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"Nos vero intellectum longius a rebus non abstrahimus quam ut rerum imagines et radii (ut in sensu fit) coire possint."

FRANCIS BACON, *Proleg. Instaurat. Mag.*

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PART II.—REVIEWS.

Darwin on the Expression of the Emotions in Man and Animals. By T. Claye Shaw, M.D.

Mr. Darwin has called his book by the title of "The Expression of the Emotions in Man and Animals," but he has gone into the mechanism of other conditions besides "Emotions." "Affirmation" and "Negation," "Reflection," "Meditation," and "Helplessness," are not necessarily associated with "Feeling," and may more conveniently be called *states of mind* than emotions. If this had been better recognised it would have prevented the making of such an "antithesis" as Indignation on the one hand and Helplessness on the other. An *indignant* man is no doubt in an emotional condition, but a man who shrugs his shoulders in sheer *helplessness* may be, and generally is, simply devoid of all emotion whatever. But then to make and apply this distinction between "emotions" and other states of mind which are unattended with emotion, is to deprive Mr. Darwin of one very important factor in his attempts to explain the origin of "expression." If Mr. Darwin had been as explicit in defining what at the end of the book he confesses himself to have a great difficulty in, viz., "the proper application of the terms will, consciousness, and intention," as he has been in assuming as proved what others have "much difficulty" in believing to have been ever proved, he might have met the reading public more on common ground. In the very last page of the book it is said "we have seen that the study of the theory of expression confirms to a certain limited extent the conclusion that man is derived from some lower animal form; but as far as my judgment serves, such confirmation was hardly needed," and, again, scattered through the pages are phrases to remind us of our forefathers, such are ". . . . . Never noticed a snarling action in our nearest allies, the monkeys, in the Zoological Gardens,"—"We may readily believe from our affinity to the anthropomorphous apes that our male semi-human progenitors," and so on; so that unless we are willing to concede so much to Mr. Darwin it is useless hoping to agree with him. Those only who are "evolutionists," that is, believers in the derivation of species from other and lower forms, can accept many of the theories brought forward to

explain various expressions, whilst those who view man and all other animals as independent creations, or who maintain, with Sir C. Bell, that many of the facial muscles are a special provision for expression, though they expose themselves to the taunt that "by this doctrine anything and everything can be equally well explained," yet may take comfort to themselves that the imagination and flights of fancy necessary to their faith are as nothing to the immeasurable depths and yawning chasms bridged over by the "evolutionist," who can at one moment hang the most weighty conclusion on the slenderest thread, and at another, by free use of the potentials "may" and "might," interpolate a missing link, as yet unseen, but presumably certain. It is a great comfort to readers that Mr. Darwin has taken for granted the descent from an anthropoid ape, as they are by this assumption saved from a long, and perhaps fruitless, discussion; but it by no means follows that because men and monkeys move the same facial muscles in laughter, *therefore* they are descended from a common progenitor. It would be just as good an argument that because elephants weep, whilst none of the monkeys in the Zoological Gardens do so, *therefore* we are descended from a common ancestor with elephants. It is as well to start with a clear idea of Mr. Darwin's position. His basis is, that expression is *an accident* as it were; that certain actions, although they reveal the state of the mind, were not at first either intended or expected to do so; that expression is, therefore, something superadded to the original function. Accordingly, he cannot believe in any special muscle of expression, and he expects that by the help of certain laws which he lays down, and perhaps by some others not as yet enunciated, "some able physiologist" will explain those whose object and origin are still in the dark. It is admitted that expressions of the emotions are serviceable (and will, therefore, be retained and developed), that they are even now innate, so that we have an instinctive power of recognising them, but we are asked to believe that "*at the first* the movements were of some direct use, or the indirect effect of the excited state of the sensorium."

This we notice, that facial expression only occurs after a certain development of brain, and in combination with a loose set of facial muscles; that, however, other movements expressive of emotion may be guessed in animals which have no facial expression, such as in birds ruffling their feathers from fright, or the ruffling of a hen's feathers, or a contented

chuckle, &c.; and in these expressive movements we can see a purpose for a definite end, affording an argument that if passions or emotions can be shown to excite in animals *purposive* movements which are at the same time expressive, we may *à priori* state the same to be the case with ourselves, regarding the muscles of the face. This, undoubtedly, presupposes that certain muscular movements and emotions depend on the growth and development of a certain part of the brain, for all emotions are not produced at birth—witness the sexual element of love. In idiots, where the *potentiality* of certain emotions does not exist, it is impossible by any means to evoke the corresponding expressions. We take, then, attitudes (including those of the face) assumed under various mental emotions to be the direct product of a *certain bodily organization*, allowing that *some* that we recognise as expressions have been artificially adopted for a definite (but now lost) purpose, such, for instance, as the peculiar expression of some savages who show they are pleased by rubbing their bellies or hands. The origin of expression would be in this wise—a certain feeling of joy or grief, of pleasure or pain, is experienced, and muscular movements follow, calculated to promote the one or relieve the other; whenever a similar sensation or emotion recurs there will be a tendency to the repetition of the same action, and at length we come to connect a certain *set* of features with a definite emotion, *i.e.*, we obtain an *expression of the emotion.* Now comes in the element of *Sympathy*, which serves as the glass in which we see ourselves (and which has been so ignored by Mr. Darwin, because, presumably, there is in it that *je ne sais quoi* so repulsive to evolutionists and teleology) which means, as Mr. Bain says, "The tendency of one individual to fall in with the emotional or active states of others, these states being made known through a certain medium of expression." To rejoice with them that rejoice, and weep with them that weep, to conform to the society that we live among, &c., are a part of the human constitution, capable of being generalised under one commanding principle—"sympathy appeals to our feelings as imitation does to our actions." The power of sympathy, that is, the re-presentation by an individual of the state of mind and expression existing in another, is illustrated by the popular theory that a man and his wife become more like each other as they grow older. Certain it is that children, however different from their parents they may be in colour of hair, eyes, &c., do, by sympathy or association, assume the

same type or expression of face. The child of a dim ecclesiastic is always depressed, and "a merry heart maketh a cheerful countenance." Who drives fat oxen must himself be fat. "Sympathy," says Burke, "is a sort of substitution by which we are put into the place of another man, and affected in many respects as he is affected. It may turn on either pain or pleasure, and is the principle by which poetry, painting, and other affecting arts transfuse their passions from one breast to another." After all, "sympathy" is merely sensori-motor action.

The necessity of Mr. Darwin's argument forces him to assume that the demand precedes the supply, that emotion or feeling precedes movement, that before a child cries there must be something to cry for, something rendering it necessary for such and such muscular combinations to occur; that before a dog uncovers his teeth and erects his tail when angry, and finally transmits these movements as heirlooms to his descendants, leaving no room for an "original" dog to devise better means, there must have been the demand for this combination, or being the best possible one for accomplishing the end; and though he has to acknowledge that many of these movements are "independent of will, and independent of habit—due solely to the indirect action of the nervous system," yet he gives as little award as possible to this which most persons look on as the great factor of all expressive movements, and relies mainly upon its association with other "principles" which he lays down. What these principles are we will proceed to examine.

