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The Scotsman

Jan 22 1872

NEW BOOKS AND NEW EDITIONS.

Whatever may be the ultimate fate of the doctrine of evolution, even its opponents must grant that to its influence is mainly due the rapid strides that have of late years been made in our knowledge of the phenomena of life. Apart altogether from the general question of its claim to be considered *the* true theory, such a result might have been anticipated from the nature of the theory itself, as contrasted with the rival hypothesis of "intermittent creative fiats." The latter, by explaining anything and everything equally well, which simply means giving no explanation at all, and being by its very nature incapable either of scientific proof or logical contradiction, holds out no incentive to the human mind to continue its researches; while the other, claiming as it does to explain—that is, rationally to account for—most of the phenomena of life, and standing or falling according to its ability to make this claim good with regard to facts as they arise, holds out every inducement both to friends and foes to accumulate these. This is borne out by the fact that since the publication of the "Origin of Species," when the doctrine of evolution may be said to have first attracted scientific attention, it would be difficult to name a single important contribution to our biological knowledge which has not emanated from a source more or less *evolutionary*. No better example of this tendency could be found than in Mr Darwin, who, while a leader of evolutionists, has likewise proved himself the foremost of investigators, and any new work from his pen is now eagerly welcomed as likely to prove a solid contribution to the stock of human knowledge. A perusal of his latest work, *The Expression of the Emotions in Man and Animals* (1) will fully bear out this expectation. It exhibits the same brilliant power of generalisation, conjoined with unwearied industry in the collection of facts which has characterised all his works, and which has given them such a charm. The material with which he works in this volume is far from recondite; indeed most of the facts with which the book teems are such as come under our observation daily, but these are so skilfully manipulated, that like the shapeless bits of glass in the kaleidoscope, they assume in the reader's mind the most unexpected forms: what appeared meaningless when isolated, is seen to be full of meaning when properly connected, and a whole chaos of facts are reduced to something like order under the government of a few fundamental principles. The expression of the emotions is a subject that has received but scant attention hitherto, by far the most important book on the subject until the present being that on "The Anatomy of Expression," by Sir Charles Bell, a licentiate of the Edinburgh College of Surgeons, published at the beginning of the century. That was, as far as it went, a satisfactory work, and throughout his book Mr Darwin acknowledges his obligations to it; but Sir C. Bell, as a firm believer in the separate creation of man, had no difficulty in believing that many of our facial muscles were "purely instrumental in expression," or were "a special provision" for this sole object. The claims of the anthropoid apes to be considered as even our most distant relations had scarcely yet been heard of, or probably more attention would have been paid to their anatomy, when it would have been discovered, as it has been since, that the human face possesses no muscles not to be found in the faces of these apes, and as Darwin remarks, "this simple fact renders it very improbable that these muscles in our case serve exclusively for expression, for no one, I presume, would be inclined to admit that monkeys have been endowed with special muscles solely for exhibiting their hideous grimaces." Mr Darwin, on the other hand, treats the subject as an evolutionist, recognising the lower animals as important witnesses in elucidating the origin of the various movements of expression.

"With mankind," he says, "some expressions, such as the bristling of the hair under the influence of extreme terror, or the uncovering of the teeth under that of furious rage, can hardly be understood except on the belief that man once existed in a much lower and animal-like condition. The community of certain expressions in distinct though allied species, as in the movements of the same facial muscles during laughter by man and by various monkeys, is rendered somewhat more intelligible if we believe in their descent from a common progenitor."

In endeavouring to discover what are the movements which may be regarded as really expressive of certain states of the mind, and so to avoid all those of a merely conventional character, Mr Darwin has paid special attention to expression in infants, the insane, the different races, and especially the uncivilised races of man; works of art—but here he confesses to have been little benefitted; and, as before mentioned, the lower animals. In his mode of obtaining information regarding the various races of man, we have a good illustration of the author's characteristic energy in collecting facts. He tells us that he prepared a circular containing sixteen queries bearing on expressive movements; these were printed and forwarded to correspondents all over the world, many of them missionaries labouring among the most savage and degraded, and, at the same time, most distinct races of mankind, and the answers which he has received form in themselves a most valuable contribution on the subject, and one of which he makes good use throughout his work. From all the facts which he has thus been able to observe or collect, Mr Darwin adduces three principles, "which appear to him to account for most of the expressions and gestures involuntarily used by man and the lower animals under the influence of various emotions and sensations." These he briefly states in the three opening chapters, and after a first perusal of the work the reader would do well, if he would appreciate the full force of these principles, to re-peruse the opening chapters, which, as they contain the results deduced from the facts contained in the others, would perhaps have been as appropriately placed at the end of the book. The author, after premising that expression is not confined merely to the action of the facial muscles, but that it includes movements or changes in any part of the body, such as the wagging of a dog's tail or the shrugging of a man's shoulders, states his first principle as that of "serviceable associated habits." "Certain complex actions are of direct or indirect service under certain states of the mind, in order to relieve or gratify certain sensations, desires, &c.; and whenever the same state of mind is induced, however feebly, there is a tendency through the force of habit and association for the same movements to be performed, though they may not then be of the least use." Thus, in trying to discern a distant object we are in the habit of raising our eyebrows, in order to get our eyes more widely opened; and in trying to remember a thing, we likewise, and apparently from the force of habit and association, raise our eyebrows as if to see it. So, too, in describing a horrid sight, people often shut their eyes momentarily and firmly as if to keep the disagreeable thing away from their actual view. Many reflex actions—that is, actions performed independently of our will, such as sneezing, coughing, and winking when the eye is touched—were, Mr Darwin believes, in some cases at least, at first consciously performed, but have become, through habit and association, reflex. That an action which at one time required a distinct effort of the will for its each performance, should at last come to be performed independently of it, is certainly remarkable, but this wonder is much increased when we are told that the will, which at first could alone produce the act, is at last efficient only for its prevention. It is at least a well-known fact that the conscious wish to perform a reflex action often stops its performance, though the proper sensory nerve be stimulated. Thus, to quote an example from our author—

"Many years ago I laid a small wager with a dozen young men that they would not sneeze if they took snuff, although they all declared that they invariably did so. Accordingly they all took a pinch, but from wishing much to succeed, not one sneezed, although their eyes watered, and all without exception had to pay me the wager."

