ankle, as in Megalonyx and the other allies of Megatherium, was not pivoted as in the sloths, but the inner maleolus was quite cut away and replaced by a slightly concave articular surface looking downwards and a little inwards, which was continuous with that of the lower ends of the tibia, a ridge intervening. The superior surface of the astragalus was consequently of a peculiar form, possessing a longitudinal median groove. The first and second digits of the foot were missing, and a claw was present only on the third, in which the middle and distal phalanges were anchylosed; there were two phalanges on the fourth toe, and only one was present on the fifth. As to its habits, there is no doubt that Megatherium was not a burrower as supposed by Pander, nor arboreal as suggested by Lund, but that Prof. Owen's hypothesis is correct in which he considers that it was terrestrial, feeding on trees, which it uprooted or broke boughs off.

Mylodon possessed the same number of teeth as its allies and the sloths, but the anterior pair in the upper jaw were separated by a considerable interval from those behind. All the teeth were more or less cylindrical and had persistent pulps; the worn surfaces were cupped and not ridged, because the dentine was softest in the centre; the fourth lower molar was elongated and grooved. Several species of this genus have been found, one only in North America. Gervais has divided off some with more separated anterior molars into a new genus, but Burmeister does not think this justifiable. The College of Surgeons possesses a very good skeleton, almost perfect, obtained in 1841. The skull was very slothlike, the fore part being truncated and the nasal fossae open. There was a large descending process of the zygoma and an ascending one; the bony arch was complete. There was no enlargement of the molar region in the lower jaw like that of Megatherium. Air cavities existed all round the brain-case, as in the elephant, but to a less degree The vertebræ were C. 7, D. 16, L. 3, S. 7, and Caud. 21. The lumbar vertebræ were anchylosed together to the last dorsal and to the sacrum. The tail was long and powerful; the limbs much like those of Megatherium, but differed in the radius and ulna being separate, as were the tibia and fibula. In the fore-foot Mylodon had the five digits, with claws on the first three. The ankle was as in Megatherium; the hallux only was missing, and the fourth and fifth toes did not carry claws.

Scelidotherium was smaller and altogether lighter built than those mentioned above; the teeth were equidistant and elongated from before backwards as was the head. The rest of the skeleton much resembled Mylodon, but the lumbar vertebræ were not anchylosed.

Megalonyx was a North American form. Prof. Leidy has described it fully. There was a great gap between the anterior tooth, which was large and much like a canine, and the other molars, whose number were the same as in the sloths. The animal had longer and slenderer limbs than those described above and therefore more nearly approached the sloths.

[In last week's report of these lectures, *Thylacoleo* is misprinted *Thylacoles*, and the animal is stated to have 32 instead of 2 molar teeth in the lower jaw.]

FAUNA OF THE NEW ENGLAND COAST

PROF. VERRILL, in discussing the collections made by the parties of the United States Commissioner of Fish and Fisheries upon the Coast Survey steamer *Bache* during her cruise off the coast of New England, in the summer of 1872, sums up by stating that they represent six distinct faunas and sub-faunas as follows:—

(1) The surface fauna outside of the banks, and, at certain times, even extending over their outer slopes. This is essentially the same as the fauna prevailing over the entire surface of the central parts of the Atlantic Ocean, and shows very clearly the direct effects of the Gulf Stream.

(2) The surface fauna inside of the Banks, which is decidedly northern in character, very similar to that of the Bay of Fundy. The contrast between the two shows that the Gulf Stream is almost entirely turned aside by the Banks, and has comparatively little effect upon the fauna between them and the coast.

(3) The fauna of the St. George's Bank itself. This is decidedly boreal in character, and essentially identical with that of the Bay of Fundy at corresponding depths, on similar bottoms, and in regions swept by strong currents. The fauna of the south-western part, however, is less boreal than that of the north-western.

(4) The fauna of the Le Have Banks, and off Halifax. This, even at the moderate depth of twenty fathoms, is decidedly more arctic in character than that of the St. George's or the Bay of Fundy at similar or even greater depths.

