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## ORDINARY MEETING.*

THE REV. F. A. WALKER, D.D., F.L.S., IN THE CHAIR.

The Minutes of the last Meeting were read and confirmed, and sixty Elections took place (see page 32), after which the following paper was read by the author :—

## *INSTINCT AND REASON.* By CUTHBERT COLLINGWOOD, Esq., M.A., B.M. Oxon, M.R.C.P., F.L.S., &c.

*Instinct* signifies those natural powers with which all animals are born, and which are sufficient for the carrying out of the two great bodily functions of nutrition (including self-preservation) and reproduction, which constitute the sum-total of their existence.

*Reason* is the special characteristic of Man, unshared (in its higher regions, at least) by animals,—by the agency of which he is able to accumulate impressions,—in its lower regions, from without, and in its higher regions, from within; by which impressions the faculties are aroused and developed,—which faculties are, especially in those higher regions, vastly in advance of, and distinct in kind from, any endowments of animals. Moreover, these faculties exist in Man only potentially at birth.

IT is not many years since that the Cartesian theory (so-called) of animal automatism was tentatively offered to the scientific world from a high authority; a theory which suggested that the lower animals were but machines, impelled to movement and apparent life by a merely unconscious reflex action, alike without feeling or instinct, in any true sense of the term. The theory, it is true, met with no general acceptance, and has since been consigned to the limbo of pseudo-scientific vagaries. Now, on the contrary, instead of being automata, animals are placed virtually upon a level with Man, both as regards their physical organisation

* December 2, 1889.

and their mental endowments; only differing in either respect from him in the sense that savage Man differs from his more fortunate civilised brethren.

For current science, not content with the array of facts which suggest that, as to his physical body, Man exhibits so close a relationship with animals as to favour the hypothesis that the evolutionary process has extended to him through them, further endeavours to prove that the mental phenomena of those same animals are of so identical a nature that they cannot be separated by any expressed distinction or conceivable character from those exhibited by intellectual Man himself, any more than they can separate the genus Homo by any organic classificatory distinction from the genera of the higher or anthropoid apes.

According to the modern school of Biology, Man differs so little from the higher apes that "there is no just ground for placing him in a distinct order;" and Mr. Huxley, therefore, includes them both under one order, which he terms Primates. Both structure and development prove Man to have a close physical relationship to the animal world; but we are further assured that his moral qualities also have been evolved from certain instincts characteristic of the lower animals, while his intellectual powers are absolutely shared, in a lower degree, by existing animal races. In other words, it is held that Man's moral sense (including his spiritual faculties—if, indeed, he be allowed to possess any) has been developed out of certain social instincts characteristic of animals, including sympathy, which instincts were themselves acquired through the agency of natural selection,

It is admitted, however, by all, that Man possesses a sense of responsibility, which, while it demands a certain course of conduct (which is held to form three-fourths of life), and is claimed by none for the animal world, is yet affirmed to be also developed from some obscure animal instincts—instincts, that is, in beings in which no such sense of responsibility or resultant conduct does, or ever did, or even could conceivably exist. We are not instructed how a strictly positive quality has been developed out of a strictly negative quality—how the distinguishing character of the human mind has been evolved from totally different instincts in the animal, in which its principle is wholly wanting. All this we are to take upon scientific authority, which would have us believe that the simple but uncomprehended instincts of animals, which are palpably corporeal in their

nature, could, by a stretch of imagination, have been so developed as to reach the higher plane of the moral sense and spiritual faculties of Man.

So also, with regard to what is called "animal intelligence," it is claimed for them that "there is no fundamental difference between Man and the higher mammals in their mental faculties," while, however, it has to be admitted that "the difference between the mind of the lowest Man and that of the highest animal is immense." But the doctrine is taught that this immense difference is, after all, "one of degree only, and not of kind." In other words, they are upon the same plane, continuous one with the other; and there is, therefore, a theoretical possibility of the one being converted or developed into the other; and that, in point of fact, it was so converted.

But we believe that arguments can be adduced which tend to disclose a wide chasm between the apparently intelligent actions of animals and the real intellectual operations of Man; and to prove that Man has become the dominant animal—not simply because, through some unknown and entirely speculative influences, he has rapidly evolved a high standard of moral sense and a lofty ideal of intellectual grandeur—but because he is essentially distinct in his non-material nature from what are called, not poetically only, but most truly and correctly also, the lower animals; and also because moral sense and responsibility are his attributes by an absolutely special and peculiar privilege, while his intellectual powers themselves differ *toto cælo* from those of the lower animals, not merely in degree but in very essence and kind. In support of which propositions we offer the following remarks and suggestions.

We are not inclined to dispute the fact that certain animals exhibit mental phenomena which, upon a superficial view, may easily be imagined to be similar to, if not identical in character with, analogous phenomena in Man. But we would, at the outset, draw attention to a certain distinction between the phenomena as exhibited by two widely different classes of animals; viz., first, those exhibited by animals comparatively low in the scale of organisation, but which have, by their singularity and apparent complexity, attracted the interested attention of mankind in all ages—such as, for example, the construction of geometrical cells by the hive bee and symmetrical webs by the spider, or the various complex habits of the families of ants; and second, the half-reasoning (as the poet calls it) efforts of animals of

the highest organisation, such as the elephant, the monkey, or the domesticated dog—undoubtedly the most seemingly intelligent of all the animal races. The first-mentioned class of phenomena is observable in utterly untaught invertebrate, and generally minute, animals, whose sensory ganglia are indeed large in comparison with their total bulk, but yet greatly inferior in anatomic construction, and in differentiation, to the true cerebral lobes of vertebrated animals; in fact, only exhibiting in the highest instances a tendency to the concentration of these ganglia into one or two quasi-cerebral masses.*

And yet it is the acts of such humble and often tiny members of the invertebrate animal kingdom (Articulata) which most astonish the thoughtful mind, and have furnished the problems alike for the mathematician and the psychologist. And it is, at the same time, such acts which come purely and simply under the term Instinct, acts which, unaided by contact with any other race than their own, and unsuspected of any subjection to human influence or human instruction, are yet performed generation after generation, practically unchanged, and spontaneously by the newest equally as by the oldest of the individuals; whereas the second class of phenomena is exhibited by animals high in the scale of organisation, and in greater degree where human influence, teaching, and example (we might almost say) are brought to bear—as, for instance, among animals subject to domestication.

The great functional principles to which all the phenomena of Instinct may be referred, may be briefly and inclusively classed under the two heads of self-preservation and reproduction. These great functional activities undoubtedly (it is true) constitute an essential and even considerable part of the nature of Man, although we would not be understood to assert that Man possesses them in the same instinctive form as animals undoubtedly do. But the lower nature of Man is more or less swayed by these two natural principles; and the cravings of his sensual part on their behalf place him so far upon common ground with animals. And the more these principles are permitted to act in him, without the restraint of the higher and specially human faculties, the more does he become like the "beasts which perish," while the more these

* Mr. Darwin, with (as it appears to me) a most astounding failure of appreciation of human faculty, says, "the brain of the ant is one of the most marvellous atoms of matter in the world, perhaps more marvellous than the brain of man."—*Descent of Man*, i, 145.

entirely natural promptings are kept under the dominion of the higher faculties, the more they are subordinated to the intellectual and moral nature, the greater is the distance between Man and the brute. This may appear like stating a truism, but it is necessary; for that very fact exhibits not only the immeasurable gulf between Man and the mere animal, but also the unaccountable circumstance that (if the Darwinian theory be correct) the course of Evolution must have absolutely reversed the original Instinct, and have produced, in fact, in ourselves something which is declared to be "not ourselves!" The brute is totally unable to effect this subordination, for it has no sense of the responsibility which demands such a sacrifice; the Man knows that such a sacrifice is demanded, and the more he strives to effect it, the more he is of a Man, while the more he yields to this lower nature, the more of a brute does he become.

There is thus a certain common ground of Instinct and Intelligence; and all the evil and sin which unhappily so mar and disfigure the true (or higher) nature of Man may be referred to this possession of a common ground with animals, to an inordinate licence arising from a too weak resistance against the cravings of those purely animal propensities which may be classed under the two heads of the instincts of self-preservation (including nutrition) and of reproduction. And these very evils are thus necessities of that community of nature which we share with animals; for, like them, we must provide for the calls of a natural appetite for food and drink, and for self-protection against enemies; and, like them, we are subject to the stings of sensual affections, arising from the œstrus of the sexual or reproductive organs.

