circumstances, such a Utopian idea cannot be realised, monsters and abnormal growths of all kinds, as well as diseases, are simply the outcome of the clash of accidentally conflicting forces. They are “errors of nature,” caused, as Janet observes, “by the predominance of the laws of nature in general over the interests of living nature.” This was Plato's view, and Aristotle explained evil in the same way. And if men would but clearly distinguish between moral evil (*i.e.*, conscious abuse of nature's laws) and physical evil (*i.e.*, the production of effects which man—chiefly—dislikes), there would not have been so many attempts to prove a separate author of “evil” from that of “good” in the world.

In the Second Book the author addresses himself to solve

the question whether there is a first cause of finality. Finality being a law of nature, what is the first cause of that law? The reply has ever been, Intelligence. Is this conclusion legitimate?

The old teleological argument has ever been met by the Epicurean view of chances. Atoms have an eternal motion; their fortuitous concourses must have already exhausted infinite combinations, so that the one which now exists is simply one of them. But this theory requires *infinite time* for its accomplishment, and the most modern views of the period spent in elaborating the universe from nebulous matter still make it finite. But, further, we are told that the existence of such combinations of atoms fortuitously as exist is possible, *because it is*. This is obviously to beg the whole question, for the theory assumes that the universe is possible without an intelligent cause. Janet justly remarks, "This picture is possible, because it is; it has, therefore, had no painter"—is just as logical. Logical possibility and real possibility are confounded.

The whole argument is, however, antiquated, and so may be dismissed. The modern form of the objection is that raised by Kant and other metaphysicians, who point out that the argument of analogy cannot do more than suggest an *architect*, but not a *creator*. It cannot rise beyond suggesting a relatively wise, skilful, or powerful cause, but not an absolute one. This, however, implies, observes Janet, that only the form of things is contingent, and that *matter* is not so. "If matter is not contingent, that means that it is necessary,—it exists of itself, it has in itself the reason of its existence; . . . for the same reason we must suppose the cause that gives the form to be necessary on the same ground as the matter itself, and that it is self-existent. How, in short, can it be admitted that a non-necessary cause would have the power to act on a necessary matter and to give it orders? . . . The *processus in infinitum*

would here avail nothing, for by hypothesis the matter supposed necessary is also a last term; therefore, on the other hand, the cause must likewise be a last term." \*

This argument strikes one as irrefragable, and the conclusion is obvious, that the organising cause of the world is a cause of itself or an absolute cause.

Kant's second objection falls with the first, namely, that "from a contingent world we cannot rise to an absolute cause." "But the first objection," says our author, "by the hypothesis of a pre-existent—that is, necessary—matter, furnishes the material of the absolute idea of which I have need. If the first cause is absolute, it will be so in all its attributes: being by hypothesis intelligent, it will be omniscient; being powerful, it will be omnipotent; being good, it will be perfectly good, and so on." †

These two objections of Kant, however, do not touch the very essence of the argument that order implies intelligence.

Three solutions have been offered to account for the existence of finality: the hypothesis of *subjective* finality, that of *immanent*, and that of *unconscious* finality.

The first is the doctrine of Kant, and Janet fully admits "that there is something subjective in this doctrine, namely, the part that is insusceptible of demonstration and verification, and also the unknown part that goes on always increasing in proportion as we approach the very source of the creative activity. But then again, the same doctrine is objective where it represents facts; it is real on the same ground as all induction that rises from what is seen to what is not seen." ‡

That finality is *internal* or *immanent* is perfectly admissible, "but this *relative immanence* of natural finality does not imply an *absolute immanence*, and, on the contrary, can only be comprehended by its relation to a transcendent terminus. These two difficulties overcome, we are now face to face with the true problem: Is the supreme cause

\* P. 335.

† P. 336.

‡ Pp. 352-3.



of finality an intelligent cause—a *Mind*? This will be the object of our last inquiries.”\* †

Hegel says that finality is not merely immanent, it is *unconscious*. A striking illustration of unconscious finality is seen in the instincts of animals.

An unconscious finality, says Frauenstadt, is no contradiction of terms, just as “the Aristotelian opposition between the efficient and final cause is in no way identical with the opposition between the unconscious and the intelligent cause. For the final cause itself may be unconscious.” †

“To attribute to nature an *instinctive* activity is to say that nature acts like bees and the ant in place of acting like man; it is *zoomorphism* substituted for *anthropomorphism*. We see no advantage in it.