However Mr. Darwin may ignore the fact, yet several eminent physiologists have assigned to the emotions a definite connection with certain parts of the brain; thus Dr. Todd referred their seat to "the posterior and superior part of the mesocephale." He says, "It is plain that that part of the brain which is influenced by emotion must be so connected that the convolutions may affect it, or be affected by it; that it may be readily acted on by the nerves of pure sense; that it may influence the spinal cord and the motor nerves of the face, when the ordinary channels of voluntary action have been stopped. The working of the intellect may act on the seat of emotion through the same channel (the optic thalamus) and an excitement of this part produce movement by its influence on the spinal cord, through the olivary columns." Dr. Laycock regards "the medulla oblongata as at least the seat of the corporeal feeling of pleasure and pain," and others

might be quoted. It is certain that these ultimate facts in the constitution of the nervous system, and other anatomical facts that we recognise, such as that under one set of emotions the flexors contract, whilst the extensors do so under another, will explain on easily understood principles, many (if not all) of the expressive movements, and it says a great deal for Mr. Darwin's "laws," that though he does not seem to have been aware of the researches of modern physiologists in this direction, yet that some of the principles he lays down do strikingly coincide with what would be expected as the functions of a certain ultimate structure and arrangement. Thus the proximity of the nerve nuclei to each other in the medulla oblongata will explain the radiation of nerve force from one to the other, and thence over all the muscles of the body, when an influence of an excessive quantity or kind is brought to bear on the brain, be it an *imaginary* joy or fear, or a feeling of horror or delight, aroused through one of the external senses, or simply an acute pain manifested through the nerves of common sensation. Hence the expression of very great joy or sorrow may be identical, as seen in the alternations of hysterical weeping and laughter in those under great affliction, though no one would for a moment suppose that this condition implied a pleased frame of mind. Let, however, a feeling *less intense* have been excited in connection with one of the sensory nerves—sight, for instance—so long as the channels are sufficient, if the term may be used, for carrying the excitement, the movements resulting are chiefly in relation with the sense in question, and though by association and habit other muscles may be involved, we are in a better position for seeing how this must or may be so from recognising what has been demonstrated concerning the relations and interconnections of the nuclei and ganglia.

Arguing backwards, an "expression" may often be seen to pass over the face of a person when it is quite clear that no emotion has been present; for instance, watch a person pressing a hard substance with the teeth—it is not uncommon to see a decided expression of grief from the action of the corrugator supercilii. Why, then, if the corrugator supercilii is the "grief muscle," does not the feeling occur? Because, on *true principles of physiology*, the emotion has not been caused; the nuclei in the neighbourhood of the fourth ventricle and the muscles connected with them have been aroused, but the influence has not spread upwards

into consciousness. It is, indeed, doubtful whether an emotion can ever be recalled, as some assert it can, by simply placing the features in a certain combination. It would seem that, as in sympathy, the impression must first be made on some one of the spinal sense apparatus, as when seeing an actor on the stage pourtray some emotion strongly and vividly we unconsciously follow him in the expression; yet even in this case it is curious how, though many will—be it from sympathy or from any law of association or otherwise—assume the kindred expression, still the *idea* accompanying the emotion (and there is always an *intellectual* accompanying the *emotional* element) will in most be different, judging, at least, from the similes used by different persons in comparing their feelings. Hence we can understand how there must be one form of manifestation for all varieties of the same feeling, and, on the principle that nerve-manifestations follow accustomed tracks, pleasing feelings which are associated with an expansive or receptive condition of sentient surfaces will, when acting downwards, display themselves by an expansive expression, just as hurtful or unpleasant feelings will act in an opposite or repulsive manner.

Of the six means taken by Mr. Darwin to ascertain, "independently of common opinion, how far particular movements of the features and gestures are really expressive of certain states of the mind," one was the study of the insane. Few of modern days can, perhaps, approach Mr. Darwin as an observer, and it is to be regretted that he has not been able to study for himself the conditions of the insane rather than have been obliged to receive these second-hand, at the risk, as will be shown, of occasionally doubtful information. What was to have been expected from the study of expression in the insane? The insane are notoriously creatures of impulse and habit, whilst among them are monstrous and debased forms of the higher intellectual faculties, in which from, shall we say, an approach to the feral condition the higher states of mind are absent. "A faint echo," says Dr. Maudsley, in a brilliantly-written sentence, "from a far distant past, testifying to a kinship which man has almost outgrown." Accordingly, it appears that whilst in the latter certain forms of expressions are never seen, in the former the expressions are the same as in those of sound mind, with the addendum that under the persistence of a joyous or a painful state the particular expression is *more continuous*, and, therefore, by the law of association and habit, will lead to its

strong repetition on the slightest cause; or, when one muscle of a group forming an expression is affected by a chance spasm, the appearance of the expression will be powerfully superinduced, even though no emotion, or, perhaps, one directly opposite to that expressed, may be felt. Who has not noticed the deep furrows on the faces of the chronic insane, the busiest of busy wrinkles, or has not seen an expression of melancholy pass over the face of one who, when in a placid interval, happens to excite one of the group of the weeping muscles? What, however, in the expression among the insane we gain most information from, is the alteration that occurs in general paralysis, where the interpretation by others of an existing expression is directly opposed to the emotion itself. For instance, in the advanced stages there is paralysis or great enfeeblement of the orbicularis oris, shown by inability to compress the lips, as there is also of the elevator muscles of the upper lip; the tongue, too, is affected, but the most manifest impairment is in the utterance of the explosives p, b, &c., all of which require perfect power over the lips. Now one of the commonest expressions among general paralytics is that of grief, it being at the same time clear that no corresponding emotion is present. How does this occur? The muscles about the mouth are the first to become affected, whilst those in the upper part of the face are intact, and come into play as a kind of *extraordinary muscle* of articulation. Either thus, or from a difficulty in pronunciation, a frown is produced, or an action of the corrugator supercilii with the central fasciæ of the occipito-frontalis muscle, giving a strong expression of grief. In this way, though a joyous and "large" feeling really exists, the very opposite would, from the "emotional expression," have been guessed. The expression is probably not quite perfect, because mixed, but a real deception is caused by it. The study of cases of labio-glosso-pharyngeal paralysis and of unilateral paralysis of the face is very instructive in showing how completely unfelt emotions may be simulated under the altered relations of the facial muscles. But it is time to examine the three principles which "appear to account for most of the expressions and gestures involuntarily assumed by man and the lower animals under the influence of various emotions and sensations."

The first is that of "serviceable associated habits." Certain actions are of direct or indirect service under certain states of mind 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 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 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 likewise expressive. The force of association has been long acknowledged by writers on mental science, as Messrs. Bain and Spencer, to be of the first importance in explaining phenomena, and Mr. Darwin has brought from his wonderful store of knowledge of the animal kingdom many facts in support of it, whilst he has been most successful in employing it for the interpretation of expressive movements in man. There can indeed in these days of Protoplasm and Bioplasm be no difficulty in admitting almost any amount or number of transformations and combinations that may be effected from the plastic nature of organic and organised matter.