But beyond this, what remains of common ground between the instinct of the animal and the Intelligence of a Man, which is thus far merely corporeal, and dependent upon purely terrestrial influences? Both animals and Man are possessed of a natural affection for the offspring (or *στοργή*), while the *ἀντιστοργή* of the animal is provided against in Man by the corrections of the intellectual and moral faculties, in other words by reason and responsibility. But the mere unreasoning natural affection of animals is only a phase of the reproductive instinct; and the courage, devotion, and self-sacrifice of the animal exhibited in the protection of its young are but necessary appendages, as it were, or accessories, in the higher races, of that one great and comprehensive instinct by the instrumentality of which the race is kept

up and perpetuated. It is true that it has a subjective character, but in organised beings possessing an elaborate nervous system such subjective phenomena cannot but be exhibited in correspondence with cerebral development, and in accordance with nervous function; yet only in such proportion as should distinctly adumbrate the full and complete, genuine love of the offspring, which alone is characteristic of the complete human being.

For it is easy to perceive the essential difference between the natural affection existing between animals and their partners and offspring, and the human domestic relations. Among animals such partnerships are, in the majority of cases, merely temporary, and even their parental affection is, as we have seen, soon, in many cases, cast out by stronger instincts. However beautiful and touching the devotion shown by the actual mother to her young, it is not lasting, but is, in fact, frequently succeeded by an equally natural hatred. It is in Man alone that conjugal love is of an enduring nature, and survives the mere attractions of sense, because it is founded upon a distinctly different and essentially higher principle than mere instinctive animal passion; and parental love, in Man, is not the temporary instinctive attachment which it is in animals, but an undying affection, founded in the recesses of an elevated moral nature, and bound to the inmost soul by the ties of conscious duty and responsibility. Love in Man has a different and far higher source, and strengthens with time, surviving and transcending sense, and even Life itself.

In common with animals it is true that we perform certain automatic actions which refer to the spontaneous or habitual exercise of bodily functions, in which we assist Nature, as in deglutition, &c., or, again, certain semi-automatic movements, which take place sometimes with, and sometimes without, our sensible co-operation, such as the application of the hands to the mouth and to various other parts of the body, or the direction of the movements of the feet, as in walking, and the maintenance of the erect posture. Moreover, animals are, like us, subject to impressions of a sensuous nature, and to certain emotions, bearing upon, or related to, and, indeed, inseparable from, the two great categories of instinct above specified. Rising higher in the scale of their endowments, we find them (unconsciously, indeed) associating these impressions, and by the aid of a certain power of memory (of a very external kind) rendering their retrospective impressions subservient to anticipatory

perceptions; and thus exhibiting the semblance of a kind of experience by which they are enabled to profit. This, in fact, constitutes the *rationale* of that plasticity of their mental emotions, which, while it corresponds to the plasticity of their organic forms, is apt to deceive those who imagine that they are endowed with reasoning powers of the same kind as those of Man, because their instinct is thus, within very narrow limits, adaptive, and, therefore, simulates on a small scale the operations of Reason. But all this is in reality merely sensuous in its nature, and has nothing in common with the higher manifestations of memory, experience, and inference, as exhibited by reasoning Man.

In the second category, that of the higher animals, we have also indications of a certain teachableness, within definite limits, in matters, not indeed of morality or responsibility, in any true sense, or even in true intellectual exercise in its most rudimentary form; but in matters relating chiefly to that which is one of the real and sole subjects of instinct, viz., self-preservation (avoidance of danger or of pain) and matters accessory to nutrition and the appetite for food and drink (in the form of rewards for obedience and docility). For it is these impulses which chiefly reconcile such animals to the mechanical performance of tasks which only the superior will of the human teacher can influence them, contrary to their nature, to strive to accomplish.

For, be it observed, Thought does not enter into any of these mental operations of animals. For even in the highest phenomena which spring from this teachableness or docility, there is exhibited nothing more than a certain plasticity of mental endowments which is affected and brought into play by habit and environment, just as their bodies possess such an inherent plasticity which is affected by similar, or, more properly speaking, correlative, influences. And although such phenomena appear to give to the evolution school the countenance which they seek, they are in reality mere accessory manifestations of instinctive powers with a purely corporeal motive, which will be shown, as we proceed, to leave quite untouched the fundamental principles which externally distinguish between animal instinct and human Reason. The plasticity, indeed, even where it exists, is acknowledged by all to have very narrow limits, and, in its highest development, to result in phenomena of so simple and so humble a character, that, if observed in a young child, would scarcely redeem it from the imputation of idiocy.

But in addition to these limited phenomena to which the instinct of the lower animals is confined, Human Intelligence is capable of other, and infinitely more comprehensive, expressions, and of transcendent mental feats which have no analogues, even, in mere instinct. To what animal can we attribute the power of reflecting upon its own being and existence, or of endeavouring to unravel the phenomena of its own consciousness? What animal is capable of conceiving abstract ideas, such as goodness and truth? What animal (out of Æsop's fables) can be imagined as exercising private or public judgment, of carrying on an inductive argument, of deducing sound principles from logical premises, or of even remotely comprehending, in the very faintest degree, the simplest or most rudimentary principles of Science or Art, or of experiencing, far less of expressing, any intellectual feeling or emotion? And if we add to all this vast superiority in Man that great prerogative of Reason, articulate speech, truly the difference between the mind of the highest animal and of the lowest Man, in whom all these magnificent capabilities unquestionably exist *in posse*, must be recognised as indeed, in the highest sense of the term, immense—immeasurable in degree, and also absolutely distinct in kind.

The question has often been discussed, whether either Man or animals are possessed of innate ideas. With regard to Man we shall speak later; but, as far as animals are concerned, it is a question which we shall not find it difficult to answer. For what constitutes an Idea? An idea consists in an impression of something not present, but which the mind is able to present to itself, or to recover by a mental operation or exercise of thought;—as Locke expresses it, "whatever is the object of the understanding when a man thinks." But what reason have we for supposing that any animal thinks? The most marvellous illustrations of instinct are observed in tiny animals whose nervous masses are necessarily exceedingly minute, and in their structure bear but little comparison with the brain of the really thinking animal, Man, or even with that of the higher Mammalia. And yet the bee, for instance, builds its cell in a geometrical form such as astonishes the mathematician by its accuracy of design and economy of material. But is it supposed by anyone that the bee thinks when it constructs these geometric cells; can it be imagined that the perfection of the cell depends on the bee's thought concerning its work? Does not the bee construct its first cell equally well as its second?

Do not both works result in an equally accurate cell, or is there the faintest difference between its first and last work? How different from a Man's work, who thinks about what he is doing, and whose thought results in improvement—while his first work infallibly betrays his original unskilfulness and inexperience.

And if it cannot be conceded that the bee thinks while constructing its admirably adapted cells, why should it be supposed that the ant thinks when it is engaged in the performance of those extraordinary feats of instinct which are the admiration of all who study its ways, though not perhaps more really noteworthy than the economy of the hive, of which the construction of the comb is a leading feature? If indeed these complicated instincts were carried on under the guidance of thought, bees and ants, with their tiny ganglia, would be even more surprising in their so-called "intellectual" powers than Man, in view of the brief space of the lives (briefer of bees than of ants) into which these mental phenomena are crowded, and the entire impossibility of that experience, which, in really reasoning beings, is an essential both of intellectuality and of progress (see note p. 4). And further, to carry on the argument for the untenability of insect "intelligence," is it supposed that the caterpillar employs a reasoning faculty in the determination of the juncture and method of spinning its cocoon; the moth, upon the nature of the plant upon which it shall deposit its eggs, in order that it may provide a suitable food for its prospective young; or the spider (so nearly allied to insects), upon the position and geometrical arrangement of the threads of its ingenious web?

