is necessary to work with patience and in co-operation with others, as the labour is one demanding both time and exhaustive study.

ANTON STUXBERG

Gothenburg Museum

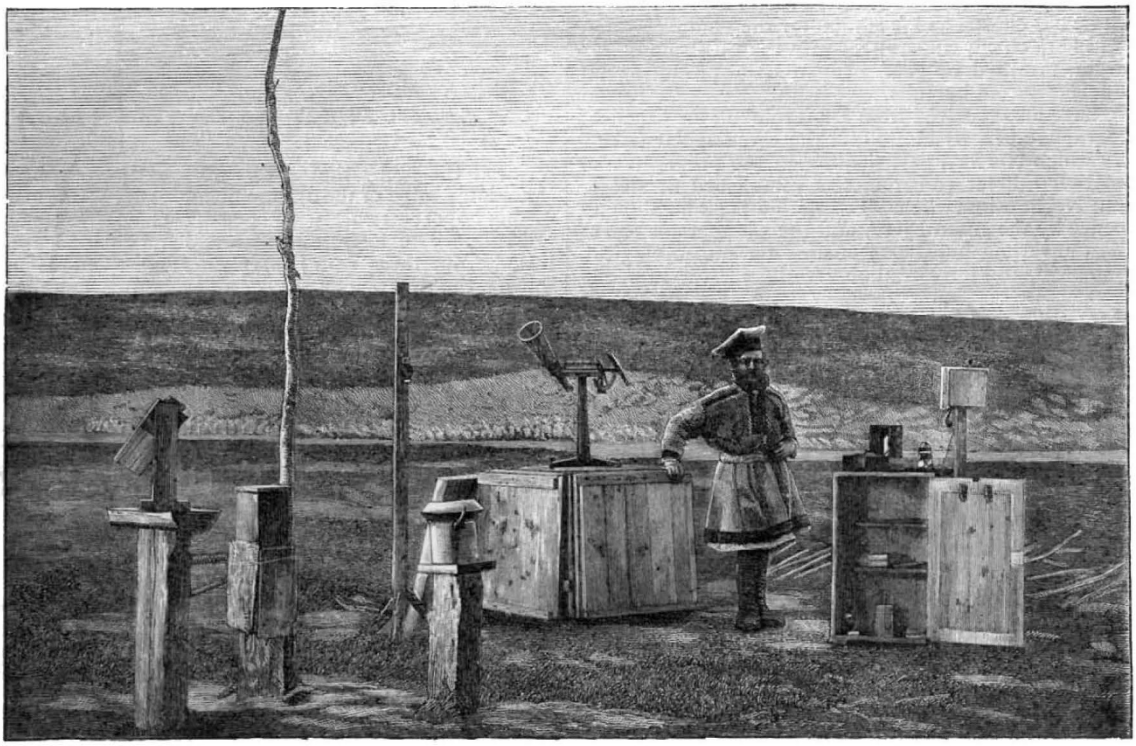
DR. TROMHOLT'S AURORAL OBSERVATORY AT KAUTOKEINO

WE are indebted to Dr. Sophus Tromholt for the photograph from which our engraving has been made of his auroral observatory at Kautokeino in Finmarken, Norway.

The Norwegian *savant* has, as may be remembered from his communications to NATURE, during last winter sojourned in Lapland for the study of the aurora borealis, simultaneously with which observations of this remarkable phenomenon have been made at the Norwegian and Finnish Circumpolar Stations at Bossekop and Sodankylä.

Dr. Tromholt writes :—"Since September last I have, for the sake of the aurora borealis, been residing here in North Finmarken (69° N. lat., 23° E. long.), in a zone therefore where the auroræ attain their maxima, and where the phenomena, consequently, are so frequent and on such a scale that there cannot be a question of selecting and analysing one in particular.

