With the author's respects 51
and regards.

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REVIEW

OF

'DARWIN ON EXPRESSION:'

BEING A

POSTSCRIPT

TO

THE SENSES AND THE INTELLECT

BY

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POSTSCRIPT.

Review of Darwin on 'Expression.'

Mr. Darwin, in his recent work, entitled 'The Expression of the Emotions in Man and Animals,' has made very considerable additions both to the facts and to the theories of Emotional Expression, a subject handled at some length in the present volume. I propose to compare his conclusions with the views given in my chapter on the Instincts.

The large mass of observations in Mr. Darwin's volume will have a permanent value, even although the theories arrived at by him should be considerably modified. The worth of his compilation is greatly enhanced by his candour and fairness in stating whatever facts have come to his knowledge, whether they agree or conflict with his general conclusions.

Three principles are put forward as summing up the facts.

The first is entitled 'The Principle of Serviceable Associated Habits.' As an example, a frown accompanies and expresses states of pain, of anxiety, of deliberation, because it was originally useful in screening the eyes from the sun in circumstances of anxiety.

This principle implies three assumptions:—(1) Voluntary movement, or movement for ends, is an earlier fact than Emotional or purposeless movement. (2) Voluntary movements become associated with the feelings that occasioned them, so as to be manifested although there is no proper act of the will. (3) These associated movements are transmitted by inheritance. This last is the carrying out of Mr. Darwin's own doctrine of Evolution.

The second principle is called 'Antithesis,' and is intended to account for certain cases where an expression is stimulated, not by a positive association with the feeling, but by a motive of antagonism or contradiction to some established expression of the opposite feeling. Thus, a dog, in a savage mood, has certain movements and gesticulations positively associated with his angry and aggressive passion, being the incipient movements of a destructive onslaught; a

dog, in an affectionate mood, not having a positive endowment corresponding to affection, chooses the most exact contrast or opposition to his angry demeanour.

The third principle is 'The principle of actions due to the constitution of the Nervous System, independently of the will from the first, and independently to a certain extent of Habit;' more briefly, it is stated as the principle of 'the direct action of the nervous system.' The reader of the present work will recognise in this what I have termed the Law of Diffusion. Mr Darwin quotes the statement I have given of the law, and remarks that it 'seems too general to throw much light upon special expression;' which is quite true; nevertheless, he himself employs, for that very purpose, a mode of stating it that I believe to be still more vague.

The order of these principles is the inverse, or analytic order, which is, on some occasions, more convenient than the direct or synthetic. If we were to start from what is primitive or primordial, we should begin with the last-named principle, 'the direct action of the nervous system.' The two others are subsequent and superinduced upon this; more especially is that named first, which is the author's own law of Evolution or Inheritance, a later effect—or a growth or addition to the simpler process of nervous diffusion. The characteristic feature of the book is the applying of Evolution to account for the phenomena of expression. The two other laws are less often appealed to. Wielding an instrument of such flexibility and range as the inheritance of acquired powers, a theorist can afford to dispense with the exhaustive consideration of what may be due to the primitive mechanism of the system; he is even tempted to slight the primitive capabilities, just as the disbeliever in Evolution is apt to stretch a point in favour of these original capabilities.

In the present volume, I have not made use of the principle of Evolution to explain either the complex Feelings or the complex Intellectual powers. I believe, however, that there is much to be said in behalf of the principle for both applications. In the third edition of 'The Emotions and the Will', now in preparation, I intend to discuss it at full length. My present object is to compare Mr. Darwin's theories of the origin of Emotional expression with the views given in the present volume; to see how far my explanations cover the ground, and at what points they seem to come short of the facts, leaving the field open for the new principle.

My readers are aware that I put great stress upon two primitive tendencies of the system, besides Diffusion, namely, the Spontaneity of Movements, and the Law connecting Pleasure and Pain with augmented and lowered vitality. Now both of these powers enter, with marked prominence, into the expression of the Feelings. Mr.

Darwin never mentions the doctrine of Spontaneity; he alludes to my statement of the Law of Pleasure and Pain, without saying whether he agrees or disagrees with it in the general formula; but in his detail of facts, he adduces many examples of it so striking that he cannot help expressing them in the phraseology of the principle. His second law, the law of Antithesis, to a small extent coincides with the law of Pleasure and Pain; but it is ill-fitted to supersede that law, as I will endeavour to show.

Conceiving as I do, that the Spontaneity of Movements is a great fact of the constitution, with important consequences both emotional and volitional, I will here point out its bearings on Expression. In so doing I must define precisely what it consists in, and how far it reaches.