Again, to take instances from animals higher in the scale. Does the bird (we would ask) think over the weaving of her nest, or the selection of a site for its building? I am aware that it has been claimed by some writers that young birds do not make so perfect a nest as the old ones, but on, I believe, most insufficient data. Leroy and Wilson are quoted, but without references. A writer in *Nature* also asserts that the chaffinch, when taken to New Zealand, varies the character of its nest, and I think, most unnecessarily jumps to the conclusion that the birds so varied, because "they were at a loss for a design, and had no nests to copy"! Surely a difference in environment would be amply sufficient to account for the slight change (see Wallace's *Darwinism*). Does the young duckling, just running from the newly-chipped egg, or from under the wing of its foster-mother,

the hen, think, when it runs, spite of her out-cries, to the water? Surely it is inconceivable that in any of these cases thought enters at all into the matter, or that ideas present themselves to the respective animals' minds in connexion with the operations in question.

Now, all these are typical examples of pure instinct, and among those examples which most strongly call forth our wonder and admiration. Some of them are performed at once, immediately upon birth, and without the possibility of their being learned from maternal or other teaching; and others, although some would have us believe them to be the result of teaching and observation, cannot, after a moment's consideration, be seriously held as such. Thus, no one will surely hold that the cells of the hive are ever defective in form or material to such an extent as to lead to the supposition that some were mere journey-work, while others were those of a master. The first web spun by a spider is not shown to be less perfect than those which follow. Nor is it imaginable that the young bird either observes the character of its own cradle, or takes lessons from its parent in the construction of its nest when its own pairing season arrives, Indeed we know how the maternal instinct, however strong during the helplessness of the brood, is (in most cases at least) succeeded by an *ἀντιστοργή*, which impels the dam to drive away the young, when fledged, to shift for themselves; nevertheless, not only do those same young build their nests to perfection in their turn, but the nests from generation to generation are so closely similar, so characteristic of the respective species in form, material, and situation, that the ornithologist recognises the bird by its nest as infallibly as by its egg. Such statements as those I have already alluded to must be received with the greatest caution—for, in the first place, there is the evidence just referred to against such an idea,—second, it would be strange indeed if after all these years of observation by ornithologists and bird-nesters, such a view could only now be brought forward, tentatively, as it were, by one or two observers, of no greater reputation than thousands of others—and third, the fact remains that there is at least no proof that birds build their nests one whit better than they did a thousand years ago. A standard is acquired upon which it is not pretended that any improvement is made—whereas if any bird thought of what it was doing, it would introduce improvements, however slight, which would be added to by its successors. But naturalists are un-

fortunately by no means always sufficiently careful to exclude spurious fancies, if they support a favoured theory.

If building its nest were not a purely instinctive act, totally unaided by anything partaking of the character of Reason, we must indeed attribute to the race of Birds a very far more equable degree of Intelligence than falls to the lot of human beings. Are there no indolent birds who shirk their work? Are all without exception, equally in earnest, equally clever architects, and equally clever handicraftsmen? They should be (as indeed they are) under the theory of non-intelligence, but not under the opposite theory. For if they used thought in their work—if they learned the art of nest-building from their parents—their nests would infallibly differ more or less from their model, according to the capacity or industry of the individual bird, instead of being, as they are, not indeed identically alike, but all equally perfect, and equally characteristic in workmanship, and material, and situation, within the limits of legitimate and natural variation.

But the instances we have thus selected for illustration are examples of pure instinct; and yet are also instances by no means the least complex of those actions which are well known to be performed by animals for whom there is claimed a certain measure of reason or intellectuality, such as differs from the Reason and Intelligence of Man in degree only. If, however, these typical acts of animals are the products, not of Reason, but of pure instinct, there can be but little question, upon that ground alone, that the acts of animals in the complex, when properly studied, and disengaged from the fallacious arguments which are used for elevating them to the heights of Reason, will be recognised as belonging also to the same category of instinctive actions as those already adduced. Mere instances of apparent Reason, or acts which simulate Reason, might be endlessly multiplied; but when the true principle of Instinct is comprehended, and its essentially lower plane duly perceived, there can be no doubt in any unprejudiced mind that all such cases are merely varieties of manifestation of a wonderful faculty implanted in animals, which is comprehensive and plastic enough to be adequate and sufficient for all their material needs by its perfect adaptation to their sensuous life, and at the same time so complex in its modes of action as to embrace the whole series of those mental phenomena which excite the astonishment of the mental evolutionist, who is

unable to satisfy himself that they have not a cogitative origin of the kind which characterises Man.

In other words, it seems to us thoroughly logical to deduce from them the consideration that, since no sophism can endow the acts quoted above with an origin in thought, reflection, or reasoning, the ground is cut away from those who would urge that certain other actions, apparently, perhaps, a degree more complicated, should be dependent upon or accompanied by such thought, reflection, or reasoning, in or for their performance. If, therefore, the acts described above can be conceivably performed without the aid of reason, properly so-called, in any degree whatever, so also may those of which we are apt to take an anthropomorphic view, and which, perhaps, on that ground, appear to us to be slightly more indicative of intelligence.

But the error lies in carrying the argument the wrong way: in setting out with the hypothesis that Reason, such as that with which Man is endowed, is the mainspring of complicated animal instincts, and thus adapting the active phenomena of the animal kingdom to this view; instead of viewing these characteristic instincts dispassionately, establishing their nature, and passing from the more simple to others more complicated, such as the so-called political economics of bees and ants, &c. In the first method, the judgment is throughout warped by a prejudice in favour of Intelligence, which entirely prevents an unbiassed examination of the facts.

One would almost imagine that plain common sense would be sufficient to discriminate between the instinct of the lower animals and human Reason. The very fact of the utter impossibility of passing a fixed boundary line in the mental development of animals, either by the most careful and laborious education and training, or by selection from a long line of animals which have had the advantage of contact with Man for indefinite generations, would, one might reasonably suppose, be sufficient to demonstrate that the instinct of animals is a strictly limited endowment, which is not the same in kind as the Reason of Man. In Man may be found every degree of mental endowment, from the merely sensuous and animal perceptions of the microcephalous idiot, with an abortive organ, to the colossal intellect of a Bacon or a Newton, provided with a normal instrument of thought; but, in animals, their instinctive sensuous perceptions are ever at a standstill. "Thus far, and no farther," is the principle of their minds. Take the

most (apparently) intelligent individual out of the most (apparently) intelligent race of animals, and teach that individual animal with the utmost care, skill, experience, and patience, and what is the result? Nothing can, even under any circumstances, convey to that animal the nature of an abstract idea; nothing can ever give it the power of framing an intellectual conception, or a lofty judgment; nothing can succeed in endowing it with the power of forming a rational inference of the simplest kind. The terms wise, intelligent, intellectual, moral, are clearly misnomers as applied to them. And yet, although all this is indisputable and acknowledged, there is a large school of mental Evolutionists which continues to hold and to teach that the instinct of animals differs from the Reason of Man in degree only and not in kind.

The lowest savage, who lives almost like a beast in his aboriginal condition, on being brought into contact with civilisation, may be taught to use true intellectual processes; may be made to comprehend abstract ideas; may be instructed to appreciate judgment, to reflect on co-existences and sequences; may be led to a sense of responsibility; may, in a word, be proved an intellectual, moral, and religious being. The lowest savage can, indeed, even without teaching or civilising contact, communicate with his fellows, impart ideas, and seek aid and sympathy from his fellow-men by means of articulate speech. But none of these things can any animal do. How say they, then, that instinct and intelligence are alike in kind, and differ only in degree?

So also can the human infant, in the first dawn of its intelligence, comprehend and enter into the ideas of its elders in a continually increasing degree; learn, without difficulty, the use of speech by impartment from its parents or nurse, and rapidly develop its faculties under judicious and suitable instruction; and in all respects proclaim the superior plane upon which its mental constitution is framed, a plane which no imaginable extension of animal instinct in its degree could ever conceivably touch.

