

it was illustrated. After indicating the position of Siam in the Malay Peninsula, the author went on to say that on the west is a chain of mountains which runs in an unbroken range to Singapore, the southernmost limit of the Malay Peninsula; some of its peaks between Burmah and Siam rise to a height of 7000 feet, while one peak in the Malay Peninsula reaches 8000 feet. On the east there is another range of mountains which forms the grand watershed of all the rivers that flow into the Gulf of Tonquin and Chinese Sea on the one hand, and the Meinam Kong on the other. There are peaks in this range that reach even 9000 feet above mean sea-level. Besides these ranges there is another which breaks away from the western range from a point north-east of Chingmai, and forms the watershed between the Meinam and Meinam Kong valleys. In this range, at the source of the eastern branch of the Meinam, are famous salt-wells. The salt is procured at depths varying from 35-45 feet—in these land-locked countries as valuable as money. The greater part of the valley of the Meinam Kong and the Meinam is flat, diversified by isolated hills, and broken and jagged ridges of limestone mountains. The most important river, though not the largest, is the Meinam Chau Phraya. It is the Nile of Siam, a good rice harvest very much depending on whether the river overflows its banks or not. The eastern branch of the river is specially known for the numerous crocodiles which yearly carry off some victims. Two other rivers converge towards the Meinam, the Mei Klong and Bang Pla-Kong. All these rivers are connected by canals, rendering communication easier in a country where roads are conspicuous by their absence. The Meinam Kong is the largest river, and flows through the northern and eastern parts of the kingdom, receiving the waters of many large affluents; but the channel of this mighty river is so blocked with large rocks and cataracts, that its navigation is very difficult, and in some parts impossible even for native craft. Mr. McCarthy then went on to describe some of his journeys in detail, especially the one to the north-east frontier, which led him through scenes of surpassing beauty, and during which he opened up much new ground.

THE Arctic land seen by Sannikoff eighty years ago has been seen again by the Expedition of M.M. Bunge and Toll from the northern extremity of the Kotelyni Island. The Great and Small Liakhov Islands, the Thadous Island, and New Siberia have also been visited by the Expedition, which has returned with rich zoological, botanical, and geological collections. Throughout the summer of 1885 the ice on the Siberian coast did not move from the shores, and the hunters said that the sea had not been clear from ice since the *Vega* Expedition.

METEOROLOGICAL NOTES.

WE have lately been subjected to a series of storms which fortunately in the British Islands is not of very common occurrence. The storm of October 30, which was noticed in NATURE a few days after its occurrence, had scarcely left our shores before a fresh disturbance was approaching us from off the Atlantic, and by the evening of Monday, the 31st, another gale was blowing in Ireland, and during the night this storm extended to all parts of the British Islands. The central area of low barometer readings, which primarily occasioned the renewal of disturbed weather, kept to the westward of our coasts, but the Daily Weather Chart of November 1 shows that two secondary disturbances had been formed, one having its centre in the St. George's Channel, and the other over the Bay of Biscay. The very severe gale experienced in the south-west and west of England on November 1 was due to the former of these, the storm area passing during the day slowly up the Irish Sea. The fall of the barometer for this gale amounted to 1.02 in. at Pembroke in fourteen hours, from 6 p.m. 31st to 8 a.m. 1st; and at Lyme Regis the wind attained the velocity of 83 miles an hour between 7 and 8 o'clock in the morning. Another disturbance skirted to the westward of Ireland on the evening of the 2nd, and during the following day, causing southerly gales in many parts of the country, the barometer standing below 29 inches over the whole of the United Kingdom. On the evening of the 3rd another subsidiary was formed in the Irish Sea, and subsequently passed over the north of England, causing gales and disturbed weather in parts adjacent to its path. Before the expiration of the week a fresh disturbance was shown in the west, and on Saturday, the 5th, the barometer was again falling; the force of the wind, however, was not severe, although

it blew a fresh gale in places. It will be seen from this notice that no fewer than five distinct storms were experienced in seven days, and in each case the wind was accompanied by heavy rain.

