traction, and heaving, in consequence of the severe frost. In narrow gorges this action had the effect of separating the bowlders from the clay, and throwing them to the centre into rows so regular as to suggest design. Mansfield Island is low, and, from disintegration of the rocks, looks like one gigantic ridge of gravel, the solid rock showing through the *débris* only at intervals. The formation is of gray limestone, in thin horizontal terraced beds, containing fossils, probably Silurian. Southampton Island is very similar, but appears to support a little more vegetation. At Marble Island, diorites and schists of the Huronian series are found; and the island probably derives its name from the white and light-colored quartzites of which the whole of the western part consists, and which bear a strong resemblance to white and veined marble. The surfaces of the beds are often strongly ripple-marked.

In considering the glaciation of the district, Dr. Bell remarks, that, if the sea here were only a hundred fathoms lower than at present, James and Hudson bays would be a plain of dry land, more level in proportion to its extent than any other on the continent. The numerous rivers that flow into it would traverse this plain, after having converged into one immense river towards the eastern limit of the plateau, and would empty into the strait near Digges, the strait remaining as a large bay, very much in its present shape.

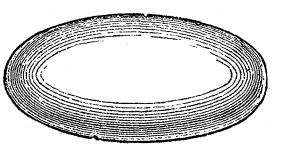
During the 'great ice age,' the basin of Hudson Bay may have formed a sort of glacial reservoir, receiving streams of ice from the east, north, and north-west, and giving forth the accumulated result as broad glaciers, mainly towards the south and south-west. In the strait, the direction of the well-marked glaciation is invariably eastward; and the composition of the drift, which includes Huronian limestone fragments similar to the more westerly formations, as well as the long depression of Fox's Channel and the strait, deepening as it stretches eastward, all point to the passage of an extensive glacier into the Atlantic. This glacier was probably joined by part of that occupying the site of Hudson Bay, and by another, also from the southward, coming down the valley of the Koksok River and Ungava Bay; these united streams still moving eastward, round Cape Chudleigh, into the ocean.

Throughout the drift-period, the coast-range of Labrador held its head above the ice, especially the high northern part; but, in going south, glacial action seems to have reached a height of a thousand feet at least. Here the course followed by the ice is down the valleys and fiords directly into the sea; while, on the island of Newfoundland, it appears to have been from the centre towards the sea, on all sides.

BIOLOGICAL NOTES.

ONE of the principal distinctions between the mammalia and the lower vertebrata has been hitherto supposed to be the possession by the former of a placenta. Duval, however (*Journ. anat. physiol.*, 1884, 193), has come to the conclusion that it also exists, though in a rudimentary form, in birds. The allantois, passing inward into the pleuro-peritoneal cavity, does not become attached to the amnion or the umbilical vesicle, but joins the chorion, becoming fused with it. It ends by forming a sac, which encloses a mass of albumen; and into this sac the villi of the chorion project, forming an organ completely analogous to the placenta of the mammalia. There is necessarily a difference in the form of this organ, due to the different modes of reproduction; in mammals the villi of the chorion being attached to the mother, while in birds they must attach themselves to the nutritive albumen. It is, however, quite intelligible, that in an ovoviviparous vertebrate, where the egg has a thin membranous shell, the placentoid organ should become attached to the internal surface of the oviduct. This placenta of birds is therefore a rudimentary organ which enables us to understand how the placenta of the mammalia may have originated.

For over sixty years Ornithorhynchus, or the duck-billed Platypus, has been believed to be oviparous; but up to the present time the evidence has not seemed to naturalists sufficient to settle this point beyond a doubt. In 1829 Geoffroy St. Hilaire, in a communication upon the subject, described the eggs as being of a regular oblong spheroidal form, of equal size at both ends, and measuring an inch and three-eighths in length and six-eighths of an inch in breadth.



It seems now to be established, that these eggs, two in number, are laid at the end of a burrow in the river-bank, about twelve yards from the water. The ovum of monotremes bears a close resemblance to that of a sauropsidan, and is very different from that of a true mammal, in that it has a good-sized yelk with which the young is nourished. It is interesting to observe that the yelk-sac and the umbilical vesicle are really homologous. In monotremes we find, as it were, intermediate animals possessing the attributes of two classes: for, on the one hand, they have developed mammary glands, the distinctive feature of the higher group; on the other, they lack that structure whereby the typical mammalian embryo receives nourishment before birth; and, in correlation with this, we find them agreeing with the lower class in the possession of a yelk-sac, whilst the contained food-yelk causes the ovum to assume the meroblastic type. We may thus trace the line of descent through the Sauropsida, directly to the monotremes (doubtless through forms extinct, as the Theromorpha of Cope); from these to marsupials, which are viviparous, but whose ova still possess a large yelk-sac, and whose embryos enter into no close vascular connection with the maternal tissues; and from these to the higher mammals.

