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SOME RECENT WORKS ON PHYSICAL GEOGRAPHY, IN WHICH WILL BE FOUND MUCH RELATING TO METEOROLOGY AND CLIMATE.

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NOTES AND EXTRACTS.

EXPERIMENTAL AGRICULTURE AT METEOROLOGICAL STATIONS.

According to the Experiment Station Record, Vol. XIII, No. 8, page 708, the system of agricultural meteorological stations in Russia is especially worthy of commendation. In 1897 the Russian Department of Agriculture and Imperial Domain established a system of stations for the purpose of bringing observations on meteorology and agricultural phenomena into closer relationship, with a view to determining more definitely the effect of various meteorological conditions on crop production:

Each meteorological station has connected with it a series of plats, not exceeding 1 dectatine (2.7 acres) each in area, on which various crops are grown. Adjacent to the plats are arranged the meteorological apparatus for measuring the temperature and humidity of the air, intensity of the sunlight, direction and velocity of the wind, etc. On the plats are installed a rain gage, thermometers for determining the temperature of the soil at the surface and at different depths, and likewise apparatus for determining the humidity of the soil and measuring the snowfall. Phenological observations are made systematically on the crops under cultivation, and a record is kept of the different stages in the development of the plant, of all the work done on the plats, any injuries caused by meteorological or other factors, and the final yields of grain and straw. In addition to these observations some stations study the underground waters, the intensity of the sun's energy, the relations of the atmospheric conditions to cultivation of the soil, and similar matters.

The stations differ in their equipment; those of the second class have only the more common apparatus, and their studies are therefore of a more limited character.

The agricultural meteorological stations are for the most part connected with the experiment stations, experimental fields, and agricultural schools, although some are located on private estates. In addition to the stations there are a large number of "observation plats," which are provided with simpler meteorological apparatus, some having, also, apparatus for the determination of soil moisture.

Early in 1901, when the official report was prepared, there were 65 of these agricultural-meteorological stations, 21 of which were of the first class and 44 of the second class, and 113 observation plats, 90 of which were provided with apparatus for studying soil moisture in addition to the atmospheric conditions. The meteorological bureau, in addition to its work in agricultural meteorology, is elaborating plans for weather forecasting, although little has been done in that direction as yet.

The list of publications of the Meteorological Bureau of the Russian Department of Agriculture includes papers on the practical importance of agricultural meteorology, instructions for making the simplest agricultural-meteorological observations, an article on the relation of the cereal crop to sun spots and meteorological factors, and a review of the observations of the agricultural-meteorological stations of central Russia, together with a number of more popular publications on the relation of meteorological conditions to crop production.

This is evidently the most extensive and systematic series of institu-

tions for the study of agricultural meteorology that has been inaugurated by any country, and its work will be followed with much interest. If nothing more is done than to work out satisfactory methods and a basis for correlating the meteorological and soil conditions with the production of staple crops, the results will be of widespread importance, and will pave the way for similar studies by the experiment stations in various countries.

MOUNTAIN STATIONS FOR METEOROLOGY.

The observatory on the summit of Ben Nevis and the corresponding low-level observatory at Fort William were established in 1883 at a time when the importance of obtaining systematic records of what is called the free atmosphere, at a considerable elevation above sea level was felt as one of the most pressing needs of meteorology. Since those days the employment of the kite and the sounding balloon has enabled us to attain still greater elevations than were considered possible at that time. But these two great improvements must always be very much restricted in their application to meteorology, they can not give us continuous records. The latter are still needed and will in fact continue to be necessary for generations to come, and their records can only be properly interpreted and utilized when combined with the occasional records that are obtained by the use of the kite and balloon and by the study of the upper clouds.

