

city, noted for its strong Faculty of Applied Science, and not less is the city celebrated for its fine Technical High School, wherein industries and industrial processes are made to serve the highest educational purposes for its three thousand day students. At night the school is attended by six thousand apprentices in the various trades the equipment covers. In short, Canada, in proportion to its population, is well provided with institutions of university rank, and in the near future she will have educational facilities second to no other country in the world. Prof. Barker is also not less loud in his praise of the educational activities and institutions of the States, especially of the Massachusetts Institute of Technology, in many respects one of the finest institutions in the world, wherein nothing is spared to make the courses good and experimental and research work so efficient that it cannot be left out of the industrial sequence, with the result that the institution is simply flooded with students who are inspired with the possibilities of discovery. He speaks highly of the provision for textile training and education, and especially of the fine school at Lowell (Fig. 2), which represents for the textile industries what the Institute of Technology of Boston represents for mining and engineering. The report is full of apt observation upon educational and industrial aims and methods.

### Sunshine in the United States.<sup>1</sup>

THE United States *Monthly Weather Review* for January, 1920, contains a discussion on "Sunshine in the United States" by Mr. J. B. Kincer, Meteorologist attached to the Weather Bureau, Washington, from observations mostly for the twenty years from 1895 to 1914.

Data are given showing the actual amount of sunshine in hours and tenths and the percentage of the possible amount, both methods having their special advantages. Charts and diagrams show the mean solar time of sunrise and sunset, and the average length of day, sunrise to sunset. The seasonal and annual distributions of sunshine are given in percentages of the possible amount, and a table shows for each month and for the year the percentage of possible amount of sunshine for all stations where records are made.

Some dissatisfaction is expressed at the records of the automatic instruments available, as they in no way indicate the different degrees of sunshine intensity—an anomaly shared by all other countries. In describing three forms of sunshine recorders in use, the Campbell-Stokes, the Jordan, and the electrical thermometric recorder, which is said now to be in general use by the Weather Bureau, the *Review* states: "The Campbell-Stokes burning recorder, consisting of a lens or burning-glass which scorches, during bright sunshine, a trace on a strip of cardboard placed at the proper focal distance and adjusted by clockwork to revolve with the sun"; this description seems open to objection, as the card is stationary, and the sun revolving impinges its image on the card bearing the time-scale.

Distribution of sunshine with geographical position is well treated. For the year as a whole the least amount of sunshine occurs along the North Pacific coast, where it is only 40 per cent. of the daylight hours. The maximum amount in the United States occurs in the south-west; in the Lower Colorado River valley the duration of sunshine is 90 per cent. of the total number of hours from sunrise to sunset. July is the month of maximum amount in nearly one-

<sup>1</sup> From U.S. *Monthly Weather Review*, January, 1920, vol. xlviii., pp. 12-17 and charts i-iv; November, 1919, vol. xlvii., pp. 794-95.

half of the country, including all the northern districts.

Data are given showing the average annual percentage of days clear, partly cloudy, and cloudy. Dealing with diurnal variations in sunshine, it is stated that the amount is least during the early morning hours, with a secondary minimum in the late afternoon. The greatest amount occurs near midday.

Prof. R. de C. Ward, of the Harvard University, contributed an article to the U.S. *Monthly Weather Review* for November, 1919, bearing the title "Bibliographic Note on Sunshine in the United States." Foreseeing the issue of a series of new sunshine charts for the United States, a brief account is given of previous sunshine charts issued.

Reference is made to work done by van Bebber in 1896 and by Gläser in 1912, and it is mentioned that "the available material was confessedly very inadequate." In charts prepared by Prof. A. J. Henry in 1898 the percentages of sunshine were obtained by subtracting the mean annual cloudiness from 100, and a map of normal annual sunshine compiled from observations at the Weather Bureau stations from 1871 to 1908 inclusive seems to have been obtained in the same way. The system seems open to serious objection, and is far less satisfactory than using the records of the automatic sunshine instrument.

C. H.

### The Peat Resources of Ireland.

THE Fuel Research Board has issued as a Special Report (No. 2) a lecture on the above subject delivered by Prof. P. F. Purcell before the Royal Dublin Society last year. The importance of using the lower grade fuels has been greatly enhanced by the enormous rise in the price of our higher grade staple fuel, coal; and Sir George Beilby, in his introductory remarks to the Report, ascribes the revival of interest in peat as a fuel not only to the general scarcity of fuel, but also to the great and apparently permanent increase in the cost of coal.

The peat resources of Ireland are of paramount interest in that country, where the bogs cover one-seventh of the area, and Prof. Purcell estimates that the peat reserves in these bogs are more than ten times those of the *proved* coal reserves of that country. The estimated "anhydrous peat" is 3,700,000,000 tons, equivalent to 5,000,000,000 tons of average air-dried peat. Sixty-two per cent. of the farmsteads are entirely dependent upon peat fuel, and it is estimated that the annual consumption is between 6,000,000 and 8,000,000 tons.

The problem of the utilisation of peat is, as is well known, one of the economical removal of excess water, the average content of which is about 90 per cent. The effect of water is, perhaps, best emphasised when it is stated that "with 80 per cent. present, the 11 per cent. of dry peat will just be sufficient to evaporate the 80 per cent. of water." In the natural process of air-drying peat, difficulties of a practical and economic nature are met with; thus the drying season is only from five to six months. In winter, water freezing in the blocks causes their breaking down, and the whole year's supply has to be won in the limited dry season of the year. "It thus happens that a great number of hands are required for a portion of the year, and few for the remainder," and these considerations furnish a very strong incentive to the invention of economical methods of artificial drying.

In Prof. Purcell's opinion, in spite of the many methods which have been tried for the removal of