But, although we have said that animals possess no innate ideas, for the simple reason that they do not possess ideas at all, inasmuch as they are incapable of thought, we nevertheless wish to be understood as affirming that whatever endowments of a quasi-mental character they do stand possessed of are innate; in other words, that the powers they exhibit of effecting those acts and combinations which come under the general name of Instinct, and which are in all

cases subservient to their habits and modes of life, and beneficial to their possessors, are born with them. For every animal acts according to what we call its nature; and if, in any particular, it aberrates from what is its settled and well-understood order of nature, we recognise in such a "freak of nature"—the exception, which proves the rule of its essential character or nature. Every animal whatsoever is endowed with its own peculiar and specific affection, which is its nature, in obedience or subordination to which it performs every act, and manifests every mental expression. And this nature or affection is always corporeal in its scope and character, and invariably has reference solely to the two great master-functions of nutrition and reproduction. Every animal at its birth is in possession of the entire sum-total of its necessary knowledge and capabilities, and is completely adapted to, and qualified for, the mode of life which is consonant with its nature or quality—with the sole reservation of allowances for growth; some animals being called upon to exercise the functions of their existence at the very outset, and others at a later period of their career. Every animal performs, untaught except by its nature, the specific acts which characterise it, and go to form its life-history, whether that be, as in the case of the sea-anemone, simply to await the stimulus of touch for the seizure of its prey, or whether, in the case of the bee, it is the problem of building perfectly-formed geometrical cells with the smallest expenditure of material.

It is indeed true that certain variations in the degree of mental endowment are observable in different animals of the same species; but these variations are not indicative of any nearer approach in the better-endowed individuals to the lofty and remote degree of human intelligence, but are in no way more remarkable than the bodily variations which exist within the limits of species. Nor, indeed, are they even of so great weight in the argument; for, whereas the Evolutionist shows reason to believe that higher organic forms have been developed from lower in such a manner as to leave no important gap in the animal series, mental endowments have certainly by no means kept pace with organisation. For it is acknowledged by the same school that the difference between the mind of the lowest men and that of the highest animal is immense—in other words, immeasurable—and in such a view we entirely concur.

But it should be the duty of the mental evolutionist to explain, what as a matter of fact they cannot explain, nor

have ever seriously attempted, viz., the remarkable and significant fact, that the gradual and generally continuous development of material organisations has by no means been accompanied by even the shadow of a correspondingly gradual and continuous mental development. Indeed, the complicated instincts of some of the inferior animals (as of certain Articulata) are not paralleled even by the highest Vertebrata. We see such complicated instincts, for example in Bees and Ants, not gradually developed, but suddenly appearing in these animal communities (and then ceasing), which cast in the shade the highest powers claimed for the Dog or the Elephant; instincts which have arisen, as it were, from no traceable source, and which lead nowhere; neither being further developed in the same classes of animals, nor reappearing in other classes, but forming, so to speak *culs-de-sac* of instinct-development, which, on the theory of mental evolution, have no meaning, nor are capable of rational explanation. And, moreover, even the vaunted powers of the very highest animals fall so far short of the intelligence of the lowest men that there is no conceivable explanation, on the theory of mental evolution, of the fact that while, organically (as Huxley affirms), the brain of Man differs far less from the brain of the chimpanzee, than that of the latter (chimp.) does from a pig's brain, nevertheless, psychologically, the difference between the mental endowments of the lowest man and the highest animal are admitted to be immense. Here is a leap, which is contrary to all the boasted laws of continuity. If instinct and Reason are the same in kind, they should be continuous, and there should be no vast or immense difference between the manifestations of the one and the other across the border-line which separates the brute from the Man. Again, Mr. Samuel Laing, in a work just published, *Problems of the Future,* is fain to admit that "the difference is a very fundamental* one," although with the singular perversity of his class of reasoners, he endeavours to minimise this fundamental or immense difference by referring it to "arrested development," a convenient phrase which explains nothing. But a vast difference, an immense distance, intervenes—a distance really far more vast and immense than is even admitted, an impassable gulf which cuts away the ground of the mental evolutionist, and proves, beyond the shadow of a doubt,

* In a former quotation from a writer of the same school the difference was declared to be not a fundamental one.

that the Intelligence of Man is not an extension upon the same plane, or in mere degree, of the instinct of animals, but that a totally new principle is introduced into the human mind which raises it far above and out of the reach of Instinct—a principle which has elevated the human being, if not at once by a bound, yet at least with rapid strides, to an immense height above what had hitherto been the plane of its mere animal analogue, which we call Instinct.

Every animal, we repeat, is possessed at its birth with its own special and peculiar affection, which we call its nature, an affection which is entirely of a corporeal and sensuous character. And inasmuch as this sensuous affection is its very nature, its very self, it governs the animal in all its movements, rules it in all its actions, and is indeed its will, by which it is swayed and led in every particular of its life. In this government and direction of its actions, there is no such thing as thought, but these actions are determined solely by sensuous perceptions through which they are enabled to a certain extent to associate the present with the past; and also by means of such associations to draw simple practical conclusions in the way of experience, which may serve to guide them in the future. These simple conclusions are aided by a low form of imagination and its cognate memory; but all these mental characteristics have reference to sensuous and corporeal states only, as opposed to abstraction and reasoning.

Further, the affection into which every animal is born has constant reference to the two great corporeal functions of nutrition and reproduction. These are their dominant characteristics, and these characteristics express themselves in the various forms and phases of self-preservation and the sexual instinct. To one or other of these may be referred every action and every movement; one or other of these functions lies at the root of every manifestation which illustrates the nature of animals; and these two functions together constitute the affection which is their very life. And even those accessory phenomena which exhibit themselves under certain special conditions, and which appear to be of an exceptional character, may be regarded as resulting from the slightly more than ordinarily complex operations of the same impulses, leading to less easily explicable acts, it is true, which yet, however, cannot be considered as indications of anything approaching to human Reasoning, because Thought is aboriginally wanting in all the animal races.

Animals, however, inasmuch as they are imbued with this affection which constitutes their nature or very life, must be capable of certain cognitions. They must be possessed of what perhaps cannot be strictly called "knowledge," so much as cognitions of certain sensuous perceptions which affect them, either agreeably or disagreeably, and which they recognise as affording sensations either of pleasure or of pain. Such cognitions are essential to that affection or nature into which they are born; for the two are inseparable, and proceed *pari passu*, knowledge of any kind always producing a corresponding affection. And the sounds which animals utter are always characteristic and expressive of these cognitions and associated sensations; and although, as a rule, these sounds are limited to a discordant cry, this cry is capable of considerable modification in accordance with the emotion, which varies as successive cognitions are aroused by sensuous associations or by sensuous memory.

But although the cries of animals may be loosely called a language, it is totally different both in nature and in kind from the intellectual or articulate language used by reasoning beings, and which is as clearly a distinctive mark of intelligence, properly so called, as the cries of animals are of their sensuous perceptions or affections. For Speech presupposes Reason, and becomes more complex and more perfect in its power and in its forms of expression in proportion as the intellectual faculties are cultivated, always following their development with vocabularies framed to suit the growth of intelligence, and to express ideas which have already been conceived within the mind.

Moreover, as we have remarked, there is no neglected savage who cannot be taught to speak intelligibly; nor is there an infant whose powers of reasoning are in a normal condition to whom (by hearing) speech does not come as naturally as the breath he draws. Whereas no animal whatever has the faintest or remotest capability for this crucial endowment;* any more than it can smile, make fire, or manufacture a tool.

So also are the gestures of animals mere unreasoning reflections of their sensuous states, consisting indeed of unrestrained movements, which, in many respects, interpret

* The announcement not long since that a learned man of science was about to teach his dog the art of conversation, and had already commenced his lessons, did not unduly alarm us. We believe the result has not yet been striking. Nor need it scarce be remarked that talking birds are *vox et præterea nihil*.

their inarticulate cries, and are supplementary to them: so that the one may, in most cases, be recognised as uniformly accompanying the other, and both be predicated as coexistent. But there is nothing in these gestures at all comparable with the impartment of ideas by the intelligent signs used by a dumb man, by which signs, indeed, every conception, concrete or abstract, may be conveyed with almost perfect and unerring facility, and entirely without the aid of articulate speech. There is, indeed, as wide a difference between the gestures of an animal and the gesture-language of a dumb man as there is between the bark of a dog and the speech of an orator.*

The conditions, by a comparison with which we may best estimate the character of animal instinct, are those of somnambulism. The somnambulist performs various actions with the same precision with which he would perform them if awake; moreover, he enacts feats which, in a waking state, he would not attempt; and many marvellous characteristics of this abnormal condition are on record. The somnambulist walks and talks, performs on musical instruments, and carries out plans which have occupied his waking thoughts, and which are thus impressed upon his mind. And yet he has but a very imperfect consciousness of his acts; certain senses are specially acute, while others, and the intellectual faculties in general, are in a state of sleep or abeyance. He acts as in a dream, and for what he does he is not held accountable, inasmuch as his condition is recognised as one in which his ordinary faculties are dormant, and in which he is, therefore, not a responsible being, since he does not possess the guidance of reason and intelligence, or the volition which can only spring therefrom.