We are, sometimes inconveniently, creatures of Habit. We cannot get up early any morning to catch a train, without, *nolens volens*, awaking at the same hour the next morning. In a recent article in the "Contemporary Review," Dr. Carpenter, speaking of this force of association, relates how a certain gentleman going to his bedroom to dress for dinner, actually, from sheer force of habit, wound up his watch and got into bed! Certain horses, again, called by the natives "Aguilillos," have acquired as an inheritance a shambling run, a specially developed combination of movements of the legs in consequence of their ancestors having been artificially broken to the pace. Plüger's well known experiment on the decapitated frog, the pushing forwards of the feet by cats when pleased, the turning round and round by dogs before lying down, the scratching of the head when puzzled, and many other actions, small in themselves, are urged by Mr. Darwin as illustrative of his principle, and a very curious instance is quoted from Mr. Galton to show how unmeaning and purposeless gestures may be transmitted. He even allows that sympathy may have come into play primarily, as when "children learning to write often twist about their tongues as their fingers move, in a ridiculous fashion,"

although in the opening chapter of the book he is rather hard upon Gratiolet for ascribing to sympathy a movement which certainly does seem better so explained than in any other manner, viz. :—following the movements of a billiard ball by a similar or "sympathetic" inclination of the body. Habit is the volitional repetition of similar acts under similar circumstances, and closely connected with it comes reflex action. The whole of this very interesting chapter will probably meet with universal approval, unless some may perhaps take exception to the assertion that "sneezing and coughing were originally *acquired* by the habit of expelling as violently as possible, any irritating particle from the sensitive air passages." It would appear that "sneezing and coughing" were from the first purely reflex actions, as much so as contraction of the iris under a bright light; for in the first place they belong to the respiratory system, which is peculiarly an independent system, and almost entirely free from control of the will, next, the muscular combinations are very intricate, and one cannot easily imagine how such a complex arrangement so admirably adapted to its end could have been first voluntarily acquired, and then transmitted; thirdly, these actions are performed perfectly before will is developed and in animals of very low order in the scale of creation, and they act when the will is suspended, as in "destructive lesions" of the brain; and, lastly, a favourite argument of Mr. Darwin's, we cannot by any voluntary means exert these muscles as powerfully as they act when doing so automatically. "Why the act of clearing the throat is not a reflex action, and has to be learnt by our children," Mr. Darwin "cannot pretend to say." Is it not because the natural way of clearing the throat is *by swallowing*, a reflex action stronger and more often used than forcible expulsion by a sudden artificial expiration? The observations on animals acting under the influence of this law are all true to life, and, indeed, its all-pervading influence is seen in every chapter of the book that follows. By-the-bye, is it not possible that the scratching backwards by a dog of all its four feet has nothing whatever to do with voiding its excrement, but is simply done from the desire of getting rid of the uncomfortable sensation produced by over-grown toe nails, for dogs, no more than wolves and jackals, ever cover up their excrement as cats do, and it is no science to presume a "purposeless remnant originally followed by some remote progenitor of the dog genus," when we have a readier, and quite as plausible, explanation at hand?

The second general principle is that of "Antithesis." "Certain states of mind lead to certain habitual movements which were primarily, and may still be of service; and we shall find that 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 have never been of service. This "principle" has involved him with most of the critics, and on first sight one is tempted to exclaim, "Ad Triarios ventum est." This is the last excuse of a man pushed into a corner for his explanation, and choosing any rather than none at all. Does it follow that because one side of a shield is seen to be white, and it can be shown why it must be white, *therefore* the other side, which is black, must be so *by antithesis?* or because the black side is first seen and cannot be accounted for, it is *because* in some shields we can explain why the other side is white? Yet this is quite as logical an argument. True, the principle is only occasionally brought in to account for a puzzling phenomenon, and Mr. Darwin seems to feel its weakness, and even to anticipate the objections to it, for he says (p. 288) "It may be asked, why should surprise, and only a few other states of the mind, be exhibited by movements in antithesis to others. But this principle will *not* be brought into play in the case of those emotions such as terror, *great joy*, &c. &c., which produce certain effects on the body." Turning back to p. 51 we find that the actions in a dog resulting from "*great joy*" are quoted as typical of these antithetic gestures! Shrugging the shoulders seems the "best instance of a gesture standing in direct opposition to other movements naturally assumed under an opposite frame of mind;" and though he gives some instances not innate where the principle seems to be asserted, yet he is surprised how few are unequivocal; such are the gesture language of the Cistertian Monks and the signs used by the deaf and dumb. It seems at one moment as if Mr. Darwin was going to allow us an easy solution of these movements, for he says "there is no *à priori* improbability in the supposition that gestures manifestly of an opposite nature to those by which certain feelings are already expressed should at first have been voluntarily employed under the influence of an opposite state of feeling;" but the cup is immediately dashed from our lips by what follows—that "it is more than doubtful whether any of the cases which come under our present head of antithesis have thus originated!"

His next principle seems to be quite enough to explain these antithetic movements, viz., that "when the sensorium is strongly excited, nerve-force is transmitted in directions dependent on the nature of movements habitually practised, or the supply of nerve-force may be interrupted." Thus, when a dog is strongly affected, as in the now well-known instance of the dog with the "hot-house face," it was to have been expected that the feeling would be shown by the passage of nerve-force along the tracks usual under such a sentiment. Not that it is for a moment necessary to suppose that the dog voluntarily put on his dejected attitude, though it is not quite so certain that "it cannot be supposed that he knew that I should understand his expression." Is not Mr. Darwin rather arbitrary in his selection of the antithetic expression? The expression of joy or humility may be the one naturally assumed from the first, whilst some dogs never feel savage or show fight. Would it be said here that the "good and gentle" element had been a special modification inherited from some pacific line of ancestors? How are animals to know (as undoubtedly they do) and correctly interpret the emotions of other animals not possessed of language, unless the "expression" has a definite meaning to them? And if they can thus correctly interpret the meaning of certain expressions it is impossible to deny them the *intention* of certain attitudes assumed for distinct purposes. "The principle on which this is founded appears to be, that every movement which we have voluntarily performed throughout our lives has required the action of certain muscles, and when we have performed a directly opposite movement an opposite set of muscles has been brought into play. As the performance of ordinary movements of an opposite kind, under opposite impulses of the will, has become habitual in us and in the lower animals, so when actions of one kind have become firmly associated with any sensation or emotion it appears natural that actions of a directly opposite kind, though of no use, should be unconsciously performed, through habit and association, under the influence of a directly opposite sensation or emotion."

That is, Mr. Darwin, after distinctly premising that for the development of movements which come under the present head some other *principle distinct from the will and consciousness* must have intervened, proceeds to state that such and such actions result from *different conditions of will*, and *from these* draws an analogy to actions connected with sensations

and emotions! Was there ever such a complete ignoring of premises in any scientific deduction? Besides, in the order of development of functions of mind, feeling and emotion *precede* will, and though it may be true that in performing the voluntary act of lifting or lowering a weight an opposite set of muscles has been brought into play, it is by no means so that opposite emotions are displayed by antagonistic groups of muscles. In the "opposite" actions, done under certain states of the will, where antagonistic muscles are called into use, there may be the same absolute feeling or emotion present, and, conversely, emotions of an opposite character may succeed each other without being expressed by such "opposite" muscles as are used in turning to the right or the left, indeed the muscular expression of opposite emotions *may be identical.* The typical cases to show this principle of antithesis, if analysed, though they point to a *difference* in the position assumed under the different emotions of anger, and joy, or pleasure, are not directly antithetic in the sense of positive and negative; thus, "when a dog approaches a strange dog or man in a savage or hostile frame of mind, he walks upright; his head is raised, tail held erect, and quite rigid, hairs bristle, ears directed forward, and eyes stare. Let us now suppose that the dog suddenly discovers that he is approaching his master. Instead of walking upright, the body sinks or even crouches; his tail is lowered and wagged from side to side; his hair becomes smooth; his ears are depressed and drawn backwards." Will any one, in looking at the illustrations accompanying this description, say that the attitudes are directly the opposite of each other? The same is true of the description and illustration of the angry and pacific cat; in this instance, in order to give play to the "principle," we have two emotions combined on one side (cat in fear and in anger), to oppose to one feeling on the other. Nor are we more fortunate in examining some of the gestures in men. Indignation and helplessness are not "antithetic" emotions, and the attitude of a helpless man may be quite as well explained on another hypothesis as by contrasting it with movements performed under an emotion with which it has no especial relation. So again, the movements assumed under a state of *astonishment* are said to be directly antithetic of those assumed in a listless frame of mind; but is it right to call astonishment and listlessness opposed emotions? Surely attention and listlessness are the direct antithesis of each other, and the expression of