By Spontaneity, I understand the readiness to pass into movement, in the absence of all stimulation whatever; the essential requisite being that the nerve centres and the muscles shall be fresh and vigorous. We may never in our waking hours be wholly free from the stimulation of the senses, but in the exuberance of nervous power, our activity is out of all proportion to the actual solicitation of the feelings. The gesticulations and the carols of young and active animals are mere overflow of nervous energy; and although they are very apt to concur with pleasing emotion, they have an independent source; their origin is more physical than mental; they are not properly movements of expression; they express nothing at all, except an abundant stock of physical power.

To obtain a correct estimate of the expression of joy, for example, the spontaneity must be allowed for and subtracted. This may not be very easy; yet the separation of the two facts is quite supposable, and is occasionally realized. The spontaneity concurs with morning freshness, or with the outburst after confinement, and will show itself in the absence of pleasurable stimulants; although these would operate in the same direction, and the two effects would be indistinguishable. The expression of pleasure is shown in isolation when the flush of spontaneity has passed by, when a certain amount of exercise has drawn off the exuberant and surplus energy of the system; it is also shown in constitutions so languid or inactive as never to have any surplus.

In the following passage Mr. Darwin obviously combines spontaneity with joyful expression, "Under a transport of Joy or of vivid Pleasure, there is a strong tendency to various purposeless movements, and to the utterance of various sounds. We see this in our young children, in their loud laughter, clapping of hands, and jumping for joy; in the bounding and barking of a dog when going to walk with his master; and in the frisking of a horse when turned

into an open field." The first case—the demeanour of children—is usually a mixture of exuberance and sportive pleasure; the second—the dog walking out—contains a known element of pleasure; the last—the frisking of the horse—is almost pure spontaneity, it does not necessarily express Joy or Pleasure at all.

The course taken in the spontaneous outburst of movements is the most usual or habitual channels of activity. The locomotive muscles are the first to be affected: actions that may have become habitual in the pursuit of ends are excited purposelessly when the system is fresh. Running, jumping, shouting, talking, may be induced in this way. Any special trick or practice may be incited; as when the dog, after relieving himself, vehemently scratches the ground. Survivals may be maintained by no other exercise than what is stimulated under the spontaneous discharge of activity. Assuming the scraping of the dog to be an action once useful, but no longer so, it would fall into disuse but for its being repeated in the moments of abounding energy.

The most frequent mode of displaying exuberant force is in following some pleasure that chances to be at hand, in itself perhaps trifling, and at other times utterly neglected. Finding ourselves in possession of productive energy, we seek occasions for turning it to account; if great opportunities do not present themselves, we are content with small. This is one aspect of *play*, in children and in playful animals. The kitten is not seriously in love with a worsted ball, nor a dog with a stone; but under superabundance of nerve force these trifling objects are magnified so as to become an inspiring pursuit. There is an exact parallel in the desultory activity of men by nature incontinently energetic.

The spontaneity due, not to natural exuberance, but to excitement, is equally devoid of meaning as regards feeling or emotion. The nervous centres are profusely active, and that is the whole fact; the concurrence of some degree of pleasure or of pain does not alter the situation, although helping to complicate it. The causes of excitement are numerous; there may be a mental state accompanying it, but the physical outburst does not represent a mental mood, it only gives evidence of the molecular energy of the nervous centres.

A man under excitement paces his room, to and fro, sits down and starts up; never rests in one posture. The excitement may be attended with pleasure or with pain, with love or with hatred, but these are not what the demeanour expresses. If the precise mood is expressed at all, it is by some display superadded to, and distinguished from, the general excitement. The extreme case is delirium; in which the violence of the movements has nothing

answering to it in the mental condition; the delirious patient being often unconscious.

As with natural exuberance, so with excitement, the movements are chosen and determined by the habitual channels of the nerve force, due to the circumstances regulating the life and activity of the individual. Inasmuch as locomotion is the prevailing mode of action, with all animals, excitement tends by preference, to rapid locomotive efforts. With excited human beings, the upper extremities gesticulate in some of the usual and characteristic actions, as in going through the formality of striking a blow.

I will now advert to Mr. Darwin's handling of what I have been accustomed to style the Law of Diffusion. It is explained at at length in the introductory chapter of 'The Emotions and the Will.' By Mr. Darwin, the general principle is expressed thus:—'When the sensorium is strongly excited, nerve-force is generated in excess, and is transmitted in certain definite directions, depending on the connexion of the nerve-cells, and partly on habit; or the supply of nerve-force may, as it appears, be interrupted.' This statement does not sufficiently distinguish the excited spontaneity of the centres, from the effects due to a feeling. The proper law of Diffusion supposes a sensory stimulus—as light, sound, an odour—affecting the nervous centres, and, while accompanied by a state of pleasure or pain, inducing a wave of movements and other effects by the outgoing nervous current. The start from a sudden shot exemplifies the diffusive nervous action; and the general law of that action, as more explicitly promulgated by Mr. Herbert Spencer, is that the diffusive display, the energy of the gesticulation and movements, is directly as the intensity of the stimulus or shock; a feeble sound, unexpected, gives a slight disturbance; a loud sharp sound causes a violent start (Psychology, I., 92).