So would it appear to be with animals. What is an

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* It may here be justly remarked that hardly enough stress has been laid upon the influence of form in judging of the actions of certain animals (such as apes) whose organs, from their similarity to homologous organs in Man, give them a power which is wrongly called imitation, and which is liable to be mistaken for an exhibition of intelligence, whereas it is merely a necessary concomitant, and, indeed, consequence, of similarity of structure. The movements of a parrot—its use of a prehensile foot—gives it a "knowing" aspect, too apt to be mistaken for superior wisdom, and the same may be said of certain Rodents; but in a more marked degree with the Simiadæ, whose anthropoid forms necessitate certain actions which are thoughtlessly brought under the category of intentional imitation, the fruit of a superior intelligence; whereas the animal possessing legs, arms, and a body so nearly approaching the human can act with them not otherwise than in a manner resembling human movements.

abnormal state of a reasoning Man is the normal condition of unreasoning animals. They perform their actions, their movements, and their gestures according as they are led by their corporeal and sensuous affection; they act as though apparently conscious of and under the influence of surrounding objects and conditions, but the intellectual faculty, the mind, is absent, or as though plunged in a profound sleep. They do not therefore reflect—do not think—and therefore there is no true volition, and they are altogether without responsibility. All the actions of their life fail to come within the grasp of mental consciousness. They are not, it is true, mere automatic machines, but they have each a definite nature or affection implanted in them, against which, like the somnambulist, they cannot possibly act, but which is, in itself, sufficient for their guidance in every event of their lives. To this end their external senses are very acute, and especially those senses which are essential to each particular animal respectively for the perfect working of its special instincts relating to nutrition and reproduction. For since they cannot apply reasoning power either to the cause or direction of their instincts, their capacity of sensation must supply all such deficiencies; and, for this end, it is enlarged to the utmost, in order that the objects immediately presented to those senses may supply a stimulus which shall be in all respects adequate to their needs and requirements.

It is the versatility of instinct, thus produced, which gives rise to actions which so often deceive the observer, from their apparent resemblance to Reason; but it is evident, unless it can be shown that all that we have so far advanced in this paper is unphilosophical, and devoid of foundation in physiological or psychological truth, that while, on the one hand, thought and reason are absent, the stimulus afforded in their place by instinct should be sufficient in its degree, and adequate in its potency, to supply the deficiency—at all events, so far as to enable the animal to perform all those functions which may be summed up as appertaining to the two great generalities of nutrition (including self-preservation) and reproduction.

Moreover, it is a consideration in unison with what we distinctly believe to be the merciful arrangement and disposition of events, that it follows from the above arguments that animals, while not automata, although they undoubtedly suffer pain under the same circumstances which would painfully affect ourselves, nevertheless do not experience painful sensations to the same extent as we do. For they are in-

capable of thought respecting it; they cannot reflect upon it, any more than they can in other circumstances and conditions reflect upon their own consciousness. And thus pain is robbed of at least half its terrors. It is with them but the thing of the moment. It is true their memory may dimly recall such painful experiences, but probably only by the association of impressions, which render them vaguely conscious that the conditions accompanying such pain are exhibiting a tendency to recur.

Let us summarise definitely the points of similarity and dissimilarity which exist between animals and Man, as regards their mental endowments.

Animals agree with Man in the possession of senses which equally enable both to be in strict relation with their terrestrial environment—senses which are far more acute for the most part in animals than in Man, and for obvious reasons.

Animals agree with Man in the possession of propensities. These propensities are also all dependent upon terrestrial relations, and are adaptive to terrestrial environment. They are just those animal feelings which, unchecked in Man, become the sources of immorality; while in animals, which are essentially unmoral, and not immoral, they are necessary for self-preservative (nutritive) or reproductive objects.

Besides these, animals possess, in common with Man, certain feelings or sentiments—mental endowments of a higher class than the propensities—such as are designated self-esteem, love of approbation, cautiousness, imitation, and, highest of all, a kind of conscientiousness and benevolence. These endowments are only found, however, in the higher animals, especially the last two, which are almost, if not quite, peculiar to the highest classes of domesticated animals—animals, that is, which, by some unknown influence, have been deprived of the ferocious nature of their congeners, and have become specially attached to Man as dependents or companions. Some of these endowments, again, are strongly adapted to the two great objects of reproduction—as self-esteem and love of approbation, or self-preservation—as cautiousness; while those still higher endowments which we must allow to a limited class are of an elementary or rudimentary description, and in themselves constitute that very element of tameness, as opposed to ferocity, which specially characterises the higher domesticated animals.

But here the catalogue ends; animals exhibiting these

endowments in a more or less elementary form in proportion to their elevation in the mental scale. But the grand distinction between the animal and the Man lies in the facts that, 1st, these endowments are innate in the animal, but not in Man; 2nd, that in the case of these higher endowments, more or less common to both, there exists a wide, unbridged gap between the mode of their exercise, as exhibited respectively by the animal and by Man; and 3rd, that above these are all the higher and truely intellectual faculties, viz., those of relation and reflection, which characterise Man, but are entirely absent in the animal.

But what, it may be asked, is the explanation of the existence of even these higher endowments of animals? I would reply that the organic relationship in which animals stand to Man and their terrestrial environment equally necessitate the existence of some endowments (other than the propensities) in common with Man, which may subserve to their self-preservation by avoidance of danger, the acquisition of necessary food, and to reproduction for the perpetuation of the species. Such endowments are, we see, common to Man and animals, but are developed in Man by teaching and example, while in animals they are acquired without these aids.

Again, those of the sentiments which we have said to be possessed by animals are only so possessed by animals in a high condition of domestication, a condition which we do not believe to have been induced by any tribe or race of uncivilised or half-civilised Man, since the highest civilisation cannot effect it. No human power can, or has ever availed to, turn the ferocious instincts of the tiger or the wolf into the uniform benevolence and docility which we call the tameness of the cat or the dog.

Further, animals stop as to their endowments at this point, whereas all the higher faculties, moral and intellectual, are peculiar to Man, to say nothing of the highest or spiritual faculties. These are different, not only in degree, from those endowments we have referred to as shared by animals, but they are distinct in kind, and could not possibly have been evolved from lower endowments of a totally different character. Ideality, wit, veneration, such as begets worship, to say nothing of the appreciation of colour and form (art), of number and order (mathematics), of time and tune (music), the general sympathy with, and admiration of, nature, ratiocination, which implies comparison and weighing of causes and their results, introspection, morality, as under-

stood by human beings, the power of choice in the selection of good or evil, spiritual communion with the Creator, and articulate language, all these, and many others are special faculties, distinct in kind from anything possessed by animals, and totally beyond the power of any process of natural selection out of inferior endowments of an altogether different kind, and which no animals ever possessed, even in a rudimentary form.

But not only is it the fact that no animals possess, or ever did possess, any of these faculties, but it is also the fact that all these exist potentially in the human infant of every race, savage or civilised; and their greater or less development depends solely upon the opportunities of instruction which such an infant enjoys, which again are dependent upon the circumstances of its environment.

### *II. Reason.*

In the few remarks which I shall make on this subject I shall advance some further considerations in proof of my position, by pointing out certain characteristics of the human mind which illustrate its absolute and wide separation from those categories of mental phenomena which are exhibited by the lower animals, and to which we apply the term Instinct.

We have already especially dwelt upon the question whether animals possess innate ideas, and have answered it in the negative, upon the plain and simple ground that animals do not possess ideas at all, in the true meaning of the term, either innate or otherwise; because they are not capable of thought, and therefore *a priori* cannot possess, either at birth or at any subsequent period, ideas. Nevertheless we have pointed out that animals are endowed with certain intuitions, which we denominate in the aggregate Instinct, and that these intuitions are innate or connate in all animals. We have shown reason, moreover, to believe that the endowments which animals do possess not only are born with them, but that they are sufficient for all the purposes of their existence; so that all that they do, and all that they know, they do and know without further instruction.

