

ally left it and fled to the neighboring towns. The Montreal papers contain whole columns of accounts of the "astonishing appearances," and it was conjectured that they were occasioned by eruptions of some neighboring volcano, and it was assured that during the darkness there were three shocks of an earthquake.

Smoky atmosphere.—Letters from Louisville, Ky., inform us that a great part of the woods between that place and Lexington, a distance of 74 miles, were in a blaze; and at Louisville the inhabitants had been nearly suffocated with smoke. * * * In North Carolina the smoky atmosphere was attributed to woods on fire in that State. The same in Canada.

From the Columbian Centinel of Wednesday, December 8, 1819, No. 3721, pp. 1, 3.

SOUTH CAROLINA, CHARLESTON, November 25.

Smoky atmosphere.—We have Bermuda papers of the 6th instant. They complain much of the smoky appearance and scent of their atmosphere, which some conjectured to have been occasioned by a great fire on the American Continent; and others, to be exhalations of the Gulf Stream.

PLANT LIFE AND RAINFALL.

The vegetation indigenous to any region having long since adapted itself to the climate of that locality, it follows that the occasional extremes of temperature, rainfall, drought, etc., that are injurious to indigenous vegetation must have some relation to the ability of the plant to adapt itself to the normal climate and its normal variability.

Thus, fifty-four years at San Francisco give an average annual rainfall of 22.74 inches; forty-one years at Salt Lake City give 17.47 inches; thirty years at Denver give 14.07 inches. The corresponding annual variability or the probable variation of any year from the mean is ± 4.00, 4.50, and 5.00 inches, respectively. This probable variation indicates that the annual values vary so much that there is an even chance that any year at San Francisco will have a rainfall either between 26.74 and 18.74 inches, or beyond these limits. For Salt Lake City these figures become 21.97 and 12.97 inches; for Denver the figures are 9.07 and 19.07 inches. Of course, therefore, at San Francisco 18.83 inches would correspond to a dry year, but not necessarily to a drought destructive to indigenous plants, because delicate plants must long since have died out or have learned to adapt themselves to such average dry years, and a really destructive drought must be something still more severe. During the fifty-four calendar years of San Francisco records, there has been one year with the rainfall 11.37 inches, or 50 per cent of the average, and the general distribution of rainfall is shown in the following table:

TABLE 1.—Precipitation by calendar years.

Percentage of normal.	Precipitation, in inches.	Number of years.	
Wet years, above 100 per cent.	Over 22.74	22	
Dry years....	100-90 per cent.	22.74-20.47	13
	90-80 per cent.	20.47-18.19	7
	80-70 per cent.	18.19-15.92	5
	70-60 per cent.	15.92-13.65	5
	60-50 per cent.	13.65-11.37	1
	50-0 per cent.	11.27-0	1
		54	

If we consider the valuable crop plants that have been introduced into California and whose prosperity depends upon the winter rainfall, namely, October to April, inclusive, then we must sum up the rainfall for the crop year, July-June, inclusive, rather than for the calendar year, January-December. Tables of this kind, given by Professor McAdie, show that the average annual rainfall is 22.74 inches, the same as before, but the frequency of dry years occurs as in Table 2.

Therefore, there have altogether been fewer dry seasons. Yet these show a greater number of severe droughts than are shown by the calendar years.

We must now further distinguish between a meteorological or climatological drought and an agricultural drought. Thus, Professor McAdie states that the year 1885, with a rainfall of

24.90 inches in the calendar year, but of 18.10 inches in the crop year, 1884-85, was an agricultural drought and that the wheat yield was the lowest in twenty years. Again, the year July, 1881-June, 1882, gave a seasonal rainfall of 16.14 and the next year July, 1882-June, 1883, gave a rainfall of 20.12 inches, and yet these were good wheat years. The moisture in the soil, the irrigation, and the area covered by wheat, is not ordinarily considered by the climatologist. He confines his studies to precipitation data, and speaks of dry and wet years without reference to agricultural statistics.

TABLE 2.—Precipitation by crop years.

