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PART 1.—ORIGINAL ARTICLES.

The Study of the Human Mind from a Physiological View.
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The scientific method of studying the phenomena of the human mind by founding it on a physiological basis, and thereby tracing the cerebral functions through the lower animals and uncultivated man, according to the plans adopted in other physiological investigations, must necessarily tend to modify or even change much that is contained in our received systems of psychology. In the hands of such men as Darwin and Huxley, the comparative method, when worked out in all its truthfulness, must necessarily bear good fruit, and be unaffected by any of the bias which the purely metaphysical method of the schools is apt to give to the investigation. The objection that it is degrading to compare the human being with the lower animals, or to take mankind in the mass, is of no value to the scientific investigator, who is merely seeking after truth, and knows that no researches of his can in any way affect man's history in the past or for the present; although they may afford many explanations of human conduct.

The method by which a knowledge of the human mind and its operations was formerly sought to be gained, appeared to consist in the philosopher sitting in his study and giving himself up to contemplation (or the working of his brain), placing on paper all his reflections, analysing them or sorting them, and then skilfully arranging them in a tabulated form. The whole scheme was a result of his cogitations. It was a development of pure mind, or of his "ego," as he styled himself. The mere feeling of individuality, or consciousness, obliged him to regard himself as something anterior to, or at least independent of, his body and its surroundings; these he could contem-

plate as exterior objects from his own superior eminence as a spiritual being; which consideration carried him often still further to the necessary separate existence and immortality of this "ego," and usually by further contemplation to the necessity of a God. The scientific man does not follow this plan, and here it may be said that the word scientific in the popular sense is often meant to convey the idea of some erudite or deep theories of certain profound men, which have no more right to be credited than any other fancies or dogmas thrust upon mankind; whereas I apprehend it should be explained that we mean, by scientific, the teachings derived from the material world around us as far as our knowledge has at present extended, in contradistinction to fancies and beliefs emanating from the fears and passions of the human mind.

The scientific man, therefore, need not take the older metaphysical view of the human mind, nor need he form any theory about it whatever. He is content to take mind as he finds it, and study it in all its forms and under all circumstances. He sees the brain and the human faculties associated with it; he knows nothing of one without the other; and the problem of their union to him is not necessarily of greater difficulty than the association of other functions with their respective organs, or the ordinary properties or phenomena of matter with the subject matter itself. It is quite true that no study of the mind alone would have alighted upon cerebral substance, nor is it likely that a study of bile would have suggested a liver, or the most minute analysis of another secretion suggested a kidney. We know that certain organs have certain actions, and we say the same of the brain; and with many persons there is no more difficulty in accepting this fact than any other fact in nature. Whether the mental faculties can remain when the brain decays, is a totally different question, and is to be argued on other grounds, and to be supported by purely moral and religious arguments. Erasmus Darwin, as a scientific man, was able to say, at a time when few opposed the teaching of the schools, "In respect to consciousness we are only conscious of our own existence when we think about it, as we only perceive the lapse of time when we attend to it; when we are busied about other objects, neither the lapse of time nor the consciousness of our own existence can occupy our attention." Descartes has said, "I think, therefore I exist;" but this is not right reasoning, because thinking is a mode of existence, and it is thence only saying "I exist, therefore I exist."

It may be remarked that those who have had reason to consider the human mind as a cerebral function, have been styled materialists, and charged with having degraded the human character; but if this material hypothesis be admitted and offered to those who are antagonistic to it, in order to discover what they understand by it, they are unable to create a being of the most material kind, like man, without giving it a feeling of self-existence or consciousness, and at the same time the inevitable necessity of placing this feeling anterior to all else in his being, even to the organism from which it sprang. This necessity of regarding his own organism, including his own brain, as an object, must come out of a material as well as any other hypothesis, unless man is to be made an altogether different creature from what he really is. The objectors admit that if they were materialists and could look into a mirror and see their own naked brain at work, out of which consciousness resulted (unless consciousness resides in every part of the body, as Plato taught), that of necessity the facts to them must be reversed, and they, as conscious beings, would regard their brains objectively. It would seem, therefore, that at the present time there is no necessity for the physiologist, whilst studying the human mind, to do otherwise than look into the material world around him, and take the facts as he finds them. It would scarcely have been necessary to make this declaration, had not certain members of our profession deemed it more satisfactory to introduce a distinct and separate principle into the human mind to account for some of its attributes, such as memory.

Those who are in unison with the scientific feeling of the age, are taking a physiological basis not only for the determination of the attributes of man, but for the explanation of a large number of the customs which have grown up around him; finding therein much to elucidate the problems contained in the various systems of morals and religion, as well as discovering the only explanation probably of his taste for the fine arts and for the development of music. As regards the latter, Darwin says that hitherto his attention has not been sufficiently given to it, and implies, and no doubt rightly, that his method will be applicable for its elucidation. The musician takes the human organization as he finds it, with its aptness to be influenced in various modes by sound, but it requires a deeper insight into man's nature to discover why a quick, or so-called lively air, stimulates him to gaiety, which will even make an infant smile, whilst, on the other hand,

a slow, measured tune would produce in the latter a long face or even a sob. It may be that life, heat, and a quick circulation go along with joyousness and rapid movement, whilst cold-bloodedness and feeble circulation accord better with slow time and dulness. Moreover, that quick time and slow time, as Sir Charles Bell suggested, are in unison with and appreciated by the contraction and relaxation of the muscles, and not by the ear, hence the use of those very appropriate terms, slow and quick *movements*, and the necessity of the master *beating* time. Again, as only a given quantity of air can be taken into the lungs at once, and so much expelled, and since also the laryngeal muscles must be alternately contracting and relaxing, it is evident that much which we call cadence, metre, and rhythm may find its meaning in a true physiological cause. The mode of talking and expression may often be taken as evidence of the frame of mind, and I apprehend that a religious service may be found to correspond exactly with the creed of the worshippers. The feeling of profanity experienced by a large section of people in approaching the Creator in any but the most melancholy airs, in which the minor key prevails, has an intimate relation to fear and awe, whilst the sound called whistling would be in the highest degree irreverent. We speak also of the harsh note of anger, or the soft whisper of love, all of which outward expressions of the feelings will find explanation by the Darwinian method of research.

