SCIENCE.

FRIDAY, MAY 8, 1885.

COMMENT AND CRITICISM.

In all branches of science where the observer deals with the forms of objects, it is more or less desirable that an average of the shapes of the objects should be attained. This end has hitherto been sought through a system of measurements, which is at best a clumsy method, suited only to determine the average of some single dimension; for, where it is the aim to present to the eye a normal or typical form, it is quite incompetent to serve the desired end. So far the beautiful method of composite photography devised by Francis Galton has only been applied to the human face, with the single exception of Dr. Billings's experiments in craniology: if it can be carried into no other fields, it will still remain one of the most important contributions to the graphic resources of science. But the naturalist who has felt the need of this resource in various directions is drawn to consider how far its use may be extended to other branches of inquiry. It seems at first sight that there may be use for it in obtaining the normal or average form of all objects which do not depart too far from a mean shape. It may be that the zoölogist or botanist who wishes to present a picture giving the normal aspect of a variable species, can, by selecting for delineation individuals of the same size, present to the eye a composite combining the general features, and neglecting the individual variations. In this way we shall be able to give to the term 'normal form' a definite and valuable meaning which has hitherto been [illegible]ing. It will also be remembered that the late Professor Agassiz laid particular stress on form as the underlying element of 'family' structure among animals; and this would seem to offer an opportunity to test experimentally the view held by the great naturalist.

It may also be hoped, that, in certain lines of inquiry in the inorganic world, this method of graphic averaging, this Galtonizing process, if we may so term it, will be of great use. Yet, important as are the prospects for the extension of this method of delineation to other fields of inquiry, its greatest use must be in the study of the human body. There this admirable process is full of promise. It may, for instance, be possible to secure an average picture of our school-children at different ages, which will give us a new measure of their condition, and so help us in what is perhaps the most important branch of social inquiry. The effect of occupations, and the results of different methods of physical culture, can also be accurately compared. It may be serviceable in testing the action of different systems of training on young soldiers, as also the influence of their accoutrements on the form of the body. So, too, the effects of certain diseases on the bodily form may be ascertained, to the great gain of medical science. Indeed, the possibilities of this method crowd on the mind. Practice may show limits to its use, and will doubtless do much to overcome certain difficulties evident at the outset of the work.

The charming composite photographs for which we are to-day indebted to Professor Pumpelly show the admirable results which may be obtained, and at the same time some of the critical difficulties of the process. No one can look upon them without a new respect for that shadowy thing called the normal man. There is a singular dignity in these combined shadows: they are strong faces, those of high-browed, deep-eyed, earnest-looking men, fit for all sorts of trials. But most of those who review the faces of American men of science will recognize that in figs. 2 and 3 one face appears, curiously, to dominate all the others, yet which, taken by itself, is perhaps the most

individual of all those contained in the plate. It would be interesting to know what effect on the composite its absence would produce. This element of what we may perhaps call prepotency is most likely to disturb these composite delineations; for, though in itself a very interesting phenomenon, it seems to be somewhat of an obstacle in this use of the new art. With this great contribution of Galton well in hand, we may at length hope that we shall be able to enter upon the study of that unexplored realm of the human face, and physiognomy become a tolerably exact science. Some such process as this seems to offer the only chance of obtaining valuable generalizations in this field of inquiry.

The citizens' committee of Montreal, formed to arrange for the entertainment of the British association last summer, has every reason to be congratulated on the success of its enterprise. Not only was the meeting a marked success in every point in which the citizens' committee had power to contribute to it, but the report presented at its final meeting a fortnight ago showed with what care it had employed the funds intrusted to it. Parliament granted $20,000 toward passage-money to the British members; and this was so carefully expended and accounted for, that there remains a considerable sum (about $2,600) to cover in to the treasury, — a new experience for a parliamentary grant of this sort. The Dominion government further voted $5,000 for general expenses, the corporation of Montreal an equal sum, and the citizens subscribed $4,580.97. This, too, has been managed with such care, that, apart from the expenses of the meeting, the committee is able to publish an edition of fifteen hundred copies, largely for gratuitous circulation, of a volume of economic papers, and then have on hand a surplus of $1,500. This the committee recommended should be given to McGill college in recognition of, and partial compensation for, its liberality in placing the building and grounds of the university at the disposal of the association. This was voted with the understanding that it should be used in some special way, such as for prizes or scholarships, to commemorate the meeting of the British association in Montreal. The success of the work of the committee was believed to be largely due to the excellent judgment and unwearied service of Mr. D. A. P. Watt and Lieut.-Col. Crawford, to the former of whom his associates presented a pleasing memento.

LETTERS TO THE EDITOR.

*** Correspondents are requested to be as brief as possible. The writer's name is in all cases required as proof of good faith.*

The ontogeny and phylogeny of the hypoglossal nerve.

It cannot be otherwise than gratifying when two investigators, travelling along entirely distinct paths, unknown to each other, find themselves suddenly brought face to face upon the same stand-point. Haeckel's dictum, that the ontogeny of any form is a brief recapitulation of its phylogeny, is continually receiving confirmation, and, taking into consideration cenogenetic modifications, may be accepted as a dogma. If, then, a theory as to the past history of any form or organ which has been deduced from embryological data is also to be deduced (and that, too, independently) from comparative anatomical studies of adult forms, there are strong reasons for its acceptance.

A case of this kind has occurred quite recently. Since van Wijhe's interesting and important observations on the mesoderm segments of the elasmobranchs, the view that the hypoglossal nerve has been derived by a separation of fibres from the ventral roots of the vagus has very generally been accepted. In a paper very shortly to appear in the 'Studies from the biological laboratory of the Johns Hopkins university,' an entirely different view will be supported.

From a comparative study of the origin and distribution of the anterior cervical nerves in the various orders of the class Pisces, I have been led to the conclusion that the post-occipital nerves, as they may be termed, of Amia and other ganoid forms, are comparable to the anterior cervical nerves of the elasmobranchs, and in the teleosts and marsipobranchs have passed backwards, and become incorporated with the first spinal nerve. The apparent first spinal, therefore, represents three nerves. In the urodelous Amphibia, one finds, however, an arrangement more similar to what obtains in the elasmobranchs, there being in the anterior spinal region three distinct nerves, whose combined distribution resembles very closely that of the first spinal nerve of the teleosts, and may therefore be considered its equivalent. In the Anura there is a reduction in the number, the first nerve disappearing, or fusing with the second, so that two nerves here fulfil the function of the original three. In all these ichthyopsidan forms there is no true hypoglossal, this nerve making its appearance in the Sauropsida. From its distribution, it is apparently homologous with the three anterior spinal nerves of the urodelous Amphibia. As