It is to be remembered that the secretions of *Orya barbarica* are acid, thus in this case excluding the explanation of Radziszewski.

WILLIAM HALLOCK.

MATHEMATICS.

*The Principles of Differentiation in Space-Analysis.** By A. MACFARLANE, D. Sc., LL. D.

According to Hamilton the differentiation of a function of a quaternion presents novel difficulties due to the non-commutative character of a product of quaternions. There is in general no derived function, and it is necessary to define the differential in a new manner. Under certain conditions there is an analogue to Taylor's Theorem, but it is very complex, and no use is made of it. Hamilton does not differentiate the general transcendental functions, but only these functions restricted to a constant plane.

The author shows that these anomalies are true of products of vectors, but not of functions of versors. In versor analysis there is a derived function, satisfying a generalized form of Lagrange's definition; and Taylor's Theorem takes on a form similar to that in ordinary analysis, only the order of the two quantities must be preserved. Let x and h denote two versors, then

$$f(x+h)=f(x)+f'(x)h+\tfrac{1}{2}f''(x)h^2+, \text{ etc.},$$

provided the order of the x and h be preserved throughout.

The author finds the derived functions of various transcendental functions in space. He also shows that there are two essentially different meanings of $\sqrt{-1}$; one, when made definite, means a quadrant of rotation round a specified axis; while the other has no reference to direction, but distinguishes the area of a hyperbolic angle from the area of a circular angle. He also remarks that the theory of functions must be imperfect, because it is based upon a complex number which is restricted to one plane; no account is taken of the two essentially different meanings of $\sqrt{-1}$, and the idea of the versor is not distinguished from that of the vector.

* A paper read before the meeting of the American Mathematical Society, January 26, 1895. (Abstract.)

METEOROLOGY.

Neudrucke von Schriften und Karten ueber Meteorologie und Erdmagnetismus.

Dr. G. Hellmann, of Berlin, has undertaken the republication of certain old and rare writings relating to meteorology and terrestrial magnetism which have an important bearing on the history and development of these sciences. Very rare or typographically interesting works are printed in facsimile. Each reprint is preceded by an introduction, containing a general description of the book and its author. Although facsimile publications generally are so dear that only connoisseurs are able to buy them, yet, owing to the aid of the German Meteorological Society and its Berlin branch, the reprints are offered at a relatively low price by A. Asher & Co., Berlin. A few copies may also be had of A. L. Rotch, Blue Hill Observatory, Readville, Mass., at the publishers' prices. Each year one or two of the reprints will be issued, but the whole number will not exceed twelve. The following have already appeared:

No. 1. *Wetterbuechlein von wahrer Erkenntniss des Wetters.* REYNMAN, 1510. 41 pages introduction and 14 pages facsimile. Price 6 M. = $1.50.

This is the oldest printed meteorological work in the German language and was very popular, having 34 editions in seventeen years. Nevertheless, it is now so scarce that hardly thirty-six copies can be found.

No. 2. *Récit de la Grande Expérience de l'Equilibre des Liqueurs.* BLAISE PASCAL. Paris. 1648. 10 pages introduction and 20 pages facsimile. Price 3 M. = 75 cents.

This little work is of the greatest impor-