In studying these subjects, we find that the widest field for investigation lies in the connection of man with the lower animals. The tendency of modern thought in this direction is no doubt disquieting to those who have always regarded man's place in nature as something perfectly distinct from and superior to the material world around him, and that he is to be regarded rather as an immaterial essence than as having any connection with inferior objects; but we must submit to the logic of facts. There are others, however, who, possessed of a scientific spirit, and who are occupied with the highest working of the human mind, with all its passions, fears, and aspirations, yet are so subtly constituted, that they shrink from methods of inquiry which appear to degrade the intellectual faculties of man and confuse them with all the lower instincts of the brute, or which require us to contemplate man in the mass like any other species of animal. There are many good and clever men in our profession, who, overcome with the thought of man's individuality, of the

solitariness of each man's soul, of the mysteries and secrets therein contained, are impressed with the power, the greatness, and the infinite vastness between it and anything which we can style "mind" in the brute; and declare that in this higher mind lies the subject for our contemplation and investigation, rather than in those lower phases of instinct, which every creature may possess. It is as well, perhaps, that there are those who take this view, for then purely physiological observers may have less fear of overstepping scientific methods in their investigations.

I myself believe the scientific and comparative method of studying the human mind, as suggested by our great countryman, Locke, is the one which will give us the greatest insight into many of its more obscure phenomena, that is, the study of it from outside the individual under all conditions; in the feeble as well as the strong-minded; in the savage as well as in the sage; even also in the madman, the idiot, the child, the four-legged and winged animal. I think the results thus obtained, being the simplest and most universal, will form the basis on which the higher superstructure can be raised. If it be found that much that is in man belongs also to the lower animals, it will enable us to define more clearly what the higher attributes of man are; whereas most observers have worked on the preconceived idea that every act of man was intimately related to his consciousness, and was, indeed, an effort of the intellect, whilst the performances of animals were the result of a piece of prearranged machinery. Man had mind, but animals instinct; a mere phrase, conveying with it no meaning. The very same act, or an apparently similar one in the two beings, was attributed to different causes. Of late years, some writers have endeavoured to show that the faculties of the lower creatures are identical with those in man, and that the rudiments of all the higher attributes of the human mind may be found in them; this is set forth in a most instructive and able article in a late number of the "Quarterly Review" as regards the dog, and in a similar manner in the "Journal of Mental Science" by Dr. Lindsay. These comparisons, however, are generally made in favour of the lower animals, in order to show that to them belong rudiments of those higher faculties which the psychologist had arranged in his scheme as belonging exclusively to man. This study of the faculties of the lower creatures is fraught with great advantage, and it will indubitably show

how much there is in common between man and the animals lower in the scale.

I believe, however, this comparison will prove not so much that there is intellect or a moral sense at work in these creatures, as that their actions are reflex and due to education, and if they resemble those in man, and the term instinct be applied to the process in the lower animals, the same expression must be applied to man ; in fact, I believe that the result of a physiological or purely scientific investigation into man's nature by the method spoken of will result in the conclusion that a large part of his mental operations result from reflex or automatic processes, although the consciousness of them on the part of the individual makes it appear to him as if they formed part of a rational act, or were the effect of deliberation. I think it will be found that when animals are taught certain tricks, they perform them only on the application of the accustomed stimulus, as horses in a circus ; also that children act after the same manner, and even that adults may pass through the greater part of their existence acting as automata, never having been able to render themselves independent for a moment of the circumstances which surround them.

The great object of this paper is to draw closer attention to the fact that physiological investigation is teaching how the nerve centres can be educated to certain habits, that they are impressionable, or become modified so as to respond in a given way to particular stimuli, and in this way prove that a great many acts in the animal body are simply reflex. It is admitted by everyone that the human being can be educated, but it is popularly thought that, being rational, he is still able to act according to his will ; in animals and young children, however, it is clear that education obliges the subjects of it to act in a certain manner, and the action may occur with or without consciousness, as it makes no difference to the reflex nature of the act. It will be as well not to try and determine here, at what precise point the spinal system ends, and where the cerebrum or that part of it which is able to appropriate sensations and elaborate them into thought and act begins ; but I see no reason to regard the large central ganglia in the cranium as other than the terminal knobs of the spinal column, since their destruction does little more than paralyse the limbs and voluntary muscles of the body. I consider, therefore, that when I educate my hand to perform a movement, I am

educating a portion of the corpus striatum of the opposite side. In the true spinal system, acts are simply reflex without any mental process occurring at all, but when the impressions are carried to the cerebral hemispheres, and ideas take place, the reflex process by no means ceases, for although it may still be called a mental one, yet it is apparently carried on quite independently of the higher intellectual faculties. If due consideration be given to the subject it may be found that many of our acts are simply the result of habit, and many of them go on without thought or will being directed in any way upon them. Such actions are clearly mechanical, and result from the functions of our spinal system, without our consciousness being roused in any way, taking place probably in the central ganglia, since these bodies rule over the limbs. Thus, an instrument may be played without a thought being given to the act, or we may get up in the morning and dress ourselves, whilst the mind is otherwise engaged; and yet the process of dressing is so complex, that if we had never performed it previously, it would have occupied all our attention and a very lengthened time to have fitted all the garments together. Again, if the arm had been educated to fall at the stimulus of a certain word through the ear, then, as in the case of Huxley's soldier, the word "attention" would have obliged the veteran to drop his mutton and potatoes in the gutter. Every medical man must have observed that when a patient is requested to lie on his back, he very often immediately turns on his belly. The word suggests showing his back.