But let us compare with the condition of such young animals that of the human infant. Instead of at once, or as soon as its stage of undevelopment and feebleness is passed through, entering upon its life-duties with a fund of practical knowledge sufficient to carry it through every phase of

common, or even exceptional experience, the infant is long incapable of anything except of drawing nutriment from the maternal bosom. And when the first dawning of intelligence begins to supervene, we find that it appears and gains increment *pari passu* with the degree in which its attention is directed to, or arrested by, the external objects presented to it by its parents or nurse. In other words, the infant is at first a mere corporeal being, with no instinct except that of sucking, and altogether devoid of intelligence; all that conduces to intelligence lying dormant and undeveloped. It is even quite devoid of that affection which we have seen to constitute the nature or the very life of the animal. The infant at first possesses absolutely no knowledge, no cognitions, and is therefore endowed with no affection of any kind; for the affection which constitutes the nature of an animal is based upon cognitions, and cannot exist apart from them. And since no infant possesses such cognitions, it therefore cannot possess intuitions of any kind whatever.

A human infant can only obtain its knowledge by means of external observation, aided by external instruction. It begins to "take notice" at an early period, but this notice or observation would be insufficient to teach it ideas without the intervention of others who already possessed such ideas: and this external intervention or instruction can alone store the dawning mind with facts or experiences, which lead to thoughts and ideas, and which thus gradually establish specific affections. So that, without such external instruction, the infant would and must remain, in its relation to the external world, more ignorant than an animal, since it would not only be void of animal innate cognition, but would have nothing to supply the deficiency, while its internal world would remain as a permanently sealed book, for want of any power of expansion within itself. Such indeed is the condition of the lower savage races, who are born and live without instruction or cultivation from without, and are yet incapable of improving themselves from within. For inasmuch as all are rude and uncultivated alike, none is capable of teaching the rest that of which they are themselves ignorant.

Such uncivilised people would indeed, from observation alone, slowly learn certain rudiments of knowledge, and gain a certain crude experience, which they would apply to the same purposes as those to which the instinct of animals is applied, as to food and shelter and security from danger, for these rudiments could only have reference to the general animal principles of nutrition and self-preservation. But

they could never raise themselves above their savage state, they could never rise to a civilised condition, unless they had assistance from without, any more than the infant could rise above the stage of infantile ignorance unless aided by the example, experience, and instruction of its parent or nurse.

Such indeed has been the positive condition of those rare but interesting cases of human beings who have grown up wild in forests until the age of puberty, and who, when discovered, were in all respects (except in their instincts) like animals, and with no more conception of civilisation or culture than bears and wolves. They had taught themselves nothing, beyond those rudiments which suffice to procure for them food and a rude shelter, they had no idea of articulate speech; and indeed, in the case of Peter the wild boy, never succeeded in learning it, though (as if to prove that that were no adverse argument) in another no less typical and interesting instance, that of Mlle. Leblanc (supposed to have been a year or two younger than Peter, when she was discovered in the forest of Soigny), perseverance in the effort to teach her to speak was at last rewarded with success.*

We will not here diverge to the further consideration of the corollary which must necessarily be drawn from these facts, viz., that civilisation did not, and never could, begin from within, as self-originated by any race whatever. We are well aware of the views most in vogue among the ethnologists of the day. But it should be evident to any unbiassed and thinking mind that no race of men or semi-men could evolve even the merest rudiments of a complex civilisation from their own unaided potential faculties, since those faculties in all cases remain dormant or undeveloped as long as they are left to themselves, and only evidence their wonderful capabilities when they are drawn out by external influences of a superior nature.†

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* We are well aware that these remarkable cases are now classed in some quarters under the category of "theroid idiots, which exhibit a striking aptitude for a wild animal life." But it is purely an assumption that they were originally idiots; nor is there any real ground for believing that they voluntarily took to their wild life. A patho-psychical niche is simply created for them, since they do not easily fall in with modern theories.

† No example (says Niebuhr) can be brought forward of an actually savage people having independently become civilised (see *Romische Geschichte*, Pt. I, p. 88). And Mr. Laing, in his latest work, begins by laying down the same axiom, although in several later passages he seems to have forgotten that he had done so, and grievously contradicts himself by his theory of primitive Man having evolved a civilisation for himself.

But if the infant comes into the world entirely devoid of any affection, or even of any kind of knowledge, both of which are possessed by animals to an extent sufficient for their needs from the very beginning, it may be asked, What is the birthright of the human being? What endowment does he possess which shall compensate for the absence of any innate knowledge or ideas? The answer is plainly, Faculties; the power of gaining by experience and teaching the knowledge it does not at first possess; the power of receiving impressions, cognitions, and thence thoughts and ideas; the power of obtaining adequate and suitable furniture for the spacious and prepared chambers of the mind; a power which in its scope is practically unlimited, —not indeed infinite, in the real sense of the expression, but yet unbounded in its progressive capability of development. A Man is born, indeed, devoid of innate ideas, but he possesses in their stead faculties for acquiring ideas to an indefinite extent; and hence his vast superiority over animals, which possess no such faculties or capabilities, but which are restricted from their birth to the sensuous knowledge and perceptions and the corporeal affection or nature into which they are born, and above which they can never by any possibility rise. Instead of differing from animals as regards their mental endowments, in degree only, a Man's intellectual and moral powers are of a radically different kind, discontinuous, and upon a higher plane, capable of indefinite expansion, and of a cumulative progression utterly foreign to the nature of the brute creation.

There exists, then, a most important radical distinction between the instinct of animals and the Intelligence of Man, a distinction which no theory of Evolution can, by any possibility, bridge over, or account for even in the smallest particular. The animal is born in possession of all its mental powers, as it were, ready for use, with everything *in esse*, and with nothing whatever *in posse*. The Man, on the other hand, has no positive endowments at his birth, but he possesses what we term Faculties, capable of being from that time forth indefinitely cultivated. He possesses, that is, nothing whatever *in esse*, but everything *in posse*. The animal knows, at, or in some cases soon after, birth all that he is ever capable of receiving of knowledge, his utmost powers being only of a sensuous kind, into which thought and ideas do not, nor ever can, under any circumstances, enter. The Man is born with nothing but a power of receptivity, a budget of faculties for imbibing knowledge and

reasoning upon it; but he is ready to learn and capable of acquiring everything under favourable conditions. The animal is perfect at birth, with a perfection which is incapable of being expanded beyond the narrow limits of its corporeal senses. The Man is imperfect, but with a power of becoming gradually perfect even in the higher flights of understanding and intelligence. The mind of the animal is like a field already sown with a crop which, although useful in itself, yet totally prevents any other crop from being inseminated therein, a meadow covered with herbage and wild flowers; while the mind of a Man is virgin soil, prepared for the reception of any and every crop, be it tares, which shall run to waste and disorder, or good seed, which shall spring up, and shall yield forty, sixty, or a hundredfold.

This radical psychological distinction between Man and animals is utterly incapable of being explained by any theory of natural selection. It passes it by without contact, and leaves the theory far behind. Any hypothesis of Evolution without superhuman guidance and direction can only act by continuous gradations, acting invariably upon the same plane, and could not by the wildest flight of imagination produce phenomena so utterly discontinuous as the unlimited faculties of Man out of the strictly limited corporeal-sensual instincts of animals. No survival of the fittest, I feel safe in affirming, however long the time granted, could develop something out of nothing, the grand and noble structure of human Reason out of materials so lowly, and so different in quality and essence.

The intellectual and moral faculties of Man are of a nature, character, and power of expansion which Man himself is utterly incapable of duly appraising, or of appreciating with anything approaching to fulness or completeness. In no man, indeed, are all these faculties fully awakened, and in some very much less than in others. They exist, indeed, potentially in all, but in infancy they are all dormant, and are gradually and, one by one, successively unfolded and roused into activity by various external circumstances, and are developed by continual use and practical exercise. A man may possess a faculty of which he little dreams, simply because the occasion for its use has not yet arisen, and it has thus never had an opportunity of being drawn forth and exercised. Thus, one may be endowed with a faculty for numbers, another for mechanics, another for military tactics, which may, by adverse circumstances, be kept quiescent for years, or which may never have an opportunity of being

brought fully into play. One may possess certain faculties to a pronounced and well-marked extent, which in another man may seem to be absent, or at best dwarfed and stunted, and the man in whom they are undeveloped may be incredulous of their existence in another. And a painter or a musician is a phenomenon to a man who has cultivated no faculty for painting or music, but who, under more favourable circumstances, and better developing conditions, would possibly have been at least very much more apt.

