Gladstone himself, after the half-hour's investigation, should refuse to believe in the O doctrine. Supposing Mr. Gladstone should, after the few minutes' investigation, prefer to entrust the further inquiry to the very enlightened gentlemen in private life; and supposing the very enlightened gentlemen should decide against the O theory—what will Mr. Kavanagh do? He cannot change his mind, for he is bound at all hazards to go on saying O in both worlds. "When the author calls to mind the many happy results which did not come to him by chance, but were obtained by means of his discovery and its principles, he can no more doubt that such a discovery must be real than he can doubt in a future state of rewards and punishments." But if, on the other hand, either Mr. Gladstone or the enlightened gentlemen should declare in favour of the O theory, and should the doctrine ever be enforced by the terrors of the law, we at least shall hold it our duty to remain conscientious Nonconformists, and, instead of addressing either Mr. Gladstone or Mr. Kavanagh with the positive O, we must deliver our souls by its undoubted negative No.

One great difficulty, we should think, which Mr. Gladstone will find, if he adopts the alternative of the few minutes' study in person and of the further reference to enlightened gentlemen, will be as to the persons of whom the Committee should be formed. The enlightened gentlemen, it is to be remarked, are specially described as enlightened gentlemen in private life. This qualification is perhaps intended to shut out certain classes of men whom Mr. Kavanagh seems to look on especially as his enemies. It would be hard to find a jury at once impartial and competent. The chief philologers of the day, the men who are likely to know, if any one ever can know, what was man's first word, would at once be challenged by Mr. Kavanagh as a matter of course. They have refused to believe in Mr. Kavanagh, or perhaps they have never heard of him. At all events he has denounced them as a pack of bunglers, who know nothing of what they are talking about; and he has even put them into a kind of comedy, much as Aristophanes long ago did by Socrates. And it is plain, that if Mr. Kavanagh would refuse to be judged by Professors, he would still more stoutly refuse to be judged by reviewers. Against our unhappy class Mr. Kavanagh seems, perhaps not unnaturally, to have very great wrath indeed. Towards the end of his little pamphlet it turns out that his object in making his moan to Mr. Gladstone is to claim protection against his reviewers, or at any rate against one particular reviewer. How Mr. Gladstone is to protect him we cannot guess, unless either by some general law against the press, or by some special privilegium for the benefit of the devotees of the letter O. At any rate Mr. Kavanagh shows a more intimate knowledge of the hidden mysteries of our calling than we can at all pretend to ourselves:—

> The protection claimed from Mr. Gladstone must be regarded as not sought for without good reason, when it is observed that there is, at the present moment, a certain popular member of the press whom I happened to offend unknown to myself a great many years ago, and who has ever since done all in his power to injure me and mine. He has already, to my certain knowledge, reviewed my late work in five different journals of which the editors have been so simple as to become his dupes, or so mean as to allow themselves to become his accomplices. For malevolence, gross misrepresentation, shallowness, ignorance, and palpable untruths, these reviews have never been surpassed—perhaps not even equalled.

Who this active and ubiquitous person may be we cannot even guess; but Mr. Kavanagh is good enough to tell us that it is not Professor Müller, and it is not M. Littré, and we gather that it is not Sir Charles Dilke, because this malevolent being has reviewed Mr. Kavanagh in the *Pall Mall Gazette*, the *Illustrated Review*, and the *Athenæum*, and for his review in the *Athenæum* Mr. Kavanagh thinks that Sir Charles Dilke will not return him many thanks. The same person has also a colleague in the *Daily News*, who seems to be as wicked as himself. All this is beyond us. We cannot pretend to any knowledge of the *Illustrated Review;* and we should think it *à priori* unlikely that the same man should review Mr. Kavanagh both in the *Pall Mall Gazette* and in the *Athenæum;* and we further know by experience that all surmises of this kind are pretty sure to be wrong. Nor does the matter greatly concern us. Mr. Kavanagh does not venture to say that the *Saturday Review* is one of the places where his relentless enemy wields the scourge with five lashes. We suppose however that our turn will come, as Mr. Kavanagh tells us that he is busy on his work called *An Author his Own Reviewer*, in which he is to notice all that has been said about him anywhere. We await our doom calmly; and meanwhile we have refreshed ourselves with looking back to certain persons of great antiquity and dignity who, like Mr. Kavanagh, were addicted to the saying of O. The Æschylean Eumenides, when called on by the shade of Klytaimnestra, answered by an ὠγμός—a cry of O. She rebuked them by the question ὄζεις; which we may freely render "Is it O you're crying?" This expostulation drew forth only a second ὠγμός, but a second rebuke drew forth something far more terrible, a μυγμὸς διπλοῦς, ὀξύς, a twofold and sharp cry of *Mu*, or, as we are half tempted to spell it, *Mew*. Mr. Kavanagh, in his book and in his pamphlet, has given us the first and the second ὠγμός. Is the *Author his Own Reviewer* to be a μυγμὸς διπλοῦς, ὀξύς? Surely as great mysteries can be got out of μὲ as out of ὦ. That it will deserve the epithet of ὀξὺς we cannot doubt for a moment. Something very awful must be coming when Mr. Kavanagh has made up his mind so firmly as appears by the following extract:—