Mr. Darwin, in his concluding expression, "the nerve force may be interrupted," allows for the cases where the severity of a blow paralyzes the nervous system.

It is true of the diffusive display caused by stimulating one of the senses, or by some emotion anyhow arising, as of the spontaneous discharge, that the channels selected by it will depend upon the structural connexions of the nerve centres, whatever may have brought about those connexions. Nevertheless, diffusion in response to a sensory or emotional stimulus, is more specially limited than spontaneity; and hence the expressiveness and character of the movements under feeling. We shall see what are these various guiding and limiting circumstances.

The following are a few of the instances where Mr. Darwin

adverts to diffusion, or direct nervous actions:—He adduces, first, the sudden change of the colour of the hair, under terror or grief, as a case in point. He next brings forward a number of instances connected with the extreme forms of pain and terror, and dwells particularly on the muscular tremblings in fear. In contortions of pain, he remarks, that nearly every muscle of the body is brought into violent action; admitting, however, that much of this excessive action is due to the promptings of the will to mollify the pain. Again, many of the signs of rage (not all), he attributes to the direct action of the excited sensorium; not only the gestures and movements, but also the influence on the heart's action, and the circulation of the blood. Farther, joy quickens the circulation, and this stimulates the brain, which again reacts on the whole body. Also, terror, in all animals, causes tremblings of the body, relaxes the sphincter muscles, disturbs the heart and the breathing, and leads in the end to utter prostration, and even fainting. Pain and fear, if great, are depressing; if not so great, they are stimulating. These are the leading instances in the chapter expressly devoted to the principle of direct nervous action. A few scattered references occur in other chapters: the lashing and curling of the tail in animals under excitement (126); the sympathetic action of unnecessary muscles, along with those that are at the time necessary (166), as in closing the eyes, and the mouth.

These examples are obviously complicated with the effects special to pleasure and pain; they are the very cases that I have always adduced in support of my view of the law connecting increased vitality with pleasurable, and diminished, with painful emotion. The best example for diffusion by itself is Surprise or astonishment; there being numerous instances of surprise without any marked degree of either pleasure or pain.

It would appear, therefore, that the principle of 'direct action' cannot be carried to any length, without raising the question as to the distinctive modes of expression under pleasure and under pain. Either the diffusion is the same, in degree and in character, whether the primary shock be pleasing or painful; or there is a difference. If there is a difference, what is it? Until this question is probed to the bottom, everything is vague.

Mr. Darwin, in describing particular instances, occasionally notices the invigoration attending pleasure, and the depression and exhaustion often attending pain, notwithstanding its being a stimulus to activity. He remarks the contrast in nature between the so-called exciting and the depressing states of the mind (78). 'Under the expectation of any great pleasure, dogs bound and jump about in an extravagant manner, and bark for joy' (122). Monkeys

tremble for fear, void their evacuations, and almost faint (146). The screams, groans, and writhings of extreme pain, are followed by profuse sweating, pallor, trembling, utter prostration, or faintness (147). After excessive grief, 'the circulation becomes languid; the face pale; the muscles flaccid; the eyelids droop; the head hangs on the contracted chest; the lips, cheeks, and lower jaw sink; the features are lengthened, the face is said to fall, (178). In high spirits, a man holds his body erect, his head upright, and his eyes open (212). 'With all the races of men, the expression of good spirits appears to be the same' (213). A similar strain of observations occur in Sir Charles Bell's work on Expression.

It is only under his principle of Antithesis that Mr. Darwin makes any attempt to generalize the contrasting expression of pleasure and pain. Indeed the chief examples that lend an unequivocal support to that principle are examples coming under the present head. I will, therefore, now review his mode of expounding that principle.

'Certain states of mind lead to habitual movements which were primarily, or may still be, of service; when a directly opposite state of mind is induced, there is a strong and involuntary tendency to the performance of movements of an opposite nature, though these have never been of any service.' Such is the principle of Antithesis. It is illustrated in the first instance, by a reference to the lower animals; and the leading example is from the dog, who has attained, by hereditary transmission, the attitude and actions belonging to the aggressive mood; but has no such hereditary endowment for affection and fondness; what he does, therefore, when his affection is roused, is to reverse all the aggressive movements. The movements of the cat, under the two opposing states—hostility and affection—are represented to have the same exact antithesis. The great example in man is the 'shrugging the shoulders,' which is stated as the reverse, in all particulars, of the indignant and defiant attitude. The other scattered allusions to the principle of opposites are almost pure examples of the opposition of pleasure and pain.

