maintains, than is sufficient to supply the simple wants of the natives. Coal he saw none, and he does not believe that such a thing exists over the wide area embraced in his route. This may be discouraging, but it is wholesome, and may prove a check to the wild schemes sometimes broached by speculators for opening up the African interior. From the Chimboya Mountains to the south-east of Tanganyika Mr. Thomson found numerous streamlets flowing southwards, doubtless to join the Chambeze, which, after passing through many a lake and levying tribute from a region one million square miles in extent, pours its almost Amazonian volume, as the Congo, 3000 miles below, into the bosom of the broad Atlantic. The much-debated Lukuga he found, as Mr. Hore had found shortly before him, to be a broad and rapid river, flowing westwards from the Tanganyika Lake to the Lualaba, as the Congo here is called; and Lake Hikwa he saw was a fine sheet of water with no outlet, lying among the lofty mountains, which stretch away east from Southern Tanganyika. What may be the extent and value of the purely geographical observations obtained by Mr. Thomson we have no means of knowing; doubtless in this respect the expedition suffered in the death of Mr. Johnston, who was a trained geographer. But in other respects, in information as to the structure of the country, the nature of its products, and the character of its varied peoples, the expedition under Mr. Thomson has been fruitful to a high degree; altogether it is one of the best pieces of original work which our not too energetic Geographical Society has ever done. Mr. Thomson's well-written and well-read paper was received with enthusiasm by an unusually distinguished audience. We trust to be able very shortly to give details concerning both the geography and geology of the Central Plateau from Mr. Thomson's own hands.

UNITED STATES WEATHER MAPS, DECEMBER, 1878

IMPORTANT changes took place this month in the distribution of the earth's atmosphere as compared with what obtained during the previous month, and these were accompanied with at least equally important changes in the geographical distribution of the temperature.

If a line be drawn from Texas to Newfoundland across the Atlantic, the north of France and Germany, thence curving round to south-eastward through the Black Sea, the Caucasus, India, the East India Islands, and Australia to the south island of New Zealand, it is found to pass through a broad and extended region where atmospheric pressure was throughout considerably below the average of December, and this low pressure was still further deepened at various points along the line. Again, another line passing from Australia through the Philippine Islands, Japan, Mantchooria, Behring's Straits, and Alaska, also marks out an extensive region where pressure was uninterruptedly below the mean.

On the other hand atmospheric pressure was above the average, and generally largely so, over the United States to west of long. 90°, over Greenland, Iceland, Farö, Shetland, and over a large portion of the Old Continent bounded by a line drawn from Lapland round by Lake Balkhash, Canton, Pekin, to at least the upper waters of the Lena. Another area of high pressure extended from Syria, through Egypt and East Africa to the Cape; and part of a third area of high pressure appeared in the north island of New Zealand.

As regards North America, the greatest excess of pressure, 0·196 inch above the average, occurred in the Columbia Valley, from which it gradually fell on proceeding eastward to a defect from the average of 0·146 inch about Lake Champlain and to northward, rising again to near the average on the north of Nova Scotia. To the north-east and north of this region exceedingly high pressures for these regions and the season prevailed, being 0·635 inch above the average in the north-west of Iceland, 0·500 inch in the south of Greenland, and at the three stations in West Greenland, proceeding northwards, 0·445, 0·402, and 0·346 inch.