> I stand alone; and what can I do against a man who, with no regard for truth, can, whenever he thinks fit, have a host of dupes or accomplices at his back. Literature belongs, however, to us all, and we are all, for this reason, bound to oppose its adversaries, as much so as we are bound to oppose the enemies of public order, or our own private property against thieves. And every one to whose noble mind these sentiments are congenial, will, I have reason to hope, call for fair play, and, respecting my pretensions, will also join with me in soliciting Mr. Gladstone to cause that inquiry to be made, which if once granted cannot but lead to certain victory.

When Mr. Kavanagh has won the victory, what will be the form of his triumph? Conquerors have often taken titles as memorials of their conquests. There is one title which no one could so fittingly bear as Mr. Kavanagh. In the old state of things in France, there was a great family which bore the title of Marquis of O. What if the upshot of the whole matter should be for Mr. Gladstone to advise Her Majesty to bestow the same honour—one truly "teres atque rotundus"—upon the house of Kavanagh?

REVIEWS.

DARWIN ON EXPRESSION IN MAN AND ANIMALS.*

OUT of the inexhaustible stores of his observation of nature and his diffusive reading Mr. Darwin has given us another copious series of proofs from natural history, which, if no more than minor affluents of the main stream of the *Origin of Species* and the *Descent of Man*, he regards as illustrating the great law of the unity and continuity of life. Although dealing with a more limited and special class of phenomena than most of his earlier works, the present treatise readily connects itself with the general scheme of investigation and reasoning which has won for the author a distinctive name in the history of philosophy. His leading idea is that of tracing the law of evolution as displayed in, or accounting for, Expression or the play of features and gesture in man and animals—the inarticulate language, as it has been called, of the emotions. For the scientific basis of such an investigation it is necessary to go far down into the ultimate structure of organic life, and to study the manifestations of character in their simplest forms. So long as man and all other animals are viewed as independent creations, an effectual stop is put, Mr. Darwin pleads, to such an attempt. The inherent defect in the treatment of the subject by writers so able as Sir Charles Bell, Gratiolet, Duchenne, and others adduced by Mr. Darwin has always been, he considers, the taking for granted that species, man of course included, came into existence just as they are now, wholly distinct from each other. The tendency to draw as broadly as possible the distinction between man and brutes led Sir Charles Bell to deny to the lower animals any expression beyond what might be referred more or less plainly to acts of volition or necessary instincts, their faces seeming to him to be chiefly capable of expressing merely rage or fear. The facial muscles in man he thought to be a special provision for the sole object of expression, and so far distinctive of humanity. But the simple fact that the anthropoid apes possess the same facial muscles that we do renders it most improbable, apart from any reference to teleology in general, that we were endowed with these muscles for any such purpose, still more that monkeys had special muscles given to them solely for the purpose of exhibiting their hideous grimaces. Since distinct uses can with much probability be assigned to almost all the facial muscles, we may look upon expression as but an incidental result of muscular or organic function. Mr. Darwin's early inclination towards the doctrine of evolution, or the origin of man from lower forms, led him five-and-twenty years ago to regard the habit of expressing our feelings by certain movements, innate as it has now become, as having been in some manner gradually acquired at the first. Seeking back for the origin of movements of this kind, he in the first place was led to observe infants, as exhibiting emotions with extraordinary force, as well as with a simplicity and an absence of convention which cease with more mature years. Secondly, the insane had to be studied, being liable to the strongest passions, and giving them uncontrolled vent. Dr. Duchenne's ingenious application of photography, representing the effects of galvanism upon the facial muscles of an old man, gave some assistance towards distinguishing varieties of expression. Less aid than was expected was found to be derived from the study of the great masters in painting and sculpture; beauty in works of art excluding the display of strong facial muscles, and the story of the composition being generally told by accessories skilfully introduced. More important it was to ascertain how far the same expressions and gestures prevail among all races of mankind, especially among those who have associated but little with Europeans. With this view a list of sixteen questions was circulated by Mr. Darwin within the last five years, to which thirty-six answers have been received from missionaries, travellers, and other observers of aboriginal tribes, whose names are appended to Mr. Darwin's introductory remarks. The evidence thus accumulated has been supplemented by the close and keen observation of the author himself through a wide range of animal life. It seemed to him of paramount importance to bestow all the attention possible upon the expression of the several passions in various animals, "not of