(5) Between the St. George's and Le Have Banks and the coast there is a great region of cold and comparatively deep water—in places more than 100 fathoms in depth—with a bottom of mud and fine sand, and communicating with the great ocean-basin by a channel between the St. George's and Le Have banks, which is comparatively narrow and, in some places, at least 150 fathoms deep. This partially inclosed region has, physically and zoologically, the essential features of a gulf, and may be called the St. George's Gulf. The deeper waters of the Bay of Fundy are directly continuous with those of this area. The fauna of this Gulf and of its outlet is peculiarly rich in species new to the American coast, and nearly identical with that of the deeper waters of the Gulf of St. Lawrence, and agrees very closely with that found on muddy bottoms, and at similar depths, on the coasts of Greenland, Finmark, and Norway.

He also presents additional generalisations as follows:—

(6) The deepest dredging, in 430 fathoms, was outside of the St. George's Banks, on the slope of the actual continental border, and within the limits of the true Atlantic "basin." The fauna there is especially rich and varied, decidedly northern in character, and agrees closely with that of similar localities and depths on the European side. The animals were mostly such as inhabit bottoms swept by strong currents in the Bay of Fundy.

(7) Everywhere over the banks, and especially on the southern slopes, the difference between the bottom and surface amounts to from 15° to 20°, or even more; the surface temperature being usually from 60° to 72°. The temperature of the air was very near that of the water, generally one or two degrees higher.

(8) No such contrast of temperature was found inside of the Banks in the St. George's Gulf or the Bay of Fundy; the difference seldom being more than ten degrees, and often, especially in the Bay of Fundy, less than five. The surface temperature at corresponding dates in the Bay of Fundy were 48° to 53°, showing an average difference of about 20° for the surface temperature in the two regions, while the average bottom temperatures do not appear to differ materially.

(9) The high surface temperature of the Banks is evidently due chiefly to the direct influence of the Gulf Stream.

(10) The very low surface temperature of the Bay of Fundy is largely due to its *geographical position*, and the *absence* of any appreciable influence from the Gulf Stream, but it is no doubt intensified by the powerful tides, which are constantly mixing the cold bottom water with that of the surface.

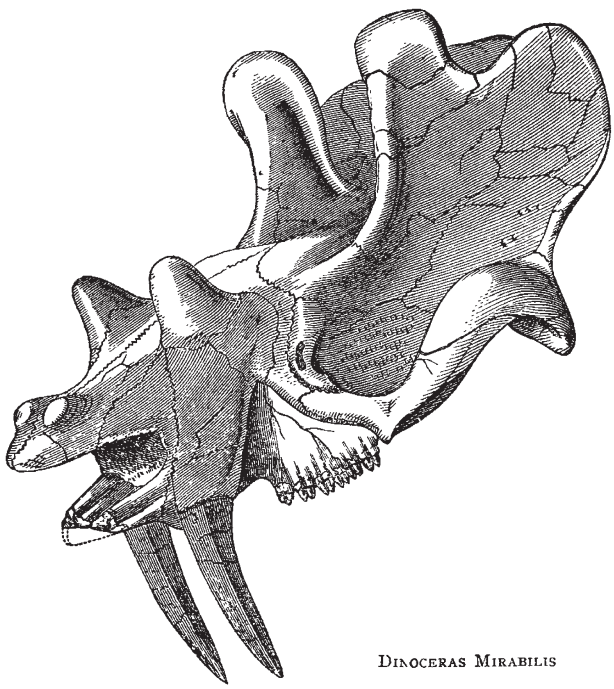
The facts hitherto observed do not seem to warrant the assumption that an "arctic current," properly so-called, as distinguished from the tidal currents, enters the St. George's Gulf or the Bay of Fundy. The action of

the tidal currents in bringing up the cold bottom waters of the ocean is perhaps a cause sufficient to produce most of the coldness of the water in this region.

ON DINOCERAS MIRABILIS (MARSH)

A SHORT time ago we gave a note respecting one of the recently-discovered gigantic fossil mammals from the Eocene of Wyoming in the region of the Rocky Mountains; the accompanying woodcut, copied from a paper by Prof. Marsh, on this extraordinary extinct animal, named by him *Dinoceras mirabilis*, will further assist in making its peculiarities easily understood.

