additional argument (already touched upon) adverse to the hypothesis.

TABLE 5.—*Departure from normal.*

Year.	Month.	Aleutian temperatures.	California rainfall.		Month.	Year.
			Northern.	Southern.		
		° F.	Inches.	Inches.		
1883	June	+0.5	+ 0.27	+0.01	Sept.	1883
1883	July	+0.2	+ 0.60	+0.83	Oct.	1883
1883	Aug.	—0.6	— 1.37	—1.03	Nov.	1883
1883	Sept.	—0.4	— 2.53	—0.35	Dec	1883
1883	Oct.	+1.3	— 1.58	—0.74	Jan.	1884
1883	Nov.	+0.1	+ 0.31	+5.42	Feb.	1884
1883	Dec	—2.7	+ 5.08	+5.85	Mar.	1884
1884	Jan.	—1.4	+ 2.19	+1.12	April	1884
1884	Feb.	+5.8	— 0.83	+0.71	May	1884
1884	June	—0.3	+ 0.12	—0.08	Sept.	1884
1884	July.	+0.9	+ 0.64	—0.21	Oct.	1884
1884	Aug.	+0.4	— 2.08	—0.17	Nov.	1884
1884	Sept.	+1.2	+ 4.35	+1.80	Dec.	1884
1884	Oct.	—1.5	— 2.84	—1.00	Jan.	1885
1884	Nov.	+0.5	— 3.49	—2.44	Feb.	1885
1884	Dec.	+2.0	— 3.18	—1.42	Mar.	1885
1885	Jan.	+2.3	— 1.51	+0.11	April	1885
1885	Feb.	—3.2	— 0.60	—0.13	May	1885
1885	June	—0.1	+ 0.73	0.00	Sept.	1885
1885	July	—1.2	— 0.62	—0.20	Oct.	1885
1885	Aug.	+0.1	+10.06	+2.39	Nov.	1885
1885	Sept.	—0.8	+ 0.09	—1.37	Dec.	1885
1885	Oct.	+0.1	+ 2.17	+3.20	Jan.	1886
1885	Nov.	—0.6	— 2.83	—1.26	Feb.	1886
1885	Dec.	+0.7	— 0.82	+0.67	Mar	1886
1886	Jan.	—0.8	+ 1.70	+0.87	April	1886
1886	Feb.	—2.7	— 0.43	—0.31	May	1886

Regarded as a whole, the Japan Current theory is open to the objection that the generalization is out of all proportion to the premises. The conclusion arrived at is far too weighty to be suspended upon so slender a thread of evidence as that presented by the Unga Island records. A coincidence has been discovered, not a law. Variations in the path of the Japan Current have little, if any, effect upon the rainfall either in California or elsewhere along our Pacific coast. The distribution of atmospheric pressure is undoubtedly the determining factor, for, upon investigation, it is found that if, from any cause, the mean storm track shifts to the southward along the western margin of the United States, such shifting is accompanied by heavy precipitation in regions where, under ordinary conditions, the rainfall is but scanty in amount. Such a condition prevailed in December, 1889, when the storm track shifted southward from the extreme northwestern border to central California. During this month the rainfall over the California coast was heavier than that over any other portion of the Pacific slope. Such shifts of storms and winds are the ultimate causes of changes in the ocean currents or drift and in the weather or climate; the Japan Current and ocean drift have no effective influence on California weather.

Inasmuch as storm areas must appear upon the weather map before their probable courses can be determined, and since individual storms cross the field of observation and disappear within a few days, we must consider long-range forecasting for any section of the country as impossible until our present knowledge of meteorology has been materially increased; until, in fact, the general circulation of the atmosphere is thoroughly understood.

SOME FEATURES OF THE CLIMATE OF IDAHO.[1]

By S. M. BLANDFORD, Section Director, dated Boise, Idaho, August 9, 1899.

An interesting study from a meteorological standpoint is found in the investigation of the physical laws which operate to give the isotherms of Idaho their north and south trend for a distance of 400 miles. A glance at the monthly isotherm chart, assisted by the knowledge that there are only slight variations from the general direction from month to month, suffices to show that the subject is worthy of investigation.

Few States in the Union possess more interesting features meteorologically and topographically than Idaho. Since these considerations become a part of each deduction which a forecaster is required to make in diagnosing the weather symptoms of any locality, it will be interesting to note to what extent they are intertwined in Idaho.