The simply automatous manner in which many animals act was well shewn by Dr. Huxley in his paper at the British Association. His view was one which I had always been inclined to hold in explanation of the actions of the lower creatures, and I had even applied his theory to man; I had even made use of his example of the Frenchman, who, after an injury to the head, performed many acts during a state of unconsciousness. In my lectures I have illustrated the Aristotelian doctrine of "*nullum in intellectu nisi in sensu*" in several ways, and shewn how ideas are excited by an external stimulus. Thus smell of a particular kind is so retentive in many persons that it will revive the memory of some former odour, and with this a whole train of ideas. An explanation of dreams given by Lord Brougham, as due to a reflex operation excited by some external stimulus affecting the body without,

is a doctrine which Shakespeare had already expounded in the lines beginning—

“ Oh, now I see Queen Mab hath been with you ;
 She gallops night by night o'er courtiers' knees that dream of courtesies
 straight ;
 O'er lawyer's fingers who straight dream of fees :
 O'er ladies' lips who straight on kisses dream.”

All these thoughts and fancies take place during sleep, but in our waking hours, because we are conscious, it by no means follows that many of our acts and words are not excited by a similar external stimulus, and responded to in the same involuntary manner. In fact, there is every reason to believe that during much of our active life consciousness is a mere coincident condition.

And herein lies the very pith of this paper, and that which the scientific method of investigation is evolving, that in lieu of the old metaphysical method in which every individual act is a consequence of consciousness and will, we have that of unconscious cerebration—a cerebral, or we might say mental process—going on without the subject having a knowledge of it. Or if he be conscious, it may be to a simple waking up to the operation proceeding in his brain. To the individual himself all is the result of thought, deliberation, and will. To the outward observer his acts are simply reflex, and often exactly similar to what we observe in the lower animals. It is, therefore, necessary to analyse all human actions before we can regard them as being based on deliberation or reason, and to endeavour to discover what are due to habit, or are simply reflex, before we can bring in a moral element and style them capriciously either virtues or vices.

The great central fact is that a child, like the lower animals, is educated or taught to act in a determinate manner, the same faculties being employed in both of them. There may be consciousness, and a certain amount of effort may be required for their performance, but the acts occur none the less systematically than if a piece of machinery were at work. In this case not only the individual or actor, but the teacher or parent is unaware of the great fact, and attributes the child's performance to the highest intelligence, just as the owner of a dog speaks of his favourite's cleverness.

Let us take what is called a clever dog or a pet dog. Its owner will exhaust you with an account of its superior intelligence and its wonderful performances ; but have the dog at your own house, you observe nothing remarkable in it, but

think, indeed, it is rather stupid. You don't know how to excite its nerve centres as his master does, and therefore you cannot bring him out; but, then, probably you will be informed of acts of intelligence which do not depend upon special stimulation to evolve them, as its recognition of Sunday. This illustration, however, proves too much, for it is not likely that he recognises the day independent of the outward observances of it; for he would then shew more acuteness than his master, who, when journeying amongst the mountains in a foreign country, might easily forget the day, as I have known occur more than once to travellers in Switzerland. Take the dog from his usual surroundings, and his great intelligence is by no means very evident.

The same may be said of the parrot which is taught to say certain words, and whose reflected character from a wonted stimulus is most striking. The sight of one person recalls a certain word, and the sight of another person another word; food will recall a third, and which is, perhaps, the appropriate one; but let the parrot be put amongst strangers, it is dull and stupid. So reflex, indeed, are all the parrot's sayings and doings that most of the stories relating to these birds making apposite replies are obviously false. Now, exactly in the same way, if we take a child and regard him in his household with his special surroundings, he will go through his particular performances; in the doctor's house he will play with a stethoscope, and apply it to the chest of his playfellows to the great delight of the father; in an architect's house the child will build a house with its wooden bricks, and with such a wonderful eye to sanitary arrangements that the father already sees the future greatness of his progeny. Again, instead of a child making use of the ordinary name of an object he will be heard using some more familiar terms, apparently as if he had in his simplicity coined the word; as, for example, I heard a child quite lately call its breasts "fatties," and a steam-engine "puff puff," and on observing the circumstance the mother solemnly asserted that the child had never been taught them. Such self-deception shews that the only method of studying human actions is by external observation; for if a parent can believe that a child's expressions are spontaneous when he himself has taught them, how is it possible for him to judge of the words and actions arising in himself? Many of us may gain a better insight into our inclinations by asking ourselves how we act rather than how we feel. We see the baby, the dog, and the

parrot, under their own special surroundings, go through a number of performances when the reflex acts are excited through stimulation of the nerve centres. Place these individuals under other circumstances, and they are all equally dull; so that it is notorious how other people's animals and children when thrust upon strangers are insufferable nuisances. These examples of animal life may be profitably compared under circumstances where questions of morality, of human passions, of right and wrong come in; thus if a parrot be presented with a piece of bread and jam he will eat the jam and drop the bread. This is said to be the result of instinct. The child will do exactly the same thing; he is called naughty, and beaten accordingly. The bird will drop from his perch by a sudden noise as if he were shot, so purely reflex is the movement; yet when a human being is suddenly startled he exclaims that he was frightened, and a bystander will call him timid. A man may start at his shadow, but not be a coward. Some fair and thin-skinned people suddenly blush when spoken to, but it generally implies no inward emotion. Any number of illustrations might be given of acts which are purely reflex, and yet because occurring in a conscious human being are generally associated in his mind with his intelligence or moral nature. The most important and striking of such illustrations are those which may be drawn also from the lower animals.

