ocular and the small plane mirror round the axis of the tube by a very simple process. The reason of this arrangement is to facilitate the use of the large iron winding staircase. This enormous metallic structure is moved by special machinery on two circular iron rails. It is always placed on the same side of the tube as the counterpoise, which would render observations impossible if the ocular and seeker were not rotated round the axis of the tube. The height of the iron staircase is about twelve metres, and its weight six tons. The observations are made in open air, and when the weather is propitious the cabin protecting the apparatus is removed by machinery. It is an iron casement (weight twelve tons), moveable on rails. In less than a quarter of an hour the telescope can be directed on any object, however minute.

The clock is finished, but not adjusted. The machinery for moving in right ascension is finished and works admirably. The handle and screws for minute motions in declination are finished and working most nicely. So does the gear for connecting and disconnecting the tube with the clock.

The cost of the reflector is 8,000*l*. It was built in six years, but the work was interrupted several times, first by the dismissal of M. Leverrier, secondly by the war and the Commune.

M. Leverrier is justly proud of having completed the large refractor, to which a very few details only are wanting—the adjustment of the clock, the handles for slight equatorial motions, and the machinery for large declination motions. He asked M. Wallon to give orders for the construction of the large refractor, and it was granted at once. A sum of 8,000*l*. has been already voted by the National Assembly for that purpose. It will be seventeen metres in length, and the construction will be completed in three years, if the work is not interrupted by any political or other commotion.

LIEUT. WEYPRECHT ON ARCTIC EXPLORATION

WE have already (vol. xii. p. 460) referred to Lieut. Weyprecht's paper on the Principles of Arctic Exploration, read at the German Scientific and Medical Association. A full report of the paper has now come to hand. Lieut. Weyprecht rightly maintains that the polar regions offer, in certain important respects, greater advantages than any other part of the globe for the observations of natural phenomena—magnetism, the aurora, meteorology, geology, zoology, and botany. He shows that hitherto immense sums have been spent and much hardship suffered for the mere purpose of extending geographical and topographical knowledge, while strictly scientific observations were regarded as holding only a secondary place. While admitting the importance of geographical discovery, he maintains that the main purpose of future Arctic expeditions should be the extension of our knowledge of the various natural phenomena which may be studied with so great advantage in these regions.

After showing in some detail the kind of observations which would yield valuable results, Lieut. Weyprecht lays down the following general propositions:—1. Arctic exploration is of the highest importance to a knowledge of the laws of nature. 2. Geographical discovery in these regions is of superior importance only in so far as it extends the field for scientific investigation in its strict sense. 3. Minute Arctic topography is of secondary importance. 4. The geographical pole has for science no greater significance than any other point in high latitude. 5. Observation-stations are to be selected without reference to the latitude, on account of the advantages they offer for the investigation of the phenomena to be studied. 6. Interrupted series of observations have only a relative value.

Suppose that stations were established at Novaya Zemlya, 76°; Spitzbergen, 80°; West or East Greenland, 76°-80°; N. America east of Behring Strait, 70°; Siberia at the mouth of the Lena, 70°, there would thus be a girdle of observatories around the entire Arctic region. A station in the neighbourhood of the centre of magnetic intensity is much to be desired. By means of the stations already existing in the neighbourhood of the polar circle, a connection would be established with our own region. The cost of one geographical exploring expedition would supply the means of keeping up these stations for a year. The object of these expeditions would be, with similar instruments and according to similar instructions, to record simultaneous observations as far as possible throughout a year. In the first line would be placed the various branches of Physics and Meteorology, as also Botany, Zoology, and Geology; and first in the second line, detailed geographical exploration. Were it possible to establish stations for simultaneous observation in the Antarctic regions, results of much higher value might be expected. Were the cost of these yearly expeditions divided among various countries, it would fall very lightly upon each.

While we think the curiosity of a healthy kind which seeks to know the configuration of the entire surface of our globe, we are sure every man of science will admit the value of Lieut. Weyprecht's propositions. There has, without doubt, been hitherto too much weight attached to merely reaching a high latitude, and too little provision made for strictly scientific observation. Lieut. Weyprecht's suggestions deserve the serious consideration of all civilised countries; were they adopted as a ground for action, a new era in polar exploration would be begun, and results of far higher value than any hitherto obtained might with certainty be expected.

NOTES

IT is rather disappointing that Capt. Young's Arctic Expedition in the *Pandora*, which arrived at Portsmouth on Saturday, should have returned home prematurely without accomplishing any part of the work for which it was organised—the discovery of additional Franklin relics and the complete navigation of the North-west Passage. Under the circumstances, however, Capt. Young has adopted the wisest possible course. Better that the expedition should spend a comfortable winter at home, and set out early next year to renew the attempt in which they have just been baffled. Disco was reached on August 7, Upernivik on the 13th, and Cape York on the 16th, after a splendid passage through the much-dreaded Melville Bay. Carey Islands were visited to deposit letters for the *Alert* and *Discovery* and to obtain a despatch from Capt. Nares, as previously agreed on. The despatch, however, was not discovered till the return voyage. From Carey Islands the *Pandora* proceeded up Lancaster Sound to Beechey Island, which was reached on the 26th. Here Capt. Young inspected "Northumberland House," which was built as a storehouse by the *North Star* (Capt. Saunders) in 1850. It was found that the house had been broken into by bears, and many of the stores damaged, but those in casks and barrels had sustained scarcely any injury. The yacht *Mary* and two lifeboats left by Sir John Ross were in such good condition that, with a few repairs, they could still be made seaworthy. After putting the stores in order, Capt. Young proceeded up Peel Strait for the purpose of reaching King William Land. After considerable manœuvring with the ice, and some difficulties arising from the uselessness of the compasses so near the magnetic pole, La Roquette Island, near Bellot Strait, was reached on August 30. The ground thus far gone over was pretty well known from the explorations of previous expeditions, and Capt. Young was close to his former encampments when travelling from the *Fox* in 1859. But now an impenetrable pack of ice across the channel barred all further progress, and after vainly trying to find a