Preliminary to the discussion of the cause of the peculiar trend of the isotherms, it will be interesting to note the varying elevations over an undulating surface, such as the State presents, from its 485 miles of western boundary, eastward to its natural boundary, the Bitter Root Range and Rocky Mountains, i. e., from a point where the normal actual barometric pressure is 29 inches, corresponding to 1,000 feet elevation, to 22 inches pressure (8,000 feet) at its eastern boundary, the Rocky Mountains.

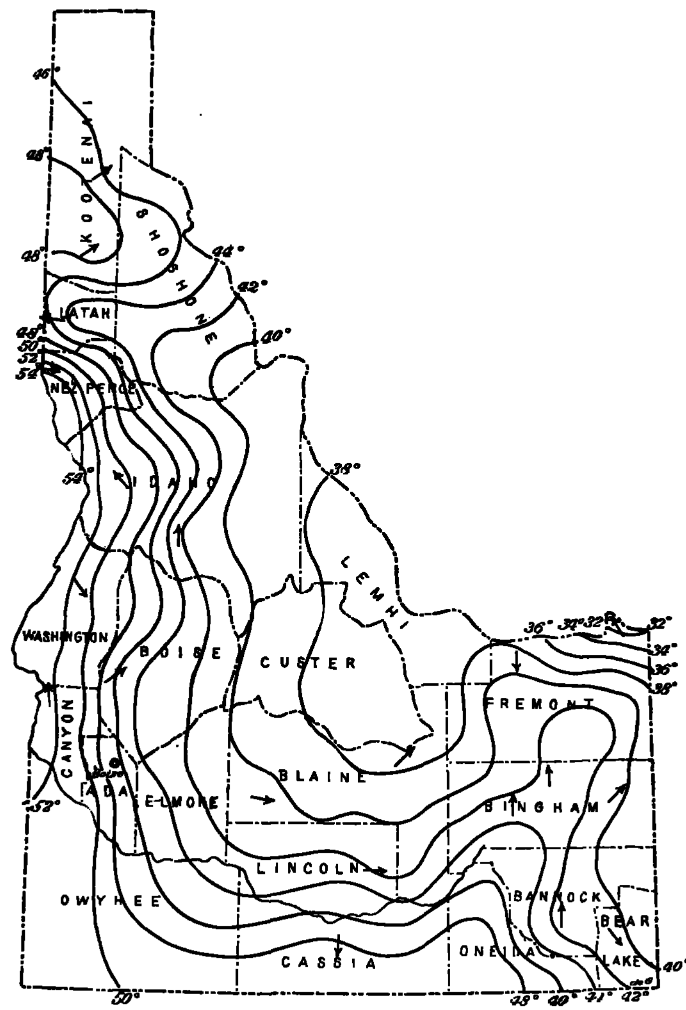

FIG. 2.—Mean annual isotherms and prevailing winds in Idaho, 1898.

An 8,000-foot barrier, trending southeastward from the winter storm track and penetrating the numerous cyclonic disturbances to a vertical height of a mile and a half, necessarily has an influence sufficient to cause the forecaster serious reflection in determining to what extent the storms are deflected by it from their natural course.

Not the least consideration is the valley of the Snake River,

[1] In reply to a general circular letter of September 14, 1898, Mr. S. M. Blandford, Section Director at Boise, Idaho, prepared a report on some features of the climate of Idaho that has not, so far as we know, as yet been published and which we take pleasure in laying before our readers. In connection with this article, a previous one on weather types, published at Portland, Oreg., in pamphlet form, August 15, 1897, should be studied.—ED.

which, from a topographical view, is a trough in the great American Plateau. For 400 miles eastward from its intersection with the western boundary of the State, the surface of this valley ranges from 1,000 to 4,000 feet above sea level, while the mountains that surround it on the north, east, south, and west vary in height from 6,000 to 10,000 feet. Briefly, these are the prominent topographical characteristics of the State of Idaho that bear upon our subject.

It is not generally known that the Snake River Valley, covering one-third of the State, has a climate so mild in the winter season as to be the natural home for stock from the first fall of heavy snow on the mountains until signs of spring appear. In this favored valley thousands of sheep, horses, and cattle seek refuge from the storms and cold waves of winter. Not only does the mildness of the temperature offer inducement to the herder to establish his winter quarters here, but the almost total absence of snow and the presence of growing grass enable the stock to subsist during mild winters upon what nature alone has provided.

Why should the Snake River Valley be mild when to the southward, over the plateau States, the normal condition during the winter season is an area of high pressure prevailing for weeks without great fluctuation? There is no explanation for it unless the air when flowing over the mountains from the high pressure area down into the Snake River Valley is heated by compression.

