Mr. Darwin's work on "The Expression of the Emotions in Man and Animals,"[14] the third of the *pièces justificatives* published by him in support or illustration of his theory of the origin of species by natural selection, does not seem to carry matters much further than they were before. The expressions by which some of the mammalia manifest their emotions, with the exception of a sort of rudimentary laughter in which certain monkeys are said to indulge and the weeping of some other animals, seem to have no analogy with those displayed by mankind, and their citation here serves rather to show how the same principles govern the outward manifestations of emotion wherever such occur. These principles, as laid down by Mr. Darwin, are as follows:—

"1. *The principle of serviceable associated habits.*—Certain complex actions are of direct or indirect service under certain states of the mind, in order to relieve or gratify certain sensations, desires, &c.; and whenever the same state of mind is induced, however feebly, there is a tendency by the force of habit and association for the same movements to be performed, though they may not then be of the least use. Some actions ordinarily associated through habit with certain states of the mind may be partially repressed through the will, and in such cases the muscles which are least under the separate control of the will are the most liable still to act, causing movements which we recognise as expression. In certain other cases the checking of one habitual movement requires other slight movements; and these are likewise expressive."

"2. *The principle of antithesis.*—Certain states of the mind lead to certain habitual actions, which are of service, as under our first principle. Now when a directly opposite state of mind is produced, there is a strong and involuntary tendency to the performance of movements of a directly opposite nature, though these are of no use; and such movements are in some cases highly expressive."

"3. *The principle of actions due to the constitution of the nervous system independently from the first of the will, and independently to a certain extent of habit.*—When the sensorium is strongly excited nerve-force is generated in excess, and is transmitted in certain definite directions depending on the connection of the nerve-cells, and partly on habit; or the supply of nerve-force may, as it appears, be interrupted. Effects are thus produced which we recognise as expressive. This third principle may, for the sake of brevity, be called that of the direct action of the nervous system." (Pp. 28, 29.)

It is by means of these three principles that Mr. Darwin endeavours to investigate the origin of the various expressions of emotion, and although in some cases, at any rate, we may admit that his reasoning

[14] "The Expression of the Emotions in Man and Animals." By Charles Darwin, M.A., F.R.S., &c. London: Murray. 1872. 8vo.

seems to be a little far-fetched, it is yet impossible to deny that in general it furnishes an ingenious and often happy explanation of very difficult matters—difficult, at least, unless we are prepared to accept the old notion that these outward expressions, with language, were given to man by a sort of inspiration, and not as Mr. Darwin maintains, in the chief cases acquired by our early progenitors and transmitted by them by inheritance to their offspring until they have at length become fixed and innate. The following summary of the origin of the expression of grief in the human face will serve to illustrate Mr. Darwin's treatment of his subject. Starting from the principle that screaming or crying out under painful or troublesome circumstances is a natural, and indeed useful, action common to man and most of the lower animals that are endowed with a voice, our author says:—

"When infants scream loudly from hunger or pain the circulation is affected and the eyes tend to become gorged with blood; consequently the muscles surrounding the eyes are strongly contracted as a protection: this action, in the course of many generations, has become firmly fixed and inherited, but when, with advancing years and culture, the habit of screaming is partially repressed, the muscles round the eyes still tend to contract whenever even slight distress is felt: of these muscles the pyramidals of the nose are less under the control of the will than are the others, and their contraction can be checked only by that of the central fasciæ of the frontal muscle. These latter fasciæ draw up the inner ends of the eyebrows and wrinkle the forehead in a peculiar manner, which we instantly recognise as the expression of guilt or anxiety." (P. 351.)

As examples of the application of the principle of antithesis Mr. Darwin cites the behaviour of dogs under certain circumstances. A dog approaching another dog or a strange man with inimical feelings "walks upright and very stiffly; his head is slightly raised, or not much lowered; the tail is held erect and quite rigid; the hairs bristle, especially along the neck and back; the pricked ears are directed forwards and the eyes have a fixed stare"—peculiarities or actions which may nearly all be explained as beneficial in the dog's intended attack upon his enemy. But let the animal approach his master or some other person to whom he is attached, and his whole bearing is precisely the reverse to that above described; but now not one of his "movements, so clearly expressive of affection, are of the least direct service to the animal," and Mr. Darwin considers that they are explicable "solely from being in complete opposition or antithesis to the attitude and movements which, from intelligible causes, are assumed when a dog intends to fight, and which, consequently, are expressive of anger. The different attitudes of cats when angry and when demonstrating their affection for their friends furnish Mr. Darwin with another illustration of this principle, upon which he also explains the human habit of shrugging the shoulders and throwing out the open hands as an expression of helplessness or of acquiescence in what cannot be avoided, the actions in this case being in complete contrast with those expressive of indignation and defiant resolve. It would be impossible to follow Mr. Darwin through his discussion of the expressions by which the motions of joy, tender-