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course as deciding how far in man certain expressions are characteristic of certain states of mind, but as affording the safest basis for generalization on the causes or the origin of the various movements of expression." In observing animals we are not so likely to be biassed by our imagination, and we may feel sure that their expressions are not conventional.

As the result of his observations Mr. Darwin has arrived at three principles, which appear to him to account for most of the expressions used by man and the lower animals under the influence of various emotions and sensations. The first of these is the principle of serviceable associated habits. Movements which are of service in gratifying some desire, or in relieving some sensation, become by repetition so habitual that they are performed, whether they are of any service or not, whenever the same desire or sensation is felt even in a very weak degree. Actions which were at first performed consciously become through habit and association reflex or automatic, the sensory nerve cells exciting the motor-nerve cells without first communicating with those cells on which our consciousness and volition depend. Starting at the approach of danger, and blinking with the eyelids so as to protect the eyes, become perfectly spontaneous. Reflex actions, too, gained for one purpose, may be modified independently of the will or of habit, so as to serve for some other distinct purpose; or they may be developed through natural selection. And they are thus often brought into play in connexion with movements expressive of emotion. When movements associated through habit with certain mental states are partially repressed by the will, the strictly involuntary muscles retain their action, and may be highly expressive; and when, on the other hand, the will is relaxed, the voluntary muscles fail before them. Debility of the brain, Sir C. Bell remarked, is most shown in the case of those muscles which are in their natural condition most under the control of the will. A further mode of expression arises when the checking of one habitual movement calls up another.

The second principle is that of antithesis. When certain movements or gestures have been acquired as aforesaid, and have come to be habitually performed in connexion with a certain state of mind, there will then be a strange and involuntary tendency under the opposite state of mind to directly opposite movements, whether in any way serviceable or not. Hence alone, Mr. Darwin thinks, can be explained, not only the sudden and extreme changes of expression in the attitudes of animals, but many gestures used by savages or by the deaf and dumb. This antithesis in attitude from anger and defiance to affectionate crouching is illustrated by him in the case of the dog and the cat by means of photography. The Cistercian monks, among whom speaking was sinful, invented a gesture language founded upon the principle of antithesis. It is clear that in this principle the will intervenes largely. Mr. Darwin is, however, less confident in referring expressive signs or gestures to the action of this principle than to his third originating cause, the direct agency of the nervous system. When the sensorium is strongly excited, nerve force is generated in great excess, and is transmitted in certain directions, determined by the connexion of the nerve cells, or, where the muscular system is concerned, by the nature of the movements of face or limb which correspond to each nervous impulse. These are, at the first at least, independent of the will, or even of habit, though in later stages habit may have considerable play, inasmuch as nerve force tends to pass along accustomed channels. Mr. Darwin inclines to think that what seem the most strictly involuntary actions, such as the bristling of the hair in fear or anger, may have been effected by the mysterious power of the will. He is far, however, from laying down dogmatic views upon the operation of these various agencies in causing or varying expression, nor is he prepared to draw sharp lines between the action of his three elementary principles. Many phases or signs of expression may partake, he considers, of all three, and may be referable to no single or direct physiological cause. The visible apparatus of expression may of course be taken as muscular; and he begins with laying down diagrams of the various muscles of the face in man, those in particular which are connected with the eyes and mouth. Drawings of animals by Mr. Rivière, Mr. T. W. Wood, and other artists are brought in to show the analogous display of emotion in brutes. A series of skilfully taken photographs, by Mr. Rejlander, Herr Kindermann of Hamburg, and Dr. Wallich, in addition to those borrowed from Dr. Duchenne, gives vivid expression to the play of the features in laughter, weeping, and other manifestations of emotion or character. Suppose we take as an illustration the oblique or upturned eyebrows of a man suffering from grief or anxiety. Every one must be familiar, both from nature and works of art, with the way in which the inner angle of the eyebrow is drawn up under this emotion, the forehead being contracted or wrinkled at the same time. Mr. Darwin evolves the origin of this involuntary movement through the same logical train of sequence by which we have seen him in his earlier and more elaborate works draw out the extraordinarily complex chain of laws which runs through natural history. When infants scream loudly from hunger or pain, the circulation is affected, and the eyes tend to become gorged with blood. In consequence the muscles surrounding the eyes are strongly contracted by an involuntary action as a protection. This action, in the course of many generations, has become firmly fixed and inherited. With advancing years and culture the habit of screaming is partially repressed; but the muscles round the eyes still tend to contract whenever even slight distress is felt. Of these the pyramidal muscles of the nose are less under the control of the will than the others, and their contraction can be checked only by that of the central fasciæ of the frontal muscle. These latter fasciæ draw up the inner ends of the eyebrows, and wrinkle the forehead in the peculiar manner which we immediately recognize as the expression of grief or anxiety. Mr. Darwin differs here from M. Duchenne, who insists upon the independent action of the "corrugators." The corrugations dwelt upon by our author are easily distinguishable from those of a simple frown. The muscles producing them are known to artists as the "grief muscles." They are not to be acted upon voluntarily without some practice. An extreme case of this power is shown in a young actor who posed for Dr. Duchenne's camera, and in a girl specially photographed for Mr. Darwin. Studies of his own children have enabled him to observe the same effect to be produced by the action of strong light upon the eye. The drawing down of the corner of the mouth, another sign of anxiety, is due to the contraction of muscles (depressores anguli oris) which are also among those least subject to the control of the will. These having been brought into strong play during infancy in many generations, it is easy to see that nerve force will tend to flow, on the principle of long associated habit, to these muscles whenever in after life even a slight feeling of distress is felt; and, being less controlled by the will, they may contract, when the expression known as being "down in the mouth" will be given, the other features remaining inexpressive.