Some of the most striking examples of the first principles are taken from the lower animals, and in the case which we are about to give many of our readers will probably have observed the fact for themselves, although they may not have hitherto even guessed at their meaning.

"Kittens, puppies, young pigs, and probably many other young animals alternately push with their forefeet against the mammary glands of their mother, to excite a freer secretion of milk, or to make it flow. Now, it is very common with young cats, and not at all rare with old cats, when comfortably lying on a warm shawl or other soft substance, to pound it quietly and alternately with their fore-feet, their toes being spread out and claws slightly protruded, precisely as when sucking their mother. That it is the same movement is clearly shown by their often at the same time taking a bit of the shawl into their mouth and sucking it, generally closing their eyes and purring from delight. This curious movement is commonly excited only in association with the sensation of a warm surface; but I have seen an old cat, when pleased by having its back scratched, pounding the air with its feet in the same manner, so that this action has almost become the expression of a pleasurable sensation."

It is in his second principle, that of Antithesis, that Mr Darwin's wonderful faculty for generalization is most conspicuously seen. The other principles have been to a certain extent recognised by other writers as instrumental in producing expression, though not investigated to any length, but this principle of Antithesis we owe entirely to Mr Darwin, and after he has unfolded it the thing looks so patent and plausible that one is only surprised that it was not suggested long ago. He thus states it:—

"Certain states of the mind lead to certain habitual actions, which are of service as under our first principle.

(1) The Expression of the Emotions in Man and Animals. By Chas. Darwin, M.A., F.R.S. London: John Murray.

Now when a directly opposite state of mind is induced, then there is a strong and involuntary tendency to the performance of movements of a directly opposite nature, though these are of no use; and such movements are in some cases highly expressive. One of the best examples of Antithesis is to be found in the expressive movements of a dog according as it approaches in a friendly or in a hostile mood. Should a supposed stranger approach, it at once assumes a fighting aspect. It walks upright and stiffly, with its head raised, tail erect and rigid, the hair along its back and neck bristling, ears pricked and directed forwards, and its eyes staring. These movements indicative of the dog's intention to attack an enemy are intelligible on the first principle. Should the dog, however, discover that the supposed stranger is its master, what a total change comes over its bearing! Instead of walking upright," says Mr Darwin, "the body sinks downwards, or even crouches, and is thrown into flexuous movements; his tail, instead of being held stiff and upright, is lowered and wagged from side to side, his hair instantly becomes smooth, his ears are depressed and drawn backwards, but not closely to the head, and his lips hang loosely. From the drawing back of the ears, the eyelids become elongated, and the eyes no longer appear round and staring. Not one of the above-mentioned movements, so clearly expressive of affection, are of the least direct service to the animal. They are explicable, as far as I can see, solely from being in complete opposition or antithesis to the attitude and movements which, from intelligible causes, are assumed when a dog intends to fight, and which, consequently, are expressive of anger."

An example similar to the above is afforded by the cat, but in this case the expressive movements are strangely reversed, the posture of an angry cat being not unlike that of a friendly dog, and *vice versa*. Actions so minutely antithetical as these, of no direct service to the creatures themselves, and that it cannot be supposed could have been assumed by them from a conscious wish to intimate that they had passed into an opposite frame of mind, seem to shut us up to the adoption of Mr Darwin's principle, that movements habitually associated with a certain state of mind necessitate directly opposite movements in a directly opposite state. The third principle is that of "the direct action of the nervous system," and deals with those expressive movements and changes which take place independently of our will, and in part also of habit. Under this head fall the phenomena of trembling, which is neither serviceable to us nor preventible by any exertion of the will; loss of colour in the hair, which has occasionally been observed after great grief or trouble; standing of the hair on end, blushing, &c. Actions which come under this principle are, however, often combined with others which depend on the first or second principle. These, our author considers, explain so many of our expressive movements that he believes we may hope hereafter to see all thus explained, or by closely analogous principles. They have been arrived at after close observation of the emotional expressions in man and the lower animals extending over more than thirty years, the author having made notes on the subject so early as 1838, and the bulk of those facts he has embodied in his present work. Of the part which deals with expression among the lower animals the reader will naturally turn to the author's observations on monkeys, either hoping to find additional proofs of our consanguinity, or fearing a further development of that "odious approximation" to ourselves, according as his sympathies go with or against evolution, and probably in neither case will he be disappointed. Mr Darwin begins somewhat ominously with the remark "that some of the expressive actions of monkeys are interesting from being closely analogous to those of men," and we cull the following from a host of illustrations which he gives in support of this:—Young chimpanzees and orangs, when tickled under the arm-pits, utter a decided chuckling or laughing sound, while their eyes usually sparkle. That this is very closely allied, if not identical with human laughter, is seen from the corners of the mouth being drawn backward, and by the wrinkling of the lower eyelids as in man. Many species of monkeys exhibit their grief by weeping, although this is not confined to them, as the Indian elephant is known to weep under similar circumstances. They all redden from passion, and grow pale and tremble through fear, just as we do. They show sulkiness in a way which is characteristic of children all over the world, namely, by protrusion of the lips, or pouting, as it is called. In performing such an action as the threading of a needle, requiring great precision, we are in the habit of firmly compressing our lips, probably to exclude the disturbing element of breathing; an expression similar to this Mr Darwin observed in a young orang, "the poor little creature," he says, "was sick, and was amusing itself by trying to kill the flies on the window panes with its knuckles; this was difficult, as the flies buzzed about, and at each attempt, the lips were firmly compressed, and at the same time slightly protruded." As an example of the mode in which anthropoid apes show an affectionate regard for each other, we are told how two chimpanzees, rather older than those usually imported into this country, behaved on being first brought together. "They sat opposite, touching each other with their much-protruded lips, and the one put his hand on the shoulder of the other. They then mutually folded each other in their arms. Afterwards they stood up, each with an arm on the shoulder of the other, lifted up their heads, opened their mouths, and screamed with delight." This certainly bears on the face of it what Charles Lamb would probably have characterised as "an important correspondency" to that action of poor humanity commonly known as "falling on each other's necks and weeping." True, the apes shed no tears, they only screamed, but as Mr Darwin shows in another place, even our own infants can only express their feelings at first by