astonishment is not the same as that of attention. If we arrange in antithetic order a few of the emotions (so far as such "opposition" is applicable to states of mind) and compare the expressions and attitudes assumed under them, the doctrine of antithesis will prove unsatisfactory, for many, though strongly expressed on one side, are almost negative on the other; thus, anger and kindness, joy and sorrow, courage and cowardice, hope and despair, power and impotence, pleasure and pain, love and hate, terror and confidence. Therefore, on the grounds that movements under feeling precede those under will, that some states of mind have been classed as antithetic where no opposition can be shewn to exist, and that some of the attitudes displayed under these opposed states are only modifications, and not real antitheses, whilst the principles of direct nervous action and of association by habit can be made to explain all, Mr. Darwin's second principle must, apparently, be accepted with reserve.

The third principle is, that certain actions which we recognise as expressive of certain states of the mind, are the direct result of the constitution of the nervous system, and have been from the first independent of the will, and, to a large extent, of habit. Good instances are afforded by the trembling of muscles, sweating of the skin, the modified secretions of the alimentary canal and glands, loss of colour of the hair under extreme terror or grief, direct action of the heart, involuntary erection of the hair. But this principle is often in a complex manner combined with that of habitually associated serviceable movements; thus, in the violent movements that take place under extreme suffering, the undirected radiation of nerve-force from the nerve-cells which are first affected, the long-continued habit of attempting by struggling to escape from the cause of suffering, and the consciousness that voluntary muscular exertion relieves pain, have all probably concurred. "Under a transport of joy or of vivid pleasure, there is a strong tendency to purposeless movements, and to the utterance of various sounds." Does not this explain the purposeless movements of a dog in a pleased state of mind better than the doctrine of antithesis? If an emotion does not lead to action, it does not, says Mr. Darwin, cause any outward sign, and so we are enabled to tell the important part played by the principle of associated habit. The instance selected to exemplify this is not a felicitous one. Few will be disposed to admit that "a mother, feeling the deepest love for her

helpless infant, may not show it by outward sign." The principle of antithesis is invoked to co-operate with this third law, as when "a frantic woman rushes about, tears her hair or clothes, and *wrings her hands.*" This latter action is due to the second principle, betraying an inward sense of helplessness. To what movements are wringing of the hands antithetic, and why may not this action be explained, as the other wild and violent movements are, by the flow from the surcharged and liberated nerve-force? Even the change from extreme action, in the case of frantic grief, to despair, may merely be the result of exhaustion of the nervous system, without the consciousness that "nothing more can be done." A recent writer on expression, Dr. Daniel H. Tuke, in a work entitled the "Influence of the Mind upon the Body," has also elaborated a "principle" which agrees to a large extent with Mr. Darwin's first, that of serviceable associated habits. Feeling dissatisfied with Sir C. Bell's assertion that "the outward signs of passion in the face and elsewhere are to be traced to the heart and lungs, and all the extended instruments of breathing," he sees "something more than this —a certain fitness between the emotion which agitates the muscle of the mouth and nostrils, and the form which they assume, and which may be due to the action of another and more comprehensive principle." "This principle rests on the fact that the functions of the bodily organs are assisted and guarded from injury by, and, in short, are dependent on, the action of the muscles. In regarding the action of the emotions, therefore, upon the muscles, it seems natural to trace their movements to their *original use and signification* in their immediate connection with the bodily organs, particularly those of special sense." "As all movements have as their great end the preservation as well as the enjoyment of the individual, and as contraction and relaxation take place primarily to attain this end, a *general expansiveness of expression* and gesture is allied with all the emotions which are excited by impressions of a beneficent character, while a general *exclusiveness or contraction* ofthe features is allied with emotions excited by maleficient impressions; the object of one class of movements being to court and receive, and of the other to avoid and reject." "We suffer pain of two kinds—bodily, as toothache; mental, as grief or anxiety; and when the latter occurs the outward signs, allowing for local differences, are curiously similar to those which are exhibited in the former. Hence when joy

and fear respectively cause respiratory and cardiac excitement, the expression of the features is entirely different—the form assumed being determined by the corresponding bodily form excited by common and special sensation—the rough outline representing common sensation and the delicately specific shades answering to the predominating special sense figuratively affected." Thus Mr. Darwin and Dr. Tuke seem, independently, to have arrived at somewhat similar conclusions as to the origin of the expression of emotions.

The chapters of the book that follow the enunciation of the three leading principles teem with observations of the marvellously minute and exact character in which Mr. Darwin so excels; they require, and well deserve, the most attentive perusal. Many kinds of animals are brought under notice, and the signs and gestures of all people from the uttermost parts of the earth have been obtained, partly through Mr. Darwin himself in his travels, and partly by answers to a series of printed questions which were circulated, with the result that "the same state of mind is expressed throughout the world with remarkable uniformity. This fact is interesting, as it affords a new argument in favour of the several races being descended from a single parent stock." There are, of course, amongst different nations *tricks* of expression due to the inheritance of some at one time capriciously adopted gestures (just as we see oddities transferred in families from father to son, and so on through a considerable line), which gesture may be quite peculiar and seen in no other people; but the many points of close similarity in the various races are due to inheritance from a single parent form, and prove that the races of men are not descended from several aboriginally distinct species. The emission of sounds by various animals under emotion is accompanied by a theory of the acquirement of musical tones in man before speech, and how it is that a different pitch of voice is related to a certain state of feeling. An attempt is made to bring the principle of antithesis to explain the cacchinations and screams from pain in monkeys; the satisfied grunt of a pig and its harsh scream of terror or pain; the bark of anger and that of joy in a dog. "As might have been expected," the operation of this "law" is doubtful. The erection of the dermal appendages is of more direct interest to us, as a special application has been made by Mr. Darwin of some of his theories to the condition of the hair in the insane. "Hardly any expressive movement is so general as the involuntary

