The Bulletin Quotidien de Renseignements in its simplified form contains a 7 a. m. chart for northwest Europe and the eastern Atlantic, on which are entered winds, isobars, and lines showing the change of pressure in the past 24 hours. Beneath this map are forecasts given separately for the region around Paris and for the whole of France. On the reverse side there is a smaller map showing changes of pressure in the past three hours with large arrows indicating the direction of movement of the isallobaric systems; also charts of maximum and minimum temperature and rainfall. The different phases of the système nuageux, of which so much use is made in French forecasting, are indicated on another map which shows the state of the sky at 7 a. m., the regions in which the several types of cloud formation prevail being indicated by distinctive symbols. This report seems admirably to fulfill its purpose of being a simple and (if we except the système nuageux) nontechnical publication.

The Bulletin Quotidien d'Etudes in its new form commences with tables of readings at 7 a. m., 1 p, m., and 6 p. m., for French stations together with aerological reports, while the last page contains a small table of ships' reports from the Atlantic and Mediterranean. It is interesting to note that readings from foreign stations no longer find a place in the report. More than one-half of the eight pages are devoted to charts. In the first of these, which is reproduced as the frontispiece of this number of the magazine, polar fronts appear for the first time in the French daily weather report. The chart is an ambitious one showing isobars and fronts over the whole of that part of the Northern Hemisphere which extends from Europe in the east to eastern Canada, the Great Lakes, and part of the United States in the west. The fronts are shown very clearly, by broken lines for a warm front and a row of black dots for a cold front. Fronts are often difficult to locate; sometimes their very existence is doubtful. Further, they vary greatly in intensity and importance and it therefore seems regrettable that no observations are entered on the chart to help the student to judge of the nature of the fronts and of their effect on the weather in the vicinity. The chart on which these fronts are shown is for 1 p. m. G. M. T. A Northern Hemisphere chart for 1 a. m. covering an area centered at the pole occupies most of the last page of the report, and shows isobars but not fronts.

The importance attached to isallobars in France is shown by the inclusion of six small charts of changes of pressure in the periods of 24 hours, 12 hours and 3 hours respectively, ending at 7 a. m. and again for the same periods ending at 6 p. m. The only forecasts contained in this report are in the form of two charts, one for the anticipated changes of pressure in the 12 hours ending at 7 a. m. the following morning and the other for the state of the sky and the wind anticipated at this hour. Alongside these two charts are written an analysis of the situation and some comments on the reasons which have led to the deductions drawn. The report appears to be issued on the day following that to which it refers, as a short critical discussion is included of the success or otherwise obtained in the forecasts. Such a discussion is likely to be of value by giving the reader an insight into the lines on which the forecasters work, and may in addition be helpful to the forecasters themselves. Curves showing the daily march of temperature both at the summit of the Eiffel Tower and in the courtyard of the Office National Météorologique are also included in a report, the form of which suggests a considerable appetite for meteorological information amongst French students of meteorology.—*J. S. Dines.*

Fire weather investigations in Wisconsin.—Foremost in importance in any plan to grow forest trees is the control of fire, for upon such fire control depends the very existence of the forest. That weather conditions very largely determine the occurrence and severity of forest fires is obvious. Just what the conditions are that spell low or high hazard, however, has never been definitely determined for the Lake States region. To secure this information, a study of fire weather and the hazard resulting was started in the spring of 1928 by the cooperating agencies.

Early in May temporary field stations were established in northeastern Wisconsin in typical jack pine and hardwood areas. At each of these stations during the spring fire season observations were made daily at 8 and 11 a. m. and 2 and 5 p. m. of the conditions prevailing in the open, in the forest, and on partially cut-over areas. The resulting inflammability and moisture content of the litter was also determined at frequent intervals. In addition, the occurrence of fires in the protection districts adjoining the stations was noted and the behavior of going fires observed wherever possible, as was also the character, amount, and distribution of inflammable material typical of the two forest types under observation.