Laughter and tears form media of expression which have been often subjected to analysis, but never with the same physiological minuteness and precision as in Mr. Darwin's special chapters on the phenomena of the vaso-muscular and nervous systems. The excess of nervous energy produced by pleasure and enjoyment, passing on by an efflux through the motor nerves to various classes of the muscles, finds a vent in joyous merriment, dancing, clapping the hands, and, above all, in emissions of sound and motions of the zygomatic muscles which draw the mouth backwards and upwards. From the manner in which the upper teeth are exposed in laughter and broad smiling Mr. Darwin cannot doubt that some of the muscles running to the upper lip are likewise brought into moderate action. The upper and lower orbicular muscles of the eyes are at the same time more or less contracted, while the contractile force exerted upon the vessels or glands of the eye causes the same flow of tears in extreme laughter as in sorrow. Both laughing and weeping are seen in a minor degree in many of the lower animals. In children tears do not flow, Mr. Darwin assures us, at the first, but are induced by the effect of prolonged screaming in gorging the vessels of the eye. This suffusion leading at first consciously, and at last habitually, to the contraction of the muscles round the eyes in order to protect or relieve them, the lachrymal glands become affected through reflex action. Thus, although in the first instance a merely incidental result, as purposeless as the secretion of tears from a blow outside the eye, or as a sneeze from bright light affecting the retina, we may understand how the shedding of tears serves as a natural relief to suffering.