"My winter sojourn here has two objects in view, viz. firstly to frame a pendant to the observations of the aurora borealis made at Bossekop, 1838-39, by the French Commission du Nord under Lottin and Bravais ('Voyages en Scandinavie,' &c.), and, secondly, by means of altitudinal measurements corresponding with those being made at the Norwegian Meteorological Station at Bossekop, to procure sufficient materials for fixing the parallax of the aurora borealis. I choose the remote Kautokeino for my observatory for several reasons, viz. : that the place is almost due south of Bossekop, while the distance between the two is very nearly a degree, a distance which



Auroral Observatory at Kautokeino.

is exactly suited to the theory I have formed of the height of the aurora borealis—150 kilometres ; and also because it possesses a remarkably free horizon and an inland climate insuring favourable weather conditions.

"As previously stated, observations are made simultaneously here and at Bossekop on a common prearranged plan, and measurements made in the same vertical plane by the so-called auroral theodolite constructed by Prof. Mohn. A similar arrangement has also been made with the Finnish station at Sodankylä, which is, however, situated at a great distance from this place, and in a direction somewhat unfavourable (about 45° S.E.). We shall not of course be able to compare notes before the spring, so I am unable at present to give the final results of my observations ; but judging by own researches here I feel convinced, in spite of scientists' assertions to the contrary, that the height of the aurora borealis may be measured by the method I advocate, and that from the observations made at these three stations we shall obtain the materials required for the solution of a problem hitherto deemed an insoluble one.

"The photograph which I forward you shows the little 'scientific temple' I have raised in these lonely tracts, which have hitherto only seen Lapps and reindeer. In the centre stands my most important instrument, viz. a combination of the auroral theodolite and the passage instrument, fixed on a stone column and inclosed in a small wooden box, the upper half of which may be lowered at will. Here are, besides the necessary apparatus for meteorological observations, also to be found every requisite instrument and appliance required for my researches, such as chronometers, spectroscopes, lanterns, &c. Between them all stands the writer himself, clad in the tasteful summer costume of a Lapp, viz. pointed leather shoes, breeches twisted around the leg at the ankle, the blue frock ornamented with red and yellow borders ; and to crown it, the smart cushion-shaped cap.

"I have several times attempted to photograph the

aurora borealis, but without success. Thus, not even by using the most sensitive English 'dry' plates, and exposing them from five to seven minutes, have I obtained a trace of a negative. The cause of this is, I believe, the exceedingly limited substance of light possessed by the auroræ; were thus the entire heavens flooded by the most intense auroræ their aggregate lighting power would not equal that of the moon when full. I may therefore assume that to photograph the aurora borealis is an impossibility."

On a later occasion Dr. Tromholt informs us that he obtained no negative of the aurora borealis throughout his stay at Kautokeino, while he found also, on visiting Bossekop and Sodankylä, that neither had any been obtained at these observatories.

As to the results of Dr. Tromholt's researches on the aurora, we may add that, as soon as he has received certain comparative tables of the observations made at Sodankylä from Prof. Lemström, he will immediately communicate the same to NATURE. In the beginning of October next the intrepid *savant* starts for North Iceland, which he has chosen as his station for the coming winter. He will here chiefly experiment with the "utströmnings" apparatus invented by Prof. Lemström for producing an "artificial" aurora borealis.

We have also received from Dr. Tromholt an excellent photograph, taken by himself, of the Circumpolar Observatory which Norway, participating in the programme of international Polar research, has established at Bossekop, in North Finmarken. The station is situated on an eminence by the Alten Fjord, and the photograph shows clearly the various huts, &c., erected for meteorological, astronomical, and terrestrial observations.

ALDABRA ISLAND TORTOISES

THE following report by the Hon. W. Littleton, addressed to Sir John Pope Hennesy, Governor of Mauritius, has been forwarded by His Excellency in answer to a memorial presented by the late President of the Royal Society, and several other gentlemen, relative to the preservation of the gigantic tortoises on the Island of Aldabra :—

Memorandum on Aldabra Island Tortoises

TO HIS EXCELLENCY THE GOVERNOR,—With reference to your Excellency's request for a report on the Aldabra Island tortoises lately placed on Flat Island, I have been able to get very little information about them.

