

most places in the north of Scotland, where the average excess was about 0.5° F. At Bath the deficiency amounted to 5° . January had a deficiency over the whole of the United Kingdom, the defect being greatest in the midland, southern, and western parts of England and in Ireland, exceeding 5° in a few places. February had a slight excess of temperature in the Shetlands, Orkneys, and Hebrides; elsewhere it was deficient, the deficiency exceeding 7° at Hereford, and being more than 5° at many places in different parts of England and at a few places in the south of Ireland. March had a deficiency of temperature over the entire area of the British Islands, exceeding 5° at some places in the midland and eastern districts of England. April was everywhere cold, the deficiency of temperature exceeding 5° in many parts, and amounting to 6.6° at Aspatria, in Cumberland.

London is represented by eight stations, including Greenwich and Kew Observatories. The mean temperature, the arithmetical mean of the maximum and minimum readings, from the eight stations for the five months December, 1916, to April, 1917, is 38.0° , which is 3.6° below the average for the whole period. The highest of the several means for London was 39.3° at South Kensington, the observing station of the Meteorological Office, and the lowest Hampstead, 35.9° . The mean of the minimum, or night, readings at Hampstead was below the freezing point in each of the months from December to March, and in April the mean minimum was 33° . At Greenwich the mean of the maximum for the five months was 43.3° , the mean of the minimum 32.3° , and the mean was 37.8° , which is 3.8° below the normal. The means for January and February were both 35.3° , and April, with a mean of 42.7° , had a deficiency of 4.5° , the greatest deficiency from the normal in any of the five months. The mean temperature for the five months was 0.2° higher than for the corresponding period from December, 1890, to April, 1891, and it was 0.1° lower than for December, 1878, to April, 1879, the next lowest mean since 1841, and 0.2° lower than from December, 1844, to April, 1845.

Taking six representative stations in the midlands, for the five months the mean temperature was 36.8° , and the difference from the normal was *minus* 3.9° . At Brighton the mean temperature was 38.6° , a deficiency of 3.9° from the average. In Dublin the mean temperature for the five months was 40.0° , and the deficiency 3.5° ; at Jersey 40.7° , and deficiency 4.2° . Three representative stations for Scotland give the mean temperature 37.9° , and the mean deficiency from the average was 2.3° .

Meteorological information from western and northern Europe shows that other parts were similarly affected with prolonged cold.

Dr. Mill, of the British Rainfall Organisation, in a letter to the *Times* of June 4, directs attention to the month which has just closed as being the warmest May at Camden Square, London, since the establishment of observations in 1858. He gives the mean temperature on a Glaisher stand as 59.1° F., or 5.1° above the average, whilst April was just 5° below its average. At Camden Square May, 1868, had a mean temperature 58.9° , a trifle cooler than the recent May, and it was followed by a very hot summer. Dr. Mill quotes several warmer Mays according to the old London records, and mentions that only in 1809 did an extremely warm May follow, as this year, an extremely cold April. At South Kensington, the observing station of the Meteorological Office, the mean temperature in a Stevenson's screen for May was 59.6° . The Greenwich observations give 58.8° in 1841 and 1848 as the previous highest May temperatures, from maximum and minimum readings, since 1841,

and in 1893 the mean was 58.4° . In 1908 at Greenwich the mean temperature for April was 44.3° , which is 4° below the average, whilst that for May was 56.7° , or 3° above the average. The following summer was by no means fine or hot.

CHAS. HARDING.

THE COOLIDGE X-RAY TUBE.

THE Coolidge X-ray tube has been on its trial in this country during the last two years, and it may be said with some confidence that it has gone a very long way towards justifying the claims which have been made concerning it. Whether the tube be judged from the laboratory or from the clinical point of view, it marks a new era in the history of the X-ray tube. There is now to the hand of the experimenter or of the radiologist a source which provides him with a beam of X-rays which can be varied in the course of a few seconds, as regards both quality and output, over a very wide range; such radiation, moreover, may be repeated with certainty.

The work of Sir E. Rutherford and his colleagues, which was directed to find the shortest wave-length of the radiation emitted by the Coolidge tube, disclosed the fact that a limit was set to the penetrating power of this radiation when the potential difference between the terminals of the tube was about 150,000 volts. The Coolidge tube can be run at a higher working voltage than the ordinary X-ray tube owing to the absence of any measurable quantity of gas within the former, and the range of radiation emitted by it extends rather further into the region of the shorter wave-lengths than is obtained with the older type of tube.

There is a considerable clinical use of such very penetrating rays, which are rather more penetrating than the γ rays from radium-B, but less so than those emitted by radium-C. The difficulty of protecting those who apply such radiation is considerable, but the necessity for so doing is no less urgent than it is apparent, and we are glad to see that prominence is given to this question in a descriptive leaflet of the Coolidge tube, dated October 31, 1916, issued by the British Thomson-Houston Co., Ltd.

This memorandum contains a description of the tube, its mode of construction, and the methods which are now generally employed in its manipulation, both for radiographic and for radio-therapeutic work.

Considering the ease with which the Coolidge tube may be manipulated, and the short time which is required by anyone conversant with X-ray matters to acquire the necessary technique, it must be inferred that the only hindrance to its more general adoption in this country is the high cost of the tube.

The Coolidge tube may perhaps be looked upon as the most successful practical application which has yet been made of the classical work of Prof. O. W. Richardson on thermionic currents. We trust that the British Thomson-Houston Co., Ltd., which states that it is the owner of the English patents of this tube, will be instrumental in putting the Coolidge X-ray tube within the reach of a wider public than exists to-day.

THE ROYAL OBSERVATORY, GREENWICH.

THE report of the Astronomer Royal to the Board of Visitors of the Royal Observatory, Greenwich, was presented at the annual visitation of the Observatory on June 1. A few of the matters dealt with in the report are here summarised.

The catalogue of stars down to 9.0m. on the B.D. scale between the limits of 24° and 32° of north declination has been completed by the determination of