erection of the hair, feathers, and other dermal appendages. These are erected under excitement of anger or terror, and the action serves to make the animal appear larger and more frightful to its enemies or rivals." Then comes a body of facts, showing how general the action is with mammals, birds, and reptiles. The action is referred to the class of those induced by the direct action of the nervous system, like sweating and trembling, independent of the will. Still it is "hard to admit that the creation of the dermal appendages by which an animal is made to appear larger and more terrible to its enemies should be altogether an incidental result of the disturbance of the sensorium." Now comes the crux. The *arrectores pili* are unstriped muscles. How then can they be brought under the influence of the will? Mr. Darwin would gladly take refuge in such an argument as that the arrectores from being once voluntary muscles had since lost their stripes and become involuntary. But no pretence for such a line of policy can be shown. Nor is there any more reason for believing that the converse can occur, that a striped muscle is ever replaced by unstriped. Some other explanation must be sought, and it is suggested that in the first instance these hair muscles were slightly acted on in a *direct manner*, as in our so-called *goose skin*, that a channel for the rush of nerve-force was thus acquired, rendering such erection more likely to follow on the next recurrence of the emotion. After a certain time, animals, seeing the effect of this erection on the appearance and bulk of the bodies of their rivals, would (might?) have wished to make themselves appear larger and more terrible by voluntarily assuming a threatening attitude and uttering harsh cries. Hence not only are actions done by involuntary muscle, but possibly (?) animals might when "dimly conscious" of a change in the state of their hair act on it by repeated exertions of the will! Variation and natural selection have also here come into play. Now it seems pretty clear that Mr. Darwin has confounded in his arguing on this subject two distinct actions; one, the action of the voluntary muscle, the panniculus carnosus; the other, the action of the minute arrectores pili, involuntary muscles, which as shown by Kölliker are attached in the deep layer of the skin to the capsules of the small hairs, and *enclose the glands at the bases of the follicles.* The former is the muscle used when a dog approaches another in a hostile frame of mind, when a lion erects his mane in a rage, when any alteration occurs in the direction under anger of

the hair on the scalp of a man. The latter are the set brought into play under emotions of *fear*, where the whole body shrinks into as small a condition as possible, in the "rigor" preceding an attack of acute disease, or in different conditions of the skin in connection with its use as a secreting organ. In describing the attitude of an attacking dog, Mr. Darwin says the "hair bristles especially along the neck and back," and these are just the parts where the panniculus carnosus has most play; but the hairs over the parts of the surface are by no means erected, those namely which are acted on by the arrectores pili. Take again the instance of a cat in anger not combined with fear, there is only a slight or no erection of the hair; whilst in the state of fear there is a universal bristling all over the body, more a secondary result of the suppressed action of the skin than a primary erection due to a voluntary muscle such as that used in anger. Let us now turn to the subject of erection of the hair in the insane. It is, as Dr. Brown says, not always associated with terror. In by far the majority of cases, there is no element of terror in them, and where the greatest alteration in the condition of the hair is seen (as in some chronic insane and idiots), there have never been any symptoms of terror or rage sufficiently prolonged to have given rise to an associated habit. Several causes have concurred to materially alter the condition of the hair in the insane, and chiefest of all is the changed and imperfect action of the skin, especially as regards the sweat-glands. Anyone knows how difficult it is to brush the hair when the digestion is out of order, and chronic dyspeptics have an habitually shock head of hair. Now the skin of the insane is, as all who have seen the effects of the Turkish Bath and the peculiarly sticky nature of the sweat know, very defective in its action, and in acute mania the glands of the skin are in some way especially suppressed in their action, for a maniac may rage about for hours in the most violent manner without sweating in the least degree, and some patients in the Turkish Bath cannot be made to sweat at all. Any cause, therefore, that tended to lock up the secretions of the sweat-glands, such as contraction of their orifices, would at the same time *alt r the direction of the hair* so that in all probability the altered blood which is at the bottom of the skin affection is more the cause of any alteration in the state of the hair than is an emotion of fear or rage. Besides, when the hair is affected

under rage it is (as in the case of the dog), just those parts which are more immediately under command of the occipito frontalis which are moved. Change in the condition of the digestive organs also modifies the *electrical* state of the hair, for when, owing to suppressed action of the cutaneous glands, the hair becomes dry, the slightest friction, whether by brush or the hand, developes a curious state of attraction and repulsion in the individual hairs. So long as this imperfect action of the skin continues, then so long should we expect the rough state of hair to remain. In all persons who have the hair "hogged" that is, cut very short—as in some places on the Continent—a peculiar erect condition is after a time superinduced, and there is no doubt that the system pursued in most asylums of keeping the hair cut short, especially in the troublesome and violent persons, has rendered this change of direction more conspicuous. The cropped heads of the French are doubtless in part due (if not chiefly) to the close way in which for generations the hair has been cut. Owing to disturbance in the circulation of the brain and tissue of the scalp in the insane, a thickened condition extending to all the parts forming the scalp is not uncommon. This would of course tend to increase the effect of the above-mentioned states on the hair, whilst the hairs themselves grow faster and are rendered coarser, and more liable to take on the erect state.

There appears then to be no other reason for giving a different explanation to the erection of hair in the Insane, than there is in those of sound mind. When it occurs *voluntarily* under the influence of rage it is simply partial, and due to a very slight alteration of direction from the action of the occipito-frontalis. When under the influence of terror or in a state of chronic insanity (the best instance of altered direction of the hair we ever saw, was in a *demented* girl without any but the most vegetative existence, whose skin was always dry and cold), a bristling is noticed; it is a secondary effect due to changes in the skin, especially of the sweat glands, and is no more connected with emotion, as emotion, than is the crop-head of a foreigner to be ascribed to it. When therefore it is attempted to explain the erection of the hair in animals under different emotions by changes wrought through *disease* in the Insane, the analogy seems to fail, and it is a pity that Mr. Darwin has not kept distinctly forward the difference between the *moving of a portion of surface with hair on it* AS A WHOLE, and the *separate movement of each*

particular hair whilst the surface to which they are attached remains stationary.

The fifth chaper is devoted to special expressions in Dogs, Cats, Ruminants, and very fully in Monkeys whose modes of rendering such states of mind as astonishment, anger, pleasure, &c., whilst in some degree they resemble the expressions of man, yet in others, as weeping and attention, are different, or absent altogether. Weeping, as an expression of suffering, has received great attention at Mr. Darwin's hands. It is still by him considered as a *habit*, acquired since the period when man branched off from the common progenitor of the genus homo and of the non-weeping anthropomorphous apes. Following Sir C. Bell, the cause of contraction of the muscles round the eye during screaming is shown to be of serviceable origin by defending the eye from injury under a different condition of the circulation within the globe. The "order of contraction" of the muscles is well observed, and the fact of the depressor anguli oris being less under control of the will than the other muscles, is particularly noted, as depressed corners of the mouth are often seen in persons who try to restrain their emotions unsuccessfully. Sobbing seems to be peculiar to the human species; no monkey has ever been known to sob. It is, indeed, closely connected with the secretion of tears, and does not occur at a very early age, before, in fact, tears are secreted." Mr. Darwin thinks that "it 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." This explanation seems most probable, but is perhaps not all, for the fact of the action only arising after tears are secreted, connects it in a special manner with them, the object of the short, jerky inspirations being to prevent the tears which flow down the nose from falling on the upper lip, and to bring them into the pharynx, where they can be swallowed. Again, sobbing occurs at the end of a protracted crying fit, that is, when from the prolonged expiration the lungs are much emptied of air, and the chest walls are contracted; it is something like the hiccough that comes on after a severe fit of laughing, and the jerky inspiration of sobbing probably is a reflex act due to the accumulation of deleterious products in the lungs, and the necessity for a change of the air. Why, again, sobbing is not seen in very young children is, perhaps,

because the crying fit is not so prolonged in them as to lead to the requirement of this spasmodic refilling of the lungs with air, so that after all the shedding of tears *may have nothing to do* with sobbing more than being a mere concomitant of it, for as children of a later age do have most protracted fits of crying, implying great emptying of the lungs, the necessity for receiving air would be equally great, whether tears were secreted or not, but as they are observed to be first secreted at the time when in a child these protracted crying fits occur, a significance as to their necessary connection with sobbing has been urged, which scarcely, on a close analysis, seems justifiable.

