Geometria noneuclidea and Liebmann's German translation, by Arthur Ranum; Nichol's Analytic geometry, revised edition, and Wentworth and Smith's Complete arithmetic, by G. H. Scott; Wangerin's Theorie des Potentials und der Kugelfunktionen, by J. B. Shaw; Timerding's Geometrie der Kräfte, by W. R. Longley; "Notes"; "New Publications."

BOTANICAL NOTES

FORESTS AS GATHERERS OF NITROGEN

At a meeting of the Society of American Foresters, on March 31, 1910, a paper was read by Mr. Treadwell Cleveland, Jr., on "Forests as Gatherers of Nitrogen." This paper summarized results recently obtained by Jamieson, of Scotland, and by Zemplen and Roth, of the Royal Hungarian Experiment Station at Selmecbanya, which tend to show that forests are able to appropriate free atmospheric nitrogen by means of their trichomes. Jamieson investigated several forest trees (as well as a number of smaller plants), among which were *Acer campestre, Tilia europaea, Ulmus campestris, Sorbus aucuparia, Fagus silvatica* and *Picea concolor.* Zemplen and Roth included a large number of additional species. In all cases chemical tests show the presence of nitrogen in the trichomes, and the investigators believe that they have excluded all other sources for this nitrogen than the atmosphere. Professor Henry, of the Forest School at Nancy, France, was the first to point out that forest soils are enriched in nitrogen by the decay of fallen leaves.

Zemplen and Roth are cautious in their conclusions, and urge that further investigations be made in this field.

A STUDY OF PEAT-BOG FLORAS

In the last Report of the Iowa Geological Survey Professor L. H. Pammel discusses the peat flora found in the swamps and marshes of Iowa. For the bog formations he follows C. A. Davis's monograph. These bogs are not of the *Sphagnum* type usually associated with the term, but are listed by the author as follows: Quaking aspen bog, willow bog, grass and sedge marshes, rush marshes, moss bogs. The bog floras of Iowa, Wisconsin, southern Michigan and the Dismal Swamp Virginia are compared from a list of three hundred or more plants, showing strikingly the differences in their constitution.

The following observations may be noted. *Sphagnum, Larix laricina, Thuya occidentalis* and *Picea mariana* are not found in the state. Heaths are absent from the swamp flora. Of the fifteen plants listed by Transeau as characteristic of the bogs of northern America only five are found in the bogs of Iowa. Certain plants common to the peat bogs of regions farther north are not in the bogs of Iowa but are found in the colder and less fertile locations. *Carex filiformis* is the best peat former in the state.

The author discusses the important contributions to the subject, and gives a bibliography.

THE PRINCIPLE OF HOMOEOSIS

About a year ago Professor R. G. Leavitt published (*Bot. Gaz.,* January, 1909) a paper entitled "A Vegetative Mutant and the Principle of Homoeosis in Plants," which has not received the attention it deserves at the hands of botanists, no doubt partly due to the fact that it was not fully understood, and also that botanists, as a rule, are not greatly interested in underlying principles. They are so busy with the collection of solid facts of one kind and another that such "vague and insubstantial" things as principles have little attraction for them. This may account for the assertion made by a well-known professor of philosophy in a gathering of botanists a few years ago, namely, that "while botany has had many eminent men, it has been singularly unproductive in giving to the world any conspicuous general principles." Be this as it may, the fact remains that scant attention has been given to the paper here referred to, and to the principle which it sets forth.

Beginning with some familiar cases of leaf abscission, and of the decompounding of

other leaves, the author takes up the discussion of these and numerous related phenomena. He sees in them a trans-location of characters, that is, the transfer of characters from one structure to other structures, which latter may be further along in the ontogenetic line, or not so far along, or may belong to the alternative generation, or may be morphologically non-equivalent to the structures from which the transferred characters are borrowed. This transposition of characters he terms homoeosis, and in a paper of nearly forty pages illustrates and expands the principle with much force, and with convincing logic. Having established to his own satisfaction, at least, the doctrine of homoeosis, he is prepared to deduce certain conclusions as follows: "The study of homoeosis must somewhat increase the caution with which we use deviations from the normal as aids to morphological interpretation," a statement to which we fancy there will be little objection by any one, and which, it is to be hoped, will be taken to heart by morphologists and descriptive botanists the world over. It becomes evident that "relationship" may have a very different meaning when once we are aware of the facts of homoeosis, such as these which Professor Leavitt has so forcefully brought out in this paper. This service alone to morphology should justify the doctrine of homoeosis. His second conclusion that homoeosis has played some part in the evolution of plants will meet with little opposition. Lastly the author holds that the idea of homoeosis unites for descriptive purposes a great number of facts of ontogenesis which possess a considerable prospective value in connection with the effort to reach a correct mechanical interpretation of development.

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PALEOGEOGRAPHY OF NORTH AMERICA[1]

FEW articles of greater general interest have appeared in the *Bulletin of the Geological Society* in recent years than this. The paper may be divided into two parts—(*a*) an introductory portion dealing with methods, criteria and principles of paleogeography, and (*b*) the sequence of events in North America.

The author emphasizes the paleontologic method as of first importance. The distribution of seas is to be inferred from the distribution of faunas. The faunas are kept apart by barriers, of which the most important are land barriers. The local effect of currents in which there are differences of salinity or temperature is recognized, but the author thinks this can not be appealed to as an explanation of most faunal differences of the past. The physiographic testimony furnished by the sediments themselves is recognized as having a modicum of value, which in some kinds of deposits rises to first importance; but in general the usefulness of such data is not regarded as large. The important diastrophic events of geologic history are used to divide the course of time into eras and periods, and it is also pointed out that minor oscillations are often responsible for individual formations.

Following the views of Suess, Willis and others, Schuchert regards the continent as a mosaic of positive and negative elements; that is to say, regions which have shown a tendency to stand out of water as against regions which have been subject to repeated submergences. The location and general outline of these elements as conceived by the author are represented on two maps.

The commendable caution of Suess is followed in speaking of geographic changes not as uplifts and subsidences, but as "positive and negative displacements of the strand line," or as emergences and transgressions. The emergences are ascribed to periodic subsidence of the ocean bottom, causing the epicontinental seas to be drawn off into the ocean basins. The transgressions, or advances, of the sea, are thought to be due to one or more of several causes: (*a*) the attraction of the sea by bold shore mountains, (*b*) the down warping of the continent into geosynclines, thus forming long trough-like seas, (*c*) the displacement of the sea level by the filling up

[1] Charles Schuchert, *Bull. Geol. Soc. Am.*, Vol. XX., pp. 427–606, Pls. 46–101, 1910.