Among the special signs or media of expression dwelt upon by the author, we further single out the shrugging of the shoulders, as involuntarily indicative of helplessness and impotence, or as an attitude of apology. Mr. Rejlander's photographs well convey the complex phases of this movement or gesture. Not only are the back or shoulders arched, but the forehead is wrinkled, and the elbows turned in to the sides, and the open palms thrown outwards, with the fingers widely spread. Though more common with more demonstrative races, the shrug is seen in English people of both sexes, as well as in those of French or Italian race. Mr. Darwin's correspondents report it as common among tribes of well nigh every land. We confess ourselves less satisfied with our author's account of the origin of this gesture than with any other of his solutions of the manifold problems of expression. The explanation is simply sought by him in his principle of antithesis. A man indignant, defiant, resentful, as shown in the opposite pair of photographs given for the sake of contrast, holds his head erect, squares his shoulders, and expands his chest. His fists are clenched or grasp a weapon. It is simply in unconscious antithesis that the helpless or apologetic figure seems to say, "What can I do?" "I really could not help it." The rationale of the attitude seems to our author as clear as that before adduced of the dog subsiding to the posture of crouching humility or affectionate fawning from that of threatening or defiance. We are surprised that Mr. Darwin's keenness of analysis did not point out to him how much more directly it may be referred to his third principle, as being due to the constitution of the nervous system, anterior to will and habit. What, let us ask, are we to conceive the kind of attitude into which a man would unconsciously or automatically throw himself under the impression of a danger or a burden impending on a sudden, and overpowering in weight, or of a feeling of guilt, not perhaps heinous in itself, but such as conventionally to disarm a man, and to be atoned for by simple apology? Under a sense like that of a crushing load coming down, in what would the nervous instinct find a vent but in putting up the shoulders, the strongest part, to meet the weight, or to bear the blow felt to be merited—the head being at the same time drawn in somewhat after the instinct of a tortoise, and the shoulders, if it were but possible, being drawn over the head? The hands would as nervously be thrown open and wide, in token of all means of resource, defence, or help, being cast aside. While upon this subject, we would draw attention to the same principle of instinctive, though more conscious, shrinking, as underlying a habit or gesture so confirmed and all but universal as the use of the right hand in man in preference to the left. No reason for this preference has ever been found in anatomy or physiology; and in none of the lower animals, even the highest of the anthropomorphous races, has it ever been observed. Now we have but to consider how soon primæval man, in his habitual state of warfare and violence, would be impressed by the fact that wounds in the region of the left side were more apt to be fatal than wounds on the right; and, learning to throw back the side of the heart in combat, he would give greater play and enhanced muscular vigour to the right hand and arm and foot. The habit thus acquired would gradually pass on into the general uses of life, the preference becoming so marked as to make left-handed workers and fighters the exception. We are sorry that this particular kind of expressive gesture has not been held by Mr. Darwin to come within the scope of his argument or research. Upon allied phenomena, such as that of nodding, shaking the head in sign of assent or dissent, his powers of observation and analysis have been interestingly employed; and the causes and the significance of blushing, which form the concluding chapter of the book, are traced with much delicacy and truth of reasoning. Space fails us to go more at length into the store of information with regard to human or animal nature which he has to adduce or to explain. As a kind of supplement or *pareryon* to his more profound or systematic studies, as well as containing inexhaustible matter of novel suggestion and curious thought, this little work will be found well worthy of the writer's name.

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Out of the inexhaustible stores of his observation of nature and his diffusive reading Mr. Darwin has given us another copious series of proofs from natural history, which, if no more than minor affluents of the main stream of the *Origin of Species* and the *Descent of Man*, he regards as illustrating the great law of the unity and continuity of life. Although dealing with a more limited and special class of phenomena than most of his earlier works, the present treatise readily connects itself with the general scheme of investigation and reasoning which has won for the author a distinctive name in the history of philosophy. His leading idea is that of tracing the law of evolution as displayed in, or accounting for, Expression or the play of features and gesture in man and animals—the inarticulate language, as it has been called, of the emotions. For the scientific basis of such an investigation it is necessary to go far down into the ultimate structure of organic life, and to study the manifestations of character in their simplest forms. So long as man and all other animals are viewed as independent creations, an effectual stop is put, Mr. Darwin pleads, to such an attempt. The inherent defect in the treatment of the subject by writers so able as Sir Charles Bell, Gratiolet, Duchenne, and others adduced by Mr. Darwin has always been, he considers, the taking for granted that species, man of course included, came into existence just as they are now, wholly distinct from each other. The tendency to draw as broadly as possible the distinction between man and brutes led Sir Charles Bell to deny to the lower animals any expression beyond what might be referred more or less plainly to acts of volition or necessary instincts, their faces seeming to him to be chiefly capable of expressing merely rage or fear. The facial muscles in man he thought to be a special provision for the sole object of expression, and so far distinctive of humanity. But the simple fact that the anthropoid apes possess the same facial muscles that we do renders it most improbable, apart from any reference to teleology in general, that we were endowed with these muscles for any such purpose, still more that monkeys had special muscles given to them solely for the purpose of exhibiting their hideous grimaces. Since distinct uses can with much probability be assigned to almost all the facial muscles, we may look upon expression as but an incidental result of muscular or organic function. Mr. Darwin's early inclination towards the doctrine of evolution, or the origin of man from lower forms, led him five-and-twenty years ago to regard the habit of expressing our feelings by certain movements, innate as it has now become, as having been in some manner gradually acquired at the first. Seeking back for the origin of movements of this kind, he in the first place was led to observe infants, as exhibiting emotions with extraordinary force, as well as with a simplicity and an absence of convention which cease with more mature years. Secondly, the insane had to be studied, being liable to the strongest passions, and giving them uncontrolled vent. Dr. Duchenne's ingenious application of photography, representing the effects of galvanism upon the facial muscles of an old man, gave some assistance towards distinguishing varieties of expression. Less aid than was expected was found to be derived from the study of the great masters in painting and sculpture; beauty in works of art excluding the display of strong facial muscles, and the story of the composition being generally told by accessories skilfully introduced. More important it was to ascertain how far the same expressions and gestures prevail among all races of mankind, especially among those who have associated but little with Europeans. With this view a list of sixteen questions was circulated by Mr. Darwin within the last five years, to which thirty-six answers have been received from missionaries, travellers, and other observers of aboriginal tribes, whose names are appended to Mr. Darwin's introductory remarks. The evidence thus accumulated has been supplemented by the close and keen observation of the author himself through a wide range of animal life. It seemed to him of paramount importance to bestow all the attention possible upon the expression of the several passions in various animals, "not of