In explaining the cause of the secretion of tears, Mr. Darwin has, it appears, in his anxiety to give a physical explanation wherever possible, somewhat exaggerated the action of the orbicular muscles on the lachrymal gland. He says, "That after a certain stage of development (for the lachrymal gland is not found to act in infants until after many days) whenever the muscles round the eyes are strongly and involuntarily contracted tears are secreted, often in sufficient abundance to roll down the cheeks, as in laughing and crying, coughing and straining. The contraction must be *involuntary* and prolonged, for these *involuntary* movements are more energetic. In the act of yawning the tears are apparently solely due to the spasmodic contraction of the muscles round the eyes." It does seem as if the action of these muscles on the gland has been exaggerated; for, look at the position of the gland, placed deep under the external angular process of the frontal bone, with only a very slight part of it protruding. Again, we may deny most distinctly that in the act of yawning there is a very strong contraction of the muscles around the orbit; why, it is very rarely that the eyes are completely closed in yawning! Where, then, is the external pressure to come from? True it is that in yawning there is an embarrassment of the respiration, which, on principles quoted from Mr. Bowman and Professor Donders, may lead to engorgement of the eyeball, and perhaps also of the gland, but (is it from the principle of habit?) the greatest flow of tears is often associated with the very slightest yawn. Can we not see a better reason for the connection between yawning and lachrymation, in the fact that the depressor muscles of the jaw are supplied by the same nerve as the lachrymal gland, and that it is extremely likely that a radiation of nerve force from any cause should implicate all or some of

the most usual of the ramifications of the nerve. This would also explain, from the connection of the fifth with other nerves, the peculiar choking feeling in the pharynx (not noticed by Mr. Darwin) whenever weeping occurs, or is attempted to be suppressed. It will shock all poets and sentimentalists to read the conclusion arrived at—that "we must look at weeping as an incidental result, as purposeless as the secretion of tears from a blow outside the eye." If this view be generally adopted, Magdalenes may cease to weep, and mourners dry "the cunning waters of their eyes," for they will find no sympathy in a practical age, which would deny a direct emotional purpose in this tenderest of all expressions, even to an angel. The obliquity of the eyebrows is made a special subject by Mr. Darwin, and has been by him worked out in a most ingenious and painstaking manner. If any expression has ever been considered as special, that is, if any muscles have ever been deemed to specially serve for the expression of an emotion, they are the corrugator supercilii combined with the central part of the occipito-frontalis. The expression is certainly very marked, and has been adopted by innumerable painters whenever they have wished to exhibit grief; for instance in the "Francesca di Rimini," or in the pictures by Rubens in Antwerp Cathedral. Certain it is, however, that the expression may be there when no feeling whatever of grief is present, and when a direct explanation on other grounds is at hand. For several years Mr. Darwin was unable to see why grief or anxiety should cause the central fasciæ alone of the frontal muscles, together with those round the eyes, to contract. Here seems a complex movement for the sole purpose of expressing grief! The explanation is best given in his own words, "we have all of us, as infants, repeatedly contracted our orbicular, corrugator, and pyramidal muscles in order to protect our eyes whilst screaming; we cannot when distressed and wishing, when older, to restrain our emotions, prevent, in consequence of the force of habit, a slight contraction of the above-named muscles. But the pyramidalis muscles seem to be less under the control of the will than the other related muscles, and their contraction can be checked only by the antagonistic contraction of the central fasciæ of the frontal muscle. The result is the oblique drawing up of the eyebrows, the puckering of their inner ends, and the formation of rectangular furrows on the middle of the forehead."

This expression has been noticed amongst Hindoos, Dhaugars, Malays, Negroes, Australians, and in old Greek sculptures—it is, indeed, universal. There is, however, another explanation of these "oblique eyebrows," as seen in the expression of grief or suffering. Wherever the combination is seen there will be noticed *an upward direction of the eyes*, and the circumstances are such that a feeling of devotion or of longing for assistance from a higher Power is present. Now devotion is generally expressed, as shown by Dr. Maudsley, in his lectures on "Body and Mind," by a *contraction of the elevator muscles of the eye*, so that the *eyeball is upturned*, and we might say that under a feeling of Grief the corrugator supercilii is contracted (grief being of the nature of a concentrating, as opposed to *expanding* emotion), but the tendency of the mind, when under grief or sorrow, is to look upwards for help, as to a *superior* Being, hence the muscles which elevate the eyebrows and the eyes themselves, will be upturned; but the corrugator supercilii has, from its very position, a *mechanical advantage over the outer fasciæ of the occipito frontalis, which it has not over the* CENTRAL *fibres;* these central fibres, therefore, contract under the influence of the upward impulse, and the result is the "horse shoe" mark or oblique eyebrows. When not acting themselves, these facial muscles often serve as *points d'appui* for the action of others, or, in some instances, as substitutes for them, and the deep wrinkles in and about the brows of those with mobile face muscles testify to both these purposes. As a curious fact, it is worth noticing, in connection with the secretion of tears, that idiots very rarely weep, that is, true congenital idiots; they may laugh to an immoderate degree, or storm in impotent rage, but tears are rarely seen. The same is the case with crétins; but in both these classes of beings the "grief muscles" come into play as expletives of other facial movements, and "oblique eyebrows" occur without the slightest development, apparently, of any corresponding emotion. Professor Partridge used to relate in his lectures the case of a gentleman in whom, for certain reasons, the corrugator supercilii was divided subcutaneously, one of *the effects being an increased flow of tears;* this result being most likely due to some reflex action on the lachrymal gland, though Mr. Darwin might take advantage of it as showing why the attempt to restrain weeping in those under an emotion of grief should lead to a contraction of the "corrugator." In whatever way the emotions of grief and

sorrow, and the expressions caused by them, are viewed, Mr. Darwin, by his lucid and vigorous analysis, must be acknowledged to have thrown a flood of light on the subject.

Beyond a recapitulation, with some few additions, of the form of the face in laughter, Mr. Darwin has little to say in explanation. There is an attempt to explain the cacchination by a sort of antithesis—"as in distress the expirations are prolonged and continuous, with the inspirations short and interrupted, so it might have been expected, as is the case, that with the sounds uttered from joy the expirations would have been short and broken, with the inspirations prolonged." Like weeping, laughter seems to be developed only after a certain stage of development, and the gradual transition from the first appearance of a smile to a fully-developed laugh was noticed by Mr. Darwin in a child between the 45th and 113th day after birth. There is to be noticed occasionally an expression recognised as suppressed mirth, apparently due to a combination of muscles somewhat resembling that of the corrugator and occipito-frontalis in the emotion of grief; namely, the firm contraction of the obicularis oris and the depressor anguli to counteract the zygomaticus and the elevator muscles of the upper lip. The corrugator and orbicularis oris often act together, seem to become associated by habit (as in frowning, bearing pain, &c.), as do the occipito-frontalis and the zygomatici, and a curious illustration of this occurs in the attempts by patients in an early stage of general paralysis to suppress laughter; for owing to the weakness of the constrictor muscle of the mouth the zygomatics have more power, whilst the corrugator and frontalis, acting together from previous association with the other, give a comical expression of *grief*, none of course being felt. The jerking noise owing to the sudden expulsion of air through the nose and upper nasal passages renders suppressed laughter an easily recognised and well-known expression. There is a freemasonry amongst mankind in the facial expressions of pleasure and delight, though not in the mode of showing affection.