On the leading case—the opposition of rage and affection in the dog and the cat—I offer the following remarks:—

First, the contrast here is not a simple contrast of opposing states; it represents two separate developments, each springing from its own independent circumstances, notwithstanding that, when developed, there is an antagonism between the two. The simple contrast, the obverse implication, of a state of aggressive rage, is the state of collapse and dread under a still more powerful aggressor. Between the beater and the beaten there is an immediate and direct opposition; the mental condition of the one is the natural obverse of

the mental condition of the other; and the physical attitudes should show a corresponding opposition. The mind of every fighting animal has passed through both phases; as with heat and cold, the experience of both is necessary to the experience of each. If we could suppose an animal that had never known fear, doubt, inferiority, the fact or the notion of being beaten,—such an animal would not have the fully developed consciousness of the condition of rage, indignant defiance, bellicose passion; its encounters with resisting prey would be purely mechanical, like tearing up a root or climbing a tree.

So then, the antithesis to be examined is between angry superiority, and tamed or frightened inferiority; and this is sufficiently marked in all the manifestations. It is, however, a pure example of the antithesis of pleasure and pain, of elation and depression, qualified by the situation of contest.

In the next place, I must remark that Mr. Darwin's supposition of a state of affection arising without its physical concomitants, and borrowing or evoking these by a conscious or unconscious reversal of the attitudes of anger, is at variance with the very first principle of the relationship of mind and body; a principle, acknowledged by himself, although with hesitation and timidity. The development of angry passion involved with it a concomitant physical state; the two must come together; the mental cannot subsist without the bodily. This is true of Rage; and it is equally true of Affection. The affectionate mood cannot exist without an express physical support; and as the capacity and the intensity of affection advances, so do the physical embodiments characteristic of the state. We are not first made affectionate in our purely spiritual half, and then left to find out a suitable expression, in the best way we can; we cannot be affectionate in any degree, without having at the same time the movement, the yearnings, the glandular effusions, for manifesting the affection. The power of *expressing* our feelings, is merely an incident of their indispensable physical support.

Because animals from their fighting life contracted angry passion, with its accompanying attitudes, it does not follow that they should contract the affectionate moods; indeed, the one must necessarily preclude the other. If they ever become affectionate, it is because, in certain situations, they derive gratification from acts that require them to court, cherish, and uphold others of their own kind. The necessities of subsistence make them aggressive; love makes them fond and affectionate. The two interests are not a mutually-implicated couple, they are as distinct as Taste is distinct from Hearing; their contrast or opposition is shown only in their outgoings or consequences.

To advert now to shrugging the shoulders, as an example of Antithesis. I cannot help remarking how in Mr. Darwin's own description there creeps out the opposition between aggressive energy and helplessness, which is merely an offshoot of the great antithesis of elating and depressing passions—of pleasure and pain. The indignant energetic man holds his head erect, frowns, closes his mouth, squares his shoulders, expands his chest, clenches his fists, stiffens the muscles of limbs: the helpless apologetic man releases all these attitudes; his only positive exertion is the lifting of the shoulders (chiefly one shoulder) and the turning outwards of the open hands. So far as I can venture an opinion upon the lifting of the shoulder to meet the inclining head, I would connect it with the general crouching attitude in the helpless and defenceless; the meaning of which may be to make one part of the body cover the other parts, so as to diminish the exposed surface. Pure antithesis, in my view of it, simply releases movements, it does not originate counter movements; these are due to some action of the will, direct or indirect, to suit a purpose.

From this review of Mr. Darwin's two principles—namely, Direct action of the Nervous System, and Antithesis—it appears that he has, without explicit avowal, assumed the operation of the law that connects Pleasure with physical elation, Pain with physical depression. I hold that this law, if true, should appear at the very front of every theory of emotional expression; and that it is true (with suitable qualifications) I believe there is the strongest evidence. In the present volume, I have given the proofs at length; and I have just cited additional examples from Mr. Darwin himself.

Indeed if this principle is not true, there is no consistent relationship between mind and body. Pleasure and Pain are opposite states, as much as plus and minus, hot and cold, wet and dry; the one negatives the other. Any person reflecting on these two facts, namely, that pleasure and pain neutralize each other, and that they move the will in opposite ways—must admit their total contrariety. Now, if there be any harmonious principle in the the union of the mental and the physical, contrary mental states should correspond to contrary physical states. For contraries, we need only one explanation. Whatever be the physical condition corresponding to a state of pleasure, an opposite condition should correspond to pain. If pleasure is concomitant with the elation or invigoration of some vital process, pain should concur with depression or enfeeblement. Or, further, according to the supplementary law of Stimulation, pleasure is the expending of nervous power from a full stock, pain is either no expenditure at all when there is abundance (ennui) or expenditure beyond the proper limits. It may be that pleasure consists in a

certain *manner* of expenditure (not too sudden, or violent); pain will then consist in the opposite manner: we do not at present know what is the precise difference between a sweet and bitter taste, whereby under the same nervous condition, the shock of one is pleasant in all degrees, the shock of the other painful, in all degrees.