Simple phenomena of this kind in children must first be studied, when it will be seen how their actions depend upon their accidental surroundings; at the same time admitting that the material of different races varies, so that an individual of one race would be more ready to respond to a given stimulus than that of another, owing to the stimulus having been applied through several generations. Thus as children grow up they act after the manner in which they have been educated, showing a proneness for a special cultivation which has been applied to the race through several generations. An English boy, for example, educated in France can never be made so thoroughly French as a boy of French descent. These facts shew, undoubtedly, that man is less a free agent than he thinks he is, and it behoves us to try and discover in any human actions to what extent they have been the result or not of the circumstances in which we have lived. The strong feeling which seems inherent in our very nature is, that we are possessed of an independent individuality, and that every act of our life

issues from our own free will, and is a result of a distinct mental operation; in this feeling, which is a part of ourselves, lies the very essence of the viciousness of most of the older systems of psychology, which the scientific method must necessarily subvert. Perhaps the sheep (of which Carlyle speaks) who follows the bell-wether in jumping through a gap into the abyss below, has a similar feeling of independent action. Every savage who speaks of his acts as a result of his own free will, would probably feel hurt if he knew that he could not be distinguished from his fellows, and that we were quite content to include him in the race. In writing history of their manners and customs, we lump them together as a whole, and even in civilized countries we speak of English, French, or German characteristics. It is quite possible for a number of Englishmen to be together discussing a political question, and a Frenchman looking on to have gained only one idea from his stand-point, and which he would call English opinion. In all communities it is the rule for the majority to act exactly in the same way, indeed there are those whose great aim in life is to "do the correct thing." It is only by courtesy that these people can be called individuals at all. We all know how the rules of society bind us, and how we follow one another to the utmost minutiae. If I pass through the neighbouring square during the season, I see the preparations for the dinner-party, the invitation cards, the confectioner's cart, the florist's van, and a number of guests entering the house all dressed alike. On the following day there is the same performance next door, some of the same articles again doing duty, with the same people and the same conversation; so that if persons from another country, unused to the procedure, could gaze on these scenes, they would appear almost identical. When a man on taking a cool and deliberate survey of his life, finds himself engaged in the same performances as his neighbours, which he knows he himself never instituted, it sometimes puzzles him sorely to know to what extent he is a voluntary being. One can scarcely estimate the amount of intellect required to exactly copy one's neighbour, or measure it with that which the sheep employs when he jumps into perdition. The importance of endeavouring to distinguish acts which are merely the result of imitation and habit is very great in forming an estimate of the qualities of the human mind, and more especially the moral ones; yet this is often entirely overlooked by our moralists and preachers. It would seem sometimes

as if not only good-breeding but the highest morality consisted in following the rules of respectable society, and therefore it is that in every place the best, most lamented, and virtuous man is he who has strictly obeyed the laws of his country, rigidly followed the religion of his fathers, educated his children after the manner of his country, and regarded his fatherland as the best in the world. Thus it is that persons who have never had an idea beyond what their immediate surroundings have brought forth, are said to have led a blameless life, and have had every virtue inscribed in gold on their pretentious tombstones. On the other hand, the exceptional men of genius, those of literary and scientific aims, who have had more brain than was ready to act in a simple reflex manner, but have not conformed to all the customs of society, have been mourned over as reprobates. I have heard persons declare that had they lived in Athens, they should have been party to Socrates' death, since he meddled with the orthodoxy of the day, and so corrupted the youth. From this stand-point, Socrates was a bad man. It is quite necessary therefore to know and understand all the surroundings of an individual life before we can estimate its true character.

A medical man has probably a better opportunity of gaining an insight into character than most people; he sees much of the good and much of the bad (the latter shown mostly in selfishness), and is often amazed at finding people so exactly alike. He gains this knowledge because the patient has so excellent an opportunity of singing his own praises, in which his wife joins, or *vice-versá*. He gives a stereotyped story as if read from a book, of which the thread is that he leads a life which is like that of a horse in a mill, or of a dog who goes through certain performances, and of this routine he boasts as if it were a highly virtuous exploit. He tells you how he rises from bed as the clock strikes, how next he shaves himself and has his breakfast, takes his one cup of coffee, his two eggs (emphasis on two), and rasher of bacon, and then how he goes to business, not forgetful of another operation before he starts, the regularity of which is so remarkable that his wife joins in the enthusiasm which the subject excites. He reads his "Times" or "Telegraph" in the train, eats his chop for luncheon, with his glass of sherry (which is always dry) and returns home to dinner. His expression of "going backwards and forwards" to town, reminds one of a polyp attached to a rock, or a mussel with a rather long

byssus. He has a month's holiday, but he does not care to go amongst strange people abroad, with their different customs, nor does he care much for dinner parties, being content with the simplest food; on Sunday he goes regularly to church, and is never seen out of the family pew; he is a man indeed of simple tastes, and having made himself out as thoroughly common-place as he has ability to do, he would wish you to regard him as a paragon of virtue. A man of this kind makes a good citizen in whatever country he dwells, and is as estimable in England just as he would be a good Mahometan in Turkey. I do not say this in any cynical spirit, for no object is gained in holding up one's fellow-creatures to ridicule, but it is absolutely essential in discussing the qualities of the human mind to ascertain what is the influence of the surroundings; it is simply absurd to call those acts either intellectual or moral which result simply from habit or imitation.

I would not offer a single word as an apology for vice, or attempt to break down the well-marked barriers between virtue and its opposite, but one feels a little indignant when a common-place teacher can address a common-place assembly and denounce Shelley and like men of genius as bad, when neither speaker nor hearer are able to appreciate their powers. How often does one see also a woman lauded for virtues when she is merely following her instincts and habits, like one of the lower animals. She is affectionate to her offspring, and receives her meed of praise from her friends, but let this devoted mother have charge of a step-child, and we see from the newspaper reports that she is capable of illtreating it as none but a fiend could do. She is firmly attached to her home, which she also regards as a great merit; but then so is her cat. She loses her husband or children, and her grief is so overwhelming that she becomes a model of affection to her sympathizing friends, whilst another woman may be regarded as more obdurate, who, having a stronger mind, does not display this savage liking for her young, and is able to moderate her grief in consideration of the higher duties which are required of her. We too often have to observe that some of the lower instincts or habits in people are regarded in the light of virtues by the benevolent, and that they are thus blinded to the higher qualities of others who can surmount victoriously the circumstances which weigh upon them. The same observations apply to the lower animals, and may be illustrated by two stories taken from the newspapers during