How different is Mr. Darwin's description of music from Milton's! The former says, "Music has a wonderful power of recalling in a vague manner those strong emotions felt during long-past ages, when our early progenitors courted each other by the aid of vocal tones," and "Music often produces a thrill or slight shiver, which runs down the backbone

and limbs of many persons when they are powerfully affected." Listen now to the latter—

> "And ever against eating cares,
> Lap me in soft Lydian airs;
> In notes with many a winding bout
> Of linkèd sweetness long drawn out;
> With wanton heed and giddy cunning
> The melting voice through mazes running;
> Untwisting all the chains that tie
> The hidden soul of harmony."

Utrum horum mavis accipere!

Under the head of "Disgust," and to account for vomiting from a mere idea, we read that the suspicion arises that "our progenitors must formerly have had the power of voluntarily rejecting food which disagreed with them." It is a well-known fact that some idiots "chew the cud," *i.e.*, they at times vomit their meals and eat them again; but this is anything but the regular and voluntary action of ruminating animals, and cannot be placed in the same category. Mr. Darwin's explanation seems forced and unnecessary. Is it not more probable that, as vomiting from some real cause always causes a feeling of nausea going upwards, so when in the higher centres, from an idea or sickening sight the same or a kindred feeling is experienced, the expression of nerve-force will take the same channels? How could "our progenitors" formerly have rejected food which disagreed with them, except from an amount of reasoning power which it is futile to assume? Before a substance can be estimated as to its agreeing or not with the body, it must be digested, or, at any rate, passed on through the stomach, and would, therefore, if it did not of itself excite vomiting from irritation whilst in the digestive passages, be out of the power of rejection by the will. We see that animals refuse to take by *instinct* (an apology is due for using this word without shewing that this "instinct" is a result of experience which has now become innate) certain articles of diet, whilst they have no power of voluntarily rejecting all matters which disagree with them, by vomiting; for instance, a dose of castor oil, which most assuredly would not be voluntarily taken by any animal; and the same applies even to animals which ruminate. Children will swallow large quantities of poisonous matter, but are unable, without artificial aid, to vomit, even though strongly urged to do so. Surely it is to be regretted that so useful a faculty as the power of voluntarily vomiting was civilized off the elaborated man as he now exists! Why

may not the principle of the "direct action of the nervous system" be made to explain, as it is quite sufficient to do, the act of vomiting from nauseating ideas? It serves to explain trembling, bleaching of the hair, blushing, and involuntary *mechanical actions of other parts of the intestinal canal*, using the word "mechanical" advisedly, though there may also be an action on the secreting structures of glands as well, shown by increased secretion of urine, whilst the very *suddenness* with which, consequent on an idea, vomiting occurs, is another reason, if one be needed, for its being due to direct action of the nervous system. True, the doctrine of evolution is not so well served as by the "suspicion" of the lost power of a once voluntary habit; but why go out of the way to introduce a very doubtful and improbable "suspicion," after stating (p. 68) that "the manner in which the secretions of the alimentary canal are affected by strong emotions is another *excellent instance* of the direct action of the sensorium on these organs, *independently of the will, or of any serviceable associated habit.*"

Shrugging the shoulders, common to men in all parts of the world when they are in a state of mind simply passive, has been already considered. It is taken by Mr. Darwin as his great example and demonstration of the principle of "unconscious antithesis." It is not, however, apparent that indignation and a "passive frame of mind" are directly opposed emotions or states of mind, though the movements of shrugging the shoulders, bending in the elbows, showing the palms with extended fingers, &c., are in some degree the antithesis of the muscular expression of indignation; whilst another explanation due to the direct action of the nervous system is more acceptable. Besides, it is quite fair to suppose that the opening of the palm of the hand, and the presenting it forwards with extended fingers, may be a *directly intentional movement* to show that there is no weapon concealed, and the outspread direction of the bent fore arm from the body *exposes the region of the heart* to attacks, and is equivalent to a *vote of confidence* in the person before whom the gesture is made. Granting, then for a moment that there is an antithesis in the expressions of attack and impotence, it is anything but an "unconscious" antithesis; on the contrary, it seems *directly designed* to counteract other movements, in all probability as directly designed also. Though the gesture, or some parts of it, is commonly seen in different parts of the world, it is not absolutely universal, and it would be interest-

ing to pursue an enquiry in the direction and spirit of Mr. Buckle or Mr. Lecky, with the object of discovering whether the gesture is confined to people fighting with peculiar weapons, or attacking in a definite manner, and with a special regard to certain parts of the body most vulnerable. The same holds with some of the attitudes assumed under Astonishment (as in the *pose* of Mr. Rejlander). Do we not, when threatened by an unseen object, lift up our open arms, with extended fingers, to protect the head, and hence perform the same movement by force of habit and association when surprised by any cause? Yet Mr. Darwin sees in the "expression" due to Astonishment another illustration of the principle of antithesis. The opposites chosen in this instance are indifference, or an indifferent frame of mind, and Astonishment. We lately saw that "Indifference" was opposed to "Indignation," and the corresponding antithetic movements were then "shrugging the shoulders" and an "offensive" attitude. It would appear, then, from Mr. Darwin that "indifference" may act as an antithesis of "indignation" or "astonishment," and assume a different form in each case! Some Indian tribes, Australians, and Kaffirs have another gesture expressive of astonishment, viz., placing the hand over the mouth. This would seem to have been intended either to prevent the involuntary exclamation that often attends surprise, and which would be injurious to these wild tribes in their nomadic habits and customs, or else to a desire to conceal the mouth, which is a great tell-tale of what is passing in the mind. Under the feeling of "Horror," again, Mr. Darwin cannot explain how it is "that when we feel cold, or express a sense of horror, we press our bent arms against our bodies, raise our shoulders, and shudder." An obvious and easy reason would seem to be, that it is because there is a desire to make the body as small as possible, either for purposes of warmth by exposing a smaller extent of surface for the cooling agents to act upon, or for the purposes of self-defence, to preserve by a process of in-folding the most vulnerable parts from injury.