The animal must have been nearly as large as the elephant, to which its limb-bones were very similar. The only teeth it possessed in the upper jaw, were a pair of well-developed canine tusks, and six pairs of small molars, whose crowns were formed of two transverse ridges, separated externally, but meeting at their inner extremities. The frontal region of the skull was concave, on account of the lateral projection upwards of a bony ridge or crest on each side, which posteriorly developed into a large osseous process that may have been a horn core but perhaps was only covered with thick skin, and acted like the fibrous pads on the cheeks of the wart-hog, to shield the thinner skull from direct blows. Behind these the crest extended back beyond the level of the occipital condyles. The maxillaries each bore a conical process, which in a profile view is evidently seen to be directly above the root of the canine tusk, and supported it; it probably carried a horn. At the anterior extremities of the nasals were also two smaller horn cores. The horns must have been of a character very different from those in the rhinoceros, in which animal, however long they may be, they are only supported on a roughened surface of bone; if they resembled those of the cavicorn ungulata, from analogy we must suppose that they were small, for in those animals there is a close relation between the size of the core and that of the horn which it carried.



DINOCERAS MIRABILIS

There were no postorbital processes to the frontal bones. The zygoma was completed in front by the malar, the lachrymal was large, and formed the anterior border of the orbit; its foramen was exserted. The infraorbital foramen must have been behind the zygomatic ridge, as it does not appear in any of the drawings. The premaxillaries did not carry teeth; they sent forward two branches, which partially enclosed the sides of the external nares; the upper branch joined the nasal, and the lower, as in the Ruminants, continued free, and probably carried a pad. Prof. Marsh gives no illustration of the mandible, and only remarks of it that "the lower jaw was slender and the tusks small." The limbs were short, the fore limbs shorter than those behind. The radius did not cross the ulna so obliquely as in the elephant. In the head of the femur there was not any pit for the insertion of the round ligament. The great trochanter was flattened and recurved; the third trochanter was absent. The tail was short and slender. The ribs had rudimentary uncinate processes.

Prof. Marsh feels justified in placing Dinoceras in an order Dinocerata, distinct from the Proboscidia, on account of the absence of upper incisors; the presence of canines and horns; the absence of large cranial air cavities; the malar forming the anterior portion of the zygoma; the absence of a proboscis, which could not have been necessary in an animal that could easily touch the ground with its nose, and other less important differences.

This *Dinoceras* of Marsh is the *Eobasileus* of Cope and the *Uintatherium* of Leidy. The shortness of the published descriptions prevents us saying more about it at present.

THE TROGLODYTES OF THE VEZERE *

III.

Our Troglodytes of the latest epoch had, in fishing, another resource unknown to their predecessors. Their different stations contain a large number of fish bones; but it is remarkable that all these fish were salmon. Now the salmon in these days neither frequent the Vézère nor the part of Dordogne where that river joins the sea. At some leagues below the confluence, not far from Lalinde, in the centre of Dordogne, there is a bank of rocks, which, at high water, forms a rapid, and at low water a regular fall, called, The Leap of the Gratusse. The salmon do not pass this boundary, and, as it did not stop them at the epoch of the Troglodytes, we must conclude that, since that time, the level of the Dordogne has fallen, either by hollowing out its bed so as to lay bare the bank of rocks, or by losing part of its volume of water. We are led to believe that the fishermen of that time did not use nets, for with a net could be caught fish of all sizes. We thus understand why they could only catch large fish, and why they chose, among these, the kind they preferred. Had they any fishing boats? We have as yet found no proof of such. And besides, the Vézère is sufficiently enclosed for the large fish to swim along the banks within reach of the harpoons.

The harpoon of our Troglodytes was a small dart of deer-horn, very similar to the large barbed arrows, except that it was only barbed on one side. A little notch at the base enabled the fisherman to secure the cord which he held in his hand (see above, Fig. 10). The barbs are intended to secure the fish which it has struck. Why are these barbs all placed on the same side? Is it to diminish the width of the dart and make it more penetrating? This I cannot venture to affirm.†

* Continued from p. 325

† One of my colleagues of the French Association, M. Lecoq de Boisbeaudrau, who did me the honour of being present at this lecture, communicated, the following day, to the Section of Anthropology, a very interesting note on the mode of action of the unilateral barbs of the harpoon While the harpoon is traversing the air, these barbs cannot make it deviate sensibly; but directly it enters the water, the unequal resistance it meets there must necessarily change its direction. It seems, then, that the fisherman who aims straight ought the most frequently to miss his aim. But M. Lecoq de Boisbeaudrau reminds us of the well-known experiment of the straight