

METEOROLOGY.

Continuous records on self-recording instruments were obtained during 1928 of temperature, pressure, humidity, sunshine, rainfall, wind force and direction. Every refinement of measurement was exercised in order that the very slight variations of these elements from the average of previous years would be detected. These variations, which are representative of a great area of the South Pacific Ocean, have been found to be closely connected with subsequent changes in the weather of Central Africa and South America. Although the mechanism by which these vast climate changes are affected remains unknown, one of the most hopeful methods of attacking the problem of long-range seasonal fore-casting consists in the study of the changes at centres of action. Continuous records of the wind were obtained in 1928 after a lapse of about twenty years. These records, obtained on the Dines anemometer installed in 1927, are practically uninterrupted.

The temperature for 1928 was practically the same as 1927, which was higher than any year since 1920. Both rainfall and pressure were also above the normal.

On all unclouded days the Gorceynski pyrheliometer was set up and a continuous record obtained of the total solar radiation. The amount of solar radiation transmitted through the tropical atmosphere to the earth's surface is about 70 per cent. of the incident radiation. The intensity of the radiation in the ultra-violet was measured by Hill's method with ethylene blue, and found to be considerably greater than that occurring in England.

ATMOSPHERIC ELECTRICITY.

Continuous records have been obtained during the year of the electrical potential of the atmosphere at the station in the Observatory grounds and at a station erected on cement piers in the lagoon about one-third mile off shore. Insulation difficulties at the lagoon station were successfully overcome, so that for the first time records were practically complete at the two stations, allowing a comparison of electrical conditions at the two stations. The daily variation of electrical potential at both places resembles that found at Continental stations rather than the marine type found on the open ocean.

UPPER-AIR OBSERVATIONS.

The investigation of the winds at high altitudes was continued, and fifty-six balloons were sent up and observed for this purpose. This is considerably less than the number used in 1927, when more than eighty ascents were rendered possible by better weather conditions. The data for all the balloon flights made to date were published in a recent report. The more important results were—(1) The south-east trade-winds have their greatest velocity about 2,000 ft. altitude; above this their velocity decreases rapidly. (2) Above the easterly winds, which reach to 10,000 ft., are westerly winds which, at an altitude of six miles, are strong and very constant. (3) The mass of air moved northward toward the equator was five times greater than the air-mass moved southward.

Pilot-balloon observations were taken on the Island of Atafu, 450 miles N.N.W. of Samoa, during the months of June and July.

METEOROLOGICAL STATIONS OUTSIDE SAMOA.

Regular weather records are now being obtained from Atafu and from Nassau Islands. Atafu records of atmospheric pressure are especially desired, as it is in this vicinity that cyclones which later pass over Samoa and the Cook Group are known to develop. Wireless communication from Atafu is expected to be instituted shortly, with special provision for transmission of weather reports.

Wireless weather reports were received twice daily from November to April (inclusive) from Papeete, Rarotonga, Nukualofa, Vavau, Fiji, Niue, and Norfolk Island. During the remaining months of the year, when the trade-winds blow fairly continuously and cyclones are almost unknown, a single afternoon report is broadcast. Weather reports from ships have increased considerably in number during the year.

RECENT INVESTIGATIONS.

The tide produced in the atmosphere at Apia by the moon has been determined from the barometer readings from 1904–27. This work has been done in collaboration with Professor S. Chapman of London University. The moon produces a daily variation in the barometric pressure at Apia of about $\frac{1}{1000}$ in. The hourly variation when the moon is in perigee differs considerably from days when in apogee. A paper giving the results of the investigation will be published in a forthcoming number of the *Quarterly Journal of the Royal Meteorological Society*.

The blue of the sky was measured twice a day for the past eighteen months on a standard scale of blue tints varying from bluish white to deep ultramarine. The sky at Apia was found to be relatively whiter than might be expected from the frequent expressions of the intense blue skies of the tropics. The sky was found to be deepest blue after heavy rains had presumably washed out the deliquescent aggregates of common salt.

A careful series of weather observations from the New Hebrides from 1914 to 1924 was recently sent to the Observatory. Very little has been known about the meteorology of this large and important island group, the most recent published data being based on observations taken about 1870. A paper has been prepared on the 1914–24 observations and will be published in the near future.

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