7. It appears that both the influence of a changed solar constant and also that of the 11-year sun spot period on the distribution of the meteorological elements over the earth can be explained by uniform oscillations of the general circulation. In this it must be assumed, however, that an increased relative sun spot number as well as an increased solar constant corresponds, as the result of the coincident increase in the turbidity of the atmosphere, to a lessened insolation and so to a diminished intensity of the general circulation.

It would be of interest to investigate how the relations change in the course of the seasons. One of my students has nearly completed a paper relative to this matter and has divided the decades used here into summer, winter, and transition seasons. An additional investigation proposes to set forth the transition from monthly means to the decade means taken as a basis here. For this purpose my assistant, E. Ekhart, is studying the decade 1911–1920—for the present the distribution of pressure and precipitation—and with the use of a considerably greater number of stations he is able to determine what departures from the average conditions here given occur in the individual years. The work will appear in a short time in Abhandlungen des Preuss. Meteorol. Institut. A further investigation, that of lustrum values for 1885–1920, is in view, but for this a great amount of calculating must be done.—*Translated by W. W. Reed.*

City air.—"A sermon in soot," by Arnold H. Kegel, M. D., commissioner of health, Chicago, published in The Aerologist (September, 1929, vol. 5, pp. 5-9, 59, 5 ills.), effectively draws attention to the ever-increasing dustiness of city air and its deleterious effect on health. While smoke abatement has reduced the combustible dust in the air and its tarry content, it has not stemmed the increasing dustiness. Sunshine records of January and February, 1915–16 and 1925–26, show a reduction of 12 per cent, which the author ascribes to the greater air pollution in the later year. The health department's dust observations in Chicago show for 20 stations an average of 124.6 tons of insoluble solid matter per square mile per month in 1925, with an extreme maximum of 460 tons per square mile in the loop district one winter month. The minimum was 13.4 tons at an outlying station in October, November, and December. For a rough comparison the dust tonnages of Pittsburgh, 161; Liverpool, 140; Chicago, 124; St. Louis, 93; and Cincinnati, 73, are presented.

The author believes that Pittsburgh's leading position in pneumonia death rate in 1928 is the result of that city's unenviable extreme dustiness. A dweller in the Loop district, Chicago, would inhale a pound and a half of dust in the course of a year, according to Doctor Kegel's computations. At least in the congested districts provision of washed air indoors, where the city dweller spends most of his time, appears essential as an immediate though only partial health measure, while general electrification of transportation and heating may be the only though remote means of reducing atmospheric pollution.—*C. F. B.* 551.509.6 (048)

Attempts to induce rainfall.[1]—The Colony of Hong Kong has suffered from an unprecedented deficiency in rainfall during the 12 months ending June 30, 1929, with consequent distress to the population, owing to water shortage.

Amongst the many suggestions received from the public by the local government was the proposition that powdered kaolin, sprinkled from airplanes above suitable clouds, would induce precipitation; the method was stated to have been employed with sucess in other countries. After discussion with other government officials I made the following recommendation:

> I consider that the experiment might reasonably be attempted once. I have little doubt of its failure, but this avenue of relief may then be considered sufficiently explored and be definitely closed thereafter.

My personal opinion is plainly expressed in the foregoing; had the government refused to countenance the experiment, however, there would have remained a feeling in the public mind that one possible solution of the water problem had not been tried. The experiment was made by the unit of the R. A. F. stationed here, and no precipitation occurred.