THE Meteorological Council have published Part I. of the "Hourly Readings" for 1885 (January to March) made at their self-recording observatories, together with the daily means, daily maxima and minima, and the daily range for pressure and temperature. Hourly values have now been issued in either lithographed or printed form since 1874, and afford valuable data for discussion in various ways, although the hourly means are not calculated. Corrections are given for reducing the barometric observations to mean sea-level. In connection with these observations it may be mentioned that the Meteorological Institute of the Netherlands lately published an interesting paper by M. Schokker on atmospheric disturbances studied by means of the hourly readings issued by the Meteorological Office and elsewhere; he traced on charts the positions of depressions for various hours, and showed that many phenomena which are clearly traceable from hourly observations are entirely lost sight of on charts giving only one or two hours a day. He also quoted instances where timely warning of storms could have been given, which were not possible from the usual observations received by telegraph.

THE Hydrographic Office of the United States calls special attention to a new form for reports of storms, fog, ice, and derelicts, issued for the use of trans-Atlantic steamers. This form replaces those hitherto issued by that Office and the Signal Service, and the information thus collected is immediately utilized in preparing the telegrams sent daily to France by the United States Signal Service for the benefit of westward-bound vessels. Captains of trans-Atlantic steamships are requested, in the interest of navigation, to send in prompt and complete reports. No doubt British ship-owners will instruct their officers to co-operate in this enterprising experiment, as this country has at least equal interest with others in the safety of Atlantic navigation.

A DISCUSSION on the distribution of cloud over the eastern part of the North Atlantic, by Dr. W. Köppen, will be found in the *Annalen der Hydrographie und Maritimen Meteorologie* for October. The author points out that the cloud-conditions over the Atlantic are now fairly well known from the publications of the Meteorological Office (Captain Toynbee's great work for nine 10° squares), and the six 10° squares discussed by the Deutsche Seewarte. Dr. Köppen gives a table showing the mean monthly cloud from 20°-50° N. and from 10°-40° W., and the number of observations used, for every 5°, showing that, with regard to longitude, in the months January to April the cloud decreases north of 10° N. as we approach the shores of Africa and Europe, while in the other months this does not hold good. South of the equatorial calm-belt, May has the least cloud towards the east of the district, and in the months September to February the least cloud is towards the west. The differences of the amount of cloud with regard to latitude are much more decided, and these changes are shown on a map of equal lines of mean cloud, on the same plan as was adopted by the author in his discussion of the rainfall (NATURE, vol. xxxvi. p. 617). He also compares the cloud and rainfall curves for the yearly period, and draws attention to their marked difference in the zone of 15°-27° N. lat. While the tropical summer rains cease between 15° and 20° N., the summer maximum of cloud extends as far as 25° N. In the same way the winter maximum of cloud only extends southwards to 25° N., while the rain extends to 17° N. In these latitudes the minimum of cloud falls in the autumn, and the minimum of rain in spring. Only from 15°-17° to the southwards is the amount of cloud in spring less than in autumn, while northwards of 27° N. both minima coincide in the late summer season. Between 15° and 20° N. the end of the long dry season, lasting from February to June, is very cloudy. The author also compares his cloud-results with those obtained by M. Teisserenc de Bort from independent data (NATURE, vol. xxxvi. p. 15), and on the whole expresses himself satisfied at the agreement between the two investigations.

WE have the pleasure of recording the commencement of the publication of meteorological observations in the *Boletín de Estadística* of Puebla (Mexico). Observations taken three times a day are published for several stations, and monthly means for several others. The stations are generally at great altitudes above the sea.