ness, devotion, reflectiveness, sulkiness, hatred and anger, contempt and disgust, surprise, fear and horror, shame, and many others are manifested, expressions in which, according to Mr. Darwin, we have to do for the most part with a direct action of the nervous system, modified, of course, by other conditions and especially dependent on habit. But it may be mentioned that he devotes considerable space to the examination of the phenomenon of blushing, to which, indeed, as being apparently a peculiarly human manifestation, it seems to be fairly entitled. He considers blushing to be the expression of such emotions as arise from the quality which he denominates "self-attention" being more or less painfully affected. In this exceedingly imperfect sketch we have, of course, been quite unable to do justice to Mr. Darwin's work, which, like all his other writings, is full of interesting facts and ingenious arguments. Except as indicating the mode in which those gestures and changes of countenance which express the internal emotions may have gradually arisen and become fixed and intensified in man, even supposing his origin to have been as lowly and brutish as the theory of evolution would make it, we cannot see that it can do much towards the support of Mr. Darwin's published views as to the origin of species; but, as the author points out, the facts which he has gathered from all sources and countries with regard to the expression of emotion in man are of much importance, as they prove "that all the chief expressions exhibited by man are the same throughout the world," thus affording "a new argument in favour of the several races being descended from a single parent stock, which must have been almost completely human in structure, and to a large extent in mind, before the period at which the races diverged from each other." This volume is illustrated with a few good wood engravings and with numerous photographic portraits of individuals displaying various emotional expressions. Many of the latter are exceedingly good and effective; others are rather poor.

Of the volume of essays on subjects connected with natural selection published in 1870 by Mr. Wallace we are glad to notice the appearance of a second edition.[15] The author is entitled to speak with authority upon a theory of which he may claim to have been the joint originator with Mr. Darwin, and several of these essays, especially those founded on the author's own personal observations, are of great interest and value. So also in the present state of the public mind are the papers on the application of the law of natural selection to man. The alterations made in the present edition are few and of no very great importance.

Dr. Nicholson is really an exceedingly prolific writer upon subjects connected with natural history. Having given us a "Manual," an "Advanced Text-book," and an "Introductory Text-book of Zoology," an "Introduction to Biology," and the first part of a "Monograph of the British Graptolitidæ," so rapidly one after the other as almost to take

[15] "Contributions to the Theory of Natural Selection." A Series of Essays. By Alfred Russell Wallace. London: Macmillan. 1871. 8vo.

away one's breath, he comes upon us now with a "Manual of Palæontology,"[16] forming a handsome volume of some six hundred pages. It is true that in most of these works a great deal of the ground covered in each is the same; but, nevertheless, the industry required to work up the same materials into so many different shapes is something considerable, and in the present case the subject, although to a great extent the same, is surveyed from a perfectly new point of view. This "Manual of Palæontology" is divided by its author into four parts, of which the first consists of a general introduction indicating the general nature and objects of the study of that science, with an explanation of such geological facts as are necessary for the comprehension of the succeeding parts. In the second and third parts the author describes the various groups of fossil animals and plants in their systematic order, commencing in each case with the lowest forms. The fourth part is an essay on what the author denominates "Historical Palæontology"—that is to say, an exposition of the various formations of the earth's crust in ascending order, with an account of the fossil forms of animals and plants characteristic of each of them. The work, which is intended for educational purposes, is well executed, and will be found very useful. The illustrations are numerous, but a great part of them are borrowed from D'Orbigny's "Cours Elémentaire."

Of a somewhat different quality is a little book on the same subject as the preceding, entitled "Life in the Primeval World," by Mr. W. H. Davenport Adams.[17] We are not acquainted with M. Meunier's "Animaux d'Autrefois," upon which the work is said to be founded; but, judging from this adaptation of it, it must be characterized by considerable superficiality and pretentiousness. We must confess, however, that Mr. Davenport does not seem to have been sufficiently at home in the subject treated of to render him even a fair exponent of M. Meunier's statements; for we notice in many places evident mistranslations of the original French, showing that the translator is unfamiliar with the technical terms employed. He also seems to be rather careless, of which we have an instance at page 64, where we are informed by implication that the *Mesopithecus* is "the single fossil of Greece"—"*single*" here, we presume, being the translation of "*singe*"—and again at page 18, where we are told that the post-tertiary mammals are divisible "into three categories according to their several conditions of existence," and then only get two categories explained to us, the explanation of the second being as follows:—"2nd. Other formidable animals there were, contemporaries, like the former, of the Diluvium, which, having survived it, became contemporaries also of the modern Alluvium, yet have not come down to us. Such are the ox, the horse, the buffalo, the common stag, and the aurochs"! in which it seems pretty evident that we have the first

[16] "A Manual of Palæontology for the Use of Students." With a General Introduction on the Principles of Palæontology. By Henry Alleyne Nicholson. Edinburgh and London: Blackwood. 1872. 8vo.

[17] "Life in the Primeval World." Founded on Meunier's "Les Animaux d'Autrefois." By W. H. Davenport Adams. London: Nelson. 1872. Small 8vo.

part of one paragraph and the latter part of another combined to produce a very curious statement. Some people may be inclined to believe that the ox and the horse still exist, and a few misguided individuals no doubt fancied that the joint of which they partook heartily on Christmas came out of the loin of the former animal. The buffalo, the common Stag, and the Aurochs are also generally supposed to have survived to the present day. Of this little volume more than half is occupied by an account of fossil mammalia, especial prominence being naturally given to the discoveries of Gaudry at Pikermi, and this part, if it were not disfigured by many blunders, would be useful. The invertebrata are very slightly treated, and the book concludes with a sketch of what is known of pre-historic man, especially in the South of France. The illustrations are numerous, and some of them good.