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tearless screaming, as tears do not appear to be secreted at least in sufficient quantity to be perceptible for weeks, and in some cases even months after the birth of the child. To his opponents there is, however, one little "ounce of sweet in this pound of bitter," which the author for the present reluctantly surrenders. Monkeys either can't, or what is nearly as bad for Mr Darwin's purpose, won't frown. Sir Charles Bell considered the frowning muscles which produce the knitting of the eye-brows the most remarkable of the muscles peculiar as he thought to man. He looked upon their action as unaccountably but irresistibly conveying the idea of mind and sentiment. As we now know, he was wrong in supposing them peculiar to humanity, they being common also to the anthropoid apes, and Mr Darwin, aware of this, has with the aid of intelligent keepers in the Zoological Gardens, stirred these creatures into the frowning state of mind, but all to no purpose. They have been brought suddenly from the dark into the light, which rarely fails to knit the human brow, but despite their possession of frowning muscles, they "merely blinked and winked their eyes." Once, indeed, he thought he did perceive what he calls "a slight frown" but as it has never since been seen, probably the wish in this solitary instance may have quite unconsciously assisted the thought. Passing to the consideration of the expressions in man--and this occupies the larger part of the volume—he arranges our emotions in groups, such as the sorrowful, the joyful, &c., and describes with considerable detail the muscles by which these emotions are naturally expressed, and how they do it, while he attempts to explain the origin of those movements in accordance with the three principles already referred to. Upon the latter branch of the subject, confessedly obscure, and scarcely touched upon by previous writers, Mr Darwin throws quite a flood of light. He at least gives good reasons for doubting whether any of our muscles "have been developed or even exclusively modified for the sole purpose of expression," while for most of them he enables us to perceive a use quite apart from it. To take an example: A fundamental element in some of our most important expressions is to be found in the contraction of the orbicular muscles of the eyelids. This movement plays an important part in all facial expressions of joy or sorrow, being seen most intensely in the screaming of infants or in loud laughter, when those muscles so contract as to shut the eyes completely; nor does their influence end here, as upon their contraction mainly depends the other expressive movements of the face indicative of great joy or sorrow. What use, other than that of expression, can be assigned for this highly expressive movement of the orbicular muscles? During any violent respiratory exertion, such as occurs in screaming, loud laughter or shouting, there is a sudden rush of blood to the head, the arteries become gorged and distended, visible in the heightened colour of the face; such distension of the minute arteries of the eye, if not in some way counteracted, would prove highly injurious to that delicate organ; indeed this has been shown to be the case by actual experiment. The danger, however, is obviated by the involuntary contraction of the orbicular muscles of the eyelids, by which the dilatation of the blood-vessels is at least limited, if not entirely removed. Thus we may conclude with Mr Darwin, "that the closing of the eyes during the screaming of children is an action full of meaning and of real service." By means of the answers received to his queries from correspondents all over the world, Mr Darwin has been able to show that it is at least extremely probable that all the chief expressions exhibited by man are the same throughout the world. Among such the reader will probably be astonished to find the expressive movement known as "shrugging the shoulders," indicating inability either to do or to prevent something being done. When this gesture is complete, the elbows are bent inwards, the open hands are raised and turned outwards, and the fingers separated. This action is somewhat rare with us, and has generally been considered as an importation from France, where it is almost universal. Darwin's statistics, however, go to show that it is practised in a more or less complete form by the Bengalees and the Danghars, by the wild Malays inhabiting the interior of Malacca, and even by the natives of Australia, and thus it may be looked on as a gesture natural to the human race. This "shrugging of the shoulders" is also one of the best examples of Mr Darwin's principle of antithesis. None of the movements which go to form it are of the least service, but they are found in every detail to form a complete antithesis to the gestures assumed by a man indignantly defiant—a state of mind directly opposite to that helpless apologetic condition which finds its expression in a "shrug of the shoulders." From what has been already said the reader can