PART 2, vol. iv. of the Indian Meteorological Memoirs contains a very lucid discussion of the disastrous storm which visited Orissa in September 1885, and whose centre was at False Point on the 22nd, drawn up by Prof. A. Pedler. This storm is of considerable meteorological interest from several points of view: viz. the rapidity of its formation; its smallness, the diameter at the part of greatest wind-force being only from 100 to 200 miles; its enormous fierceness; particularly as it approached the land; and the decided indraught towards the centre as opposed to the circular theory; the extraordinary low reading of the barometer, 27.135 inches, being recorded at False Point at 6h. 30m. a.m. of the 22nd. The reading at 8h. p.m. of the 21st was 29.622 inches, thus giving a fall of 2.487 inches in 10½ hours. This is the lowest pressure ever recorded in a storm in the Bay of Bengal, and in fact is the lowest on record for any part of the world.

THE Journal of the Scottish Meteorological Society for the year 1886 contains a large amount of useful information, and testifies to increased activity, both observational and experimental. Among the various papers, all of which are of the highest importance, may be specially mentioned, (1) an address by the Hon. R. Abercromby on the modern developments of cloud knowledge (see NATURE, vol. xxxv. p. 575); (2) discussions on the winds and rainfall of Ben Nevis, and on a peculiarity of the cyclonic winds of the mountain, which has an important bearing upon weather forecasting, viz. the outflow of the wind from the cyclone when the centre is north or east of Ben Nevis towards an anticyclone or area of high pressure somewhere in an opposite direction. The prevalent wind on the Ben is north, while south-east and west-south-west are secondary points of maxima. Compared with the winds of other stations in the north of Scotland and Ireland, the wind curve is quite different. The year divides about equally into cyclonic and non-cyclonic periods. The most frequent cyclonic wind is south-west; next to this comes north, apparently due to the cyclones passing to the north of Ben Nevis. The relative frequency of the winds in non-cyclonic periods is quite different: while north still retains its place as a maximum point, the most frequent wind is south-east. In the curve for the whole year the west-south-west winds are chiefly due to cyclonic winds, south-east to non-cyclonic, and north to both systems. In both systems the north-west wind is wettest while it blows, and the east is driest. The south-east winds, which are generally west at low levels, are the driest on Ben Nevis, with the exception of the east winds. The total amount of precipitation for the year was nearly 108 inches; the wettest month was November, 14.6 inches; and the driest February, 2.8 inches. The journal also contains an interesting account of the biological work of the Scottish Marine Station, and the results of observations at the Northern Lighthouse Station, at the stations connected with the Medical Department, including observations in Iceland, Faroe, and Uruguay, and at fifty-five stations established by the Scottish Meteorological Society, and well distributed over the country.

GEMS AND ORNAMENTAL STONES OF THE UNITED STATES.

ON Saturday, October 22, an evening lecture on this subject was delivered by Dr. A. E. Foote, of Philadelphia, in the Trophy Hall of the American Exhibition. The speaker was introduced by Mr. F. W. Rudler, the President of the Geologists' Association.

Dr. Foote remarked that hitherto mining for gems in the United States had been of a very desultory character, being principally carried on in connection with mica and other mines. The emerald and Hiddenite mines of North Carolina and the tourmaline mines of Maine are the only ones which have been worked systematically. The gems peculiar to America are chlorastrolite, zonochlorite, and Hiddenite. Chlorastrolite, or green star-stone, was discovered by Prof. J. D. Whitney, of the United States Geological Survey, about forty years ago. The only place where it is found is Isle Royale, Lake Superior. The island, belonging to the State of Michigan, forty miles long and five miles wide, and about twenty miles from the mainland, is composed of amygdaloidal trap, in the almond-shaped cavities of which the gem principally occurs. This green stone has a radiating structure, and shows a beautiful chatoyance similar to cat's-eye and other fibrous minerals.

Zonochlorite is a green-banded stone, similar to chlorastrolite in composition, discovered by Dr. Foote at Neepigon Bay on the north shore of Lake Superior. The full description was published in the Transactions of the American Association for the Advancement of Science in 1872. Its hardness is about 7; it takes a very high polish, and if it could be found in sufficient quantities would undoubtedly be extensively used.

