

RECENT DENUDATION IN NANT FFRANCON.

SIR,—When examining the scene of the flood described in this Magazine last February I could not satisfy myself as to whether any channels had previously existed at the same place. My friend Mr. Dakyns informed me, however, that destruction of culverts is mentioned in a description of the damage done to the road. It is clear, therefore, that former channels did exist, and that the whole of the excavation cannot be ascribed to the flood of last August. I think, though, that the old channels must have been small, for if deposition be a measure of denudation, the recent excavating work done must have been very great.

I should like to take this opportunity to again suggest how valuable some regular record would be of denudation observed at the present time.

EDWARD GREENLEY.

OBITUARY.

BARON NILS ADOLF ERIK NORDENSKIÖLD,
PH.D., FOR. MEMB. GEOL. SOC. LOND., NATURALIST AND ARCTIC
EXPLORER.

BORN NOVEMBER 18, 1832.

DIED AUGUST 13, 1901.

WITH deep regret, we have to record the sudden death near Stockholm of Professor Baron Nordenskiöld, the eminent Naturalist and Arctic Explorer. Of a Swedish family long settled in Finland, Nordenskiöld was born in Helsingfors, the capital of that country, his father, Dr. Nils Gustaf Nordenskiöld, the eminent mineralogist, who died in 1866,¹ being at that time Director of Mines for Finland. Naturally, therefore, his ardent sympathies were always enlisted in favour of the land of his birth.

His family had long been eminent in science, and his inherent tastes were fostered and developed by the surroundings of his home at Frugård, which contained extensive collections of minerals and natural history specimens, and by his journeys with his father. On entering the University of Helsingfors in 1849 he devoted himself almost entirely to scientific studies, spending his vacations in excursions to the rich mineral localities of Finland. In 1855 he took his degree as licentiate, and was immediately appointed a mining official of the Government. From this post, however, he was dismissed in the same year for having indulged in pleasantries at the expense of the Russian Government at a private students' feast. A temporary absence being deemed advisable, he continued his studies at Berlin, but in 1857 returned to take his doctor's degree at Helsingfors. As ill-luck would have it, however, a deputation from the Swedish Universities was then entertained at Helsingfors, and the young doctor in an after-dinner speech again showed his sympathies

¹ See GEOL. MAG., 1866, Vol. III, p. 288.

too plainly. The affair might have been smoothed over, but Nordenskiöld refused to apologise, and was banished the country.

As may be supposed, the viking philosopher was received with open arms by the Swedes, and after little more than a year was appointed Professor and Keeper of the Mineralogical collections at the Vetenskaps-Akademi in succession to Mosander. Earlier in the same year (1858) he had entered on his Arctic travels by accompanying Torell to Spitzbergen, and in 1861 the two geologists undertook a more complete exploration of the island. Three years later Nordenskiöld headed an expedition, which mapped the southern part of Spitzbergen, and started the great work of measuring an arc of the meridian in those regions. The explorers met with some shipwrecked walrus hunters, however, and were obliged to return, their provisions being inadequate to maintain so large an addition to the party. Nordenskiöld now had higher ambitions, but money was lacking, and turning for help to the rich merchants of Gothenburg he initiated the long alliance with Oskar Dickson, productive of so much good to Arctic exploration. The steamer *Softa*, which carried the winter post to Gotland, was obtained, and in 1868 Nordenskiöld, with the present cabinet minister, Baron F. W. von Otter, as navigating officer, managed to attain the high latitude of 81 deg. 42 min.—a latitude previously exceeded only by Parry, who in 1827, going with sledges from the *Hecla* in the same direction, reached 82° 45' N. Subsequently this attainment has been surpassed more than once, as by Charles Hall, who in 1871 reached 82° 16', Payer in 1874 (82° 5'), A. Markham in 1875-6 (83° 20'), Lockwood of the Greely Expedition in 1884 (83° 24'), while the exploits of Nansen (86° 14') and the Duke of Abruzzi, 22 miles further north, will be fresh in the memory of our readers.

In 1870 Nordenskiöld set out on a short visit to Greenland to ascertain if possible whether Esquimaux dogs would be suitable for sledge-journeys to the pole. During his stay in Greenland he made an expedition into the interior over the inland ice-sheet and examined the Tertiary plant deposits at Atanekrdluk, where he discovered erect bituminized tree-trunks of Tertiary age *in situ*, proving that they had grown upon the spot (some were 2 feet in diameter), associated with beds of lignite and layers of dicotyledonous leaves. He also made important observations upon the inland ice-sheet and the glaciers on the coast, and discovered the great blocks of so-called meteoric iron at Ovifak, the largest of which weighed about 19 tons, the next 8 tons, and the third 6 tons. (See Prof. Nordenskiöld's account of his voyage, *GEOL. MAG.*, 1872, Vol. IX, pp. 289, 355, 409, 449, 516, and 88.) These masses are now shown to be of telluric origin and to have been ejected probably in Miocene Tertiary times, with the deep-seated basaltic flows through which metallic iron, of a similar character, is found to be disseminated. His belief in their cosmic origin, however, was fortunate in so far as it led Nordenskiöld to the further study of meteorites, while his observations on the surface of the Arctic ice-fields led to the well-known speculations on the falling of cosmic dust.