In some experiments upon the digestion of sponges, von Lendenfeld kept some Australian Aplysinidae in

water containing powdered carmine. It was noticed, that, although all the cells took up the carmine, the epithelium of the ciliated chambers soon ejected the granules, while the cells of the upper surface of the subdermal cavity gave them off to the amoeboid wandering cells of the mesoderm, which, after they had partly digested the carmine, transmitted it to the cells of the ciliated chambers for ejection. He concluded, therefore, that although all the cells had the power of absorption, as is the case in man, still the digestive function in the species upon which he experimented was centralized in the upper wall of the subdermal cavities. Other authors have held different views; and in a subsequent paper he himself has concluded that it cannot yet be decided whether sponges digest with the ectoderm or the entoderm, though he considers it not improbable that both layers may have that function. His papers will be found in the Proceedings of the Linnean society of New South Wales.

R. von Lendenfeld has also described in the *Annals and magazine of natural history* for December, 1884, a new variety of Medusa which may prove to be a new species evolved within the last forty years. The species is Crambessa mosaica, which Huxley in 1845 described from Sydney, Australia, as blue to gray, but which is now found in this locality distinctly brown in color, due to a parasitic alga which infests the flesh near the surface. The evidence is sufficient to cause von Lendenfeld to state that it is probable that this new variety has been born since Huxley described it in 1845. He also mentions the case of another Medusa (Cyanea annaskala) which has hitherto been found only at Port Philip, where it is abundant, but which has recently been found at Port Jackson in warmer water. Those in the latter place differ from the typical species in being much larger, and, besides, in possessing deep-purple pigment-cells around the mouth-arms, which he thinks may be able to perceive light. He makes a new variety from this variation of color.

THE ANATOMY AND PHYSIOLOGY OF THE BRAIN IN THEIR RELATION TO MENTAL DISORDERS.

Treatises upon insanity have been appearing recently in quick succession, both in this country and abroad. There is none, however, which will command more notice, and prove more suggestive, than this work.

Professor Meynert, who has been at the head of the department of psychiatry in the University of Vienna for the past fifteen years, was one of the first to advance the opinion that a study of mental disease must be preceded by an understanding of healthy mental action. Regarding mental action as the subjective side of a physiological process in the brain, he seeks primarily to ascertain the function of the organ from its anatomical structure. The logical order which is followed in this work is therefore, first, the anatomy of the brain; second, the physiology of the brain, that is, the mechanism of mind; and, lastly, disturbances of the mechanism, that is, mental disorder.

The first volume is devoted to the structure and functions of the organ of mind. The position which Professor Meynert holds as the founder of modern brain-anatomy entitles him to a respectful hearing on this subject. Since the appearance of his first articles in Stricker's 'Handbook of histology' in 1870, he has been the chief authority in Germany; and almost every one of the younger scientific men who have done original work in this department has been imbued with his enthusiasm by personal contact with him in his laboratory. Within a hundred and twenty-five pages he has succeeded in giving a clear statement of the complex subject of the arrangement and relations of the gray masses and white connecting-fibres which make up the brain. An important aid to the comprehension of the structure will be found in the numerous excellent drawings of dissections and of microscopic sections.

The gray matter of the nervous system is the part in which sensory impulses are received and registered, and in which motor impulses are initiated. The white matter is made up of threads which transmit the impulses without modifying them. The structure and functions of the gray matter differ in different parts; simple functions being performed by that in the spinal cord, more complex functions in the gray masses within the brain, the most complex and the conscious functions being assigned to the layer which is spread out upon the surface of the brain, and which is thrown into folds by its convolutions. Each part of the surface of the body is in anatomical connection, by means of nerve-fibres, with its own part of the surface of the brain; and thus it is not difficult to imagine a projection of a map of the body upon the brain-cortex. The fibres which act in this manner to bring the external world into consciousness are named by Meynert 'the projection system of tracts.' This 'projection system' was announced in 1870, and was the starting-point to which all the recent discoveries regarding the localization of functions in various regions of the brain can be traced. It is to-day the ground-work for many arguments in favor of the theory of localization, — a theory to which Meynert gives his hearty support.

At present, investigations in brain-anatomy

Psychiatrie. Klinik der erkrankungen des vorderhirns begründet auf dessen bau, leistungen und ernährung. Von Dr. Theodor Meynert. Erste hälfte. Wien, *Braumüller*, 1884. 10 +288 p., illustr. 8°.