West Greenland being thus on the west side of the region of high pressure which occupied the northern part of the Atlantic, and on the north-east side of the area of low pressure in the States and Canada, strong southerly winds set in over the country, and the temperature rose at the four Greenland stations proceeding from south to north to 1°·1, 8°·8, 12°·1, and 14°·4, above the averages. As the centre of lowest pressure was in the valley of the St. Lawrence about Montreal, strong northerly and westerly winds predominated to southward and westward, and there consequently the temperature was below the average, the deficiency at Chicago and St. Louis being 9°·5; and winds being easterly and northerly in California, temperature there was also under the average. On the other hand, in the New England States, the greater part of the Dominion of Canada, a considerable portion of British America, and in West Greenland, as already stated, temperature was above the average. Pressure was much higher at St. Michael's, Alaska, than it was to south-westward at St. Paul's, Behring Straits, and in connection therewith and with the prevailing winds, the temperature at St. Paul's was 2°·9 below the average, whereas at St. Michael's, where strong southerly winds prevailed, the temperature rose to 12°·0 about the normal. Hence whilst the continent of America presented striking contrasts in the distribution of pressure in December, 1878, it presented still more striking contrasts in the distribution of the temperature. Along Baffin's Bay the excess of the temperature above the normal was 14°·4, and at Behring Straits 12°·0, but in the south of Lake Michigan it was 9°·4 below it. In this last case the change of temperature from November to December was probably unprecedented, the mean for November having been 13°·7 above the average (NATURE, vol. xxii. p. 516), whilst the December temperature was 9°·5 below it, the difference being 23°·2!

Turning now to Europe, it is seen that Iceland lay on the east side of the patch of high pressure which overspread that region, northerly winds consequently prevailed, and with them a lowering of the temperature to 7°·2 below the average. The contrast this offers to West Greenland is very instructive. In both localities pressure was unusually high, but they occupied different positions, the one on the east and the other on the west of the same area of high pressure, with the inevitable result, of opposite prevailing winds, accompanied in the one case with a temperature 14°·4 above the average, and in the other 7°·2 below it. Hence as regards the temperature at the surface of the earth, it is not the height of the barometer which rules, but the situation of the locality with respect to areas of high and low pressure; or to put it more popularly, it is the winds which are chiefly concerned in the distribution of the temperature.

In Europe the area of lowest pressure occupied the southern shores of the North Sea, extending thence, though in a less pronounced form, to south-eastward. Hence over the whole of Western Europe winds were north-easterly, northerly, and in the south-west of Europe westerly; thus everywhere, from the North Cape to the north of Italy, temperature was below the normal, in some cases very greatly so, the deficiency being 10°·4 in the south of Norway, and 12°·2 in the south of Scotland. This is [the lowest monthly mean temperature known to have been recorded in Scotland since thermometric observations began to be made.

On the other hand, to the east of this area of low pressure, winds were southerly, and consequently temperatures were high. In some localities in Russia an excess of about 15°·0 occurred, and even over a large proportion

of European Russia the excess rose to 9°·0. This region of high temperature extended eastward into Siberia, as far as the Irtish, or to where the centre of the greatest excess of pressure prevailed. To the eastward of this area of highest pressure winds were northerly, and low temperature prevailed over the whole of the eastern part of Asia, the deficiency at Nertchinsk, on the Upper Amoor, being 6°·8 below the normal. Here, again, just as happened in America, places having the atmospheric pressure equally high above their average presented the strongest contrasts of temperature. Thus at Nertchinsk pressure was 0·154 inch, and at Bogoslovsk 0·211 inch above their respective averages; but at Bogoslovsk, on the west side of the anticyclonic patch of high pressure, temperature was 15°·0 above, whereas at Nertchinsk on the east side it was 6°·8 below the average.

This time of the year being the summer of the southern hemisphere, pressure falls to the annual minimum in Australia, but during December, 1878, this annual low pressure was still further diminished. Pressure at this season also falls to the annual minimum in the North Pacific and North Atlantic, and we have seen that the low pressure of these regions was likewise still further diminished. But in the case of the Atlantic it was accompanied with a vitally important difference. The centre of lowest pressure of the North Atlantic in winter, which is commonly located about Iceland, was removed many hundreds of miles to southward, and an unwonted development of extraordinarily high pressure appeared to northward, overspreading the extensive region of, at least, Baffin's Bay, Greenland, Iceland, Farö, and Shetland.

It was to this region of high pressure that the extreme severity of our British weather at the time was due. This high-pressure region was intimately connected with, and in all likelihood occasioned directly by the atmospheric movements resulting from the enormous extent of low pressure to southward, with its large centres of still lower pressures in the United States, mid-Atlantic, and the North Sea, where pressures were respectively 0·146 inch, 0·322 inch, and 0·307 inch below the normals. If future inquiry establish such a direct connection between the areas of low and high pressure, it is evident that when we come to attempt, on scientific grounds, to forecast the weather of the coming season for the British Islands, we must look to the Atlantic for the data on which the forecast is to be based.