the last year. The one had reference to the erection of a monument in Edinburgh to the memory of "Greyfriars Bobby," a dog who had attended his master's funeral, and had been a constant mourner at his grave in Greyfriars churchyard for four years afterwards. This was regarded as a proof of the strongest affection, and was to be commemorated on a tablet as a lesson to other dogs and the human fraternity as they pass by the spot. But unless we are assured that other temptations were open to the dog and his better nature resisted them all, we cannot but think that he was following his lowest instincts, and that, after all, he was a remarkably stupid animal. Had he possessed any high faculties worthy of record, he would have changed his mode of life. Now compare him with another dog who was in an equal manner belied. The story was, that some poachers being taken up at Leamington, a dog was found with them, who, it appeared, was let out to any poacher at a shilling a night, and comments were made by the newspaper press on this unprincipled animal for having lost the great characteristic of his species, affection to a particular master, and his consequent willingness to follow any stranger. This dog is held up to reprobation; but if we disallow the immorality of poaching, he must be regarded as a higher type of dog in being able to change his mode of life, than the other one who could not leave the spot where his master was laid, and was a mere slave to habit. Habit it is which compels us to the performance of a large number of our daily acts; conventionality is what we worship in society, we give it our highest praise, and call those virtuous who walk in its paths, so that even a poor dog who could not get out of the routine has a monument raised to its honour.

On looking at these facts we find the lower animals slaves to instinct and routine; we observe the same in children, and rising until we come to the adult, we see the whole tenour of a man's life often little more than a given round of the same duties which he had learned when young. The human being, of course, is framed in a particular way, so that he may, indeed, be nine-tenths of his father over again, especially if he be submitted to the same educational operations from birth. How difficult, under these circumstances, is it for a man to take an independent course! Should he be able to rise superior to his surroundings, he must be a man of more than usual power; he it is who is the reformer, or the man who lives before his age; likely to be hated by his fellows, or

to be a martyr to his country. The popular leader would be he who is endowed with all the instincts and feelings of his countrymen, and be like the late Lord Palmerston, who was said to concentrate in himself the spirit of the age. It would be an interesting experiment to try and discover the degrees in which strong intellects could rise above the circumstances in which they might be temporarily placed, and thus see if a guage of mental power could be formed. Let a person, for example, like Tinker Sly in "The Taming of the Shrew," be taken when intoxicated, and laid in his lord's bed, and see whether he has force within him to enable him to act and speak rightly, quite independently of his surroundings.

"Sir, I will practice on this drunken man ;
 What think you, if he were conveyed to bed,
 Wrapped in sweet clothes, rings put upon his fingers,—
 A most delicious banquet by his bed,
 And brave attendants near him when he wakes ?
 Would not the beggar then forget himself ?

Huntsman—Believe me, lord, I think he cannot choose."

He probably could not choose, and, therefore, when a man has said (in my hearing) that had he been born in Turkey he would still have been a Christian, he is probably talking nonsense. The way, indeed, in which one is moulded from infancy, and afterwards receives additional shape according to the business or profession to which he belongs, is an incubus weighing upon him from which he never can get free. Froude has well expressed this in the following words:—"Now every one of the many professions has a peculiar character of its own, which, with rare exception, it inflicts on those who follow it. There is the shopkeeper type, the manufacturer type, the lawyer type, the medical type, the clerical type, the soldier's, the sailor's. The nature of man is—

" 'Like the dyer's hand,
 Subdued to what it works in.'"

And we can distinguish with ease, on the slightest intercourse, to what class a grown person belongs. It is to be seen in his look, in his words, in his tone of thought, his voice, gesture, even in his handwriting, and in everything he does. Every human employment has its especial moral characteristics, its peculiar temptations, its peculiar influences ; of a subtle and not easily analysed kind, and only to be seen in their effects."

We have hitherto spoken of the lower actions in the

human subject as due to habit, but we shall find that what are called the higher faculties of the mind are also subject to the same reflex laws. In a dog a certain sound or object suggests a certain cry or action, but what amount of actual mental process is evolved at the same time it is difficult to determine. In the human subject, a word or person may suggest in the same manner an expression of a purely reflex character, but being attended with consciousness it is regarded as an intellectual effort, excepting when the words spoken are absurd or irrelevant, when we say "You speak without thinking;" or as is witnessed in a person admittedly insane, who will catch up one word after another, and play with them; or, as is seen often in ourselves when in a thoughtless humour and not caring to exercise the brain in conversation, we are content to "pun" upon words. The deeper the intellectual process, probably the less this is done, and the less power do words have over us. In ordinary conversation, however, in mixed society it is interesting to observe how much that is said is of a reflex character, and excited merely by peculiar expressions. One example of the kind will suffice. A gentleman seeking the appointment of medical officer to an Insurance Office required the patronage of the directors; the way, therefore, in which his friends could assist him would be by influencing these gentlemen. He mentions his candidature to the members of a family with whom he is acquainted, and who happen to have a friend Mr. C., a clerk in an Insurance office; three different members of the family suggest that Mr. C. could help him. Now there was not the slightest reason for them to suppose that Mr. C. had any acquaintance with the directors of a rival institution, or that he as a clerk had any influence with leading city men, and yet three of a family suggested his name. The explanation of their doing so lies simply in the fact that the word "Insurance" suggested their friend Mr. C.; it excited the brain to a certain movement, just as tickling the soles of the foot makes the legs jump in a case of paraplegia. There was probably about as much pure intellect employed in the one case as the other. So uniform are the ideas excited by certain words that one becomes completely prepared for many conversations which take place; as for example, after one's holiday in the autumn, the following kind of dialogue becomes stereotyped:—"Where have you been this year?" "To Ireland." "Did you go to Killarney?" "Yes." "To the Giant's Causeway?" "Yes." "Good morning."—When

all this has been said about fifty times over by different people, one feels assured that Ireland to a mass of persons suggests only two places, and that the conversation was not an intellectual one. At another time it is the following:—"Where have you been this year?" "To Holland." "Did you go to the Hague?" "Yes." "Did you see Paul Potter's bull?" "Yes." "Good morning."—Now, when different persons not in collusion have made exactly this same speech, one is apt to think that it is not men and women we are dealing with, but bees in a hive.