“In fact, the true difficulty, the profound difficulty, in this question is that we can only explain the creative activity of nature by comparing it to something that is in nature itself—that is to say, which is precisely one of the effects of that activity. . . . The true difficulty evidently applies to the hypothesis of a primitive instinct quite as well as to that of a primitive intelligence.” †

Still we have not reached the primary activity yet: the source, perhaps common, both of instinct in animals and intelligence in man. Janet says that what is called Inspiration perhaps comes nearest to our conception of a creative intelligence, or the inventing at once both the means and the end, by a single thought, in which foresight may be regarded as identical with immediate conception; as, for example, the entire air dominates the very first notes of a musical composition. Janet considers the products of a genius as vastly superior to the unconscious products of instinct. He says, “The soul inspired by sentiment is not a blind activity. It is conscious of itself; it has a vivid and profound intuition of its end; it is quite full of it; and it is precisely this vivid sentiment of the end that evokes in it its

\* P. 375.

† P. 377.

‡ P. 379.

own realisation. Instinct, on the other hand, not only is ignorant of the means, but of the end." \*

Is not our author here adducing what is *accidental* to man as grounds for regarding genius as essentially and *per se* intelligent? I cannot help thinking that Janet does not attribute enough to the wonderful powers of the automatic properties of the brain. "Calculating boys" can give no *rationale* of the marvellous feats performed by their own brains. A half-idiotic person may be an extraordinary musical performer, like the negro, "Blind Tom," who used to play in public some fifteen years ago. Remarkable powers of improvisation are perfectly spontaneous and automatic, often enkindled by artificial means, which specially excite the automatic action of the brain. It would seem very difficult to separate flights of genius from pure instinct, when we put aside the *consciousness* of man and his powers, and the *knowledge* that he can cultivate and improve those powers. It was pure instinct that led Mozart, when four years old, to compose a piece of music far too difficult to be played, but perfectly correct in harmony.†

While, therefore, I should lay less stress on man's genius than Janet does as implying great intelligence, I would see in it the highest concrete manifestation of the infinite genius of the Immanent Worker of Nature, so that whereas different forms and varieties of genius are exhibited in different men, I would regard them collectively as the common characteristics of the *power* which underlies nature itself, and which thus shines through those favoured human beings whom we call geniuses.

Then, what of Intelligence? This is not identical with genius. Perhaps one definition of intelligence is the power to distinguish *means* from *ends*, and thus to prepare the means with the view of accomplishing the ends. Thus,

\* P. 394.

† I quote the story from memory, not remembering where I read it.

intelligence is distinct from *tendencies*. "Hunger, for instance, is a tendency. It is not the same thing as the industry that finds food."\* But both are really equally automatic, and I do not see that our author clears up the difficulty, when he asks finally, "Is there not something that represents what we should call foresight, if the divine act were translated into human language? This is the question."† After discussing the nature of human foresight trammelled by accident, Janet compares it with God's "foresight," which means complete vision of present and future at once, as "The act that perceives the end, and the act that distinguishes the means."

"Thus, the doctrine of the *Noûs*, or of intentional finality, has for us no other meaning than this—that intelligence is the highest and most approximate cause we can conceive of a world of order."‡

"The doctrine of final causes, however, cannot escape, as it would seem, a final problem. If each of the things of the universe, taken separately, has been produced for another, for what, and to what end, have they, taken together, been made?"§ To be brief, the sole explanation is in the doctrine of divine love. "It is by goodness that Plato, as well as Christianity, explains the production of things." Knowledge is not the absolute end of the universe; but, as Kant says, the end is found in morality or a Moral Being—*i.e.*, Man. "The end of nature is, therefore, to realise in itself the absolute as far as possible, or, if you will, it is to render possible the realisation of the absolute in the world. This is brought about by morality. . . . Morality is, therefore, at once the accomplishment and the ultimate proof of the law of finality."¶ Man is the *only moral being* upon earth. All others are *non-moral*.

GEORGE HENSLOW.

\* P. 408. † P. 410. ‡ P. 415. § P. 443. || P. 447. ¶ P. 455.