[illegible] interesting problems of expression. When we say that the work itself is deeply interesting, the reader must not by any means conclude that it is a species of light reading—none of Mr Darwin's works are. In dealing, for example, with the muscles of the face there is much that is as dry as it is necessary; but there is nothing in the book the understanding of which requires previous technical training, or, indeed, anything more than a little consecutive attention, and this surmounted, the reward is immediate in the enhanced interest given to the facts. Nor is the work by any means to be regarded as a piece of special pleading in behalf either of Evolutionism or Darwinism; indeed the latter is almost ignored, simply because it has little or nothing to do with the subject in hand. The book ought to be regarded as a work of natural history written on that broader theory of life—evolution; but should the reader prefer the narrower basis, there is nothing to hinder him from dispensing with the arguments drawn from the lower animals, and from finding sufficient proof left to justify him in accepting Mr Darwin's three fundamental principles of expression. The work is illustrated by numerous drawings and photographs, which by fixing such fleeting things as a smile, a sneer, or a frown, greatly assist in elucidating the text.

swan, and the sparrow—erect or ruffle their feathers. The author then treats of the noises made by animals, birds, and reptiles, in order to terrify their enemies. With his remarks upon these subjects the general reader will generally assent, but scarcely so with his efforts to prove his favourite topic of evolution by an explanation of the origin of the rattle of the rattlesnake. Many snakes when angry vibrate their tails. In the lachesis, an allied snake to the rattlesnake, the tail ends in a single large lancet-shaped point or scale "Now if we suppose that the end of the tail of some ancient American species was enlarged, and was covered by a single large scale, this could hardly have been cast off at the successive moults. In this case it would have been permanently retained, and at each period of growth, as the snake grew larger, a new scale larger than the last would have been formed above it, and would have been likewise retained. The foundation for the development of a rattle would thus have been laid, and it would have been habitually used if the species, like so many others, vibrated its tail whenever it was irritated. That the rattle has since been specially developed to serve as an efficient sound-producing instrument there can hardly be a doubt, for even the vertebræ included within the extremity of the tail have been altered in shape and cohere." Had an opponent of Mr. Darwin's theory written this as a skit upon the theory of evolution, he would have been met with a chorus of indignation from the advocates of that theory. In fact, a more preposterous notion was never broached. A snake finds that a number of its cast-off scales adhering to its tail make a noise when it vibrates that tail, and so strike terror into his enemy; he accordingly sets to to improve the rattle which nature has given him, and accordingly, after generations of thinking, wishing, and selecting, the descendant snake manages to enlarge the vertebræ of his tail, to make them into a rattle, and to dispense with the exterior bunch of scales which had served his ancestors for a makeshift during the process of evolution. We should have thought that the new rattle with the enlarged vertebræ would have been far more probably formed by some rival snake to the original with the rattle of scales. The rival, terrified at the sound of this rattle, had persistently tried to do likewise. Nature not having furnished him with the large scale suitable for the purpose, he had set to work, and after many generations of descendants, all bound upon carrying out the ancestral idea, and evolving and selecting, the rattle with the vertebræ was achieved, and the original snakes with the cast-off scale rattles committed suicide, and disappeared off the face of the earth from sheer chagrin. This appears to us to be greatly the most probable version, and we should advise Mr. Darwin to use it, instead of the present palpably defective one, in his next edition.

Turning to the gestures and expressions of emotion among the human race, considerable space is devoted to weeping. Infants do not weep—that is, do not shed tears—until from 100 to 130 days old, although the glands of the eye are capable of secreting tears, as is proved by a copious outflow in case of any injury or irritation to the eye.

"It would appear as if the lacrymal glands required some practice in the individual before they are easily excited into action, in somewhat the same manner as various inherited consensual movements and tastes require some exercise before they are fixed and perfected. This is all the more likely with a habit like weeping, which must have been acquired since the period when man branched off from the common progenitor of the genus Homo and of the non-weeping anthropomorphous apes."

Civilised men do not weep from pain, because to do so would be thought unmanly; savages, however, and insane persons weep freely and copiously from very slight causes. Sobbing appears peculiar to the human species, although all the lower animals scream or cry from pain, and some shed tears. Infants, however, do not sob.

"The respiratory movements are partly voluntary and partly involuntary, and I apprehend that sobbing is at least in part due to children having some power to command after early infancy their vocal organs and to stop their screams, but from having less power over their respiratory muscles, these continue for a time to act in an involuntary or spasmodic manner, after having been brought into violent action."

Mr. Darwin agrees with Sir C. Bell that the eyes are closed by infants when screaming, and by adults when coughing, sneezing, or other violent exertion, because the blood is by such action driven so violently into the head that the eyes might suffer severe injury were not the eyelids closed firmly upon it, so as to strengthen and support it. Mr. Darwin points out that weeping is generally accompanied by tight pressure of the eyelids, and considers that the abundant production of tears is greatly due to this pressure upon the glands. It may have some such effect, but when we see the number of people who cry copiously at an affecting spectacle at a theatre, or while reading a touching story, and notice the tears streaming down while the eye is open and fixed either upon the stage or the pages of the book, we feel that there cannot be much force in this theory. The emotions of grief, joy, and anger are gone into with equal minuteness, and the action of the different muscles brought into play clearly explained. In his chapter on "Sneering and Defiance," again, Mr. Darwin makes a great deal of the fact that dogs show their canine teeth when snarling at each other, and that men occasionally do the same. It is a disappointment of course to find that the monkey tribe do not snarl and show their canine teeth; still he looks upon it evidently as a proof that man is a descendant of the dog. Now, in fact, a man seldom does show his canine teeth when sneering or defiant with another man. Most of us have seen quarrels in our times, and will we think agree that the drawing up of a lip to show the canine teeth upon one or both sides of the mouth is rare in the extreme. When it does take place it is as a sneer, and then it accompanies a curve or distension of one of the nostrils, and it would be certainly drawing less upon our credulity to say that the muscles of the nostril and lip are mutually affected than to urge that the action is a proof of our dog-descent. It is a great pity that a work so full of observation, of research, and of thought as the one before us should be marred by such crotchets as those we have mentioned. However, they are few and far between, and detract but slightly from the real merit and utility of the work.

