thirty miles, passing wells sufficient for one hundred or two hundred men only, and reaching, about sixty miles from Suakin, beyond Wady Ahmed, the summit of the line, three thousand feet above the sea, — a short but steep and narrow pass, and the most formidable obstacle on the route. Some heavy cutting will be unavoidable, unless another pass can be found. Wells at sixty-two and seventy-five miles from Suakin furnish a large quantity of good water. This portion of the route lies through barren, treeless valleys, strewn with fragments of trap and porphyry. At eighty-seven miles from Suakin is a steep, winding pass, altitude about twenty-five hundred feet above the sea, the last point offering any difficulty for a railroad. Nine miles beyond is the good well of Abd-el-Hab; and then, excepting two or three insignificant water-holes, we find only barren plains and low granite hills to Wady Ariab, — a hundred and eighteen miles from Suakin, and nineteen hundred feet above the sea. Here there is a genuine oasis, with good grazing. Twelve miles beyond, the mountains decline, and the route passes over barren plains for forty-two miles to the sand-dunes of O-Baek, about five miles across, where can be obtained a little water. In the preceding fifty-four miles there is no water. From O-Baek to the Nile, sixty-eight miles, stretches a stony plain without tree or herb, and with no water except at one good well two hours' march from the Nile. For seventy-five miles from Suakin, at no one point could a force of two thousand or three thousand men, with their animals, find sufficient water; and, after leaving Bir Ariab, there are two absolutely waterless stretches of fifty miles each.

To supply the water for the workmen while constructing this railroad, and for the troops which will be needed as guards, as well as to provide for the permanent working of the railroad, a pipe-line is at once to be laid, to consist of two lines of four-inch pipes, with stations every twenty-five or thirty miles, at which pumps will be connected with power sufficient to force the water, under a pressure of some one thousand to fifteen hundred pounds on the square inch at the pumps, so as to give a flow of about a hundred and fifty gallons per minute. The pipes will be laid in curves to allow for expansion from the excessive heat. The pumps are to be supplied by H. R. Worthington of New York, who has had great success in pumping petroleum through pipe-lines in this country under similar circumstances of distance and elevation to be overcome. In some cases their pumps have forced oil over a hundred miles without the assistance of intermediate stations. They are to be delivered in London in thirty days from the date of the order. It is also reported that the contract for laying the pipe has been offered to a New-York contractor of experience in that work, and that a man in Winnipeg, once an officer under Gen. Wolseley, and skilled in American methods of rapid railway-construction, has offered to build and guarantee the opening of the railroad from Suakin to Berber within five months from the signing of the contract.

Our enterprising countrymen are also urging upon the English government the advantages to be gained by the use, on the Nile, of the small, stern-wheel, light-draught steamboats so commonly employed on our western rivers. These boats are equipped with powerful capstans and warps for hauling them up rapids, as well as derricks for working off or over sand-bars, and can be rapidly built in the western yards and shipped in sections, or can be built abroad from plans.

THE TOPOGRAPHY AND GEOLOGY OF THE HUDSON-BAY REGION.

From Dr. Bell's report of the geological work of the Hudson-Bay expedition, we learn something respecting the topography and geological formation of that region. In passing northward along the Labrador coast, the land ascends until within seventy miles of Chudleigh, where a height of six thousand feet is reached: beyond this point it again descends gradually to the cape, which has an elevation of fifteen hundred feet. The highest land of the peninsula seems everywhere to lie close to the coast, with a gradual slope westward down to the comparatively flat basins of the Koksok, and the rivers emptying along the east coast of Hudson Bay. The coast of Labrador, like that of northern Europe, is indented by deep and narrow fiords, and in some places has shoals extending out about five miles. In the strait the coast-line appears to be less irregular, the coast is lower, the hills more rounded, and the country devoid of timber, of which the northern limit barely reaches Ungava Bay.

Throughout northern Labrador and the strait the formation is of gneiss, most of it Huronian, but some of it, perhaps, of Laurentian age, varying in color from gray to red, traversed at some points by dikes of trap, at others by veins of quartz, accompanied by the rock-formations usually found associated with such gneiss, and containing minerals characteristic of the formation, such as labradorite, anorthosite, calc-spar, iron-pyrites, and mica and felspar crystals. No economic minerals were found *in situ;* but at Ashe's Inlet some Eskimo from the eastward brought with them plates of good light-colored mica, pieces of pure foliated graphite, and one of amorphous graphite, all of which they said could be had in large quantities. On being shown specimens of minerals likely to occur in the formation, they recognized a bright-red hematite as existing inland, as well as a coarse variety of soapstone, which had been used for making pots; they also knew quartz, which they distinguished by its superior hardness from specimens of marble and gypsum shown them.

At Stupart's Bay, beaches of shingle may be seen at all levels, up to the tops of the highest hills in the vicinity, all as fresh-looking as those on the present shore, except that the stones are covered with lichens. At Port DeBoucherville the gneiss lies in island-like hummocks, the valleys being filled with bowlder-clay, which has a structural arrangement parallel to the walls, apparently due to a process of expansion, con-

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.

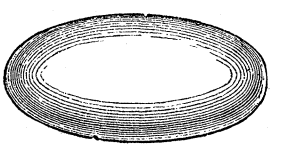
During the 'great ice age,' the basin of Hudson Bay may have formed a sort of glacial reservoir, receiving streams of ice from the east, north, and north-west, and giving forth the accumulated result as broad glaciers, mainly towards the south and south-west. In the strait, the direction of the well-marked 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