Meteorology considered as a system of research into the laws of the motions of the atmosphere is not a matter that can be prosecuted successfully by any short-lived spasmodic or discontinuous system of work, it must be undertaken by permanent cooperation and the long-continued labors of all nations; the important mountain observatories should especially be maintained intact from generation to generation without any thought of discontinuing their work. Each pair of high and low stations is really of more importance to meteorology than any dozen stations at sea level. The time will doubtless come when Mount Washington, Pikes Peak, and numerous other high stations in this country will be permanently occupied. The reports from both of these stations were frequently of great use to the Editor in his early forecast work, and it is only a question of time when we shall learn how to make use of them on every occasion. Meanwhile we quote the following remarks by Sir Arthur Mitchell, Honorary Secretary of the Scottish Meteorological Society with reference to the Ben Nevis Observatory:

In the work of the two Ben Nevis observatories, the directors did all

that was possible to render the observations useful in forecasting. They could not themselves issue forecasts. This, indeed, can only be done from a central office receiving information by wire, at short intervals, from a great many stations, near and remote.

The directors started in 1883 with the intention of performing a big and costly experiment in atmospheric physics, which, in their opinion, ought to cover a sun-spot period, that is, from eleven to twelve years. This experiment they have been able to complete by the aid of public generosity. For the first seven years after 1883, when the observatory at the top of Ben Nevis was opened, there were no hourly observations at sea level for purposes of comparison, so that the experiment began in a complete form only twelve years ago, 1890, when the low-level observatory at Fort William was also opened.

It will be borne in mind that the directors consist of men of high scientific standing—no higher could be found—and the members of the Scottish Meteorological Society should know that these gentlemen continue to hold the opinion expressed at the meeting of the British Association, at Manchester in 1887, namely, "That the Ben Nevis observations are of the highest utility in the development of meteorology and in framing forecasts of storms and weather for the British Islands."

CORRIGENDA.

Page 370, column 1, line 16, for "1893" read "May, 1894."
Page 370, column 1, line 20, for "1895" read "December, 1896."

THE WEATHER OF THE MONTH.

By W. B. STOCKMAN, Forecast Official, in charge of Division of Records and Meteorological Data.

CHARACTERISTICS OF THE WEATHER FOR AUGUST.

The amount of sunshine was normal in the upper Lake region; above normal in the Atlantic and west Gulf States, and the southern slope, southern and northern Plateau and north Pacific coast regions; elsewhere, below normal.

The relative humidity was normal in the middle slope and Middle Atlantic States; below in New England, Florida Peninsula, the South Atlantic and Gulf States, and the southern slope, southern Plateau, and middle and north Pacific coast regions, and above normal in the remaining districts.

Generally the precipitation was above the normal in North Dakota, the Missouri and upper Mississippi valleys, and the middle slope and southern Plateau regions; elsewhere it was below, except in the southern Pacific district where it was normal.

Temperatures were normal in the Ohio Valley and Tennessee; they were below in New England, the Middle and South Atlantic States, Lake regions, North Dakota, the Missouri and upper Mississippi valleys, and the Plateau and southern Pacific regions, and above in the remaining districts.

PRESSURE.

The distribution of monthly mean pressure is shown graphically on Chart IV and the numerical values are given in Tables I and VI.

The highest mean pressure obtained on the north Pacific coast, with readings slightly above 30.05 inches; and an area of somewhat lower mean readings overlay the upper Ohio Valley and the Lakes Huron and Michigan region. The lowest mean readings, generally somewhat below 29.85 inches, occurred over the southwestern portion of the country. The pressure was above the normal in the Pacific coast, Plateau and upper Lake regions and the upper Mississippi Valley, the greatest departures being +.08 inch; generally elsewhere the pressure was below the normal in values somewhat less than in the area of excess. Over the southeastern half of the United States and on the middle Pacific coast the pressure diminished from that of the preceding month, and generally by values ranging from -.05 inch to -.09 inch; elsewhere it increased, the area of greatest departure overlying the western part of the upper Lake region and upper Mississippi Valley, where the changes amounted to +.05 inch to +.07 inch.