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"Kittens, puppies, young pigs, and probably many other young animals alternately push with their forefeet against the mammary glands of their mother, to excite a freer secretion of milk, or to make it flow. Now, it is very common with young cats, and not at all rare with old cats, when comfortably lying on a warm shawl or other soft substance, to pound it quietly and alternately with their fore-feet, their toes being spread out and claws slightly protruded, precisely as when sucking their mother. That it is the same movement is clearly shown by their often at the same time taking a bit of the shawl into their mouth and sucking it, generally closing their eyes and purring from delight. This curious movement is commonly excited only in association with the sensation of a warm surface; but I have seen an old cat, when pleased by having its back scratched, pounding the air with its feet in the same manner, so that this action has almost become the expression of a pleasurable sensation."

It is in his second principle, that of Antithesis, that Mr Darwin's wonderful faculty for generalization is most conspicuously seen. The other principles have been to a certain extent recognised by other writers as instrumental in producing expression, though not investigated to any length, but this principle of Antithesis we owe entirely to Mr Darwin, and after he has unfolded it the thing looks so patent and plausible that one is only surprised that it was not suggested long ago. He thus states it:—

"Certain states of the mind lead to certain habitual actions, which are of service as under our first principle. Now when a directly opposite state of mind is induced, then there is a strong and involuntary tendency to the performance of movements of a directly opposite nature, though these are of no use; and such movements are in some cases highly expressive. One of the best examples of Antithesis is to be found in the expressive movements of a dog according as it approaches in a friendly or in a hostile mood. Should a supposed stranger approach, it at once assumes a fighting aspect. It walks upright and stiffly, with its head raised, tail erect and rigid, the hair along its back and neck bristling, ears pricked and directed forwards, and its eyes staring. These movements indicative of the dog's intention to attack an enemy are intelligible on the first principle. Should the dog, however, discover that the supposed stranger is its master, what a total change comes over its bearing! Instead of walking upright," says Mr Darwin, "the body sinks downwards, or even crouches, and is thrown into flexuous movements; his tail, instead of being held stiff and upright, is lowered and wagged from side to side, his hair instantly becomes smooth, his ears are depressed and drawn backwards, but not closely to the head, and his lips hang loosely. From the drawing back of the ears, the eyelids become elongated, and the eyes no longer appear round and staring. Not one of the above-mentioned movements, so clearly expressive of affection, are of the least direct service to the animal. They are explicable, as far as I can see, solely from being in complete opposition or antithesis to the attitude and movements which, from intelligible causes, are assumed when a dog intends to fight, and which, consequently, are expressive of anger."

An example similar to the above is afforded by the cat, but in this case the expressive movements are strangely reversed, the posture of an angry cat being not unlike that of a friendly dog, and *vice versa*. Actions so minutely antithetical as these, of no direct service to the creatures themselves, and that it cannot be supposed could have been assumed by them from a conscious wish to intimate that they had passed into an opposite frame of mind, seem to shut us up to the adoption of Mr Darwin's principle, that movements habitually associated with a certain state of mind necessitate directly opposite movements in a directly opposite state. The third principle is that of "the direct action of the nervous system," and deals with those expressive movements and changes which take place independently of our will, and in part also of habit. Under this head fall the phenomena of trembling, which is neither serviceable to us nor preventible by any exertion of the will; loss of colour in the hair, which has occasionally been observed after great grief or trouble; standing of the hair on end, blushing, &c. Actions which come under this principle are, however, often combined with others which depend on the first or second principle. These, our author considers, explain so many of our expressive movements that he believes we may hope hereafter to see all thus explained, or by closely analogous principles. They have been arrived at after close observation of the emotional expressions in man and the lower animals extending over more than thirty years, the author having made notes on the subject so early as 1838, and the bulk of those facts he has embodied in his present work. Of the part which deals with expression among the lower animals the reader will naturally turn to the author's observations on monkeys, either hoping to find additional proofs of our consanguinity, or fearing a further development of that "odious approximation" to ourselves, according as his sympathies go with or against evolution, and probably in neither case will he be disappointed. Mr Darwin begins somewhat ominously with the remark "that some of the expressive actions of monkeys are interesting from being closely analogous to those of men," and we cull the following from a host of illustrations which he gives in support of this:—Young chimpanzees and orangs, when tickled under the arm-pits, utter a decided chuckling or laughing sound, while their eyes usually sparkle. That this is very closely allied, if not identical with human laughter, is seen from the corners of the mouth being drawn backward, and by the wrinkling of the lower eyelids as in man. Many species of monkeys exhibit their grief by weeping, although this is not confined to them, as the Indian elephant is known to weep under similar circumstances. They all redden from passion, and grow pale and tremble through fear, just as we do. They show sulkiness in a way which is characteristic of children all over the world, namely, by protrusion of the lips, or pouting, as it is called. In performing such an action as the threading of a needle, requiring great precision, we are in the habit of firmly compressing our lips, probably to exclude the disturbing element of breathing; an expression similar to this Mr Darwin observed in a young orang, "the poor little creature," he says, "was sick, and was amusing itself by trying to kill the flies on the window panes with its knuckles; this was difficult, as the flies buzzed about, and at each attempt the lips were firmly compressed, and at the same time slightly protruded." As an example of the mode in which anthropoid apes show an affectionate regard for each other, we are told how two chimpanzees, rather older than those usually imported into this country, behaved on being first brought together. "They sat opposite, touching each other with their much-protruded lips, and the one put his hand on the shoulder of the other. They then mutually folded each other in their arms. Afterwards they stood up, each with an arm on the shoulder of the other, lifted up their heads, opened their mouths, and screamed with delight." This certainly bears on the face of it what Charles Lamb would probably have characterised as "an important correspondency" to that action of poor humanity commonly known as "falling on each other's necks and weeping." True, the apes shed no tears, they only screamed, but as Mr Darwin shows in another place, even our own infants can only express their feelings at first by