The reports in the local press are now being commented upon by journals outside the colony, usually with the implication that this observatory was responsible for the inception and conduct of the experiments. This was not the case; the experiments were authorized by the government to discount any subsequent criticism. No belief in a materially successful result was held by administration or its advisers, including my colleagues and myself.—*C. W. Jeffries.*

Ocean currents the probable cause of the 3-year pressure cycle of the tropical South Pacific.[1]—H. P. Berlage, jr., finds a striking sequence in departures of pressure or temperature across the Pacific Ocean, extending over some months, which he ascribes to the transfer of heat by ocean currents. The region from extreme northern Australia over New Guinea and eastern Java is an active center of high temperature and low pressure, in which the variations in temperature appear to dominate the greater or lesser degree of lowness of the pressure, while immediately outside this active area the pressure variations emanating from the active center dominate the temperature. The compensatory area of high pressure appears to be centered near Easter Island in the eastern South Pacific. The variations in pressure at Port Darwin, representing the Australia-East Indian low, and at Juan Fernandez, in the eastern Pacific high, are practically in opposition, except at the end of the southern winter.

With the changes in pressure at these centers there are corresponding changes in the trade winds and, presumably, in the speeds and temperatures of the ocean currents. There is a well-defined sequence of temperature departures following the extremes of pressure in the north Australian low and the South Pacific high, reaching their maximum phases 2½ months later at Iquique, 4 months later at Malden and Samoa Islands, and 7½ months later at Manila. This progressive sequence is at about 33 miles a day, a rate suggesting strongly the translation of temperature anomalies through the great ocean currents.

There is also a sequence of pressure departures from Juan Fernandez to Port Darwin of one and one-fourth years for the negative departures and one and one-half years for the positive. Furthermore, when the departures at Samoa are the same as at Port Darwin, the temperatures and pressures at Port Darwin hold much the same for some time beyond the period of usual change in the normal 3-year sequence, which is thereby lengthened. The persisting temperature effects of ocean currents seem also to be responsible for the continuance at Port Darwin of plus departures in late winter till midsummer and for the consequent assymetry of the 3-year pressure curve, the fall being more rapid than the

[1] Reprinted from Nature, London, Sept. 28, 1929.

[1] H. P. Berlage, jr., "Uber die Ursache der drei-jahrigen Luftdruckschwankung." Met. Zeits., July, 1929, 46:249-259, 4 figs.

rise. The correspondence or opposition of departures at widely separated stations simultaneously or after an interval of months, as well as the high correlation coefficients, are strongly indicative of successful long-range weather forecasting.—*C. F. B.*

Cool northeastern high ends hot spell.—The excessive hot spell in the northeastern United States the first days of September, 1929, was brought to an early close in New England by the typical development of a high pressure over the St. Lawrence estuary, New Brunswick, Me., and the Gulf of Maine. Over this cool water and near-by land, the pressure rose nearly 0.2 inch from the morning of September 3 to September 4. Half of this rise might have been expected from the movement of the northern tip of the southeastern high eastward, the other half of the pressure rise seems to have been due to the differential temperature of the cool region and the exceedingly hot one close by to the southwest and west. The temperature at Father Point, Quebec, on the south shore of the St. Lawrence estuary, ranged from 46° to 56° F. September 3, while that at Northfield, Vt., ran from 72° to 92° F.

As the northeastern high developed, the cool air ran out from its center westward under the hot southwesterly wind, bringing a welcome relief to most of New England by the morning of September 4. In New Hampshire and southern Maine the cool sea wind running under the hot wind produced a dense, mammillated stratus cloud moving from the SSE. at a (mountain measured) height of about 2,000 feet that lasted throughout the 4th. At night scattered warm-front thunderstorms, probably formed in northern New York and southwestern Quebec, drifted by.

The following day saw the atmospheric structure still more complex, for a slightly cooler north wind set under the now warmer (?) easterly wind from farther (?) out to sea, producing a still lower (1,500 feet) raggedly festooned stratus moving from the east. A light drizzle, increasing toward evening, fell all day in central New Hampshire. Presumably there was a fourfold layer structure to the atmosphere—the cool north wind at the ground, the cool, damp east to southeast wind next above, and the warm southwest and the cooler west to northwest winds at higher altitudes. With clouds at probably four levels, the day was the darkest one in a long time.

September 6 saw the beginning of showery weather, with southerly wind and very low clouds but more changeable sky brightness as the warm front of the oncoming low approached.

