which seems to indicate that the Tennessee has persisted in its present course for a long period of time.*

If the distribution of fresh-water faunas can not be regarded as a proof of river-capture, it is pertinent to ask, of what value is this class of evidence?

It seems to me that this will largely depend upon local conditions which must be taken into account in each individual problem. If there is a marked similarity or identity of forms in the captured stream and the stream representing the supposed former, lower course, and no such relation is found in any other two streams of the region, the evidence would be very suggestive. If the special forms thus distributed are so constructed anatomically as to be poorly adapted to dispersion by birds, insects, etc., the evidence would become much stronger. But if the divide between the two basins is low and indistinct and occurs in a broad, open valley along which aquatic birds are known to migrate habitually, and the shells in question are adapted to the various means of dispersal, then the opportunities for transference of forms between the two basins would be so excellent that the faunal evidence would be worthless as a proof of river capture. On the other hand, where no commingling of forms occurs, it might appear that no recent capture could have taken place and the evidence thus become of negative value. But even here we must take into consideration the restricted distribution of some forms along the same stream, due to the character of shores and stream bed, the intervention of falls or rapids and other features. Even where capture has taken place, the forms may not be transferred to the lower, new course of the stream, since they may not be found in the lower courses of streams long established in their present relations.

In conclusion, it is believed that the dispersion of fresh-water faunas is effected by so many different agencies, and the features of distribution are dependent on so many different factors, that such distribution can have but very limited value as an evidence of drainage modifications. In the cases where this evidence has already been offered as a proof of river-capture, it is believed that the conditions are such as to render its use invalid. It seems necessary to subject such evidence to unusually critical examination before *offering* it in support of any theory of drainage modifications, or *accepting* it as proof of the correctness of any such theory.

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* The full discussion of the Tennessee problem will appear in a forthcoming issue of the *Journal of Geology*.

Current Notes on Meteorology.

Long-Range Weather Forecasts.

The Weather Bureau has wisely published a *Bulletin* (No. 35) on the subject of 'Long-Range Weather Forecasts,' prepared by Professor E. B. Garriott, in order to counteract, so far as is possible, the misleading predictions for a month or a season in advance which are constantly finding their way into our newspapers. Indeed, such spurious long-range predictions are actually sold to the papers and to the public, and are most injurious in their effects. Long-range predictions are of various kinds, ranging from those based upon supposed planetary influences to such well-known statements, found in farmers' almanacs, as 'About—this—time—expect—showers,' these five words being so printed that they apply to a week or ten days of time. There are also other classes, based upon a careful study of sunspot periods, lunar periods, etc., some of which, as in the case of the recent investigations of Sir Norman Lockyer and Dr. W. J. S. Lockyer, seem to promise something in the way of more definite results. As to lunar influences, although much time has been spent on this matter, and faint lunar tides in the atmosphere have been made out near the equator, in the present state of our knowledge, as Angot put it two or three years ago, 'it can not be affirmed that the moon does exert any influence upon the weather, but at the same time it should not be denied that this influence may possibly exist.' As to seasonal predictions based upon the behavior and condition of animals, it is clear that the physical

condition of the animal depends upon past weather conditions, and upon the food supply which those conditions have furnished, rather than upon future weather. The best that can be done at the present time is to make forecasts for one or two days in advance, and occasionally for three or four days. The future advance will depend upon a closer study of atmospheric pressure conditions over large areas, and of the influences which bring about normal or abnormal distribution of pressure.

THE LOW RELATIVE HUMIDITY OF WINNIPEG IN WINTER.

IN a recent number of *Nature* (March 9, 1905) reference is made to some interesting electrical and other effects of the dry air of Winnipeg in winter, as reported by Professor Buller, of the University of Manitoba. The common experiment designed to show the presence of water vapor in the atmosphere, which is performed by exposing calcium chloride, has to be done in a damp-chamber. The substance shows no apparent signs of deliquescence even after some weeks' exposure to the ordinary air.

JELINEK'S METEOROLOGICAL INSTRUCTIONS.

A FIFTH edition of Jelinek's valuable 'Anleitung zu meteorologischen Beobachtungen' has been issued, under the direction of Dr. J. M. Pernter, the director of the Austrian Meteorological Institute. The fourth edition was dated 1903, and that, together with the third (1884), was revised by Dr. Hann. There are many admirable handbooks of instructions for meteorological observers, but this one has always stood in the front rank, and in its new edition, with many illustrations, is thoroughly up to date in every particular.

HANN'S LEHRBUCH DER METEOROLOGIE.

A NEW edition of Hann's invaluable 'Lehrbuch der Meteorologie' is on the way, the first part being already issued. There is no need of pointing out that the new edition will be thoroughly up to date, and that no teacher or student of meteorology can afford to do without it. It will consist of about six parts. Not the least of the many important additions will be the extension of the charts so as to include the recent important Antarctic discoveries.

A NEW RAIN GAUGE.