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

course as deciding how far in man certain expressions are characteristic of certain states of mind, but as affording the safest basis for generalization on the causes or the origin of the various movements of expression." In observing animals we are not so likely to be biassed by our imagination, and we may feel sure that their expressions are not conventional.

As the result of his observations Mr. Darwin has arrived at three principles, which appear to him to account for most of the expressions used by man and the lower animals under the influence of various emotions and sensations. The first of these is the principle of serviceable associated habits. Movements which are of service in gratifying some desire, or in relieving some sensation, become by repetition so habitual that they are performed, whether they are of any service or not, whenever the same desire or sensation is felt even in a very weak degree. Actions which were at first performed consciously become through habit and association reflex or automatic, the sensory nerve cells exciting the motor-nerve cells without first communicating with those cells on which our consciousness and volition depend. Starting at the approach of danger, and blinking with the eyelids so as to protect the eyes, become perfectly spontaneous. Reflex actions, too, gained for one purpose, may be modified independently of the will or of habit, so as to serve for some other distinct purpose; or they may be developed through natural selection. And they are thus often brought into play in connexion with movements expressive of emotion. When movements associated through habit with certain mental states are partially repressed by the will, the strictly involuntary muscles retain their action, and may be highly expressive; and when, on the other hand, the will is relaxed, the voluntary muscles fail before them. Debility of the brain, Sir C. Bell remarked, is most shown in the case of those muscles which are in their natural condition most under the control of the will. A further mode of expression arises when the checking of one habitual movement calls up another.

