

extensive beds where it has been sorted out by hydraulic action as in the Des Plaines valley or on the lake shore. A bed several feet wide extended along the water's edge for two hundred feet where the lake was encroaching upon the shore. The marcasite soon disappears upon exposure; it is of such occurrence in the region as to contribute to our knowledge of the species.

Quartz occurs in abundance in both phanero-crystalline and crypto-crystalline varieties. Good scalenohedrons of calcite are found at Stony Island imbedded in asphalt.

The asphalt and maltha which are usually disseminated through the Niagara limestone of the region occur quite pure in cavities formed by the dissolution of fossil coelenterates, echinoderms and mollusks in the strata at Stony Island.

The average of four analyses showed 15% mineral matter, 82% organic matter soluble in CS_2 , and 2% of organic non-bituminous matter.

The asphalt contains 25% petroleum and 75% asphaltine.

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Secretary.

DISCUSSION AND CORRESPONDENCE.

THE APPLICATION OF PRECEDENCE OF PLACE IN NOMENCLATURE.

It has occasionally happened in descriptive botany and zoology that two or more different names have been published by an author for the same species in the same work, even on the same printed page; in most such cases this has occurred by reason of the author regarding differing forms of the same organism as specifically different, which by subsequent observation has proved to be erroneous. The principle of now using the first in position of these two or more names as the true one, has obtained wide recognition, and is a simple and convenient method to reach this result.

There are also a few cases where the same thing has occurred with generic names, that is to say, by different generic names being published in the same work for groups of species which subsequent study has indicated to be more satisfactorily regarded as within the natural limitations of a single genus, and here precedence of place has also been invoked to

determine which appellation the combined genera should bear. Here, as in the case of species, it is only a question of determining which of one or more names for the same things is the one to be employed.

The principle has been referred to as 'priority of place,' and perhaps not improperly, but it is quite a different matter from priority in time of publication, though in its application operating in the same manner to determine which of two or more rival names is to be used. It finds its most explicit presentation in the rules for nomenclature adopted by the botanists of the American Association for the Advancement of Science, at the Madison meeting in 1893, where it is thus stated:

In determining the name of a genus or species to which two or more names have been given by an author in the same volume or on the same page of a volume, precedence shall decide.

More recently it has been proposed by some botanists, as had previously been done by some zoologists, to fix the type species of every genus originally published with more than one species, by selecting for this the species which stands first on the page at the place of publication, and it has been contended that this is a logical outcome of the principle, thus giving it a widely different application from that contemplated in the rule cited above, by making it apply not to the determination of equivalent names for the same thing but to non-equivalent names for different things, a wholly different proposition. Inasmuch as a great many genera have at their first publication been made to include more than one species, and in a large number of instances some of these, often the first in position, have been used by subsequent authors as the types of additional genera, this latter-day proposition affects an enormously greater number of cases than those which fall properly under the operation of the rule.

It is, therefore, clear that there is nothing logical in the proposed extension of the principle. This would, of course, operate as an artificial short-cut in determining generic types, except in the cases where the first species named is not definitely understood, but in many instances it would lose the historic type

altogether, and in others it would render useless for nomenclatural purposes much original investigation through which genera have been definitely established. Unless rigidly restricted in such a way as to avoid these defects it would be impracticable and undesirable.

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CLAYTON'S ECLIPSE CYCLONE AND THE DIURNAL CYCLONES.

MR. H. H. CLAYTON, of the Blue Hill Meteorological Observatory, Mass., has published an account of his discussion of certain meteorological observations made during the eclipse of May 28, 1900, in the *Proceedings of the American Academy of Arts and Sciences*, Vol. XXXVI, No. 16, January, 1901; and the full report in Vol. XLIII, Part 1, of the *Ann. Har. Coll. Obs'y*, 1901. Mr. R. DeC. Ward reviews these papers in *SCIENCE* of March 1, 1901, and says, "Clayton has gone far ahead of all previous investigations of the phenomena of eclipse meteorology. The low temperature, the circulation of winds and the form of the pressure curve all proclaim the development by the eclipse of a cold-air cyclone, as described by Ferrel; * * * The fall of temperature due to the occurrence of night must also produce, or tend to produce, a cold-air cyclone. Since the heat of day produces, or tends to produce, a warm-air cyclone; * * * These causes must, in the opinion of the author, produce entirely, or in part, the well-known double diurnal period in air pressure; * * * His explanation of the diurnal variation of the barometer seems to have in it many evidences of being the best yet offered to account for this puzzling phenomenon."

I suspect that Mr. Clayton and Mr. Ward have an incorrect conception of Ferrel's cold-center cyclone, or else they could hardly have written about it the remarks contained in these papers. The subject is rather complex, but I hope, very briefly, to indicate the leading discrepancies for the benefit of others who think that the problem of the diurnal variation of the barometer can be solved along these lines.

1. *Some Minor Errors.*—Clayton's Formula, page 8, $\tan \theta = \frac{\Sigma (\sin o) v}{\Sigma (\cos o) v}$ should be written

$\tan \theta = \frac{\Sigma v \cdot \sin o}{\Sigma v \cdot \cos o}$, where o is the azimuth of the observed wind, and θ that of the mean or prevailing wind; but this function between θ and o is incomplete and it often gives an incorrect result. In the diagram the wrong diagonal is drawn, and this introduces confusion into the exposition of the formulæ for determining C , used in $\theta^1 = \theta \pm 180 \pm C$, where θ^1 is the azimuth of the eclipse wind which is required. As the eclipse wind for Washington, Ga., Wadesboro, N. C., and Blue Hill were computed by these formulæ, the results must be imperfect. The observations were themselves not very satisfactory, as is inferred from the account of them.

2. *The Cold-Center Cyclone.*—Ferrel's account of the cold-center cyclone is found in the Report of the U. S. Coast Survey, 1877, Appendix No. 20, page 187; in the Report of the Chief Signal Officer, 1885, Appendix 71, page 257; and in other places. Also there are some general remarks on the subject in the International Cloud Report, 1898-99, page 615. The accompanying diagrams show the circulation in the warm-center and cold-center cyclones, respectively, and the distributions of pressure characteristic of them; these must serve for further explanations in this place. In order that there may be no doubt about Ferrel's idea of the cold-center cyclone, I quote from the Report of the Chief Signal Officer, page 257, "The gyrations at the earth's surface must be in the same direction as in the case of ordinary cyclones; * * * The interchanging motion is from the center below and toward it above." Report of Coast Survey, page 188, "The maximum barometric pressure is where the gyrations are reversed; * * * The pressure is a minimum at the center and a maximum at the edge" of the cold-center cyclone, at all altitudes, meaning by edge the locus where the gyrations reverse direction.

Ferrel illustrates the cold-center cyclone in these two reports, also in his popular treatise on the winds, pages 246-247, 337-342, by comparing it with the general circulation over a hemisphere of the earth, where the poles are cold and the tropics warm, and states that the circulation is the same in each. That is, the air descends at the pole, flows south and east