One of the unfinished minor projects of the late Dr. C. LeRoy Meisinger was a study of these northeastern highs that ended hot spells in New England so much sooner than in the Middle Atlantic States. An aerological investigation that would show whether, and, if so, how the heated expanded air from the eastern United States drifted northeastward and collected over the cool regions, thereby producing such highs should not only be full of interest but also very helpful in forecasting the termination of the excessive heat.—*Charles F. Brooks.*

Probable origin of the cold wave in India, February, 1929.—During the period January 28–February 3, 1929, an intense cold wave overran the whole of northwest and Central India, where surface temperature went down to about 12° C. below normal, several stations recording the lowest temperature in the last four or five decades. The results of a few soundings over Agra, which reached the stratosphere during and after the passage of the cold wave, appear to throw some light on the origin of the cold air. During winter the normal height of the tropopause over Agra (latitude 27°) is about 14.5 geodynamic kilometers and its temperature is 206° A. (see Doctor Ramanathan's Figure 1, Nature, June 1, p. 834, reproduced on p. 382), while with the invasion of the cold wave the base of the Agra stratosphere came down so low as 11.5 geodynamic kilometers and its temperature rose to 213° A. The conditions in the troposphere and the stratosphere over Agra during the cold wave were similar to those normally found at about latitude 40°. The trajectories of pilot-balloon flights up to 6 kilometers indicate that the cold air came from the northwest. It would thus appear that the cold wave had its origin somewhere to the east of the Caspian Sea.—*S. C. Roy* and *G. Chatterji.*

Droughts in September.—Press reports bring an unusually large number of accounts of drought in various parts of the world. Not since 1893 has Great Britain experienced a more prolonged drought nor has Greenwich recorded a rainless month—as this is likely to be—in 90 years. Farmers are finding the absence of rain very serious. (Daily Telegraph, September 26, 1929.)

The Times, London, of September 18, 1929, reports the long drought at Paris, France, as ended on the 17th. This drought was the second longest since 1873. In 1895, 38 days passed without rain—August 24 to October 2.

From the Fort Dodge, Iowa, Messenger of October 10 it is learned that nearly 6,000 families in Saskatchewan, Canada, will need government aid through the winter. While all of the western Canadian provinces have suffered from lack of rain, Saskatchewan seems to have been the center of the afflicted area.

The Sioux City, Iowa, Journal of October 9, 1929, prints an account from its correspondent in the Argentine, dated Cordoba. In the State of that name little or no rain has fallen in the last six months, the wheat crop is a failure, and unless rain comes within 10 days the corn crop will be in danger. (Subsequent reports, however, show that the rains came on October 22.)

The French daily weather report.[1]—The French Meteorological Service has for some time issued its daily weather report in two parts, the Bulletin Quotidien de Renseignements and the Bulletin Quotidien d'Etudes. The idea of separating the report into two parts, one for general use and one for students of meteorology seems a good one, but the separate purpose of the parts as indicated by their titles has not been fulfilled very clearly in the past. Each part has consisted of four single pages and has contained both tabular matter and charts; the station reports have been divided into two groups, those from French stations being published in the Bulletin Quotidien de Renseignements and those from "foreign" stations in the Bulletin Quotidien d'Etudes.

From July 1, 1929, the form of the report has been altered and it is interesting to note the manner in which General Delcambre, the head of the Office National Météorologique, has endeavored to meet the requirements of the French public, both those seriously interested in meteorology and those whose interest is more superficial. The Bulletin Quotidien de Renseignements has been reduced to a single sheet providing two pages of the same size as those of our own Daily Weather Report, while the Bulletin Quotidien d'Etudes has been expanded to a publication of four sheets, that is, eight single pages. The annual subscription for the latter is 320 francs as against 140 francs for the more modest single sheet of the former.

[1] Reprinted from Meteorological Magazine, August, 1929.