And as with the intellectual, so also with the moral faculties, certain of which may be possessed by men who, to others, who have not cultivated them, may appear as simple enthusiasts; but that does not prejudice them as real possessions, prized as such by those who are fully conscious of possessing them. A man with the spiritual faculty opened and developed in him may feel and know that he is in possession of a faculty which is to him a precious reality; while another, who does not possess it, who possesses indeed the capability of its development, but who by persistently denying it incapacitates himself from exercising it, so that, like any other unexercised faculty, it becomes atrophied within him, bestows upon his better gifted neighbour a self-satisfied smile, and points at him as a superstitious weakling. But such a course does not prove anything more than that such gifts are not equally valued by all, although their development demands an exercise of will which can never be set in action if the world into which the faculty leads is, in the outset, denied. It certainly does not in the smallest degree prove away the existence of what the one is conscious of possessing, though the other is incapable of comprehending it.

Those who would limit the faculties of Man to a certain section of them which are correlative with the outer, lower, or mere material world of Nature only, would do well to ponder the grand eulogium of the Poet, who, in language befitting his theme, thus apostrophises that section of the Primates which constitutes the human kind. "What a piece of work is Man! How noble in Reason! how infinite in faculties! in form and moving how express and admirable! in action how like an angel! in apprehension how like a god! The Beauty of the World! the paragon of animals!"*

* It is to be feared, however, that the typical attitude of the mental Evolutionist is to parody this just and magnificent tribute. "What a piece of journey-work is Man!" we might fancy him saying: "How

And where have these faculties their seat and dwelling-place? We reply, in the subtle and inmost recesses of Man's nature, which are quite secure from the scalpel of the anatomist, and from the microscopic investigations of the physiological histologist. Yet must they energise through the instrumentality of the cerebral organisation. Their expression may, therefore, be dulled by a defect or flaw of cerebral structure, which is absolutely imperceptible and inappreciable to the anatomist, it may be by some mere vice of constitution, whether natural or acquired; or they may be altogether veiled and darkened by a more palpable imperfection. Yet the faculties are there, as a man's birthright, only they cannot find vent through the medium of the imperfect organ or instrument; and they must remain numbed and dormant until the unfavourable conditions are changed, and they are set free from their prison-house.

But no man can ever know and realise the extent and scope of his faculties. These which he most calls into exercise will be ever the most apparent and the most active; but he may, and probably does, possess others of which he little dreams, and the conditions for the development of which never arise in his present state. It is probable, indeed, that the highest conceivable subtlety of a merely material brain-organ may be insufficient to energise certain faculties, which therefore can never be capable of manifesting themselves in our present condition, but are reserved for a higher sphere of action. And if this suggestion be reasonable, we may hereafter be endowed with powers whose development will be entirely dependent upon being set free from the grossness of a material organ, however subtle a terrestrial medium, however delicately organised and adjusted.

Phenomenal manifestations of intellectual power are indeed not unusual, and seem to indicate that the special faculty thus exalted may be due to a high degree of development of the special region of the brain which is the seat of the energising power of that special faculty. For doubtless each region of the brain is correlative with certain groups of intellectual manifestations; but we have yet to learn how far localisation and differentiation extend. But while there must be a limit to the possibilities of the manifestation of faculty through a mere material organ, such as the brain,

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ignoble in Reason! how poor and cribbed in faculties! in form and moving how akin to animals! in action how like an ape! in apprehension how like a d-o-g!"

we are not acquainted with that limit; and we may safely judge that such phenomenal manifestations as we distinguish by the name of Genius are rendered possible by some unusually delicate adaptation of a specific region of the brain to the faculty with which it is correlative; a pecularity, however, utterly beyond the power of the cerebral anatomist to detect. Such manifestations of Genius, which have brightened the history of our race, are due, on this view, to remarkable, and in a sense abnormal, subtlety of brain development, which renders possible a higher exercise of faculties, common indeed to all Mankind, but which in the generality are toned down by the exigencies of our material state and gross organisation. And thus we are led to the same point as before, viz., that when the time arrives that we shall cast off this material husk, there will be nothing to stand in the way of an indefinite expansion of our faculties, a vast exaltation of those with which we are familiar, and perhaps the birth of new ones which could never be adapted to the exigencies of a terrestrial and material life.

Considering the immense importance of the functions of the brain, and the difficulty of satisfactory investigation into the living brain-structure, it would seem that the school of mental evolutionists are somewhat hasty in their estimate of the value of the special characteristics of the human brain. Mr. Romanes, at the outset of his work, feels bound to give prominence to the perplexing character of the relation of Intelligence to the size, mass, and weight of the brain in the animal kingdom as a whole. And indeed it does seem a serious difficulty when we bear in mind the minute size of the brain of animals which exhibit the wonderfully versatile and complex instincts of the ant or the bee. It is true that more bulky animals would seem to demand a brain more proportional to their size and weight; but still the difficulty remains that the ant, with its tiny ganglion, is capable of effecting combinations which would put to shame a mammal with a brain weighing as many pounds as the ant's does grains. It would at all events suggest the belief that we are not fully acquainted with the precise material co-efficient by means of which such operations are effected.

"Now we really know (he adds) so little about the relations of intelligence to neural structure, that I do not think we are justified in forming any very strong conclusion, *a priori*, concerning the relation of intelligence to mere size or mass of brain." And again, "Knowing in a general way that mass plus structure is necessary for intelligence, we do

not know how far the second of these two factors may be increased at the expense of the first" (*Mental Evolution*, p. 46). But does Mr. Romanes mean to infer that the minute mass of the bee's or ant's brain is compensated by structure to a degree sufficient to account for their so-called intelligence? Because, if so, why cannot, in the first place, the superiority of structure be pointed out, or in some manner indicated, by the micro-physiologist?

I have before me Swammerdam's drawing of the dissected brain (or cephalic ganglion) of the bee, which well details the cortical substance communicating on either side (within) with the cord (which itself forms a loop posteriorly, and then gives origin to the first ganglion of the body), while the distal surface of the cortical substance is connected with the cortical fibres of the eyes; which again lie transversely under the membranes which support the pyramidal fibres (of the eye). We do not mean to affirm that Swammerdam gives all that the microscope would now detect; but we may safely surmise that the highest powers of the modern microscope would give no clue to the power which exists in that tiny mass for the carrying out of the wondrously complicated social economy of the hive.

And, in the second place, if superiority of neural structure compensates in these minute-brained animals for mass, what becomes of the doctrine of mental evolution? If the ant or the bee, members of the order Articulata, are so vastly superior in the structure of their brains to animals greatly higher in the scale of organisation, what law of evolution or natural selection can be formulated to account for such an anomaly?

Again, take the brain of any animal in the Mammalian ranks, and compare it with that of Man; can the cerebral physiologist determine wherein lies the vast superiority of the human brain? We are assured that the brain of Man differs less from that of a chimpanzee than the chimpanzee's does from that of a pig. But who does not see that the brain-manifestations of a pig and a chimpanzee are far nearer akin than are those of a chimpanzee and a Man. But if these facts do not justify us in forming strong *a priori* conclusions concerning the relations of intelligence to mere size or mass of brain, yet they do seem to justify us in the conclusion that, while the brain is universally (and no less so by mental evolutionists) regarded as the organ of mind, yet nevertheless, the vast distinctions or gaps in psychical manifestations are not to be accounted for at all on any known physiological

principles dependent upon either mass or structure, whether alone or combined.

But while the physiologist or the anatomist, with all the appliances of the scalpel and the microscope, searches out, we would almost say, all that can be learnt from these potent aids, he yet misses just that all-important element which sets the merely material machinery at work. If, as seems certain, the brain has a proper motion of a pulsating nature (which we should imagine to be highly consistent with natural analogies), it only confirms what we might have imagined *a priori*, viz., that the nerves are tubular vessels for the distribution of a subtle fluid, or perhaps of more than one kind of subtle fluid, utterly undiscoverable by the scalpel; a fluid or fluids adapted for the instantaneous transmission of ganglionic impulses, going from, and returning to, the cerebral cavities, like blood to and from the heart.

