MR. DARWIN'S NEW BOOK.*

However much men may differ from Mr. Darwin as to the theory of the evolution of species, no one can deny that his works have—more, perhaps, than those of any living man—done an immense deal to promote the study of natural history in all its branches. As one of our most painstaking and unwearied searchers after truth, as an impartial inquirer, and as a man gifted with very high reasoning faculties and an amazing power of work, Mr. Darwin deserves and has earned the highest respect and recognition even from those who, like ourselves, differ wholly from the theories with which his name is associated. We hail, therefore, the advent of any fresh contribution from his pen as certain to contain much that is new, much that is striking, as being not only full of research and thought in itself, but as likely to lead to thought and research in those who peruse it. In these respects the work before us is fully equal to its predecessors. It cannot be said that the subject is entirely a new one; but it is handled in so original and scientific a manner, it contains so large an amount of information gathered from so large a variety of sources, that it is quite a work *sui generis*. In studying the expression of the emotions in human beings, the author devoted himself first to infants and children, their emotions being expressed with greater force and action than those of grown-up persons, who have learnt to conceal to some extent the expression of their feelings; secondly, he applied to gentlemen in charge of lunatic asylums for notes and descriptions of the expressions of emotions among the insane; thirdly, he examined narrowly into the action of the various facial muscles as excited by galvanism; fourthly, he went through a series of photographs and engravings of the works of the great masters of sculpture and painting; and lastly he endeavoured to ascertain whether the same expressions and gestures prevail among all the races of mankind, especially with those who have associated but little with Europeans. In order to discover this Mr. Darwin circulated in the year 1867 a series of 16 printed queries, with a request that actual observation and not memory might be trusted to. Thirty-six answers were received from different observers residing among various races civilised and uncivilised in all parts of the world. These gentlemen gave every particular respecting the movements and gesticulations of the people among whom they dwelt under the influence of all kinds of emotions. Besides this Mr. Darwin devoted much attention to the expression of the several passions in some of the common animals. This mass of information acquired—and the author states that he has been engaged upon it from time to time since 1838—there remained the task of understanding the cause or origin of the several expressions, the views of Sir C. Bell in his great work, that man had been created with certain muscles specially adapted for the expression of his feelings, being, of course, altogether opposed to Mr. Darwin's own theories as to the beginning of things. Mr. Darwin has arrived at the conclusion that there are three principles which account for most of the expressions and gestures involuntarily used by man and the lower animals under the influence of various emotions and sensations; they are as follows:—

"1. *The principle 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. Some actions ordinarily associated through habit with certain states of the mind may be partially repressed through the will, and in such cases the muscles which are least under the separate control of the will are the most liable still to act, causing movements which we recognise as expressive. In certain other cases the checking of one habitual movement requires other slight movements; and these are also expressive.

"2. *The principle of Antithesis.*—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 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.

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In the first principle Mr. Darwin includes not only habits as acquired by the individual, but as transmitted or hereditary, the results of the continued action of his ancestors during past ages. With habit we are enabled to perform complex movements almost, if not quite, unconsciously, and the power to do this is, in many instances, transmitted. As familiar examples of this may be mentioned—the paces of a horse, the pointing of a pointer, the setting of a setter, the flights of certain breeds of pigeons, &c.; also the inheritance in mankind of certain tricks and gestures. The power of association is great, it is admitted. As a familiar example:—

"That 'actions, sensations, and states of feeling, occurring together or in close succession, tend to grow together, or cohere, in such a way that when any one of them is afterwards presented to the mind, the others are apt to be brought up in idea.'"

"A man when going out of doors puts on his gloves quite unconsciously; and this may seem an extremely simple operation, but he who has taught a child to put on gloves knows that this is by no means the case."

In speaking, many of our gestures are repetitions of what would have taken place had the subject spoken of been really before us; so when a man vehemently rejects a proposition he shuts his eyes and turns away his head, as if to avoid seeing it, or as again when he closes his eyes and gives a slight shudder in describing some horrible sights. Mr. Darwin quotes Duchenne's remark that a person in trying to remember something raises his eyebrows, as if to see it, and gives corroborating instances; but although we admit that this gesture is often made use of, the general expression of a person trying to recal a name or a circumstance is that of frowning heavily. A large number of these habitual gestures are termed by Mr. Darwin reflex actions, and depend but slightly upon our consciously acting upon voluntary nerves. Thus coughing and sneezing are reflex actions, but clearing the throat and blowing the nose are not reflex actions, because children have to be taught, with some difficulty, to perform them. Such an action is the involuntary closing of the eyes upon the sudden approach of some object, as also the sudden start back of a man or horse from a real or supposed danger. The closing the eyes and the leaping back are not in themselves reflex actions, but have come down hereditarily, so that even a child of three or four months old will wink at the approach of danger to its eyes, although it can have had no personal experience in the matter. Mr. Darwin gives a number of instances of the actions and movements of animals explicable by this theory.

