

awaiting shipment up the river and every possible effort is being made to relieve the congested situation while the river is in good condition and before the beginning of the next dry season. While conditions are improving along the Magdalena, freight congestion at the Pacific port of Buenaventura is becoming alarming, as boats arriving at that port find it necessary to wait indefinitely for an opportunity to discharge their cargoes.

*Honduras* (Cable Nov. 14) Banana shipments from Honduras for October show a marked decrease as compared with the same period of last year. Losses from wind storms in the late spring, reported to be as high as 5,000,000 stems, and damage done by locusts have greatly reduced the output this year. The coming coffee crop in southern Honduras has been seriously affected by adverse weather conditions and will probably be considerably under that of last year.

*Mexico* (Published Nov. 15) The first project to be carried out in connection with the vast irrigation program of the Mexican Government, from present indications, will be undertaken near the headwaters of the Lerma River in the State of Michoacan, Mexico. . . . Plans are being prepared for a great masonry dam to be built across the Rio Lerma at Tepuxtepec, in the municipality of Contepec, behind which will be stored 500,000,000 cubic meters of water for use in a great irrigation and hydroelectric power development. These waters will be harnessed to supply the growing demand for electrical power in the Federal district, through a comprehensive system of canals, to be constructed by the government for the irrigation of a great territory near Acambaro.

*Porto Rico* (Cable Oct. 25) The agricultural outlook is better than it was a year ago. Sugar cane is reported to be in good condition in most districts as a result of advantageous rains, but a dry November is now needed for increasing the sucrose content of the cane.

(Cable Nov. 13) The commercial situation in Porto Rico during the first half of November was slightly better than in either the preceding month or the same period of 1925. Coffee picking which began early in October continues, and liquidations should soon give added strength to the present situation, particularly in the coffee districts. Sugar prices and the present world statistical position of Porto Rico are regarded as more encouraging than for last year. Weather conditions continue favorable to growing crops.

*Uruguay* (Cable Nov. 6) General conditions in Uruguay give promise of an early improvement of business. Contributing factors are a greater animation in the wool market and timely rains throughout the agricultural regions.

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### THREE RAINS IN A STORM

A well developed low, moving from the southern plains northeastward to Newfoundland, is usually attended by three important phases of rain or snow over a belt several hundred miles wide south of the path of the center. The first is the chilly east wind phase. Well in advance of the oncoming storm center the cold air begins to move toward the storm. In doing so it may crowd a bit or have to ascend over obstructing hills or mountains, and, in consequence, become cloudy and drizzly. Overhead, a warmer wind from a southerly direction soon begins to blow, and the cooling of this damper wind soon adds rain to the lower drizzle.

A fog may mark the approaching end of this phase, and then the cool air gives way rather suddenly on the "warm front" to warm, muggy air. An hour or more of rainless, partly cloudy weather may follow soon after

this warm southerly wind becomes established down to the ground, for the region of upthrust over the front of the colder wind has passed on. Then the sky becomes more densely covered, showers begin anew, and become heavier. Lightning and thunder may punctuate the downpours, or even a tornado, such as that in Maryland recently. Here is the zone of violent crowding on the front of the southwest gale of the storm.

The gale breaks, and the barometer continues its descent. Scud flies by, but there are openings through to clear sky. The wind is still warm and muggy. Soon the third rain phase commences, and shortly the temperature begins to fall as the wind hauls round toward the west. The "cold-front" zone of crowding has arrived. The rainfall lasts one to three or more hours, then ceases as the drier, cooler west or northwest wind becomes established. During the subsequent descent of temperature a few snow flurries may occur, but the heavy precipitation is over.

—C. F. Brooks in "*Why the Weather*" (*Science Service*).

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### THE EARTH'S ANCIENT ATMOSPHERE

When the earth was so hot that no solids were present and water now in the oceans was vapor in the atmosphere, our atmosphere was very much deeper than at present. P. G. Nutting of the U. S. Geological Survey figures that at one time water vapor extended out 1,000 miles from the earth, or one-fourth its radius. At temperatures over 5,000 degrees centigrade the earth had no solid crust. So much oxygen, hydrogen, and water vapor were at large that atmospheric pressure equalled 20 to 30 tons per square inch instead of a paltry 15 pounds as at present. The atmosphere was 90 per cent oxygen. Between the temperature of 2,000 degrees and 3,000 degrees centigrade, oxidation occurred on a great scale; in fact, so much free oxygen was removed from the atmosphere that the pressure dropped from about 20 to 3 tons per square inch. Down to a temperature of perhaps 400 degrees centigrade, the water remained all in the atmosphere, condensing perhaps high up, but probably always evaporating lower down, before reaching the surface. But when the mean annual temperature reached about 374 degrees centigrade and the pressure around  $1\frac{1}{2}$  tons per square inch or something over 200 atmospheres, suddenly about 14 per cent of the water vapor was deposited as fluid on the surface of the earth—a tremendous transformation. From this temperature down to 300, torrential rains of water continued to accumulate until the oceans reached two-thirds of their present volume. At 200 degrees centigrade all but 6 per cent of the present ocean water had been precipitated.—C. F. Brooks in "*Why the Weather?*" (*Science Service*).

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### CO-OPERATIVE OBSERVERS' DEPARTMENT

An Appreciation of the Co-operative Observers

By J. CECIL ALTER

(U. S. Weather Bureau, Salt Lake City, Utah)

An exceptional estimate of the value of co-operative weather station records was made recently by H. L. Stoner, hydraulic engineer for the