TEMPERATURE OF THE AIR.

The distribution of monthly mean surface temperature, as deduced from the records of about 1,000 stations, is shown on Chart VI.

Generally the position of all isotherms was to the southward of their location in August, 1901, excepting in the Pacific coast districts where their trend was about the same, and in southeastern California and the extreme southwest where the mean temperatures were considerably lower during August, 1902. Maximum temperatures of 90°, or higher, occurred, except in the northeastern and north-central portions of the country, in scattered sections of the mountainous districts of the Virginias,

in the northern Plateau region, and along the Pacific coast; of 100°, or higher, in the southern portion of the South Atlantic States, in the Gulf States, southern and middle slope, southern Plateau, and the southeastern and extreme southern part of the middle Plateau regions; and 110°, or higher, in southeastern California and western Arizona. Minimum temperatures below 50° occurred generally over the northern half of the United States, in the northern portion of the southern slope and in the middle and northern slope, and the Plateau and Pacific coast districts, except in the interior of California. Temperatures of 32°, or lower, occurred in scattered portions of the Northwestern States. The temperature was above the normal from the interior of the South Atlantic States westward to the central parts of Arizona and Utah, and northward to central Nebraska, in north-central Montana, and in portions of the Pacific coast districts. The greatest departures, +4° to +5°, occurred in the central part of the east Gulf States, the northwestern part of the west Gulf States, and the northern part of the southern slope and southern part of the middle slope regions.

The average temperature for the several geographic districts and the departures from the normal values are shown in the following table:

Average temperatures and departures from normal.

Districts.	Number of stations.	Average temperatures for the current month.	Departures for the current month.	Accumulated departures since January 1.	Average departures since January 1.
New England	8	65.1	-1.6	+ 2.4	+0.8
Middle Atlantic	12	71.9	-1.3	- 3.8	-0.5
South Atlantic	10	78.5	-0.1	- 6.8	-0.8
Florida Peninsula.....	8	81.9	+0.6	- 3.6	-0.4
East Gulf.....	9	82.9	+3.2	+ 0.5	+0.1
West Gulf.....	7	83.5	+2.9	+ 5.3	+0.7
Ohio Valley and Tennessee.....	11	74.9	0.0	- 6.0	-0.8
Lower Lake.....	8	67.3	-2.2	- 2.6	-0.3
Upper Lake.....	10	64.0	-1.7	+11.4	+1.4
North Dakota.....	8	65.2	-1.1	+15.4	+1.9
Upper Mississippi Valley.....	11	71.0	-1.8	+ 2.7	+0.8
Missouri Valley.....	11	72.2	-0.8	+ 7.5	+0.9
Northern Slope.....	7	68.1	+0.3	+10.7	+1.3
Middle Slope.....	6	77.6	-3.0	+10.3	+1.3
Southern Slope.....	6	82.6	+4.0	+10.6	+1.3
Southern Plateau.....	13	75.0	-1.2	- 2.8	-0.4
Middle Plateau.....	9	68.8	-1.5	+ 1.3	+0.2
Northern Plateau.....	12	66.3	-1.7	+ 1.5	+0.2
North Pacific.....	7	61.9	+0.2	+ 1.9	+0.2
Middle Pacific.....	5	65.0	+0.3	- 1.7	-0.2
South Pacific.....	4	69.5	-2.0	- 4.5	-0.6

In Canada.—Prof. R. F. Stupart says:

The mean temperature of August was slightly above average in portions of Saskatchewan and Manitoba, and also in New Brunswick and Quebec bordering on the Gulf of St. Lawrence, but over all other portions of the Dominion departures from average were negative. In Northern British Columbia the departure was between 3° and 6° below, and in Ontario from 1° to 3° below.

PRECIPITATION.

The rainfall was, as a rule, unevenly distributed, and generally over the greater portion of the country deficient; the