

curled. As the result of the dry weather, the fruit will be smaller than usual. The planting of the oat crop, ordinarily advanced during the month, was backward, the work receiving only local attention in favored localities. The shortage of stock water approached an acute stage in some districts of the north and west, where it became necessary to haul water for both animals and domestic needs. Many wells, small lakes, and minor streams were dry."—Florida Section of "Climatological Data" for September, 1925.

A WINTERY OCTOBER

Mr. John R. Weeks, Meteorologist, U. S. Weather Bureau, Binghamton, N. Y., has sent a list of twenty-five records for his station broken by the weather of October, 1925. The period of record is generally 30-35 years. Much of the northern and eastern portion of the country was similarly afflicted. From Helena, Montana, for example, comes a record of over two feet of snowfall in October, after one foot in September.

At Binghamton, the past October was the coldest, cloudiest, stormiest, and snowiest October on record at that station. On one day the temperature did not even get as high as the freezing point. But on another the 8 A. M. temperature was 70, the highest known for this hour in October. There were 24 cloudy days and but two clear ones. Precipitation fell on 23 days and snow on 10. The daily range of temperature was the smallest on record.

Mr. C. J. Root's Illinois Section report (Climat'l Data) for October shows even worse conditions in Illinois. Corn was practically all safe by the time of the killing frost of Oct. 10, but unharvested apples and potatoes were frozen towards the end of the month, "with temperatures near zero in places and snow depths up to 6 inches." On the 29th the maximum temperature at Springfield was but 22.8° F., as compared with a previous low daily maximum of 37.5° F. in the 47 years of record.

SOLAR VARIATIONS AND THE WEATHER

The symposium on "Solar Radiation and the Weather" at the spring meeting of the Society in Washington did not bring agreement among investigators in the field. The authors' abstracts and a summary of the discussion were published in the July BULLETIN, pp. 94-105. The appearance of the papers, modified to some extent to meet the criticisms received last spring, has provoked renewed discussion. The Smithsonian papers appeared in June: "Solar variation and forecasting," by C. G. Abbot (Smithsonian Misc. Colls. vol. 77, no. 5, 27 pp., 18 figs.); "Solar radiation and weather, or forecasting weather from observations of the sun," by H. H. Clayton (*ibid.*, no. 6, 64 pp., 45 figs.); and a supporting paper, though one not in the symposium, "Solar radiation and the weekly weather forecast of the Argentine Meteorological Service," by Guillermo Hoxmork (*ibid.*, no. 7, 23 pp., 5 figs.). With these at hand it was possible for the Weather Bureau meteorologists to include in their

papers further detailed discussions. These papers were published in the *Monthly Weather Review*: "On the question of day-to-day fluctuations in the derived values of the solar constant," by Charles F. Marvin (MWR., July, 1925, pp. 285-303, 7 figs.); "Smithsonian solar-constant values," by Herbert H. Kimball (ibid., pp. 303-306, 3 figs.); and "A statistical analysis of solar radiation data," by H. W. Clough (ibid., Aug., 1925, pp. 343-348, 1 fig.). This amplification of the discussion of last spring brought from Dr. Abbot a brief reply as he was on the eve of his departure on a seven months' expedition to establish a new solar constant observatory in Asia or Africa: "Solar variations and the weather" (*Science*, Nov. 13, 1925, pp. 426-428).

Though, unfortunately, Professor Alexander McAdie was not present to take part in the symposium he published a review of the three Smithsonian papers, mentioned above, in the *New York Times*, of July 26. This brought a reply from Dr. Abbot, in *Science*, October 2, 1925, pp. 307-308. Professor McAdie responded in *Science*, Nov. 6, pp. 418-419.

A British review of the three Smithsonian papers appeared in *The Meteorological Mag.*, for Nov., 1925, pp. 237-239. The editor believes a satisfactory case has been made for short period solar variations and concludes:

"A relation of some sort [between variations of the solar constant and the weather] almost certainly exists and will be discovered by future research, but it will probably be long before this new method will be able to add anything to the high technique of daily forecasting by synoptic charts."

