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The MONTHLY WEATHER REVIEW is based on data from about 3500 land stations and many ocean reports from vessels taking the international simultaneous observation at Greenwich noon.

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As far as practicable the time of the seventy-fifth meridian, which is exactly five hours behind Greenwich time, is used in the text of the MONTHLY WEATHER REVIEW.

Barometric pressures, both at land stations and on ocean vessels, whether station pressures or sea-level pressures, are reduced, or assumed to be reduced, to standard gravity, as well as corrected for all instrumental peculiarities, so that they express pressure in the standard international system of measures, namely, by the height of an equivalent column of mercury at 32° Fahrenheit, under the standard force, i. e., apparent gravity at sea level and latitude 45°.

SPECIAL ARTICLES, NOTES, AND EXTRACTS.

THE RELATION OF THE WEATHER TO THE FLOW OF STREAMS.

By F. H. BRANDENBURG, District Forecaster. Dated Denver, Colo., August 30, 1906.

The conditions, meteorological as well as physical, affecting run-off are so many and so varied that it is probable that every stream has its own law. While precipitation is, of course, the foundation of stream flow, other meteorological elements, such as temperature, wind, and dependent influences, greatly modify effects. These subordinate influences may work in unison or separately, and the extent of their influence, whether favorable or unfavorable, depends on the resultant of their departures.

The water in the streams may come either from surface run-off or from ground water. Whether the precipitation comes as rain or snow depends, of course, on the time of year as well as on altitude and exposure, and the geographical position of the watershed. For the great interior basin and adjacent regions the snowfall constitutes the main source of supply, since about sixty per cent or more of the annual amount falls during the six months, October to March.

For high altitudes thruout the west the year may naturally be divided into two periods—the period of storage, October to April, inclusive, and the period of run-off, May to September, inclusive. The principal meteorological conditions, and conditions resulting therefrom, affecting storage are: total fall, time of fall (that is whether early or late in the season), the condition of the ground, the prevailing temperature, and wind action. The time of fall controls to a large extent the character of the late flow. Snow that comes in the fall or early winter is subjected to occasional high temperatures as well as to prolonged periods of low temperature. In time it becomes solidified and practically ice, in which form melting in summer is relatively slow. Later snows, altho much wetter, are not subjected to such low temperatures, and as the period of storage is shorter the snow never becomes so hard packed. With the coming of a warm spell melting is rapid, and a correspondingly large run-off results. The condition of the ground, whether wet or dry, is important, for when the rainfall during all or a part of the warm half of the year is below normal, ground water will be correspondingly low; so that when melting takes place much of the moisture held in storage on the surface will go to make good the deficiency. The condition of ground, whether frozen or unfrozen, affects the capacity of the ground to absorb moisture, and determines the proportion that appears as surface run-off, the unfrozen ground lessening the run-off during the early part of the season, and increasing the late flow by seepage.

Such high temperatures as occur during the storage period are not sufficient to cause a material melting at very high altitudes or in sheltered localities of less elevation. The effect of high afternoon temperatures is to cause the snow to settle, and as freezing weather prevails during the remainder of the twenty-four hours, solidification proceeds rapidly. Wind is a very important factor during the storage period. It is beneficial in packing the snow, and also in sweeping the snow into timber and other sheltered places. Wind, however, may become a detriment, as, for instance, when it partakes of the character of a chinook, or schnee fresser, as it is sometimes called from the fact that under its influence the snow disappears as by magic, leaving little or no visible moisture.

The period of run-off may be appropriately divided into two parts. The first and regular, as well as the more important, occurs in May and June, the time depending upon a joint effect on the one hand of the latitude and the elevation of the storage watershed, which are, of course, constant for a particular watershed; and on the other hand of the temperature, that is to say, whether the season is early or late, and whether days with abnormally high temperatures come in close succession, or whether there is a frequent alternation of short warm and cold spells. This early run-off is frequently due entirely to melting snow, and the amount of the flow depends on the extent and elevation of the area drained, as well as the depth and condition of the snow on the area. The late run-off will depend on the amount of the early and consequently solidified snowfall, the amount of ground water appearing as seepage, and the amount of rainfall. In many streams there is a secondary maximum due to rains; it generally occurs during the period of diminishing flow, and is common in the streams of the eastern and southern slopes. The rainfall of the interior basin in summer is generally too small to cause a second maximum. As compared with the run-off from melting snow, that furnished by rainfall is exceedingly variable in amount and time, and in general is much smaller. Owing to the occasional high intensity of local thunderstorms, a large pro-