The Mauritius Acclimatisation Society recently handed over six tortoises to this Government, on condition that they should be placed on Flat Island and taken care of. The Government accepted the charge, and they were accordingly placed there about two months ago. The Storekeeper-General (Mr. Schmidt), who is much interested in them, tells me that they are completely at liberty, that they feed themselves, and are apparently doing well.

Only five of them are Aldabra tortoises; the sixth is from Madagascar. They are all young, and of comparatively small size.

But I may perhaps mention here that there are several specimens of the Aldabra tortoise, besides these, both here and in Seychelles. There is the well-known large one in the garden of the Royal Artillery mess in Port Louis. He was here before the English occupation of Mauritius in 1810. The largest circumference of his shell measures 9 feet 3 inches. He stands 2 feet 6 inches high.

In the Botanical Gardens at Pamplemousses there are two belonging to Mr. Cockburn Stewart, who brought them from Seychelles. They are about ten years old. The largest circumference of their shell is 7 feet 2 inches, and they stand 1 foot 8 inches high. Mr. Schmidt tells me of a very large one belonging to Mr. Castel, at Rivière Sèche, and of a very large pair on the estate "Mon Trésor," near Mahebourg, belonging to Mr. Daruty; but their measurements, which have been promised to me, I have not yet received.

A considerable number are kept by various people of Seychelles, including a pair at Government House, Mahé, the female of which recently laid eggs, and I am told that many of the tortoises kept on the Seychelles Islands frequently breed.

I am sorry not to have been able to collect for your Excellency's information more details of these creatures; but I have stated enough to show that there are many specimens well known and in good keeping.

I have also been unable to ascertain whether there are any of large size known to remain on Aldabra Island; but I am told that it is supposed there are in the thick scrub of the interior.

(Signed) W. LITTLETON

Colonial Secretary's Office, Port Louis,
7th July, 1883

THE METEOROLOGY OF THE ARCTIC AND SUBARCTIC PORTIONS OF THE ATLANTIC OCEAN[1]

UP to the publication of this work by Prof. Mohn, our knowledge of the diurnal meteorological phenomena of this important part of the ocean was nearly altogether a blank. The interesting results here detailed are deduced from three series of hourly observations made during the Norwegian Expeditions in the summers of 1876, 1877, and 1878, which Prof. Mohn organised and carried out with a skill and a completeness that leave nothing to be desired. The new facts thus brought before us largely extend our knowledge of the physics of this portion of the North Atlantic.

The diurnal phenomena dealt with are atmospheric pressure, temperature, and aqueous vapour, the force of the wind, and the temperature of the surface of the sea. Of these the discussions of the atmospheric pressure and temperature are the most important and satisfactory. The results of the atmospheric pressure present several points of the highest interest. The general curve for the three seasons, if a scarcely perceptible dip about 8–9 p.m. be neglected, shows only one minimum at 4 a.m. and one maximum at 2 p.m., thus roughly approximating to the curve of temperature. The curves for the separate seasons 1876 and 1878 exhibit an evening minimum with greater distinctness. The observations made by the *Challenger* Expedition in the Antarctic Ocean give a curve with only one minimum early in the morning and one maximum early in the afternoon; and it is highly probable that if the observations made by the Norwegian Expeditions quite in the open Atlantic were alone included, the resulting curve would give no sign of a dip in the evening.

Prof. Mohn then examines the observations made at the stations on the coast of Norway at 8 a.m., 2 p.m., and 8 p.m., and it is concluded that the diurnal variation of the barometer during the summer months on the adjacent coasts of Norway, as well as in the Norwegian Sea, has its minimum in the morning and its maximum in the evening, and that possibly there is a tract in the Norwegian Sea including the bounding coasts of Norway and Greenland, thence crossing Iceland, and passing to the west and south of Faroe, where the lines of barometric variation would represent values with plus signs instead of minus signs as elsewhere. In other words, over this region there occurs a state of things the reverse of what obtains over the lower latitudes of the ocean and the land

[1] "The Norwegian North Atlantic Expeditions 1876-78. Meteorology." By H. Mohn. With 13 woodcuts and 4 plates. (Christiania, 1883.)