If we were dealing with *neutral* stimulants, those that merely rouse up consciousness, without either pleasure or pain, the law of Direct action (Diffusion) would be enough. But neutral stimulants of any considerable degree of intensity are not frequent; with the neutral excitement there is usually either pleasure or pain. Hence we can never lose sight of the need of qualifying direct nervous action by that law; pleasure as such elevating the physical tone, pain as such depressing it.

To show the various cautions that are needed in following out the Law of Direct Action, which Mr Darwin (as well as Mr Herbert Spencer) in my opinion, regards too exclusively, I will select a few typical cases, of pleasure and pain, such as we are all familiar with.

1.—A slight shock of acute pleasure—a pleasant relish or taste, a sweet perfume, a melodious note, or the opening up of the clouds to a sunny ray. The physical outburst corresponding to one of these mental stimulants is cheerful, animated, enlivening, in but a slight degree. To a young, vigorous, or demonstrative person, even a small pleasure will lead to a certain impetuosity of display; which will be the more apparent that there is no pre-engagement of body or mind. To a quiet, or feeble subject, the exhilaration will be more inward, or in the flow and direction of the thoughts; which is still an evidence of power evoked. Perhaps, the pleasure may fall on a mind already depressed; in which case, the effect will be lost in slightly abating the dejection.

2.—A pleasure of greater magnitude, and persistency—a decided accession of some acute pleasurable stimulation: such as a stirring piece of music, a noble prospect, an agreeable companion. All the language used for the first case, can be applied here heightened for degree. The demonstrations will be more powerful and persistent. In case of previous gloom, there may be power enough to restore the mean state, with or without surplus. The vigorous and robust will put forth outward manifestations; the less demonstrative will take on a cheerful cast of thought.

3.—An occasion of multiplied and concurring pleasurable impressions:—a great feast, with dainties, music, and company; a joyful celebration. Under this, every one is roused into active displays of elated emotion; the quietest temperaments have that inward thrill that bespeaks force profusely, and yet not exhaustingly, awakened.

4.—Elation of tone gradually acquired, and unaccompanied with

acute shocks or sensations:—mere health, replenishment with food, stimulants, successes, bright hopes. Here there may be no violent demonstrations; only a gentle activity, an erect attitude, a disposition to converse, to love and to be loved, a readiness for exertion, as if under a refreshing stimulus.

This last case opens up one aspect of voluminous or massive pleasure—namely, its being serene, soothing, quieting—as opposed to the rousing or stimulating pleasures, which are mostly acute. The physical side of such states may seem to be an exception to the law; as there is a lowering instead of a quickening energy. Thus muscular repose and sleepiness, if yielded to, are massive pleasures; yet they are accompanied with decline of energy. There is, however, no real contradiction. It is the very nature of the state to grow out of a muscular lull; this is its basis. So far as compatible with that essential condition, the pleasure is accompanied with its quota of enlivening accompaniments; the reposing labourer has a remnant of force enough for a cheerful demeanour.

Now for Pains:—

1.—A slight smart, an acute shock—the stroke of a whip, a bitter taste, a sudden mal-odour, a screeching noise, a glare, a small disappointment or failure. The shock being sudden, and the system vigorous, this is the occasion for the lively demonstration that seems most at variance with the law of Pleasure and Pain. The individual is wakened up to a very active display; he starts from head to foot, falls into a brisk walk, gesticulates, and seems prepared for great deeds.

2.—Let the shock be much greater—a more serious blow, but still acute; and let the subject possess great physical vigour at the moment. There will still be a lively and energetic outburst, and the appearance as if the greater intensity of the shock made a proportional intensity of the diffused manifestations. This is only, however, on the supposition of a fund of vigour in the individual. Let the case be a weak or exhausted subject, and this second degree of stimulation is the reverse of invigorating, even in appearance; it induces prostration, loss of strength, quiescence under a pain still rankling.

3.—Suppose next an accumulation of painful shocks at many points—a shower of missiles, a stroke with the cat-o-nine-tails. It is only for a moment, and in a robust subject, that this more terrific infliction can be followed by active manifestations. According to the uncorrected law of Direct Action, it ought to inspire a giant's fury; in point of fact, it is simply overwhelming, crushing, utterly prostrating. The delusive appearance of strength, under a moderate smart, is no longer seen, even to a trifling degree. Very strong men, at the halberds, keep up energetic gesticulations for a short

time; but, although, these are supposed to mitigate the agony, by diverting the nervous force, they soon die away.