The second principle is that of antithesis. When certain movements or gestures have been acquired as aforesaid, and have come to be habitually performed in connexion with a certain state of mind, there will then be a strange and involuntary tendency under the opposite state of mind to directly opposite movements, whether in any way serviceable or not. Hence alone, Mr. Darwin thinks, can be explained, not only the sudden and extreme changes of expression in the attitudes of animals, but many gestures used by savages or by the deaf and dumb. This antithesis in attitude from anger and defiance to affectionate crouching is illustrated by him in the case of the dog and the cat by means of photography. The Cistercian monks, among whom speaking was sinful, invented a gesture language founded upon the principle of antithesis. It is clear that in this principle the will intervenes largely. Mr. Darwin is, however, less confident in referring expressive signs or gestures to the action of this principle than to his third originating cause, the direct agency of the nervous system. When the sensorium is strongly excited, nerve force is generated in great excess, and is transmitted in certain directions, determined by the connexion of the nerve cells, or, where the muscular system is concerned, by the nature of the movements of face or limb which correspond to each nervous impulse. These are, at the first at least, independent of the will, or even of habit, though in later stages habit may have considerable play, inasmuch as nerve force tends to pass along accustomed channels. Mr. Darwin inclines to think that what seem the most strictly involuntary actions, such as the bristling of the hair in fear or anger, may have been effected by the mysterious power of the will. He is far, however, from laying down dogmatic views upon the operation of these various agencies in causing or varying expression, nor is he prepared to draw sharp lines between the action of his three elementary principles. Many phases or signs of expression may partake, he considers, of all three, and may be referable to no single or direct physiological cause. The visible apparatus of expression may of course be taken as muscular; and he begins with laying down diagrams of the various muscles of the face in man, those in particular which are connected with the eyes and mouth. Drawings of animals by Mr. Rivière, Mr. T. W. Wood, and other artists are brought in to show the analogous display of emotion in brutes. A series of skilfully taken photographs, by Mr. Rejlander, Herr Kindermann of Hamburg, and Dr. Wallich, in addition to those borrowed from Dr. Duchenne, gives vivid expression to the play of the features in laughter, weeping, and other manifestations of emotion or character. Suppose we take as an illustration the oblique or upturned eyebrows of a man suffering from grief or anxiety. Every one must be familiar, both from nature and works of art, with the way in which the inner angle of the eyebrow is drawn up under this emotion, the forehead being contracted or wrinkled at the same time. Mr. Darwin evolves the origin of this involuntary movement through the same logical train of sequence by which we have seen him in his earlier and more elaborate works draw out the extraordinarily complex chain of laws which runs through natural history. When infants scream loudly from hunger or pain, the circulation is affected, and the eyes tend to become gorged with blood. In consequence the muscles surrounding the eyes are strongly contracted by an involuntary action as a protection. This action, in the course of many generations, has become firmly fixed and inherited. With advancing years and culture the habit of screaming is partially repressed; but the muscles round the eyes still tend to contract whenever even slight distress is felt. Of these the pyramidal muscles of the nose are less under the control of the will than the others, and their contraction can be checked only by that of the central fasciæ of the frontal muscle. These latter fasciæ draw up the inner ends of the eyebrows, and wrinkle the forehead in the peculiar manner which we immediately recognize as the expression of grief or anxiety. Mr. Darwin differs here from M. Duchenne, who insists upon the independent action of the "corrugators." The corrugations dwelt upon by our author are easily distinguishable from those of a simple frown. The muscles producing them are known to artists as the "grief muscles." They are not to be acted upon voluntarily without some practice. An extreme case of this power is shown in a young actor who posed for Dr. Duchenne's camera, and in a girl specially photographed for Mr. Darwin. Studies of his own children have enabled him to observe the same effect to be produced by the action of strong light upon the eye. The drawing down of the corner of the mouth, another sign of anxiety, is due to the contraction of muscles (depressores anguli oris) which are also among those least subject to the control of the will. These having been brought into strong play during infancy in many generations, it is easy to see that nerve force will tend to flow, on the principle of long associated habit, to these muscles whenever in after life even a slight feeling of distress is felt; and, being less controlled by the will, they may contract, when the expression known as being "down in the mouth" will be given, the other features remaining inexpressive.

Laughter and tears form media of expression which have been often subjected to analysis, but never with the same physiological minuteness and precision as in Mr. Darwin's special chapters on the phenomena of the vaso-muscular and nervous systems. The excess of nervous energy produced by pleasure and enjoyment, passing on by an efflux through the motor nerves to various classes of the muscles, finds a vent in joyous merriment, dancing, clapping the hands, and, above all, in emissions of sound and motions of the zygomatic muscles which draw the mouth backwards and upwards. From the manner in which the upper teeth are exposed in laughter and broad smiling Mr. Darwin cannot doubt that some of the muscles running to the upper lip are likewise brought into moderate action. The upper and lower orbicular muscles of the eyes are at the same time more or less contracted, while the contractile force exerted upon the vessels or glands of the eye causes the same flow of tears in extreme laughter as in sorrow. Both laughing and weeping are seen in a minor degree in many of the lower animals. In children tears do not flow, Mr. Darwin assures us, at the first, but are induced by the effect of prolonged screaming in gorging the vessels of the eye. This suffusion leading at first consciously, and at last habitually, to the contraction of the muscles round the eyes in order to protect or relieve them, the lachrymal glands become affected through reflex action. Thus, although in the first instance a merely incidental result, as purposeless as the secretion of tears from a blow outside the eye, or as a sneeze from bright light affecting the retina, we may understand how the shedding of tears serves as a natural relief to suffering.