Even in the more important operations of life many of our acts are simply the result of habit, and excited in a reflex manner by a given stimulus; for example, a hard worked medical officer at a dispensary or hospital may prescribe cough mixture to a patient complaining of cough, and a diarrhoea mixture to another complaining of diarrhoea, without a shadow of thought. So automatic is the process that some years ago I sketched out a plan of an assistant-physician machine, whereby certain prescriptions should appear at a pigeon-hole according as the patient pronounced the words diarrhoea, cough, sickness, &c. It would be an instructive task for a physician to take each disease separately, and endeavour to try and discover what is known about it and its treatment, independently of any theories or any fictions of his own mind. Up to the present time I have never seen a single case of leucocythæmia of the lymphatic glands, or the spleen, or simple idiopathic anæmia, without the patients having been saturated by iodine, quinine, and iron; but no case is yet recorded of these remedies having done the slightest good. We shall, however, continue to give them, because they are "likely" remedies. They satisfy the mind of the doctor and patient, and that is enough. More than once, when writing on "scientific therapeutics," I have shewn that the greater the pretence to rational treatment the nearer was the approach to quackery. The best men in the present state of science are found to be content with facts. The true quack fills a column of a newspaper in praise of a remedy which purifies the blood, adds vitality to the system, and so on. In the legitimate ranks of the profession a scale might be formed according to the amount of "mind," or "rational method," introduced into the treatment. The more the "reason" the less the knowledge. It seems as if the human mind must always be satisfied; and therefore since the mass of persons are in ignorance of the mechanism of the body,

and have purely imaginary notions about disease, the shrewdest man (who is the charlatan) can best afford them satisfaction. A highly intelligent patient, aware that he can have no knowledge on the subject, has no fancy to satisfy. A modification of this exists throughout the profession ; so that it would be an instructive task to take each disease and its usual treatment, and endeavour to discover how much of what we say about it is the result of scientific research and how much a pure fiction of the mind. For instance, the value of alkalis in rheumatism rests upon the smallest possible foundation ; their only good seems to be to neutralise the idea of acid which saturates the doctor's mind directly he approaches his patient. Again, in obstruction of the bowel, I invariably hear one doctor ask another if he has used O'Beirne's long tube. I have not yet been informed of any case where the instrument was of any use ; but as it seems reasonable that a tube might reach what the finger could not, it is pleasant to see it lying about in the sick man's chamber. Its utility is quite another matter. Or, again, since all people who are ill are feeble, a very large number take quinine with iron. This medicine pleases both patient and doctor, as its use seems so rational ; but I have no hesitation in saying that a beneficial effect is seen in not more than one in twenty cases in which it is administered. In reading ancient history we take a part of it as true ; the other part as legendary, and framed by the human mind. In a book of medicine there is the same mixture of fact and fiction ; the difficulty is to separate and distinguish.

In making the preceding remarks I have only alluded to the line of investigation which must be taken in order to frame a more perfect system of psychology ; otherwise it would have been as well to have attempted some kind of definition of such terms as instinct, rational act, and habit. To have been able to have drawn a distinct line between these would probably have been to solve the problem which we are at work upon ; but at the present time, with our limited knowledge, we are able to assert that the usual and popular belief that all acts in man where consciousness is concerned are the operation of reason cannot be correct, nor in animals that there must be a like impelling force implanted in them as a separate power when they are performing similar acts unconsciously. These acts are so complex and so perfect that it is thought a divine hand, or some principle within

ruling over the organism, must be at work. Now a little consideration will tend to shew that much that is called instinct is the ordinary working of the animal machinery, and may be performed without any consciousness, or even voluntary effort, on the part of the creature to whom it belongs. How the organism is formed is, of course, another question; but the subject of instinct does not lie outside as a mental problem, but is in the domain of scientific inquiry. Those who are not physiologists are scarcely aware that the simple process of breathing results from a very complicated arrangement of parts brought into harmony by an overruling nerve-centre, just as all the intricate parts of a steam-engine are set to work, in order to drive a wheel, by the single turning of a handle. The movement of the chest, the expansion of the lungs, the opening of the larynx, are all actions occurring in unison. The respiratory centre is stimulated by the air acting on the superficial nerves, and the machine is set in motion. In the same way when we talk, we do not exercise any effort over particular parts, but merely set in motion a piece of machinery pre-arranged; a nerve-centre is stimulated which sets agoing the chest, larynx, throat, tongue, face, &c. If a person talks in his sleep or in delirium, there can be no process of a rational kind in operation, but the centre which rules over "talking" may set agoing the complex machinery on the slightest stimulus. When a child sucks, a very complex action is also taking place, the nerve-centre ruling over the process being stimulated through the lips, but the process is simply reflex. When, however, the young calf seeks its mother's teat, by apparently a voluntary effort or irresistible impulse, another act comes in, which is called instinct. Not that this always happens, for not unfrequently the calf has to be placed near the mother for some days, until sucking becomes simply a result of habit or education. So in the young chick just escaped from its shell, much has been written upon the wonderful instinct which makes it at once pick up its food; but it has scarcely been remembered, or perhaps known, that the movement of the head and opening the beak is a complex process set in action by a nerve-centre. The sight of the food stimulates the creature's nervous system to work, just as the sight of water stimulates the young duck to take the water; the swimming process, like that of pecking, is merely the action of a piece of mechanism. In this way the question of instinct is reduced to simpler terms for its solution, the

only subject for inquiry being—How is the reflex act brought into operation? When a man who, quite unconscious, is swallowing, or talking, or a child is sucking, or a chicken picking up its food, the processes will be found not very much unlike, seeing that they are all set in action by distinct nerve-centres which rule over them. The mode in which the mechanism of breathing or swallowing is pre-arranged is already known to the anatomist, just as he knows the arm has complexity of movements, and yet that these are strictly limited in number by the muscles being grouped together in action by the wonderful interlacing of nerves in the brachial plexus. If a ball were put into a man's hand who was scarcely sensible, and he squeezed it tight, he would be using muscles having the nicest adaptation for the object.

