

than the Editor. His duty is to make it a medium of instruction to all. Whenever practicable, suggested changes in manuscripts have been referred back to the respective authors for their approval, but in a few cases this has not been practicable. In all cases the aim has been, not to put new ideas and words into an author's text, but to simply restate clearly the position that each author takes in reference to his own subject.

#### WIND EFFECTS.

Abstract of an article by MARK W. JEFFERSON, in the *Journal of Geography*, vol. 3, No. 1, January, 1904, pp. 1-20.

Climate may best be taught by inducing the student to observe and study the concrete facts of the weather. From these the characteristics of our climate may be deduced. The drawing of inferences from the facts, however, involves mental processes in which the beginner needs training. Familiarity with the inductive method is needed to give faith in it, and there is especial need of every possible test of the results. For this reason it is desirable to come to our conclusions by as many roads as we can find.

If it is desired to get the student to believe in our westerly winds as an important climatic feature, we may work along three lines:

1. Observe the weather vane and after some months find which wind has blown oftenest.

2. Study the weather map and make out on it the procession of highs and lows to the eastward.

3. Look at the trees that have grown exposed to the force of the winds for indications of thrust in one direction rather than in others.

To strengthen and confirm the somewhat vague and indefinite conclusions that the beginner may deduce from the first two methods, the evidence of the trees whose growth shows plainly the influence the prevailing wind is of the greatest value in teaching.



FIG. 1.—Maple at Ypsilanti, looking north.

The typical wind effect is not an inclination of the trunk, although this may appear where the ground is softened, either by moisture or by cultivation. The typical effect is a bending or inclining of the twigs to leeward, and for this reason the best season for these studies is after the fall of the leaf. Our prevalent westerly winds are recorded in the growth of the maples from New England to Michigan, fig. 1. The maple runs to slender and hairlike twigs, and the development of the

twigs is almost horizontal on the east side of the tree and vertical on the west, as if they had been combed upward on the other, see figs. 1 and 4. Maples give excellent wind effects everywhere that I have observed them, and if there are any about Dodge, Kans., where the prevailing wind is easterly, it would be interesting to know how they grow.

The results of this wind influence are individual with each kind of tree. While the cottonwood, at least about Ypsilanti, is resistant to wind effects, its cousin, the white poplar, shows them in a high degree. In the poplar, curves are strongly developed, see fig. 2. On the east side of the tree, the branches form curves concave to the ground. On the west, vertical lines would cut not a few branches in two points with the curve between concave to the east, so strongly are they bent to leeward as they grow. In this case it is a branch effect rather than a twig effect, while the individuality of the poplar comes out in the curve. The maple succeeds better in rearing its greater branches vertically into the air. There is a distinct curving here, too, in the more slender branches, but much less in degree.



FIG. 2.—White poplar, Ypsilanti, looking north.



FIG. 3.—Elm at Ypsilanti, looking north.

Elms are available for observation through a wide stretch of this country. The elm branches grow longer to eastward

than to westward, which enables the slender ends to hang nearer the ground on the east. The twig effect is not unlike that on the maple, but the greater length of the pendulous end twigs takes away the appearance of combing upward on the west side. The tips of the lower limbs on both sides hang directly downward, but toward the top of the tree the effects are almost identical with those observed on the maple. Fig. 3 is an example in twig. A photograph of the same tree from the west is quite symmetrical.

Wind effects may also be noted in the oak, the hickory, the sycamore or buttonwood, and the black walnut. Many tropical trees have their tops one-sided under wind influence, though they are one-sided to south or west instead of to east.

The best trees for observation are those standing alone in an open space, where they are not sheltered from the wind, and where the direction of their growth is not influenced by unequal lighting. Trees tend to grow strongly toward the light, but such observations as have been made seem to justify the statement that light usually has less effect on trees fairly exposed to the wind than the wind does.

These studies may afford a method of determining prevalent winds in regions meteorologically unexplored.



FIG. 4.—Wind effects.

NOTE.—These illustrations have been kindly loaned by the editor of the *Journal of Geography*, but the numeration has been altered to suit this abstract.

#### ARGENTINE REPUBLIC WEATHER SERVICE.

The Weather Bureau has recently contributed two men to the meteorological office of the Argentine Republic. These are Mr. L. G. Schultz, who is to take charge of the magnetic service, and Mr. Montrose W. Hayes, Section Director, who goes to the central office, which is now established at Buenos Ayres, and who will probably also have charge of the forecast division. It is a pleasure to realize that there is a demand for men who have gone through the training implied in a long service in the Weather Bureau.