The situation is still much as it was last spring. Dr. Abbot and associates are continuing to measure solar radiation intensities with every increasing refinement, at an increasing number of stations, and from these measurements they are attempting to approximate the daily solar constant, or the probable heating potentialities of solar radiation at the outer limits of the earth's atmosphere. These approximations, in conjunction with certain visual appearances of the sun's disc, have been correlated with coincident or subsequent weather and then applied in weekly, and, to some extent, monthly forecasting. The verifications published indicate a measure of success. Professor Marvin and a number of other meteorologists have looked on with considerable interest, and have raised searching questions not yet answered to their satisfaction. In the "Solar constant" values, how much of the variability from day to day is the result of the unavoidable though small errors of observation and approximation? The total variability is so small that if these errors are given any place at all the day to day changes become too small apparently to be physically capable of affecting the weather as much as claimed. And are these forecasts made solely upon solar indications? Is the method of verification adequate? Dr. Abbot, Mr. Clayton and Mr. Hoxmark say they are, and, therefore, procede with their observing, studying, and forecasting. And Professor Marvin is continuing his searching statistical analyses of the published data. More and better data must ultimately end the differences of opinion, for opinions are buried when facts become established.—C. F. B.

Dr. Abbot has moved the solar constant station from Harqua Hala, Ariz., to Table Mountain, California, 2,000 feet higher, with much better sky conditions. Summer conditions were unsatisfactory at the former location.

Sunspot numbers are on the increase. Wolfer's relative numbers for July, August, and September, 1925, averaged 34.8, 35.8, and 60.9, respectively. They are still far below the maximum of 154.5 in August, 1917. (*Met. Zeit.*, Oct., 1925, p. 399; *Mo. Wea. Rev.*, Aug., 1920, p. 460). Dr. A. Wolfer has published "Observed sunspot relative numbers, 1749-1924, in *Terr. Mag. and Atmos. Elec.*, June, 1925, pp. 83-86.

"THE CLIMATES OF THE UNITED STATES"

By R. DE C. WARD, Ginn and Co., Boston, 1925. 518 pp., frontispiece, 145 figs. \$4.00

Nineteen years have elapsed since the last "Climatology of the United States," by Professor A. J. Henry, was published (U. S. Weather Bureau, Bulletin Q, Washington, 1906). During most of that time Professor R. DeC. Ward has been preparing the book now available. Where there were distinct gaps he has induced his graduate students at Harvard to undertake the research necessary to fill them, and has himself made many studies. Years of preparation and of working constantly toward a reasonably complete treatment of the climates of the United States have now culminated in a work so comprehensive and carefully prepared that it must for years remain the standard book of reference. Professor Ward was not content with presenting merely his own masterly summaries of the several topics, he has with great care presented an excellent bibliography in his numerous footnotes. Thus we have not only Professor Ward's interpretations, but also an opportunity to look back to the original sources.

The major research contributions by Professor Ward are his chapters on "The Weather Element in United States Climates," and "Climate and Health." Nevertheless, the remainder of the book is hardly to be considered as any less his own. The author's excellent judgment in picking out, arranging, and emphasizing essentials, is clearly in evidence throughout. The general plan of the book is a cross-section of United States climates by elements, rather than a treatment of climates section by section. Near the end, however, a chapter is devoted to the characteristics of the several climatic divisions of the country. The historical development of United States climatological work is discussed in the opening chapter and is continued throughout in the textual and footnote references. The human aspects of the climatic features are woven into the book as an essential part, and near the end the most important two phases, climate and health and climate and crops, receive special treatment in separate chapters. The book concludes with a brief summary of the climates of Alaska. The index is adequate except in not including the footnotes.

As for faults, they are few and far between, as would be expected in one of Professor Ward's books. Not a single typographical error was noticed by the reviewer, and only five slips, all minor. The diagrams and maps, however, while finely executed, do not all come up to the high