Percentage of normal.	Precipitation, in inches.	Number of years.	
Wet years, above 100 per cent.		26	
Dry years....	100-90 per cent.	22.74-20.47	7
	90-80 per cent.	20.47-18.19	9
	80-70 per cent.	18.19-15.92	6
	70-60 per cent.	15.92-13.65	1
	60-50 per cent.	13.65-11.37	1
	50-0 per cent.	11.37-0	4
		54	

OCEAN WAVE AT HONOLULU, HAWAII.

Rev. Dr. Sereno E. Bishop, well known as the first observer of Bishop's circle, writes from Honolulu under date of December 4, 1903:

On November 29 the self-recording tide gage in this harbor recorded several high and low tides in succession only a few minutes apart.

These are ocean waves, believed to be due to earthquakes, and to have traveled several thousand miles across the Pacific. Similar waves are known in former times to have come from Peru, from Japan, and from Krakatoa. The direction of the source of these last waves is determined by the fact that there were slightly damaging inundations along the north shore of the island of Oahu and also along the north shore of Molokai on the same day. Dr. Bishop therefore thinks it probable that these waves originated in the volcanic regions of the Aleutian Islands or of western Alaska. The seismograph at the United States magnetic station, some 20 miles from Honolulu, also recorded a very distinct convulsion of the earth at about the same time. Dr. Bishop adds that both Mauna Loa and Kilauea are now in great and increasing activity. These volcanoes are about 190 miles distant from Honolulu in a direct line, where their severest convulsions are only slightly felt, although once in many years their smoke slightly obscures the atmosphere at Honolulu. Kilauea is 25 miles east of Mauna Loa, and about 4000 feet high, while the latter is 14,000.

Is it not plausible that the oceanic wave reaching the northern coasts of the Hawaiian Islands originated in some slight disturbance at the bottom of the ocean near these islands, rather than in some greater disturbance on the Aleutian or Alaskan coasts?

LOWEST TEMPERATURE AT FRANKLINVILLE, N. Y.

Dr. John W. Kales, Voluntary Observer at Franklinville, N. Y., reports that on the morning of January 5 his thermometers and thermograph registered —34° at 6 a. m., being the lowest ever recorded at that station.

METEOR AT MARION, IND.

Mr. William T. Blythe, Section Director, Indianapolis, Ind., suggests that we put on record an observation of the great meteor, the largest and most brilliant ever witnessed in the neighborhood of Marion, Ind. It was seen on the morning of November 6, 1903, at exactly 20 minutes after 5 (we assume that this means 5 hours and 20 minutes central time, or 6 hours and 20 minutes Washington time, but we are not in-

formed as to whether central time is always used at Marion). The meteor is said to have been—

Coming toward the earth at an angle of 45°, and shortly after it passed over Marion an explosion was heard like that of the heavy discharge of nitroglycerin. The brightness was sufficient to turn night into day. The light of the moon was smothered in the light given out by the great ball of fire as it passed overhead from north to south. The ball was a dark red, like burning coal, and followed by a flaming tail. It was also accompanied by three other flames of fire. The explosion was heard as far as Jonesboro, Hartford City, Montpelier, and Upland.

THE PECULIARITIES OF CALIFORNIA NORTHERS.

Prof. Alexander G. McAdie makes the following remarks in a letter to the Editor dated August 7, 1903:

I have read with the greatest interest the translation by Dr. Cleveland Abbe, jr., of a lecture delivered by Professor Ebert on "Atmospheric electricity considered from the standpoint of the theory of electrons." (See MONTHLY WEATHER REVIEW, May, 1903, p. 229.) What particularly interests us in California is the reference to the distribution of electrons in the air of the Foehn. We have what is generally known as a "norther" in California—one of the most distressing features of our climate. It is a common saying that no wise man will enter into a discussion when the north winds blows. It is a very dry wind and irritating to a high degree. It has always been supposed that these north winds were highly electrified, and one might well believe so, as there must be great friction in the rapid rushing of the abnormally dry air from the mountain ridges down into the valleys.

I wish that the problem might be taken up, either at Stanford or at Berkeley University, but I fear there will not be any considerable amount available for the prosecution of such experiments. There is no land under the sun where climate is so much talked about as it is in California, and where, from a purely commercial standpoint, climate is capital.

OUR CLIMATOLOGICAL PUBLICATIONS.