4.—Keeping still the obverse parallel of the instances of Pleasure, I take now the case of general mental depression, without acute inflictions: as cold, hunger, fatigue, danger, defeat, mortification, remorse, despair. The physical side here is weakness, depressing enervation, without any redeeming circumstance, or the pretence of activity. Some special inspiration is requisite to waken up the powers under massive depression and gloom. Our general law is seen without any distorting or misleading appearances.

5.—A very special and highly illustrative case, is the irritation of a sore, or a 'raw;' than which, nothing is more destructive of vital energy. The tearing open of a wound, or a protracted surgical operation, induces fainting and sickness—the culminating term of the debilitated nervous centres. Something of the same prostration follows a blow on the more sensitive organs—the eye, the nose, the ear, the stomach, the testicle in men, the breasts in women.

The properly Emotional expression, or manifestation, of the Feelings, is constantly mingled with pure and proper volition; and especially is this the case with Pain. The action of the Will is loudly demanded in acute agony, first to procure relief, and failing that, to deaden the feeling by a diversion of nerve force to the muscles. Hence there is great probability in Mr. Darwin's view, that the expression of acute pain is, in its origin, volitional, or stimulated with a view to relief. The energetic gesticulation that follows immediately on pain, not too severe, or in strong subjects, may be an inherited tendency, beginning in the ordinary course of the Will, namely, to seek relief from pain by efforts proportional to its violence. It is in Will, or volition that the proportionality of action to stimulus may (with certain allowances) be fairly attested.

Before proceeding to Mr. Darwin's first and greatest law, the principle that is his crown of glory as a theorizer, I will make a passing allusion to two minor circumstances, partially adverted to by him, which enter into the explanation of our movements of expression.

The first is the simultaneous or consentaneous action of the muscles, described in the present volume (p. 268) as the law of Harmony of State of the muscular system. Yawning is quoted by Mr. Darwin as a good example. Again, in scratching a part that itches intolerably, there is a forcible closure of the eyelids; which may come under that general action by which almost all the muscles of the body are made rigid at the same time (p. 166).

The second circumstance, which a great deal might be made of,

is the Limitation and Diversion of energy. The dropping of the jaw, in astonishment, is attributed to the great draft of nervous energy in supporting the active strain peculiar to the state; there is a relaxation of many of the muscles, the mouth opens, and the jaw drops of its weight (p. 284). The vacant expression of the eyes, in a mood of intense abstraction or meditation, is caused by the relaxation of the muscles that converge the eyes (p. 229). A very large number of situations might be pointed out, wherein the characteristic display is due to the loss of energy at one point through its absorption at another; as stopping suddenly in a walk, when a thought strikes us, or when about to say something emphatic to a companion.

It is under the 'Principle of Serviceable Associated Habits' that Mr. Darwin brings to bear, upon the problem of the origin of Expression, his doctrine of the Inheritance of acquired powers. He supposes the will to be a more primitive fact than Emotional Expression, at least in the various specific modes and peculiarities; for expression, according to the law of Direct Action would be coeval with the sentient organization. The first examples of the principle are taken from the lower animals. Dogs before going to sleep on a hard floor turn round and round and scratch the floor with their fore-paws, as if to trample grass and scoop out a hollow. Many carnivorous animals, as they approach their prey, lower their heads and crouch; the meaning is partly to hide themselves, partly to prepare for a rush; they do this when there is no real occasion. Dogs are well known to go through the form of covering their excrement, in circumstances wholly irrelevant; a purposeless remnant of some ancient utility. Kittens, puppies, and other young animals have been accustomed to push, with their fore feet, their mothers breasts, to make the milk flow; they do the same against a warm soft obstacle. A horse, eager to start on a journey, paces the ground; he adopts the same movement when about to be fed, and impatient for his corn.

It is, perhaps, in discussing the special Emotions, that Mr. Darwin obtains the most illustrative cases of inherited expression: the best are Anger and Fear. The gestures of Anger are the inherited attitudes of a combatant or aggressor; the sneer or snarl, which sometimes uncovers the canine teeth reveals our animal descent. The expression of Fear is connected with the violent movements for escaping danger.

I shall, however, proceed at once to his mode of accounting for the anomaly of the pained expression in the human face—the energy put forth in frowning, and in curving the mouth by the depressor of the angle. This was the difficulty that neither Sir Charles Bell nor

Müller could explain; and it is in plain contradiction to the law of pleasure and pain. The only suggestion that I have been able to offer is that a certain amount of contraction of the smaller muscles would more effectually relax the greater, as in crouching when the body is already disposed to collapse. If we are in a depressed condition, the renunciation of muscular expenditure leaves a larger share of blood to the viscera and the veins, and contributes to ameliorate the tone of mind, which is more dependent on these organs, than on muscular exertion. Now if the relaxed muscles were large, and the relaxing muscles small and lightly moved, I think there would be some gain by the positive expenditure; and this would be one way out of the contradiction of supposing that to Pleasure and to Pain there is equally attached the manifestation of physical energy. I have been disposed to think that this explanation would suffice as regards the forced collapse of the whole body; I have never been quite satisfied of its sufficiency for the face. In the face, the relaxed muscles are apparently too small, and the counteracting efforts too great to yield the required release of power in the whole.