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served, at least in sufficient quantity to be perceptible for weeks, and in some cases even months after the birth of the child. To his opponents there is, however, one little "ounce of sweet in this pound of bitter," which the author for the present reluctantly surrenders. Monkeys either can't, or what is nearly as bad for Mr Darwin's purpose, won't frown. Sir Charles Bell considered the frowning muscles which produce the knitting of the eye-brows the most remarkable of the muscles peculiar as he thought to man. He looked upon their action as unaccountably but irresistibly conveying the idea of mind and sentiment. As we now know, he was wrong in supposing them peculiar to humanity, they being common also to the anthropoid apes, and Mr Darwin, aware of this, has with the aid of intelligent keepers in the Zoological Gardens, stirred these creatures into the frowning state of mind, but all to no purpose. They have been brought suddenly from the dark into the light, which rarely fails to knit the human brow, but despite their possession of frowning muscles, they "merely blinked and winked their eyes." Once, indeed, he thought he did perceive what he calls "a slight frown" but as it has never since been seen, probably the wish in this solitary instance may have quite unconsciously assisted the thought. Passing to the consideration of the expressions in man—and this occupies the larger part of the volume—he arranges our emotions in groups, such as the sorrowful, the joyful, &c., and describes with considerable detail the muscles by which these emotions are naturally expressed, and how they do it, while he attempts to explain the origin of those movements in accordance with the three principles already referred to. Upon the latter branch of the subject, confessedly obscure, and scarcely touched upon by previous writers, Mr Darwin throws quite a flood of light. He at length gives good reasons for doubting whether any of our muscles "have been developed or even exclusively modified for the sole purpose of expression," while for most of them he enables us to perceive a use quite apart from it. To take an example: A fundamental element in some of our most important expressions is to be found in the contraction of the orbicular muscles of the eyelids. This movement plays an important part in all facial expressions of joy or sorrow, being seen most intensely in the screaming of infants or in loud laughter, when these muscles so contract as to shut the eyes completely; nor does their influence end here, as upon their contraction mainly depends the other expressive movements of the features of great joy or sorrow. What use, other than that of expression, can be assigned for this highly expressive movement of the orbicular muscles? During any violent respiratory exertion, such as occurs in screaming, loud laughter or shouting, there is a sudden rush of blood to the head, the arteries become gorged and distended, visible in the heightened colour of the face; such distension of the minute arteries of the eye, if not in some way counteracted, would prove highly injurious to that delicate organ; indeed this has been shown to be the case by actual experiment. The danger, however, is obviated by the involuntary contraction of the orbicular muscles of the eyelids, by which the dilatation of the blood-vessels is at least limited, if not entirely removed. Thus we may conclude with Mr Darwin, "that the closing of the eyes during the screaming of children is an action full of meaning and of real service." By means of the answers received to his queries from correspondents all over the world, Mr Darwin has been able to show that it is at least extremely probable that all the chief expressions exhibited by man are the same throughout the world. Among such the reader will probably be astonished to find the expressive movement known as "shrugging the shoulders," indicating inability either to do or to prevent something being done. When this gesture is complete, the elbows are bent inwards, the open hands are raised and turned outwards, and the fingers separated. This action is somewhat rare with us, and has generally been considered as an importation from France, where it is almost universal. Darwin's statistics, however, go to show that it is practised in a more or less complete form by the Bengalees and the Danghars, by the wild Malays inhabiting the interior of Malacca, and even by the natives of Australia, and thus it may be looked on as a gesture natural to the human race. This "shrugging of the shoulders" is also one of the best examples of Mr Darwin's principle of antithesis. None of the movements which go to form it are of the least service, but they are found in every detail to form a complete antithesis to the gestures assumed by a man indignantly defiant—a state of mind directly opposite to that helpless apologetic condition which finds its expression in a "shrug of the shoulders." From what has been already said the reader can [illegible] expression. When we say that the work itself is deeply interesting, the reader must not by any means conclude that it is a species of light reading—none of Mr Darwin's works are. In dealing, for example, with the muscles of the face there is much that is as dry as it is necessary; but there is nothing in the book the understanding of which requires previous technical training, or, indeed, anything more than a little consecutive attention, and this surmounted, the reward is immediate in the enhanced interest given to the facts. Nor is the work by any means to be regarded as a piece of special pleading in behalf either of Evolutionism or Darwinism, indeed the latter is almost ignored, simply because it has little or nothing to do with the subject in hand. The book ought to be regarded as a work of natural history written on that broader theory of life—evolution; but should the reader prefer the narrower basis, there is nothing to hinder him from dispensing with the arguments drawn from the lower animals, and from finding sufficient proof left to justify him in accepting Mr Darwin's three fundamental principles of expression. The work is illustrated by numerous drawings and photographs, which by

NEW BOOKS AND NEW EDITIONS.