The monthly reports and annual summaries published by the respective Climate and Crop sections contain a mass of valuable climatological data that is highly appreciated by those who have occasion to study the prominent features of the climate of the United States. Besides giving monthly means and extremes of temperature, rainfall, clear days, and prevailing winds, we have also in many cases full statements of snow, frosts, floods, and in perhaps every case a detailed account of the relation between the weather and the crop of the current year. In general, the maximum and minimum temperatures and the monthly and annual mean temperatures and total rainfalls, as also the departures from normal, are given for every station in an annual summary; analogous data for every day are given in the respective monthly reports. An average of 108 or 116 quarto pages is thus published annually by each of the 45 sections, and the sum total of 5000 pages yearly is a magnificent contribution to the study of climatology, the importance of which will be appreciated more fully by future generations.

Although these publications issue in large numbers from month to month, still they are only in pamphlet form, and it is extremely difficult to obtain a complete set for the whole of the United States. Such sets will always be highly prized by public libraries to which engineers, physicians, statisticians, and others must resort for consultation. We can, therefore, not refrain from urging that each section director see to it that sets of his own publications are preserved in the great State libraries and famous public libraries of the country. Certainly every section should have on its list of recipients such libraries as the Boston Public, the New York Public, the Philadelphia Public, the Library of Congress, the Meteorological libraries of Johns Hopkins, Chicago, Berkeley, Leland Stanford, Cornell, Yale, and Harvard universities; the library of the meteorological observatories at Blue Hill, Mass., and Central Park, New York City.

As back numbers, and especially complete sets of back numbers, of these monthly section reports are rare and much to be desired, we can but urge those voluntary observers who receive

the reports to carefully preserve them, and see that eventually they are deposited where they will be permanently cared for and frequently used.

WEATHER BUREAU MEN AS INSTRUCTORS.

Mr. David Cuthbertson, Local Forecaster, Buffalo, N. Y., reports that during January four classes in physical geography from the high schools of Buffalo and neighboring cities visited the office and received instruction from his assistants, Mr. W. J. A. Schoppe and Mr. F. T. Williams, in the construction and use of the station instruments, the preparation of weather maps and forecasts, as well as the general workings and benefits of the Bureau. In each case the instruction was varied to suit the needs of the class.

Mr. J. Warren Smith, Section Director, Columbus, Ohio, delivered an illustrated lecture upon the work of the Weather Bureau before the Central Ohio Farmers' Institute, Westerville, Ohio, January 30, 1904.

During the month of January two classes in physical geography from the city high schools, accompanied by their teachers, visited the office, and listened to a brief lecture on the instruments at the station and the work of the office.

Mr. H. C. Bate, Local Forecaster, Nashville, Tenn., states that the weather map and the art of forecasting are studied daily in the public schools and high schools of that city. Several private schools also take up the subject, and the students from these schools as well as from the Nashville University frequently visit the office of the Weather Bureau.

Mr. Robert Q. Grant, Observer, La Crosse, Wis., recently entertained the Nineteenth Century Club of that city at the office of the Weather Bureau, and gave an exposition of the theoretical and practical branches of meteorology.

Mr. J. R. Weeks, Observer, Macon, Ga., delivered during January a series of lectures for the benefit of the Macon Hospital.

Mr. W. M. Wilson, Section Director, Milwaukee, Wis., lectured on the Weather Bureau and its methods on January 16, in the Y. M. C. A. Hall of that city.

Mr. S. W. Glenn, Local Forecaster and Section Director, Huron, S. Dak., states that the teachers of the class in physics of the Huron High School have given special attention to meteorology. On January 22 and 27 the class visited the office of the Weather Bureau, inspected the instruments and listened to an hour's talk by Mr. Glenn.

Mr. P. H. Smyth, Observer, Cairo, Ill., has promised to address the Illinois State Convention of County Officials at Cairo, February 9, on the value of the Weather Bureau to commerce, agriculture, and navigation.

The class in physical geography at Hunter, Okla., maintains a weather record, and is studying the daily weather maps.

HURRICANE OF AUGUST 14-15.

In the MONTHLY WEATHER REVIEW for September, 1903, p. 415, is given the record of the hurricane of August 14-15, as reported by Capt. J. Elligers, jr. At that time, the exact loca-