The chapter on Blushing is one of the most acceptable in the book. Whether from shyness—from shame as a real cause—from shame owing to a breach of etiquette, from modesty, from humility, or from indelicacy, it depends in all on the same principle, viz., a sensitive regard for the opinion of others, primarily, in relation to our personal appearance, especially our faces; and, secondarily, by association and habit, in relation to the opinion of others on our conduct. It is a well-

established fact that attention directed to any part of the body for a longer or shorter period affects the nutrition or blood supply of the part, as in hypochondriasis, when there is every reason to believe that a *certain idea* about some part or viscus may ultimately *cause* a diseased state in the part. The phenomenon is commonest in women and children, and is also seen in the coloured races, and the extent of surface involved corresponds, as a rule, to that usually uncovered; thus in Europeans it is the face and neck, which give ground for the greatest display of it, but in some of the people who invariably go about in a semi-nude state the "expression" may be seen on the body so exposed. The well-known instances given by Sir James Paget of a lady who felt a pain in the foot, and had a swelling in it from merely seeing a child in danger of being crushed in the foot by a closing gate, or the experiment quoted by Dr. Maudsley from Volkmann, that when one finger is pricked the skin of the corresponding finger on the other side is thereby rendered more sensitive, are sufficient to show the influence of attention in temporarily modifying the nutrition of a part, whilst the intimate connection existing between the skin and the brain is seen in epileptics and in the subjects of hysterical catalepsy, where the capillary circulation is so responsive to the slightest stimulus that it is possible, by merely drawing the finger lightly over the body, to mark out the name of the individual in distinct red letters, marks which, as in blushing, are immediately succeeded by pallor. This pallor, consequent on the redness, has been shown by Dr. Burgess to be general in blushing, and it is more than probable that in those cases where "paleness instead of redness is caused under conditions which would naturally induce a blush," the blush has really been there, but has been so rapid as to have escaped notice, and has given place to a strongly pronounced pallor; just as in rabbits, shown by Dr. Brown-Séquard to be affected in a very rapid manner, and to pass through a very short stage of "rigor mortis" after death by lightning. *Suddenness* appears to be a condition of blushing. A "hardened villain" is one who, having well considered certain evil courses, betrays no emotion when taxed with them, because there is no element of surprise; they are the story of his life. It is the sudden and pointed gaze, the quickly-pressed question, the *immediate* precipitation into a breach of etiquette, that summon up the blood.

"Those who believe in design," says Mr. Darwin, "will

find it difficult to account for shyness being the most frequent and efficient cause of blushing, as it makes the blusher to suffer, and the beholder uncomfortable, without being of the least service to either of them." But is this quite fair? Many will be disposed to maintain that though it may cause discomfort, yet it is not so "unserviceable" as is made out. There is no better protector of a maiden's modesty than her blushes, and nothing can so atone for one who by some *faux pas* has caused blushes involuntarily, as blushing in his own person. It is, indeed, a flag of warning, or of distress, hoisted to give notice that a *certain effect has been produced*, and that further advance in that direction must be abandoned, or cautiously carried on. Those who are most sensitive, and, therefore, run the greatest risk of being most frequently offended, are the greatest blushers, and were it not for blushing many a small crime would go undetected. It is not necessary to believe that it was "*specially* designed" to appreciate its value as an expression of a certain state of mind, any more than it is necessary to believe in weeping, laughing, &c., having been "specially designed by the Creator, and therefore opposed to the general theory of evolution, which is now so generally accepted." A non-evolutionist might fairly ask of Mr. Darwin—"if, as you say, blushing, which originated at a very late period in the long line of our descent, is of no service to either blusher or beholder, but rather the reverse, why is it retained, or on what principle of usefulness was it ever evolved? If an accident, due to direct action of the nervous system, it has at least come to acquire a very curious significance in informing us of the moral condition of others, and in acting as a shield to the weak." The summary contains a speculation—a pure speculation—on the period at which the various expressive movements, now exhibited by man, were acquired, and as to what might have happened if the structure of the organs of respiration and circulation had been different. "If a man had breathed water by the aid of external branchiæ, his features would not have expressed his feelings much more efficiently than now do his hands or limbs." Very curious, indeed, would be Mr. Darwin's Frankenstein, and these "idle speculations" almost seem as if intended to make caricatures of humanity, after the manner of those artists who illustrate children's picture books and "comic" journals, by adapting the head of a fish to the body of a man (or some such hybrid combination), or in still

greater variety during the pantomime season. He who looks at the wag of the tail of a Syren from the point of changed structure in the organs of circulation, will, as Mr. Darwin says, "view the whole subject of expression in a new and interesting light."

No one can read this book without being struck by the earnestness and extensive range of observation visible in every page. It was a powerful grasp of the mind to generalise on community of expression of the whole human race, in all its stages of development, from the Babe to old Age; and if Mr. Darwin has not succeeded in explaining all, there can be no doubt that he has given a new phase to our ideas concerning the expression of emotions, by his practical application of some, now well recognised, laws of nerve action and association. Wherever the subject is discussed or debated, this last contribution of Mr. Darwin's will necessarily be quoted; and if some of the explanations should prove unsatisfactory—as we think will be the case—they will, at least, be acknowledged to be ingenious. One cannot but have the greatest respect for his good faith and sincerity, but he starts with a pre-conceived theory, and, in some things, his knowledge is defective. From the class of persons by whom Mr. Darwin's books, through his great reputation and versatility, are read, it was, perhaps, impossible for him to enter on the question of sexual emotions, though, by not doing so, the opportunity is lost of enforcing much that already is written. These are very strong—the strongest of all the emotions, and at times lead to correspondingly forcible expressions. The Heliotype Plates, from Ginx's Baby crying, to Mr. Rejlander, in apparently a state of stupified amazement (it would be interesting to know if the "twenty educated persons of various ages and both sexes," who formed the jury of expression, would have understood, "without explanation," the emotion Mr. Rejlander intended to pourtray), are not worthy of the Book or the Author.

There are many gestures which are merely *tricks* peculiar to one country or to one tribe; these can receive, of course, a merely empirical explanation—very often no *raison d'être* can be given. As an instance, among the signs of Contempt, Mr. Darwin has mentioned "snapping the fingers;" this is not very intelligible, but may be understood by reference to certain gestures in use among the deaf and dumb, where anything insignificant or contemptible is denoted by somewhat similar signs, just as in language we use the termina-

tion ling, the German *lein*, to express *smallness*, and, secondarily, contempt. But there is another gesture, very expressive of Contempt, which has been completely ignored, perhaps because it has a ludicrous side, though scarcely any gesture expresses so well the meaning intended to be conveyed, viz., *placing the extended fingers to the end of the nose.* To put it in the language of the sixteen Queries:—Is contempt expressed by placing the open hands, with extended fingers, at the end of the nose, the right hand being generally nearest the body, with the palm pointing to the left side? No one of the three "principles" seems adequate to explain it, so we are left to conjecture. It would be interesting to know whether, or not, Gaika would recognise the movement; also whether, or not, amongst the Kaffir women, contempt is shown by "the nose being slightly turned up"—to use some of the latest words of the Poet Laureate—"tip-tilted like the petal of a flower."

The Treatment of Criminals in Relation to Science. An Essay read before the Royal Society of Victoria, Melbourne, by H. K. Rusden. Melbourne, 1872.

We have frequently, as critics, to deplore the want of vigour, if not also of originality in the works which come before us for review, and when one thinks of the numberless medical publications which are issued from the press every year, the cause of the lassitude is not far to seek. Competition is so severe, and the ranks of the profession so overcrowded, that a certain class of our professional brethren have no other way of keeping themselves before the public than by writing windy books and essays. The consequence of this is that a sort of carelessness has crept into the ranks of the medical critics also, and the spirit of vigour and independence which distinguished the earlier writers have given way to a system of indiscriminate praise or unnecessary condemnation. In fact the critic just now is something like Byron's description of Peter looking after the gates of Heaven—

> "St. Peter sat by the Celestial Gate—
> His keys were rusty and the lock was dull,
> So little trouble had been given of late."

In such an indolent state of mind were we when this pamph-