Whatever may be the ultimate fate of the doctrine of evolution, even its opponents must grant that to its influence is mainly due the rapid strides that have of late years been made in our knowledge of the phenomena of life. Apart altogether from the general question of its claim to be considered *the* true theory, such a result might have been anticipated from the nature of the theory itself, as contrasted with the rival hypothesis of "intermittent creative fiats." The latter, by explaining anything and everything equally well, which simply means giving no explanation at all, and being by its very nature incapable either of scientific proof or logical contradiction, holds out no incentive to the human mind to continue its researches; while the other, claiming as it does to explain—that is, rationally to account for—most of the phenomena of life, and standing or falling according to its ability to make this claim good with regard to facts as they arise, holds out every inducement both to friends and foes to accumulate these. This is borne out by the fact that since the publication of the "Origin of Species," when the doctrine of evolution may be said to have first attracted scientific attention, it would be difficult to name a single important contribution to our biological knowledge which has not emanated from a source more or less *evolutionary*. No better example of this tendency could be found than in Mr Darwin, who, while a leader of evolutionists, has likewise proved himself the foremost of investigators, and any new work from his pen is now eagerly welcomed as likely to prove a solid contribution to the stock of human knowledge. A perusal of his latest work, *The Expression of the Emotions in Man and Animals* (1) will fully bear out this expectation. It exhibits the same brilliant power of generalisation, conjoined with unwearied industry in the collection of facts which has characterised all his works, and which has given them such a charm. The material with which he works in this volume is far from recondite; indeed most of the facts with which the book teems are such as come under our observation daily, but these are so skilfully manipulated, that like the shapeless bits of glass in the kaleidoscope, they assume in the reader's mind the most unexpected forms: what appeared meaningless when isolated, is seen to be full of meaning when properly connected, and a whole chaos of facts are reduced to something like order under the government of a few fundamental principles. The expression of the emotions is a subject that has received but scant attention hitherto, by far the most important book on the subject until the present being that on "The Anatomy of Expression," by Sir Charles Bell, a licentiate of the Edinburgh College of Surgeons, published at the beginning of the century. That was, as far as it went, a satisfactory work, and throughout his book Mr Darwin acknowledges his obligations to it; but Sir C. Bell, as a firm believer in the separate creation of man, had no difficulty in believing that many of our facial muscles were "purely instrumental in expression," or were "a special provision" for this sole object. The claims of the anthropoid apes to be considered as even our most distant relations had scarcely yet been heard of, or probably more attention would have been paid to their anatomy, when it would have been discovered, as it has been since, that the human face possesses no muscles not to be found in the faces of these apes, and as Darwin remarks, "this simple fact renders it very improbable that these muscles in our case serve exclusively for expression, for no one, I presume, would be inclined to admit that monkeys have been endowed with special muscles solely for exhibiting their hideous grimaces." Mr Darwin, on the other hand, treats the subject as an evolutionist, recognising the lower animals as important witnesses in elucidating the origin of the various movements of expression.

"With mankind," he says, "some expressions, such as the bristling of the hair under the influence of extreme terror, or the uncovering of the teeth under that of furious rage, can hardly be understood except on the belief that man once existed in a much lower and animal-like condition. The community of certain expressions in distinct though allied species, as in the movements of the same facial muscles during laughter by man and by various monkeys, is rendered somewhat more intelligible if we believe in their descent from a common progenitor."

In endeavouring to discover what are the movements which may be regarded as really expressive of certain states of the mind, and so to avoid all those of a merely conventional character, Mr Darwin has paid special attention to expression in infants, the insane, the different races, and especially the uncivilised races of man; works of art—but here he confesses to have been little benefitted; and, as before mentioned, the lower animals. In his mode of obtaining information regarding the various races of man, we have a good illustration of the author's characteristic energy in collecting facts. He tells us that he prepared a circular containing sixteen queries bearing on expressive movements; these were printed and forwarded to correspondents all over the world, many of them missionaries labouring among the most savage and degraded, and, at the same time, most distinct races of mankind, and the answers which he has received form in themselves a most valuable contribution on the subject, and one of which he makes good use throughout his work. From all the facts which he has thus been able to observe or collect, Mr Darwin adduces three principles, "which appear to him to account for most of the expressions and gestures involuntarily used by man and the lower animals under the influence of various emotions and sensations." These he briefly states in the three opening chapters, and after a first perusal of the work the reader would do well, if he would appreciate the full force of these principles, to re-peruse the opening chapters, which, as they contain the results deduced from the facts contained in the others, would perhaps have been as appropriately placed at the end of the book. The author, after premising that expression is not confined merely to the action of the facial muscles, but that it includes movements or changes in any part of the body, such as the wagging of a dog's tail or the shrugging of a man's shoulders, states his first principle as that of "serviceable associated habits." "Certain complex actions are of direct or indirect service under certain states of the mind, in order to relieve or gratify certain sensations, desires, &c.; and whenever the same state of mind is induced, however feebly, there is a tendency through the force of habit and association for the same movements to be performed, though they may not then be of the least use." Thus, in trying to discern a distant object we are in the habit of raising our eyebrows, in order to get our eyes more widely opened; and in trying to remember a thing, we likewise, and apparently from the force of habit and association, raise our eyebrows as if to see it. So, too, in describing a horrid sight, people often shut their eyes momentarily and firmly as if to keep the disagreeable thing away from their actual view. Many reflex actions—that is, actions performed independently of our will, such as sneezing, coughing, and winking when the eye is touched—were, Mr Darwin believes, in some cases at least, at first consciously performed, but have become, through habit and association, reflex. That an action which at one time required a distinct effort of the will for its each performance, should at last come to be performed independently of it, is certainly remarkable, but this wonder is much increased when we are told that the will, which at first could alone produce the act, is at last efficient only for its prevention. It is at least a well-known fact that the conscious wish to perform a reflex action often stops its performance, though the proper sensory nerve be stimulated. Thus, to quote an example from our author—