In the winter months pressure rises to the annual maximum over Central Asia, and in America about the region of the Rocky Mountains. In December 1878, however, pressure rose in both regions greatly above its usually very high average, the excess being nearly a quarter of an inch in the valleys of the Yenisei, Obi, Irtish, and Tobal, about lat. 60°, and 0·200 in America in the Columbia Valley. It follows therefore that with the singular outstanding exception of the high-pressure area of Greenland, the meteorological peculiarities which make December, 1878, so memorable, arose out of a distribution of the earth's atmosphere, essentially the same that commonly obtains at this time of the year, but the usual irregularities in the distribution of the pressure appeared in more pronounced characters.

We have now had the pleasure, through the courtesy of the late General Myer, of presenting our readers with a series of Twelve of these unique Weather Maps, which open out a new future to meteorology. The map for December, 1878, closes the series which appears in NATURE. The questions which a perusal of these maps raises are of first importance, whether we consider the atmospheric changes they disclose, these being repeatedly so vast as to stretch across four continents at one time, besides being often profoundly interesting from their influence both on the food supplies and the commercial intercourse of nations; or the large problems hereby presented, with hints toward their solution, which underlie physical geography, climatology, and other branches of atmospheric physics. We have thus had shown us from month to month, in a way not hitherto possible, the great atmospheric changes as influenced by oceans and continents, including the important parts played in bringing about these changes, by mountain ranges, extensive plateaux, and physically well defined river basins. Much yet, however, remains to be done, principally by extending the network of observation in order that the Weather Maps may show, in an approximately adequate manner, the meteorology also of the North Pacific and the southern hemisphere. Till this be done many fundamental questions cannot be discussed, such as the inter-relations of the different continents and oceans of the globe in their bearings on successive meteorological changes; and the important inquiry as to whether the pressure of the earth's atmosphere be practically a constant from month to month, and, if not, what are the conditions or forces on which the observed differences depend. For the bringing of this great international work to so happy a consummation, we look with confidence to the War Department of the United States, since this implies no more than a continuance of the same energy and enlightened liberality that have won for the Americans their high position in meteorology.

SEARLES VALENTINE WOOD

PALÆONTOLOGY has sustained a severe loss in the death of the veteran explorer of the English Pliocene deposits. Born towards the close of the last century, the late Mr. Wood was from an early age an ardent collector and student of the fossils so abundantly found in the crag-pits of East Anglia. At this period the facilities for collecting the fossils of the English Pliocene strata were much greater than at present. Fresh pits for the purpose of obtaining the shelly marls and sands, which were then extensively used for manure, were continually being opened in the counties of Norfolk and Suffolk, while at the present time the new chemical manures have caused the crag to be quite neglected by agriculturists. The geologist who visits the Eastern Counties at the present day to study the Pliocene has to content himself with such exposures as he can find in old pits, now often overgrown with vegetation and which are used as sheepfolds or stackyards.

Mr. Searles Wood, as he himself said, was born within sight of one crag-pit; he resided for a great part of his life in the crag country, and hoped to be buried within sight of a crag-pit.

In the year 1839 Mr. Searles Wood joined the Geological Society of London. The following year was marked by the establishment of the London Clay Club by seven earnest students of fossils, of whom we believe only Prof. John Morris, formerly of University College, London, still survives. The object which the members of the London-Clay Club set before themselves was the figuring and describing of the British Tertiary fossils.

The London-Clay Club was the forerunner of, and became merged in, the Palæontographical Society of London. This Society has published between thirty and forty volumes, which have appeared annually, and has accomplished a most valuable work in the illustration of our British fossils.

At a very early date Mr. Searles Wood and his friend the late Mr. Frederick Edwards agreed to divide between them the work of describing the mollusca of the English Tertiary formations. The absence of marine Miocene formations in this country divides our British Tertiaries into two great groups, the Older Tertiaries, in which the great majority of the mollusca belong to extinct species