I will now, therefore, review Mr. Darwin's explanation. And first as to the act of Frowning; performed by the contraction of the small muscle between the eyebrows, opposing the large muscle of the scalp (occipito-frontalis). The frown is primarily, and generically, an expression of pain; all its derivative applications—in anger, displeasure, eager pursuit and determination, perplexity, deliberation, and meditation—are easily traceable to this origin. Mr. Darwin has two modes of accounting for the frown. One, given also by Mr. Spencer, is the habit of shading the eyes from the sun, during very intent and anxious vision, as in scanning the horizon for an approaching enemy. Mr. Spencer puts stress specially upon the situation of a combat; we know that boxers toss for the sun; and the combatant that has the sun in his eyes is at a great disadvantage; his only resource being to draw down the eye-brows and eye-lids as a shade. We may, however, give ourselves the benefit of the wider range of situations quoted by Mr. Darwin; extending our reference to all critical occasions whatsoever, where an animal might be incommoded by too much glare.

The other explanation given by Mr. Darwin, is to assign a train or series of connected steps in the expression of the face, accounting for the entire circle of characteristics under pain, namely, shedding tears, frowning, and curving the mouth downwards. He starts with the act of screaming, as arising under pain. The exertion of the voice in pain, is originally voluntary, with a view to obtaining assistance; and is energetic, according to the necessities of the case. By inheritance, this grows to be an expression of pain under all cir-

cumstances; it ceases to be consciously voluntary, and becomes a properly emotional expression.

The exertion of screaming being thus assumed, a number of consequences arise, Mr. Darwin thinks, by physiological cause and effect. Violent screaming leads to the gorging of the eyes with blood; this is a painful effort, and the will is roused to various protective or ameliorating actions. Thus, the eye-balls are compressed, and the congestion stemmed, by the united tension of the orbicular, corrugator, and pyramidal muscles; all which we know, in point of fact, to be exerted during a fit of crying; while, at the same time, the lachrymal glands, under the like compression, give forth a stream of tears. In this group of effects, Mr. Darwin traces out (1) frowning, (2) the expression of grief in the obliquity of the eye-brows, (3) the lifting of the upper lip, and (4) the depression of the angle of the mouth. "When infants scream they firmly contract the muscles round their eyes, and this draws up the upper lip; and as they have to keep their mouths widely open, the depressor muscles running to the corners are likewise brought into strong action. This generally, but not invariably, causes a slight angular bend in the lower lip, on both sides, near the corners of the mouth. The mouth thus assumes a squarish outline. The contraction of the depressor muscle is best seen in infants when not screaming violently, and especially just before they begin, or when they cease to scream" (194).

Such is the explanation, iterated in various forms by Mr Darwin, of the greatest difficulty attending emotional expression. It hinges on two assumptions. The one is that screaming in pain has arisen from a voluntary beginning, namely, the calling for assistance. The primitive outburst of the voice would be either from spontaneity, or in the effusion of delight, or both together; to 'shout for joy' is the natural result of the primary tendencies of our being. To shout under pain, is exceptional and secondary; and supposes a sense of some end to be gained; the *habitual* employment of the scream for this end transfers it from a voluntary to a purposeless act, or an emotional expression, purely and properly so called.

The other assumption is that with the violent exertion of the muscles of the larynx and chest, there is a congestion of blood in the adjoining parts, namely, the features and the eyes. In the eyes, the gorging is especially distressing, and would by the law of the will, induce movements of counteraction; these being such as compress the eye-ball. The actions suited to the effect comprise the whole circle of movements of the features under a fit of crying; and in the milder states of pain, there would be a smaller exertion of the same parts. For example, the brow is corrugated, and the angle of the mouth depressed, without either screaming or tears.

The hypothesis is bold and original, and has the appearance of being adequate to the facts; (the most doubtful point, perhaps, is the extension of the supposed influence to the depression of the angle of the mouth). The author in addition to his own observations, adduces the authority of oculists and others, to confirm his view of the supposed sequence of cause and effect. There underlies, of course, the wider hypothesis of Inheritance of acquired modifications, granting which we may readily allow that the explanation is feasible and probable. A more critical and advanced physiology may find flaws, and perhaps also make good defective links; while, at the present moment, any one rejecting the hypothesis will have some difficulty in supplying its place with one equally adapted to the problem to be solved.