Hiddenite is a green variety of the well-known species spodumene. A yellow variety from Brazil has been cut as a gem for many years. The green variety has been known for about seven years, and is fully as beautiful, and valued as highly, as the diamond. It occurs in connection with emeralds in North Carolina. Of gold quartz about £28,000 worth is sold annually. Most of this comes from California, where it is not only used as a gem, but in the manufacture of various ornaments.

Although the flexible sandstone, the reputed gangue of the diamond in Brazil, is found in mountain masses in North Carolina and other States, no very large diamonds have as yet been discovered. Many small ones are recorded from California, North Carolina, Virginia, and elsewhere. The largest was found at Manchester, near Richmond, Virginia, and weighed 23½ carats in the rough and 11½ carats cut. Prof. Whitney states that the largest found in California was 7½ carats. Rubies and sapphires have been found in the rock in the corundum mines of North Carolina, and Mr. C. S. Bement has an uncut green one in his collection that would give 80 to 100 carats' worth of good stones, one of which would probably weigh 20 carats. The largest red and blue crystal weighs 312 pounds, and belongs to Amherst College. The best sapphires are found in the placer mines of Montana. Asteriated corundums are found in Pennsylvania and elsewhere.

About £2200 worth of quartz or rock crystal is mined annually. The best localities are Hot Springs (Arkansas), North Carolina, New York, and Virginia. A portion of a mass that must have weighed over 40 pounds was recently received from Alaska, that cut a hand-glass 3 inches by 5. Rock crystal is frequently dug up in the prehistoric mounds, and was used by the medicine-men and others for telling future events. Amethysts are found in very fine specimens in Pennsylvania, Georgia, Texas, and the Lake Superior region. From the latter region they are very remarkably lined, some specimens showing "phantom crystals" equal to the Hungarian. Near the Yellowstone National Park and in the chalcedony forests of Arizona are tree-trunks, some of which are 100 feet long, mineralized by the action of silicated waters. Some of these trees are still standing upright, others, having fallen, bridge deep chasms. The once hollow cavities of some are lined with amethyst, others with agate. The Arizona agatized or jasperized wood shows the most beautiful variety of colours of any petrified wood in the world. Probably the most remarkable locality anywhere for smoky quartz, or cairngorm stone, is Pike's Peak, Colorado. Here it is found in a graphic granite associated with Amazon stone, which also makes a very beautiful green ornamental stone. The rutilated quartz, or Cupid's arrows, is found in remarkably fine specimens in North Carolina. Perhaps the most remarkable mass is one 7 inches by 3½, now in the collection of the Academy of Natural Sciences of Philadelphia. The crystals of rutile are about the size of knitting-needles. Some of the North Carolina rutile has been cut, furnishing brilliant gems, closely resembling carbonado. The rutile, geniculated till it forms a perfect circle or rosette, from Magnet Cove, Arkansas, is often mounted and worn as a gem. While opals are found at many places in the United States, they do not rival those of Queretaro in Mexico. Here are found not only the "milky opals that gleam like sullen fires in a pallid mist," but fire opals and almost every other variety known. Rhodonite, in specimens suitable for polishing, is found in Massachusetts and New Jersey. At the latter locality were obtained the finest crystals ever seen. The garnets from New Mexico and Arizona are superior to the "Cape rubies" from South Africa; and from Alaska the most beautiful crystals ever seen, in a setting of gray mica schist, have recently been obtained.

The New Mexican turquoise is mined to the value of about £700 annually. It has recently been described very fully by Prof. Clarke, Curator of the Mineralogical Department of the National Museum, and is especially interesting as being the material from which the "chalchihuitls," or most sacred images of the Aztecs, were made. The Indians still regard it as a lucky stone.

Labradorite, lately so popular for gems and ornamental stones, is found in many localities. The tourmalines of Maine are