#### SEISMOLOGICAL WORK.

Under date of March 15 Prof. Dr. J. M. Perntner announces that by order of His Majesty, the Emperor of Austria, the seismological work hitherto supervised by the earthquake committee of the Imperial Academy of Sciences of Vienna will now be undertaken by the K. K. Zentralanstalt, and the official title of this institution is, therefore, changed to read as follows: "K. k. Zentralanstalt für Meteorologie und Geodynamik."

#### AVERAGES BY MONTHS OR BY SEASONS.

In a recent letter from Prof. Victor Raulin, of Montfaucon d'Argonne, France, who, since the death of Glaisher, is undoubtedly the oldest living meteorologist of Europe, he says:

It is the custom of the meteorologists of Europe, and probably of the whole world, to group the twelve months into four seasons, beginning, respectively, with December, March, June, and September.

It would be very interesting to determine and to mark out precisely each year the regions where droughts or excessive rainfalls prevail. For this purpose it would be necessary to begin by establishing a good average, for example, of twenty years, for a large number of stations in Europe. Then we should have to compare with this average the monthly or seasonal amounts of each of the years that have contributed to form it. By this means we should be able to determine the departures and their direction, and perhaps also to recognize some periodicity.

The question whether the twelve months of the year should be classified according to the meteorological year or the calendar

year is, we think, still open for discussion. The individual months themselves seem to us more important than the four seasons of the year. But the question really depends upon what use we propose to make of the rainfall data. In all parts of the world there are some plants, some animals, some industries and other human interests that depend so closely upon the rainfall that we are continually tempted to make comparisons, in the hope of elucidating the complex relations and possibly discovering some law of importance to mankind.

In all such researches the proper attention to important details requires us to make use of monthly rainfalls instead of seasonal. There are other broader questions, such as the comparison of the local climates in different parts of the world, in which it may be allowable to consider only seasonal averages, but the publication of monthly means is certainly a primary duty, so that each may have the data that he needs in his study. For instance, in different portions of North America seed is sown or planted in different months, ranging from the early spring to the late autumn, and the development of any crop, depending as it does as much on the amount of water stored in the ground as on the current rainfall, requires us to consider the precipitation between certain definite dates, which do not agree with the beginnings of winter, spring, summer, or autumn, but may more appropriately be assumed to coincide with the beginnings of special months. On another page, for instance, we publish a study in local climatology by Mr. Emigh, of Dodge, in which he shows very plainly why monthly means rather than seasonal means must be used for Kansas.

#### A HAWAIIAN WEATHER BUREAU STATION.

A regular meteorological observation station of the Weather Bureau, under the charge of Mr. Alexander McC. Ashley, formerly local forecaster at Syracuse, N. Y., will be established at Honolulu. This station will be the center of the Hawaiian Climate and Crop Service, and will issue a weekly crop report and a monthly bulletin.

#### UNIFORMITY IN METHODS AND STANDARDS OF INSTRUCTION IN METEOROLOGY.

Attention has been called to the fact that instruction in meteorology is going on at nearly all the stations of the Weather Bureau. In some cases the observer has only his assistants under instruction; in other cases he gives a course of lectures to classes of high schools, colleges, or universities. It is desirable that in all cases the instruction should be consistent with the best methods of the service, and the best knowledge we have of meteorology. The multitude of official instructions, circular letters, elementary and advanced textbooks issued during the past twenty years leaves opportunity for many sources of discrepancy and uncertainty. It is possible and desirable that uniform methods should be adopted at all stations, and that the instruction given in the college classes should be up to date. The general supervision of this whole subject may eventually be entrusted to some competent official; meanwhile, the editor will be very glad to hear directly from any one in the service who has felt the need of greater educational facilities, or who wishes to contribute his ideas and experience to the improvement of this branch of the work of the service. Those who have given courses of lectures should send in an outline or synopsis of these; those who wish to give courses should state the subjects on which they think lectures should be given; those who have had experience in the instruction of beginners in regular station work can, perhaps, suggest some improvements in this class of work. The need of a general school of instruction; the desirability of calling in the older members of the service, so that they may attend advanced lectures at the Central Office; the need of a special text-book to supplement those of Davis and Waldo;