While the data secured have not yet been worked up in detail, a very direct relation between the inflammability of the prevailing forest fire fuels and weather conditions, particularly precipitation and relative humidity is obvious. For example, each of the three critical periods encountered this spring were preceded by from four to eight days without precipitation and with a mid-day humidity of 40 per cent or less. The moisture content of the litter during dry periods also was found to vary directly with the humidity, explaining why fires burn more fiercely between noon and 4 p. m. and are more readily controlled in the morning and late afternoon. Wind velocity was also found to be an important factor when other conditions were favorable for the occurrence of forest fires, velocities of seven miles per hour and over causing fires to spread rapidly and making control difficult.

The spring fire season in northeastern Wisconsin this year (1928) was acute but not abnormal. * * *

The lowest humidity observed was 21 per cent in the open jack-pine country at 5 p. m. on June 6, the last bad fire day of the season. While the humidity tended to run somewhat higher in the hardwood than in the jack-pine country, days with humidity of 30 per cent and less were numerous at both stations. Decidedly higher humidities and a consequent higher moisture content of the litter normally prevailed at the forest stations than in the open in both hardwood and pine, conditions in partially cut-over stands being intermediate. This difference was particularly striking in the hardwood country after the leaves had come out, but also prevailed consistently in jack pine.

On the other hand, light rains were found to be more effective in the open than in the forest, the forest cover evidently preventing the precipitation from reaching the ground. As a result, normal conditions were found to be reversed by light rains, the litter in the forest remaining dry and hence more inflammable than that in the open.

* * * Just what conditions cause fires, apparently dead beyond the possibility of revival, to flare up after lying dormant for days is worth knowing. This spring a fire of this kind occurred in northern Wisconsin in the area that was being covered by this fire-hazard study.

As long as the relative humidity at 8 a. m. was 50 per cent or above the fire remained dormant. However, when the humidity dropped appreciably below 50 per cent

the fire flared up and required determined and sustained effort to keep it under control. Light rainfall did not make the fire safe. A half inch of rain or more seems to be necessary to put a fire in a condition where it is no longer a menace.—*Forestry section, 1927–28, Annual Report of the Director, agricultural experiment station, University of Wisconsin.*

Count Rumford in meteorology.—In the course of a most interesting biography of Count Rumford by Lyman C. Newell, published in Science, July 27, 1928, pages 67–73, the following (pp. 69–70) is of historical interest in American meteorology:

One of his investigations was an elaborate series of unique experiments on the heat-conducting power of fluids. He showed among many other things that convection currents are the principal means by which heat is transferred through fluids, and described how, when a vessel of water is heated, there is generally an ascending current in the center and a descending current all around the periphery. Hence he concluded it is only when a liquid expands by increase of temperature that a large mass can be readily heated from below. He also pointed out the exceptional behavior of water below 39° F., viz, it contracts when heated and expands when cooled. Then he proceeded to explain how large bodies of water are prevented from freezing at great depths on account of the expansion which takes place on cooling below 39° F., and he mentions as an example that in the Lake of Geneva, at a depth of a thousand feet, the temperature was found to be 40° F. He emphasized the fundamental bearing of this unusual behavior of water on climate everywhere, and on the preservation of trees, fruits, and vegetables during the winter in cold countries.

In his experiments on the heat-conducting power of liquids, Count Rumford * * * turned his conclusions to practical account in making warm clothing, not only of woven fabrics but also of feathers and fur. * * *

In another series of experiments devoted to the radiating power of different surfaces he showed how the power varied with the nature of the surface and illustrated the results by demonstrating the effect of a coating of lampblack in increasing the radiating power of a body.

He also investigated the absorption of heat by different surfaces. His results led to the law that good radiators are good absorbers and the recommendation that vessels in which water is to be heated should be blackened on the outside. In speculating on the function of the coloring matter in the skin of the negro, he said:

"Were I called to inhabit a very hot country, nothing should prevent me from making the experiment of blackening my skin, or, at least, of wearing a black shirt, in the shade and especially at night, in order to find out if by those means I could contrive to make myself more comfortable."

—*C. F. B.*

New rainfall record for Canal Zone.—Rainfall in this consular district during the months of July, August, and September was considerably greater than during the corresponding months of the year 1928. A notable feature was a precipitation in the space of one hour of 5.16 inches. The total rainfall in the Colon consular district during the month of August was 23.78 inches.

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