Mr. Darwin's theory of Blushing is one of the happiest suggestions in the book. He carefully surveys the facts; ascertains when children begin to blush, what are the exact limits of blushing in the body, and how far the different races of mankind are liable to blush. He describes the movements and gestures of the body that accompany blushing; and remarks that the state is usually attended with some degree of mental confusion. He enquires into the antecedent mental states and emotions, and enumerates as the chief, shyness, shame, and modesty; the essential element in all being *self-attention*, more especially as directed to *personal appearance*, and above all to the *face*. To explain the origin of the effect, he refers to a physiological principle which has of late years been brought into view by various observers,—that attention closely directed to any part of the body tends to interfere with the ordinary and tonic contraction of the small arteries of that part; so that the capillaries, in consequence, became enlarged and congested with blood.

In order to establish his theory, he recites a number of the facts illustrating the debilitating effects of intense self-consciousness of the bodily processes; but I am disposed to think that the examples adduced do not all belong to one law.

I have discussed at length (p. 336) the process of acting out an idea, or the tendency of ideas, in so far as allowed, to become full realities; as when the idea of some crime that has been prepetrated operates upon weak minds to make them repeat it. This principle embraces the influence of ideas on mesmerized patients; it also embraces the production of the physical accompaniment of a sensation, by means of the ideas strongly suggested to the mind; as salivation at the sight of food.

The consequences of the principle are sometimes beneficial or agreeable, sometimes disagreeable, according to the circumstances.

The idea of something pleasing, as a feast, is itself pleasing or exhilarating; the actualizing of agreeable ideas is agreeable, and obversely.

The problem of blushing, however, requires a painful agency; and if it comes under the foregoing law, it comes under its painful aspect. But a prior question occurs, is the tendency to raise an idea into actuality, the same as the tendency of self-attention to debilitate the parts attended to? Let us examine this case by itself. I have adverted, in an Appendix Note (p. 685), to the contrast between Objective and Subjective regards; the one being invigorating and stimulating, the other relaxing or depressing. Of this, as a general fact, there can be no doubt; although no explanation has as yet been given of it, the fact itself has been accredited by general observation. Sir Henry Holland and other physicians have remarked that attending to the sensations of digestion impairs its power for the time; that the process goes on better if the attention is wholly withdrawn from it. Mr. Darwin quotes a patient of his father's who when he felt his own pulse, found it irregular; when felt by the physician, it was perfectly regular. In these cases, however, we can hardly say that there is the carrying out of an idea into actuality. There may be instances, where a patient has a preconceived idea about himself—that his heart is diseased, or that his digestion is bad—and by dwelling on the idea, may induce something of the reality. Still that is not the same as salivating at the sight of food. It would be paralleled by salivating from thinking of the glands or the saliva. The essential point is not the having an idea, and working it out in its proper character, but the concentrating of attention on some part of our own body or of the mind. To be thinking of self is the main fact; and the general consequence is some debility or derangement in the functions of the part; there is relaxation of the vaso-motor stimulus of the vessels, with local congestion, which amounts to functional weakness, if not disease. Among the records of Medicine and Pathology, more special consequences are assigned; but this is the general result. Sometimes, although not often, a healthy action has been attributed to the self-reflecting operation; as when the catamenial flow has been stimulated by thinking intently on the operation; and in the influence of imaginary physic. From such instances medical men have supposed that a curative power may be found to be wrapped up in the influence of the imagination; but the cases that favour this supposition turn chiefly upon a principle different from either of the two now in discussion, namely, the power of hope, belief, or sanguine anticipation—a state favourable to healthy action, on the law of Pleasure and Pain.

I apprehend, therefore, that Mr. Darwin's explanation of

blushing rests upon the *debilitating effect of self-consciousness*.. This effect can be to some extent localized; attending strongly to the stomach, affects digestion; attending to the heart's action disturbs the pulse. The localizing operation has something to do with our ideas, but not with the actualizing of an idea. As pain and derangement are the occasions of our most earnest attention to our bodily organs, the act of attending to them may possibly induce an unhealthy state of the circulation. So it is, however, that when we are in our best condition of bodily and mental vigour, our regards are objective or outward.

Granting then the principle of self-consciousness as affecting the vaso-motor system, how does it apply to blushing? Thus:—When we are very much stared at by others, we are led by imitation and by solicitude to think of our face; the moment we think of it, we feel it growing warmer; this is the weak form of blushing—the lower degree of congestion, blushing being the higher. In some individuals, the congestion readily assumes the higher degree seen in reddening, or of the blush proper. The area of the blush corresponds to the parts of the body usually exposed to the public gaze.

MAY, 1873.

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