During the winter season storms pass in succession over the Canadian Northwest bringing Idaho continually within the field of influence, though the center of disturbance almost invariably remains in the north. It is during the prevalence of the storms in the north that Idaho remains in the foothills of the high pressure area prevailing over the plateau States with the barometer (reduced to sea-level) reading 30.40 to 30.80 at Idaho Falls, Salt Lake City, Denver, and Carson City, and moderately high at Baker City, varying, apparently, with the declivity of the depression in the north. The drift of the air from the high pressure area of the Plateau occurs with each appearance of a depression over Alberta, and as the air drifts over the network of mountains to the south and west of the Snake River Valley the principle of dynamic heating comes into operation.

When the high area disappears from the Plateau, permitting the troughs from the low pressure field to sweep southward through the State into Utah, Nevada, and Arizona, then the cold weather occurs in Idaho, since the slightest depression passing southward through the State is productive of a fall in temperature and is sufficient to justify the issuance of frost warnings as late in the season as July.

Since the Weather Bureau established the station at Boise persistent effort has been made to induce those to whom the daily weather map is accessible to comprehend these plain rules. Not until February 2, 1899, when Idaho was visited by a cold wave of unusual severity which resulted in loss of stock, did those who were vitally interested comprehend that their loss would have been materially lessened had they heeded the warnings which gave time for ample protection.

STUDIES ON THE ATMOSPHERE AT TRAPPES, FRANCE.[1]

By M. LEON TEISSERENC DE BORT.

Since the autumn of 1897 more than a hundred and fifty kite ascensions have been made at the Trappes Observatory, although the atmospheric conditions are less favorable than those on the American coast.

These observations demonstrate the importance of inversions of temperature in the vertical, as soon as the cyclonic condition has ceased to exist; a decrease of temperature, very slight in the first 1,200 meters, is an almost certain indication of fine weather the next day.

As with the Americans so with us—our ascensions have increased in height as our materials have improved, and we have learned better how to start the kites.

The vicinity of several lines of railroad, and of quite a crowded network of telegraph wires prevented us in many cases from letting out long lines of kite wire, the slightest accident causing our line to be carried down to the railroad track. Nevertheless, the very first year we attained an elevation of 2,000 meters, then 2,500, and 3,850 meters. Finally, September last, we were able to raise our instruments as high as 4,300 meters.

Whatever be the success obtained by the kite the altitudes reached are necessarily limited. Moreover, they can not ascend at all in calm weather; we must, therefore, have recourse to balloons in order to explore the atmosphere more thoroughly. The ascensions of the "Aérophiles" of Messrs. Hermite and Bésaucon showed:

(1) That the temperature was much lower than was supposed from the observations made on mountains, since a temperature of —60° was found at an altitude below 14,000 meters.

(2) That the gas inside of the balloon cooled very rapidly, so as to approach the theoretical temperature obtained by the expansion of the gas for the same differences of pressure. This fact, which has been neglected up to the present time, because it is generally concealed by the great rise of temperature produced when the balloon is exposed to the sun, is of considerable practical importance, and must be taken into account in calculating the height that can be reached by a balloon ascending in the night.

(3) These ascensions have led M. Hermite to construct a form of shelter called "parasoliel," for sheltering the instruments from solar radiation. This "parasoleil" consists of a paper tube blackened on the inside, and covered on the outside with a sheet of metal in such a way as to become heated to the least possible degree under the direct action of the sun.

Since the meteorological conference at Paris in 1896, an international agreement has been entered into, and at certain fixed times, sounding balloons have been sent up from Paris, Berlin, Strasburg, Vienna, Munich, and St. Petersburg. These ascensions, six in number, are not as yet sufficiently numerous to lead to the discovery of very precise laws, but have enabled us to study the methods and to explain many details.

In view of the diversity in the atmospheric conditions and of the rapidity with which the phenomena change from day to day, I have thought it necessary to make very frequent aerial soundings—when necessary, several times a week—and for this purpose we have first turned our attention to rendering the usage of sounding balloons more simple and less expensive.

We have attained this result by employing pure hydrogen, which allows of greatly diminishing the diameter of the balloons and of diminishing the weight of the instruments sent up, without, however, impairing their accuracy.

In order to send up these balloons even in violent winds or stormy weather, which has scarcely ever been attempted, but is of the greatest interest, I sought a device which would enable us to start the balloon, when once it is inflated, without exposing it to injury from the very first gusts, since we desire always to use extra light netting. For this purpose I adopted the following arrangement: I constructed, upon a revolving table, a very light tent, open on one side. The balloon once

[1] Translated from the Journal de Physique, (3) Vol. IX, March, 1900, pp. 133–137.