"Many years ago I laid a small wager with a dozen young men that they would not sneeze if they took snuff, although they all declared that they invariably did so. Accordingly they all took a pinch, but from wishing much to succeed, not one sneezed, although their eyes watered, and all without exception had to pay me the wager."

Some of the most striking examples of the first principles are taken from the lower animals, and in the case which we are about to give many of our readers will probably have observed the fact for themselves, although they may not have hitherto even guessed at their meaning.

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It is in his second principle, that of Antithesis, that Mr Darwin's wonderful faculty for generalization is most conspicuously seen. The other principles have been to a certain extent recognised by other writers as instrumental in producing expression, though not investigated to any length, but this principle of Antithesis we owe entirely to Mr Darwin, and after he has unfolded it the thing looks so patent and plausible that one is only surprised that it was not suggested long ago. He thus states it:—

"Certain states of the mind lead to certain habitual actions, which are of service as under our first principle. Now when a directly opposite state of mind is induced, then there is a strong and involuntary tendency to the performance of movements of a directly opposite nature, though these are of no use; and such movements are in some cases highly expressive. One of the best examples of Antithesis is to be found in the expressive movements of a dog according as it approaches in a friendly or in a hostile mood. Should a supposed stranger approach, it at once assumes a fighting aspect. It walks upright and stiffly, with its head raised, tail erect and rigid, the hair along its back and neck bristling, ears pricked and directed forwards, and its eyes staring. These movements indicative of the dog's intention to attack an enemy are intelligible on the first principle. Should the dog, however, discover that the supposed stranger is its master, what a total change comes over its bearing! Instead of walking upright," says Mr Darwin, "the body sinks downwards, or even crouches, and is thrown into flexuous movements; his tail, instead of being held stiff and upright, is lowered and wagged from side to side, his hair instantly becomes smooth, his ears are depressed and drawn backwards, but not closely to the head, and his lips hang loosely. From the drawing back of the ears, the eyelids become elongated, and the eyes no longer appear round and staring. Not one of the above-mentioned movements, so clearly expressive of affection, are of the least direct service to the animal. They are explicable, as far as I can see, solely from being in complete opposition or antithesis to the attitude and movements which, from intelligible causes, are assumed when a dog intends to fight, and which, consequently, are expressive of anger."

An example similar to the above is afforded by the cat, but in this case the expressive movements are strangely reversed, the posture of an angry cat being not unlike that of a friendly dog, and *vice versa*. Actions so minutely antithetical as these, of no direct service to the creatures themselves, and that it cannot be supposed could have been assumed by them from a conscious wish to intimate that they had passed into an opposite frame of mind, seem to shut us up to the adoption of Mr Darwin's principle, that movements habitually associated with a certain state of mind necessitate directly opposite movements in a directly opposite state. The third principle is that of "the direct action of the nervous system," and deals with those expressive movements and changes which take place independently of our will, and in part also of habit. 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This movement plays an important part in all facial expressions of joy or sorrow, being seen most intensely in the screaming of infants or in loud laughter, when those muscles so contract as to shut the eyes completely; nor does their influence end here, as upon their contraction mainly depends the other expressive movements of the face indicative of great joy or sorrow. What use, other than that of expression, can be assigned for this highly expressive movement of the orbicular muscles? During any violent respiratory exertion, such as occurs in screaming, loud laughter or shouting, there is a sudden rush of blood to the head, the arteries become gorged and distended, visible in the heightened colour of the face; such distension of the minute arteries of the eye, if not in some way counteracted, would prove highly injurious to that delicate organ; indeed this has been shown to be the case by actual experiment. 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form some notion of the manner in which Mr Darwin deals with the many interesting problems of expression. When we say that the work itself is deeply interesting, the reader must not by any means conclude that it is a species of light reading —none of Mr Darwin's works are. In dealing, for example, with the muscles of the face there is much that is as dry as it is necessary; but there is nothing in the book the understanding of which requires previous technical training, or, indeed, anything more than a little consecutive attention, and this surmounted, the reward is immediate in the enhanced interest given to the facts. Nor is the work by any means to be regarded as a piece of special pleading in behalf either of Evolutionism or Darwinism; indeed the latter is almost ignored, simply because it has little or nothing to do with the subject in hand. The book ought to be regarded as a work of natural history written on that broader theory of life– evolution: but should the reader prefer the narrower basis, there is nothing to hinder him from dispensing with the arguments drawn from the lower animals, and from finding sufficient proof left to justify him in accepting Mr Darwin's three fundamental principles of expression. The work is illustrated by numerous drawings and photographs, which by fixing such fleeting things as a smile, a sneer, or a frown, greatly assist in elucidating the text.