We have suggested more than one subtle fluid, for while the blood is usually called the life of the animal, no one supposes that it is in any other sense the life than as the bearer of a prepared pabulum to every part of the organism, both for its building up, and for the supply of waste tissue. The real organic life is not hæmal, but neural; not a gross fluid like the blood, but something which dominates the blood, as it does all the other particulars of the organism—something from which the blood itself derives its living properties. This subtle fluid must penetrate the whole body, through the agency of the nervous fibrillæ, which are its conductors or transmitters.

The material carrier or energiser of organic life must be of a highly subtle character, and the term animal spirit may be applied to it. But no scientific test can be brought to bear directly upon it, though we may hope at some future time for side-lights which may one day demonstrate its existence.

But, besides the animal spirit, or vehicle of organic life, the nervous centres must also be the material organs for the residence and expression of intellect and soul; and for these we can hardly conceive a fluid sufficiently subtle and ethereal. It need scarcely be said that these are suggestions, in which, however, it would be hard to say that there was anything unreasonable. Cerebral physiology, as, perhaps, the very highest walk of biology, is naturally in a very imperfect and undeveloped state, nor do we suppose that the most perfect and accomplished anatomist for a moment imagines that he has exhausted the subject, or even pene-

trated near to its inmost recesses. The probability is that he has not reached their confines.

The object of these remarks and suggestions is to point out the fallacy that mere size and weight of brain alone can be taken as an index of mental power; whereas it is probable that it is the subtle workings of its yet almost unknown fluids or spirits which determine its activities and energies. "Idiocy," it is remarked, "is compatible with large and apparently well-developed brains," but this apparently can only indicate the broad features and characteristics of brain-development, and can take no cognisance of those of which we have been speaking. To be the medium of the intellect (to leave soul out of the question), the brain must be an organ of wondrous delicacy and complexity; and it is conceivable that a very slight, and (by any physiological appliance) utterly inappreciable defect or want of balance would be amply sufficient to interfere with the due exercise of the reasoning functions, and would leave the otherwise rational Man an idiot. And such idiocy would yet be perfectly compatible with the belief that it arises from no absence of faculty, but that, could the defect or flaw in the instrument, or the impediment to the flow of the nervous fluids, be remedied, the faculties would energise; just, in fact, as a small warp or crevice in a flute would put a stop to its capacities for melody, although the same means were used which could otherwise render it musical.

In like manner we may conceive that the slight apparent structural differences between the brain of a Gorilla and that of a Man may be of but little importance, if a higher quality of nervous spirit be admitted as the probable operating cause of the higher manifestations of faculty in Man. Size, and weight, and even microscopic structure are but gross criteria for so excellent an organ as the brain—the sustainer of life, the instrument of thought, the energiser of the intellect, and the bond between the soul and the body.

And lastly, to return to that which led to these remarks, such delicate shades of organisation and such functional activities of the spirituous fluids (influences which very possibly interact) are in all probability the causes of those superior, and, in a sense, abnormal, manifestations of intellectual power in some special direction which we call Genius —manifestations which give us some slight insight into what would be the capabilities of the same faculties were they not hampered by a material organisation, but, instead thereof, lodged in an approximate spiritual organism. Justly guided

and properly directed they would seem to have, not indeed infinite, but certainly indefinite, powers of expansion, of which our highest efforts here serve to afford but a slight glimpse or foretaste. And the manifestations of genius with which we are familiar in exceptionally-gifted human beings, since they thus depend upon organic variation whose ultimate cause is unknown, and, although belonging to the highest regions of organic nature, are nevertheless, like other organic variations, liable to descend by inheritance, and to reappear in the next or even in the alternate generation, so that hereditary genius does not seem to be a phenomenon of greater singularity or import than the heredity of any other organic trait, or of any other of the multitudinous variations which the infinity of nature exhibits.

The possibilities of human nature, and of human faculty, are boundless. But let no man scorn that in another which he does not feel moving in himself; for it may be one day discovered that such shortsighted contempt will bring upon itself its own retributive punishment.

The CHAIRMAN (Rev. F. A. Walker, D.D., F.L.S.) conveyed a vote of thanks to Dr. Collingwood for his able paper, and after a discussion of a general character the meeting was adjourned.

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## REMARKS ON THE FOREGOING PAPER.

By Professor E. HULL, M.A., LL.D., F.R.S., F.G.S., Director of the Geological Survey of Ireland.—Dr. Collingwood seems to me to have very ably stated the essential distinction between instinct in the lower animals and reason in man. The two master passions in the former—those connected with nutrition and reproduction—are, as he points out, limited to those purposes, and are purely sensuous; in man, they are made subservient to his higher mental and spiritual nature. The emotion or passion arising from the apprehension of impending danger which we call "fear" is equally powerful in man and the brute; though in the former the exercise of the intellectual faculty tends to neutralise its force. The origin of instinct in the lower animals is as great a mystery as the origin of genera and species; and notwithstanding all that has been written on this subject by Darwin, Romanes, and others,

the subject is involved in great obscurity. I doubt if Dr. Collingwood has given sufficient credit to the capacity of the instinctive faculty in the lower animals for expanding, on special occasions, into something very like reason and reflection. Most of us have had opportunities of witnessing examples of this higher exercise of the instinctive faculty—which would have done no discredit to the reasoning faculty in a human being; at least in the case of a boy or girl. But, notwithstanding such exceptional instances, the essentially limited scope of Instinct as compared with Reason appears to show a difference not only in degree but in kind, as the author maintains.

By Professor DUNS, D.D., F.R.S.E., New College, Edinburgh.—I have read Dr. Cuthbert Collingwood's paper with much interest. It is an able statement, review, and criticism of a great subject, which holds at present a prominent place in, so-called, philosophical biology. Is brute instinct generically the same as human reason? Have "the higher organic forms been developed from lower in such a manner as to leave no important gap in the animal series?" The latter question is generally answered first, and, by assumptions for which no reasons are given but subjective ones, the theory of evolution is held to warrant an affirmative answer to both. Oken's *dictum* passes for true science:—"Every organic thing has arisen from primitive slime, which originated in the sea from inorganic matter!" And man is no more than a link in the chain of being. It seems to me that this is begging the whole question, and is not scientific, because science rests on facts. Long ago Sir William Hamilton set this in its true light, so far as man is concerned: "What man holds of matter does not make up his personality. Man is not an organism, he is an intelligence served by organs; they are his—not he." This, moreover, strikes the point at which Scripture and true science bear one testimony as to man's place in Nature. In one aspect of his being man is linked to the lower animals; in another he has mental qualities which make a great gulf beween him and the lower animals. When we take into account his rational nature—will, affections, imagination, hopes, capacity of education, self-consciousness, thinking that he thinks—we meet with elements which refuse to fit into any scheme of zoological classification that attempts to deal with man as if his place were not unique in Nature. Dr. Collingwood's able discussions are of much value from this point of view.

By the Rev. W. GUEST, F.G.S.— Dr. Collingwood has laid us under much obligation by his powerful arguments in relation to a current controversy. We may rest confident that the teaching of extreme evolutionists in their contention that the difference is one of degree only between the intellectual perception of man and the lower animals cannot be sustained. They are driven to this assumption; it is the necessity of their position, and will assuredly end in their discomfiture. The reaction is setting in strongly on the part of members of their own school, and Dr. Collingwood has done much to strengthen their protest. Nevertheless, we shall weaken our cause by imitating their positiveness. We lose nothing by acknowledging the mysteries that still shroud the boundaries of Instinct and Reason. Many of our members will hesitate to adopt the language of the author of the paper, and affirm that "Thought is aboriginally wanting in all the animal races;" nor will they be prepared to say that there is not "the remotest capability for the crucial endowment of speech" (pp. 98 and 99); and while firmly holding that the instinct of animals differs from the reason of man in "kind," they will be unable to withhold from animals an ability of adaptation of actions to the ends sought, which implies more than is found in the unguided steps of the somnambulist (p. 101).