The second principle—that of Antithesis—is ingenious, but will hardly recommend itself to general acceptance. Mr. Darwin gives illustrations of dogs standing in an attitude of defiance, and of the same animals fawning upon their master. In the one case they stand erect and very stiff: the tail is rigid, the hair bristles, the ears are pricked forwards, and the eyes have a fixed stare. As he prepares further for attack the canine teeth are uncovered, and the ears pressed close backwards upon the head. When fawning upon a master all this is reversed. The body sinks downward and crouches, and is thrown into flexuous movements: the tail is wagged from side to side, the hair is laid smooth, the ears and lips hang loosely. Any one will admit that the positions and attitudes are the reverse of each other; but it is difficult to agree with Mr. Darwin that because the attitude for attack is the natural one, therefore the animal wishing to show affection has deliberately selected the attitudes and gestures the exact opposite of those which he had assumed as convenient for an attack. Mr. Darwin does not contend that each animal of the present day chooses its attitudes for this reason, or that it has acquired them by hereditary descent, but he thus accounts for their origin in a far-off progenitor. The third principle of expression—namely, the action of the nervous system—will be at once conceded by all. Such, for example, are trembling and perspiring from fear, and blushing from shyness or shame. Foremost among the means of expression among animals are the elevation of the dermal appendages, such as hair or feathers. Mr. Darwin believes that this, although now involuntary, is the result of an original desire to appear larger and fiercer, and so to strike terror into a foe. In this way almost all carnivorous animals roughen their coats, and birds—as for example the hen, the

* "The Expression of the Emotions in Men and Animals." By Charles Darwin, M.A., F.R.S., &c. London: John Murray. 1872.

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...ceaseless 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 Dunghars, 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

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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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person trying to recal a name or a circumstance is that of frowning heavily. A large number of these habitual gestures are termed by Mr. Darwin reflex actions, and depend but slightly upon our consciously acting upon voluntary nerves. Thus coughing and sneezing are reflex actions, but clearing the throat and blowing the nose are not reflex actions, because children have to be taught, with some difficulty, to perform them. Such an action is the involuntary closing of the eyes upon the sudden approach of some object, as also the sudden start back of a man or horse from a real or supposed danger. The closing the eyes and the leaping back are not in themselves reflex actions, but have come down hereditarily, so that even a child of three or four months old will wink at the approach of danger to its eyes, although it can have had no personal experience in the matter. Mr. Darwin gives a number of instances of the actions and movements of animals explicable by this theory.

The second principle—that of Antithesis—is ingenious, but will hardly recommend itself to general acceptance. Mr. Darwin gives illustrations of dogs standing in an attitude of defiance, and of the same animals fawning upon their master. In the one case they stand erect and very stiff: the tail is rigid, the hair bristles, the ears are pricked forwards, and the eyes have a fixed stare. As he prepares further for attack the canine teeth are uncovered, and the ears pressed close backwards upon the head. When fawning upon a master all this is reversed. The body sinks downward and crouches, and is thrown into flexuous movements; the tail is wagged from side to side, the hair is laid smooth, the ears and lips hang loosely. Any one will admit that the positions and attitudes are the reverse of each other; but it is difficult to agree with Mr. Darwin that because the attitude for attack is the natural one, therefore the animal wishing to show affection has deliberately selected the attitudes and gestures the exact opposite of those which he had assumed as convenient for an attack. Mr. Darwin does not contend that each animal of the present day chooses its attitudes for this reason, or that it has acquired them by hereditary descent, but he thus accounts for their origin in a far-off progenitor. The third principle of expression—namely, the action of the nervous system—will be at once conceded by all. Such, for example, are trembling and perspiring from fear, and blushing from shyness or shame. Foremost among the means of expression among animals are the elevation of the dermal appendages, such as hair or feathers. Mr. Darwin believes that this, although now involuntary, is the result of an original desire to appear larger and fiercer, and so to strike terror into a foe. In this way almost all carnivorous animals roughen their coats, and birds—as for example the hen, the

* "The Expression of the Emotions in Man and Animals." By Charles Darwin, M.A., F.R.S., &c. London: John Murray, 1872.

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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