THE *Meteorologische Zeitschrift* for January, 1905, contains a description of a new form of rain gauge designed by W. Gallenkampf, of Munich. The unsatisfactory character of the record made by the ordinary self-recording gauge, which does not show the details of rainfall sufficiently well, has led to the construction of a gauge from which the rainfall *drops*. Each drop falls on one end of a delicately-balanced arm, which descends under the weight, closes a circuit, and thus the fall of one drop is recorded. So detailed is the record that the rainfall curve can be plotted on the basis of the number of drops which fall from the gauge in half a minute, and these curves show clearly that the ordinary shower is very variable in its intensity, these smaller variations not being shown on the usual rain-gauge record. A number of curves illustrate the article, and throw a new light on the way in which our rain falls.

THE MICRO-BAROGRAPH.

IN the *Quarterly Journal of the Royal Meteorological Society*, Vol. XXXI., 1905, pp. 39–52, Dr. W. N. Shaw and Mr. W. H. Dines describe an apparatus called the 'Micro-Barograph,' which has been designed to magnify the minor fluctuations and at the same time to disentangle them from the general barometric surges. The causes which suggest themselves as likely to produce temporary fluctuations of the barometric curves are the following: (1) Atmospheric billows passing along surfaces where there is discontinuity in density, in a manner similar to ocean waves; (2) the passage of minute whirls, or cyclonic depressions of small dimensions; (3) variations of pressure due to the attraction or repulsion produced by electric stress as masses of air at different potential pass by; (4) the mechanical effects of wind, and (5) the mechanical effects of the rapid condensation of aqueous vapor.

NOTES.

THE effect of a severe drought upon meteorological observations is seen in the 'Report'

of the Meteorological Commission of Cape Colony for 1903. There is a fair increase in the number of ordinary stations over 1902, but the rainfall stations show a decrease of 31. This is due to the fact that, owing to a drought, many farmers have 'trekked' with their cattle to adjoining territories, leaving their homesteads unoccupied.

Mr. D. E. Hutchins, of Cape Town, discusses the relation of the rainfalls of South Africa and of India during the period 1892–1902, and finds that the years of famine in India have been followed by years of bad drought in South Africa. The belief is expressed that the summer rains of South Africa have their origin in the moist winds from the Indian Ocean (*Nature,* Vol. 71, 1905, 342–344).

R. DeC. Ward.

A CONTEMPLATED MAGNETIC SURVEY OF THE NORTH PACIFIC OCEAN BY THE CARNEGIE INSTITUTION.

A project for a magnetic survey of the North Pacific Ocean by the Department of International Research in Terrestrial Magnetism has been favorably acted upon by the executive committee of the Carnegie Institution of Washington, and authorization has been given to begin the work this year. An initial allotment of $20,000 has been made to cover the expenses for the current year.

As is well known, the state of our knowledge of the distribution of the magnetic forces over the greater portion of the earth—the oceanic areas—owing to the paucity of precise data, is exceedingly unsatisfactory. This fact is especially true for that great body of water—the Pacific Ocean—rapidly developing in great commercial importance.

Captain Creak, for many years superintendent of the Compass Department of the British Admiralty, now retired, says: 'The North Pacific Ocean is, with the exception of the voyage of the *Challenger,* nearly a blank as regards magnetic observations, and I, therefore, think the magnetic survey proposed will be of great value.'

Hence, except for data from occasional expeditions and such as were acquired in wooden vessels a long time ago, the present magnetic charts used by the navigator over this region depend largely upon the observations on islands and along the coasts. Such land observations, however, are rarely representative of the true values because of prevalent local disturbances. It is, therefore, impossible to make any statement as to the correctness of the present charts. The demands of science, as well as those of commerce and navigation, require a systematic magnetic survey of this region under the most favorable conditions possible and that the work be done under the auspices of some recognized research institution in order to insure that the scientific aspects of the work receive their adequate recognition.

The eminent physicist and magnetician, Professor Arthur Schuster, states as his opinion: "I believe that no material progress of terrestrial magnetism is possible until the magnetic constants of the great ocean basins, especially the Pacific, have been determined more accurately than they are present. There is reason to believe that these constants may be affected by considerable systematic errors. It is possible that these errors have crept in by paying too much attention to measurements made on islands and along the sea-coast. What is wanted is more numerous and more accurate observations on the sea itself." Furthermore, the superintendent of the United States Coast and Geodetic Survey, Mr. O. H. Tittmann, says: "There is no doubt in my mind that a survey for that purpose would result in obtaining data of great and permanent value and that it should be undertaken."

Additional quotations could be given; the above, however, are representative and show sufficiently the great importance of the proposed work and the fruitful results that may confidently be expected. It is the hope that upon the completion of the magnetic survey of the North Pacific, the means will be forthcoming for extending the survey so as to include other oceanic areas. An effort will, furthermore, be made to secure the interest and cooperation of all civilized countries, so that we may look forward to the completion of a general magnetic survey of the accessible portions of the globe within about fifteen