Nordenskiöld felt convinced that he could reach a much higher latitude by wintering in Spitzbergen and utilizing sledges. Accordingly he sailed thither in 1872 in the *Polhem*, accompanied by two tenders. Unfavourable conditions of the ice rendered the geographical results less important than he hoped; but he discovered fossil plants of great importance to the history of climatology during former geological epochs. Moreover, with Lieutenant Palander, now the Swedish Minister of Marine, he successfully surveyed part of North-East Land, and in the following July the vessels were extricated from their winter quarters at Mossel Bay, on the north coast of Spitzbergen, and returned home richly laden with important scientific collections.

Nordenskiöld now turned his attention to the exploration of Siberian waters, and in 1875, following the pioneers Carlsen (1869) and Wiggins (1874), he sailed through the Kara Sea to the Yenissei, and ascended the river in a small boat, returning home overland. In the following year, after a flying visit to the Philadelphia Exhibition, he introduced merchandise by sea to Siberia, returning in the autumn with his steamer by way of the Kara Sea and Matotschkin Sound. These experiences gave Nordenskiöld a reasonable hope of accomplishing the North-East Passage, and the King of Sweden, Mr. Oskar Dickson, and Mr. Sibiriakoff at once lent their aid to the project.

In July, 1878, Nordenskiöld, with Palander as navigator, started in the *Vega*, accompanied by two smaller ships. She was the first vessel to double the most northern point of the Old World—Cape Tchelyuskin. She wintered near Behring's Straits, and once more free in July, 1879, reached Japan on September 2. After a triumphal passage home around Asia and Europe, Nordenskiöld was enthusiastically welcomed at Stockholm on April 24, 1880, and laden with honours, being created Baron and appointed a Commander of the "Nordstjerne Orden" (Order of the North Star). In 1883 Nordenskiöld made his second voyage to Greenland, where he investigated the inland ice, and succeeded in penetrating with a ship through the dangerous ice-barrier along the east coast of that country south of the Polar circle, a feat in vain attempted during three hundred years by different Arctic expeditions.

Thus, at the age of 51, he brought to a close a career of exploration comparable in the magnitude of its results with that of a Vasco di Gama or a Magelhaens. But his intellectual activity was by no means ended. His own explorations furnished material for numerous books and memoirs, such as the account of his first visit to Greenland in 1870 (see *GEOL. MAG.*, loc. cit.), "The Voyage of the *Vega* round Asia" (1881), and the "Second Swedish Expedition to Greenland" (1885). His professional work as Keeper of the Mineralogical Division of the State Museum in Stockholm led him to contribute many valuable papers to the publications of the Academy of Science and various technical journals, as those in which he described the new minerals Crookesite, Laxmannite, Haumasite, and Cleveite. Combined with his love of active

exploration was a deep interest in the history of past geographical discovery and the development of cartography, This gave rise to the preparation of his great "Facsimile Atlas to the Early History of Cartography" (1889), translated by Ekelöf and Sir Clements Markham, and to the equally large complementary work, illustrated with numerous facsimile reproductions of ancient manuscript maps and portolani, and issued in 1897 under the title "Periplus: an essay on the early history of Charts and sailing directions," the English translation being by F. A. Bather. Nordenskiöld, indeed, was half a bookworm, and thus it is that when the *Vega* reached Japan, he employed his stay there in buying up every book and manuscript he could lay hands on, thus forming the finest collection of Japanese books in Europe. A catalogue of it, by Professor Léon de Rosny, was published at Paris in 1883.

A feature of Nordenskiöld's work, even in its most active manifestations, was always the underlying philosophy, sometimes appearing to the public very remote and speculative, sometimes fantastical if not absolutely erroneous, but leading as a rule to success and to results of practical value. Thus his views on the origin of cracks in igneous rock, originally sketched out thirty-three years ago in a paper on the geology of Spitzbergen, led ultimately to numerous deep borings for water in the gneiss and granite of Sweden and Finland; some account of these was published in *Natural Science* for September, 1895. Nordenskiöld also busied himself with a project for an expedition to the Antarctic, which, however, came to nothing at the time. It is interesting, however, to note that his nephew Otto Nordenskiöld has been appointed to take command of the Swedish Antarctic expedition.

At various periods from 1869 onwards Nordenskiöld added to his other duties those of politician, sitting in the Swedish Parliament, first as Liberal member for Stockholm, and subsequently in the Upper House. It is not long since he took part in the deputation that journeyed in vain to St. Petersburg to lay before the Tsar a petition on behalf of the Finnish nation.

Baron Nordenskiöld leaves a widow, a married daughter, and a son, whose mourning is shared by the whole Swedish nation, and by people of culture throughout the world. The son, Erland, is now on an exploring expedition in Patagonia; his elder brother, Gustaf Erik Adolf, died in 1895, at the age of 27, thus cutting short a career that promised to be one of excellence both as geologist and archæologist.—F. A. B.

ERRATA.—Mr. J. P. Johnson asks us to make the following corrections in his article "Some Sections in the Cretaceous Rocks around Glynde," which appeared in the June number: p. 249, last line of text, and p. 250, line 11 from bottom, for *Cuvieri* read *Brongniarti*.—In Mr. F. R. Cowper Reed's article, August number, page 358, for *Pleurotomaria reniformis*, Salter, read *Pleurotomaria uniformis*, Salter.