A further understanding of these questions will shew that just as the exposure to air will excite the respiratory act, so the sense of touch will set the whole process of sucking going in a new-born infant; the sense of sight may set the chick pecking for its food; and so indeed the intimacy of all objects with their surroundings is much greater and closer than is at first sight apparent. In fact, the animal is so intimately related to its surroundings that it could not exist without them. What is a jelly-fish when taken out of the water but a mass of albumen, the water being an essential part of its very existence? Take a creature of this kind and watch it drawing nutriment into it and digesting it. We call it an individual, and if of a larger size and higher type, it might have a consciousness and will, but even then it is not very evident how it differs from the human stomach, which appears to have a choice of certain articles of food and dislike of others. The floating stomach is probably no more independent of its surroundings, nor capable of having an existence without them, than the human stomach of living when taken away from its connections with the body. Let us look at the intimate union between the animal and the air in which he lives. Remove the latter, life departs from the earth; it is not simply that the animal breathes to live, but that the air constitutes as much a part of its organism as any of the fluids of its body; for exactly what the ureter is to the kidneys and the biliary duct to the liver, so is the bronchial tube to the lung; the difference being that the contents of the two former are within the body, and form an integral part of it; whereas the contents of the other tube—the air—belongs to the animal's surroundings. So that what is ex-

ternal to the animal is as much a part of its own being as its own organs and secretions. A line of thought in this direction, shewing how all the kingdoms of the earth—the mineral, vegetable, and animal—are intimately united, how, indeed, they melt the one into the other, will, no doubt, lead us towards solving many of the problems of interest which we have been discussing.*

There is also another very important issue which will result from a true physiological study of man, and that is the value which will accrue from the grouping together of persons after the manner of the old temperaments; so that we shall be able to associate more closely man's nature in all its intellectual and moral attributes with his physical formation. These temperaments, as originated by Hippocrates, were four in number, and the classification has been in use to this day. The division is rather pathological than physiological, and has for its object the determination of the particular diseases to which each class is liable. A pathological division of mankind is not what we require, especially as we should find that a classification founded on healthy or normal form would necessarily carry with it certain morbid tendencies. Thus the man whom the physician calls gouty is often a burly Englishman, possessed of a good physique, and having great activity of mind and body. He accordingly requires a designation appropriate to his general characteristics, and the physician may afterwards mark him as a man having proclivities to certain diseases. So, again, we say a person has a consumptive tendency, and that another is disposed to melancholia or mania; but these names, expressive of morbid peculiarities, should not be used for designating a healthy class of people. In a perfect grouping, not only should the medical man be able to recognize certain pathological tendencies, but the artist should discern the differences in form, and the psychologist in an equal manner the varieties of mind, taste and disposition. A true system of phrenology and physiognomy might well accord with the

* The grand idea pervading the scientific mind is the association or actual correlation of all the forces in nature, and that the same unalterable laws are in operation in the earth, and all that therein is. When Tyndall, in his admirable lecture, asserted this, it was naturally opposed by those who had other notions of terrestrial operations. This must be the case, when, for example, a distinguished divine can speak of a person's death as the result of Sin (meaning the devil), and afterwards speak of coal as having been given us by Providence (meaning God); asserting, that an Evil Spirit causes decay of the animal, and a Good Spirit decay of the plant.

doctor's view of temperament. A good artist can depict, not only the general character of the sitter, but his state of mind and feeling at the time he is drawn. The same student of nature would also probably know that there are general characteristics belonging to every person, and that there are certain curves and lines traceable through the face, body, and limbs, so that he might, upon being given one part of the body, complete the rest.* Physiognomists may have pretended to powers of diagnosis greater than they have possessed, but they have discerned the fact that certain forms of feature imply a peculiar formation of the skull, and therefore of the brain within, and in accordance with this also a particular fashioning of the body. For example, in all times it has been remarked that men with large noses have been men of action, men on whom dependence could be placed in case of emergency, and thus have made good generals; witness the resemblance between the faces of Julius Cæsar, the Duke of Wellington, Von Moltke, and Sir G. Wolseley. On the contrary, the straight Grecian nose has been associated with intellectual and artistic culture, and often with sentimentality and dreaminess. Along with these different features the form of the body differs, and often in a marked degree the hand, so that the latter has often been taken as a type of character. It has been observed, for example, that the large hand has accompanied independence of thought and action, whilst the smaller hand, with tapering fingers, has belonged to those families who for generations have performed no manual labour, and who belong to the richer and satisfied class. The ancients saw so much in the hand, and in the development of this member as man rose superior to other animals, that they asked themselves the question whether man was the most wise because he had a hand, or had a hand because he was most wise; now probably the development of the hand, as well as the bones of the skull which determine the shape of the nose, have a close relationship with the brain within, as we know that the limbs are ruled over by the central cranial ganglia, and these again by the central masses which surround them. Physiology already

* I know a young lady who takes the flowers of the heartsease, and finds in them, according to the markings on the petals, different expressions of faces. These are pasted in an album, and then the body of a gentleman or lady in different attitudes is drawn to complete the figure—the face, of course, suggesting the remainder.

shows an intermediate correspondence in form and power between the limbs and all other portions of the body. That the limb is an exponent of the anatomy and physiology of the whole body is clear from the zoologist using it as the basis of his classification.

The subject I have been touching upon is so large, that it is difficult to withstand a discursion into many other matters, but I must add that these few remarks have not been carried sufficiently far to afford any test of the condition of mind known as the unsound. I have spoken of the ordinary mortal man who is made by the circumstances around him, like many other animals, and cannot soar above them; the sanest man I apprehend is he who can make use of these circumstances, and arrange and order them for his purpose. On the other hand, a person who is totally unaffected by his surroundings, and lives in a world of his own creating, would be in common parlance insane. The first class of persons, and who in the best sense are scientific, are probably the most valuable persons of the community, especially if, as Buckle says, civilization means material advancement; but the others have a type of mind altogether different, and, in less degrees than can be called madness, their imaginations run riot, their thoughts soar high, their ideas flow quickly, they believe themselves possessed of powers which others have not, they say they "know" what others require to prove, they have missions, and can reform or at least enlighten the world. Such persons often constitute great poets, or artists; they possess creative power, and thus constitute for a time the leaders of public opinion. The sober-minded man, the man who can coolly survey and measure everything around him, calls such people mad, and yet amongst them have been found those of whom the world should be proud—those who have infused poetry, literature, and the arts into the masses of society. The mere unlikeness to the common-place mortals is sufficient often for the designation madness, and as Shelley says of another, "And he was mad, if madness 'tis to be unlike the world." In looking through the pages of authors who have written on insanity, we meet with names illustrating their subject, such as Mahomed, Swedenborg, Robert Hall, Dr. Johnson, Blake, Charles Lambe, and many others whom England is proud to have produced. Now, if this is so, I would ask—Has the time arrived in which we could adopt