Among the special signs or media of expression dwelt upon by the author, we further single out the shrugging of the shoulders, as involuntarily indicative of helplessness and impotence, or as an attitude of apology. Mr. Rejlander's photographs well convey the complex phases of this movement or gesture. Not only are the back or shoulders arched, but the forehead is wrinkled, and the elbows turned in to the sides, and the open palms thrown outwards, with the fingers widely spread. Though more common with more demonstrative races, the shrug is seen in English people of both sexes, as well as in those of French or Italian race. Mr. Darwin's correspondents report it as common among tribes of well nigh every land. We confess ourselves less satisfied with our author's account of the origin of this gesture than with any other of his solutions of the manifold problems of expression. The explanation is simply sought by him in his principle of antithesis. A man indignant, defiant, resentful, as shown in the opposite pair of photographs given for the sake of contrast, holds his head erect, squares his shoulders, and expands his chest. His fists are clenched or grasp a weapon. It is simply in unconscious antithesis that the helpless or apologetic figure seems to say, "What can I do?" "I really could not help it." The rationale of the attitude seems to our author as clear as that before adduced of the dog subsiding to the posture of crouching humility or affectionate fawning from that of threatening or defiance. We are surprised that Mr. Darwin's keenness of analysis did not point out to him how much more directly it may be referred to his third principle, as being due to the constitution of the nervous system, anterior to will and habit. What, let us ask, are we to conceive the kind of attitude into which a man would unconsciously or automatically throw himself under the impression of a danger or a burden impending on a sudden, and overpowering in weight, or of a feeling of guilt, not perhaps heinous in itself, but such as conventionally to disarm a man, and to be atoned for by simple apology? Under a sense like that of a crushing load coming down, in what would the nervous instinct find a vent but in putting up the shoulders, the strongest part, to meet the weight, or to bear the blow felt to be merited—the head being at the same time drawn in somewhat after the instinct of a tortoise, and the shoulders, if it were but possible, being drawn over the head? The hands would as nervously be thrown open and wide, in token of all means of resource, defence, or help, being cast aside. While upon this subject, we would draw attention to the same principle of instinctive, though more conscious, shrinking, as underlying a habit or gesture so

confirmed and all but universal as the use of the right hand in man in preference to the left. No reason for this preference has ever been found in anatomy or physiology; and in none of the lower animals, even the highest of the anthropomorphous races, has it ever been observed. Now we have but to consider how soon primæval man, in his habitual state of warfare and violence, would be impressed by the fact that wounds in the region of the left side were more apt to be fatal than wounds on the right; and, learning to throw back the side of the heart in combat, he would give greater play and enhanced muscular vigour to the right hand and arm and foot. The habit thus acquired would gradually pass on into the general uses of life, the preference becoming so marked as to make left-handed workers and fighters the exception. We are sorry that this particular kind of expressive gesture has not been held by Mr. Darwin to come within the scope of his argument or research. Upon allied phenomena, such as that of nodding, shaking the head in sign of assent or dissent, his powers of observation and analysis have been interestingly employed; and the causes and the significance of blushing, which form the concluding chapter of the book, are traced with much delicacy and truth of reasoning. Space fails us to go more at length into the store of information with regard to human or animal nature which he has to adduce or to explain. As a kind of supplement or *parergon* to his more profound or systematic studies, as well as containing inexhaustible matter of novel suggestion and curious thought, this little work will be found well worthy of the writer's name.

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irrepressible buoyancy sustains him under fevers, hardships, and desertions. He is, we suspect, a trifle hasty in his temper, and perhaps rather more demonstrative than English coolness would approve, and inclined to place a sufficiently high estimate on his own merits. Nor is he quite without his share of that *odium geographicum* of which he speaks, and which leads every African traveller to have a few unnecessary raps at his predecessors. Still it would be most unjust not to acknowledge the respect and liking which we come to entertain for him; and we feel convinced that Mr. Gordon Bennett has only to order him to go to the North Pole, or to travel overland through the most difficult regions of Central Asia, in order to obtain the latest news from those regions, or to hear that his faithful supporter has perished in the attempt.

The main outline of Mr. Stanley's travels is of course already familiar to our readers; and we shall not here discuss the probable significance of Dr. Livingstone's discoveries. Mr. Stanley still holds that the great river Lualaba is the upper course of the Nile; but he admits the difficulties in the way of that hypothesis, and would probably be little surprised if it should turn out to be the Congo. These, however, are questions with which Mr. Stanley's book has really little connexion. It is simply a narrative of the highly dramatic incident of the discovery of Dr. Livingstone; and we know of no book of African travel which has a better story to tell, and few which, on the whole, tell their story more graphically. The narrative naturally falls into three parts. First there is Mr. Stanley's journey from the coast to the charming town of Unyanyembe, the half-way house to Ujiji. Secondly, there are the adventures which befell Mr. Stanley in forcing his way past hostile