

breaking. This, however, is only the case with new ice, as after a short time the salt crystallises out of the ice, and the surface covers itself with a snowy layer of salt, sometimes reaching two inches of thickness. Even in the most intense cold this layer retains so much moisture that it makes the impression of a thaw; only little by little, evaporation and drizzling snow do their work, and the ice itself becomes brittle.

In this way almost all the salt, which was frozen in, crystallises out, and is washed off and back into the sea by the melted water in the next summer. The melted water at the end of the summer is therefore almost free from salt, and has a specific gravity of 1.005. It is evident that a smooth plane of ice, as is found on sweet water, is a very rare occurrence in Arctic regions.

The finest and most interesting phenomenon, the only change in the long night of winter, is the Aurora Borealis; no pen can describe the magnificence of this phenomenon in its greatest intensity. In February 1874 Lieut. Weyprecht saw an aurora, which ran beyond the zenith from east to west like an immense stream of fire, and constantly showed intense prismatic colours running like flames, and as quick as lightning, from one side of the horizon to the other. At the same time flashes of fire came from the southern horizon and reached to the magnetic pole; it was the most stupendous natural display of fireworks he had ever been able to imagine. With regard to the intensity of the aurora, Lieut. Weyprecht says he can prove by data that it differs, independently of the geographical latitude, in the different parts of the Arctic zone, and that the district he visited was a maximal district; when the sky was clear, traces of auroræ could be uninterruptedly observed; in the second winter he even kept an "aurora journal," which, however, gave only few positive results, and was left behind in the ship. The phenomenon is past all description and classification, changing constantly and showing new forms at every moment. Lieut. Weyprecht was never able to describe the origin of an aurora; the phenomenon is there, and it is impossible to say whence it came.

Only in a very general way three forms of auroræ can be distinguished: first, quiet, regular arcs, slowly passing from the southern horizon and disappearing in the northern one; then, bands of light of great variety of forms, ever changing place and intensity; and lastly, the so-called corona, *i.e.* radiations from or towards the magnetic pole. Generally the colour is an intense white with a greenish hue; with greater motions and stronger radiations the prismatic colours are often seen in great intensity.

Lieut. Weyprecht spent much time and trouble on spectral observations of the auroræ, but unfortunately his spectroscope was too small and imperfect. He could never see more than the well-known green line; compared with the spectral observations of the Swedish Expedition, which were made with much more perfect instruments, his observations are of no value. One interesting fact with regard to the auroræ was, however, ascertained. It was found that upon very intense auroræ storms followed almost every time; this is proved by meteorological data, and Lieut. Weyprecht thinks he is justified in the conclusion that the Aurora Borealis is an atmospheric phenomenon and closely connected with meteorological conditions; he arrived at this conviction through observing hundreds of auroræ, but says he cannot give any positive or important reason for his conclusion.

(To be continued.)

JOHN EDWARD GRAY, F.R.S.

WE have to record the death, on Sunday morning last, at his residence in the British Museum, of Dr. J. E. Gray, late Keeper of the Zoological portion of the National Collection.

Dr. Gray was born in 1800 at Walsall, in Staffordshire, being the eldest of the three sons of Mr. S. F. Gray, a chemist of that town. He was educated for the medical profession, and very shortly exhibited his biological taste, by writing a work on the then new "natural" arrangement of plants. In 1824 Dr. Gray was appointed an assistant in the Natural History department of the British Museum, where, with the assistance of Dr. Leach, he commenced the study of zoology to such good purpose that in 1840 he succeeded Mr. Children as Keeper of the Zoological Collection of the Museum. At that time biology held but a small place in popular favour, especially in the eyes of those most active in the superintendence of

the extension of the British Museum. Against the opposing influences thus affecting his department, not the least of which was the antagonism of Mr. Panizzi, Dr. Gray, by his indefatigable zeal and courage to face obstacles, nevertheless succeeded in bringing the national collection of osteological and skin specimens, during the thirty-five years of his keepership, to so high a standard of excellence, that no other museum, not even Leyden itself, is equal to it.

Most of the biological societies which now exist include Dr. Gray amongst their founders or earliest members. The Zoological Society owes much to him, the number of papers communicated to it by him being very great. He was the leading spirit of the *Annals and Magazine of Natural History*, and was the author of the *Zoological Miscellany*, *Knowsley Menagerie*, and other works. In his Catalogue of the Mammals in the British Museum, which is far advanced towards completion, is incorporated much of the author's work in that direction, published originally in separate short papers.

The qualities which most distinguished Dr. Gray as a naturalist were his great industry in combination with an acute perception of minute distinctions. His imperfect acquaintance with anatomy in many of its branches much limited his generalising powers, and in some cases distorted his view of the relative importance of character based only on osteological features. To all students of the groups of animals which were touched upon by Dr. Gray—and there are but few that were not—that author's work will be found invaluable, both from the independent light which it throws on the subject, and from the careful review which it gives of the previous investigations of other naturalists.

Dr. Gray was elected a Fellow of the Royal Society in 1832; he resigned the Keepership of the British Museum at Christmas last. He leaves a widow, but no children.

#### NEW ORDER OF EOCENE MAMMALS

AT the last meeting of the Connecticut Assembly, February 17, Prof. O. C. Marsh made a communication on a new order of Eocene Mammals, for which he proposed the name *Tillodontia*. These animals are among the most remarkable yet discovered in American strata, and seem to combine characters of several distinct groups, *viz.*, Carnivores, Ungulates, and Rodents. In *Tillotherium*, Marsh, the type of the order, the skull has the same general form as in the bears, but in its structure resembles that of Ungulates. The molar teeth are of the ungulate type, the canines are small, and in each jaw there is a pair of large scalpriform incisors faced with enamel, and growing from persistent pulps, as in Rodents.

The adult dentition is as follows:—Incisors  $\frac{2}{2}$ ; canines

$\frac{1}{1}$ ; premolars  $\frac{3}{2}$ ; molars  $\frac{3}{3}$ . The articulation of the

lower jaw with the skull corresponds to that in Ungulates. The posterior nares open behind the last upper molars. The brain was small, and somewhat convoluted. The skeleton most resembles that of Carnivores, especially the *Ursidae*, but the scaphoid and lunar bones are not united, and there is a third trochanter on the femur. The radius and ulna, and the tibia and fibula are distinct. The feet are plantigrade, and each had five digits, all terminated with long, compressed and pointed, unguis phalanges, somewhat similar to those in the bears. The other genera of this order are less known, but all apparently had the same general characters. There are two distinct families, *Tillotherida*, in which the large incisors grew from persistent pulps, while the molars have roots; and the *Stylinodontida*, in which all the teeth are rootless. Some of the animals of this group were as large as a Tapir. With *Hyrax* or the *Toxodontia* the present order appears to have no near affinities.