any of those rules in the choice of marriages which can be followed in the breeding of animals, as is suggested in Lothair? "It is the first duty of the State to attend to the health and frame of the subject. The union of the races concerns the welfare of the commonwealth much too nearly to be entrusted to individual arrangement." The subject has been lately developed in one or two essays, and more especially in reference to the mixture of the insane element into human society. In reference to this it must be said, that at the present time we have not sufficient knowledge of temperaments, under what conditions they arise, and, in fact, how they are produced; nor do we know, when regarding certain temperaments, how the good and bad are intermingled, that is, how with what we call morbid tendencies there may not be important bodily and mental characteristics and activities of great value. One kind of person whom England is apt to produce some would purposely avoid as being liable to gout, with all its attendant evils; and yet though gouty, he is a vigorous, active, independent man. Another kind of person, whom we call consumptive, and which England is also especially apt to produce, would be avoided; and yet there is in him often a wonderful activity of mind and body. Then, again, if the person inclined to insanity is the one above all to be shunned in a marriage connection, it might turn out that we were losing some of the best blood of the country. It is no doubt fearful to think of a man or woman marrying with a strong taint of insanity, and bringing into the world a family of lunatics, but it does not follow that an infusion of the insane blood may not be desirable.* I think it might easily be shown that such infusion has given genius to a whole family; it has leavened the whole mass. There may be an intellectual element which in moderation is good, and in excess is none other than madness, in the same way that common sense may find its acme in an inactive dolt. It is this very case of the supposed value of getting rid of the insane element in society, that would make me hesitate before I offered any restrictions to marriage, or dared to dictate to my fellow-creatures as to the impropriety or otherwise of mixing certain temperaments. It may be, as I just now observed, that it is the insane element which imparts what we call genius to the human race, the true celestial fire; and

* I believe Dr. Maudsley has also expressed this opinion.

thus it is that the madman has been called inspired, and thought to have in him a touch of the divinity. I, for my part, if one can look at such a question from a personal point of view, sometimes feel when one has been engaged in pursuits of a scientific character, has been cultivating a cautious habit of mind, endeavouring to look at every subject all around, and avoiding speculating or even theorizing on any matter, for fear of a false issue, that it is an actual relief to meet with some one not so tied down, one who is a seer, who looks into the depths of things, and then pours forth a flood of brilliant ideas, with the most poetic fancy. My own feeling in going into an asylum is not that with which I enter a menagerie, or even a hospital, but I gaze on my fellow-creatures with awe, and not unfrequently with admiration. My feeling has sometimes been rather that of envy than pity, and I should have had no hesitation in parting, had it been possible, with part of one's own slow and prosaic nature for a portion of their confiding ecstasy. If there be an element of truth in what I have said, the time has not assuredly yet come when we can form any rules for the inter-marriage of our citizens, much less commence with the attempt to eliminate the class of persons of whom I have been speaking.

The main purpose of the present paper is to show that the study of the human mind in a purely scientific manner from observation, leads us to different conclusions from that which is arrived at by the older method founded on self-consciousness; the main result of the inquiry being that a large part of human actions are of the same kind which are observed in the lower animals, and may be called reflex, or the result of habit. It is no part of the scientific inquirer's business to ask whether his conclusions tally with any popular views on the subject, and to ask where they lead to, but should he desire it, knowing that every conclusion drawn from nature and fact cannot be opposed to any other fact, but only to some preconceived idea or fiction of the human mind, he can always frame as good a theory as any other person which shall be suitable to his idea of the world's government and history. He may say that the man thoroughly imbued with the spirit of nature sees the same laws prevailing in the solid earth, the sea, the plants, the animals, and himself; sees the universal harmony, and feels himself, in consequence, more closely bound to all the objects around him. In his sympathy with

every object in nature, as well as every living thing, he does not feel himself more debased than when he erects himself lord of the creation, and regards all objects below him as for his use and subject to his will. In mixing with his countrymen he feels how he has grown up under the same influences, and that all their minds have been formed in the same mould; and that other men, speaking another language, have been subjected to other but similar conditions; and that each race has its own characters stamped upon it. The reflection will make him more charitable and less conceited or vainglorious, and give him a little insight into what is meant by the brotherhood of nations. He can see that, as a necessary part of man's independence, he must have a strong feeling of individuality, and that this may lead him to be self-seeking, and to endeavour to supplant his neighbour by all those modes which constitute our principal crimes; but he will the more strongly feel that it is this very denying of self, and suppressing this powerful impulse, which constitutes the leading Christian virtue of "loving one another," and "doing to another as you would do to yourself." And if a higher flight be taken, the evolutionist sees nothing in his theory which militates against the survival of the mind of man, and its still further progress and development into a final consummation. The eternal truths can be found in man's nature and in the world in which he dwells, as Tyndall has lately shown in his eloquent address, and not only found by the scientific inquirer, but by the devout worshipper of nature, like Wordsworth, whom Tyndall quotes. The poet can use orthodox phraseology with the deepest religious feeling, and declare that as man was made after God's image, and that as man belongs intimately to the earth, so the same spirit pervades all.

"Come then, prophetic Spirit, that inspirest
The human Soul of universal earth."

"While my voice proclaims
How exquisite the individual mind
(And the progressive powers perhaps no less
Of the whole species) to the external world
Is fitted:—and how exquisitely, too
(Theme this but little heard of among men),
The external world is fitted to the mind."