

to attack with success the subject of modern analytical geometry. Mr. Dupuis looks at a triangle not as "the three-cornered portion of the plane inclosed within its sides, but the combination of the three points and three lines forming what are usually termed its vertices and its sides and sides produced." His object is to lead up to the idea of a figure as a locus, with a view to preparing the way for the study of Cartesian geometry. Here the necessity for a careful distinction between congruence and equality arises. He introduces freely the principle of motion in the transformation of geometric figures, and devotes some space to the principle of continuity. Further, he connects geometry with algebraic forms and symbols, "(1) by an elementary study of the modes of representing geometric ideas in the symbols of algebra, and (2) by determining the consequent geometric interpretation which is to be given to each interpretable algebraic form." The subject of proportion is treated on the method of *measures*, and the term *tensor* is freely used. The first part (pp. 1-90) traverses the point, line, parallels, the triangle and circle. The second part (pp. 91-146) considers the measurement of lengths and areas: each part closes with a section devoted to illustrative matter drawn from constructive geometry. The third part (pp. 147-177) consists of two sections—the first on proportion amongst line-segments, and the second on functions of angles and their applications in geometry. Some instruments are described, as the proportional compasses, the sector, the pantagraph, and the diagonal scale. In the fourth part (pp. 178-251) there are seven sections, which are taken up with such matters as the centre of mean position, inversion and inverse figures, pole and polar, radical axis, and centres and axes of perspective. The closing part (pp. 252-290) introduces the student to harmonic and anharmonic properties, polar reciprocals and reciprocation, and to homography and involution. The author discusses all these points in a lucid style, and illustrates them with full store of carefully selected solutions: in addition there are a great number of unworked exercises in all the subjects. These good results are the outcome of many years' teaching of geometry to the junior classes in the University of Queen's College, Kingston, Canada. The book is closed with a full index, and clearly drawn figures accompany the text.

A Vertebrate Fauna of the Outer Hebrides. By J. A. Harvie-Brown, F.R.S.E., F.Z.S., and T. E. Buckley, B.A., F.Z.S. (Edinburgh: David Douglas, 1889).

THIS is a sister volume to "A Fauna of Sutherland, Caithness, and West Cromarty," which was published by the same authors in 1887, and reviewed in NATURE at that time. It may be remembered that in the preface to this work, the authors expressed their intention of following it up with others, dealing in a similarly exhaustive manner with the vertebrate faunas of other parts of Great Britain. We are glad to receive at so early a date so substantial a fulfilment of this intention; for we cannot give higher praise to "A Fauna of the Outer Hebrides" than by saying that it is in all respects worthy of its predecessor. Moreover, when we have regard to the immense amount of labour which the production of these volumes must have involved, we cannot refrain from congratulating the authors on the rapidity with which their works have followed one another. This second member of the series runs to over 250 pages, and, like the first member, is embellished by a few beautifully executed drawings of landscape scenery. Like the first member, also, it gives an exhaustive account of all the Vertebrata which occur within the area specified, together with several introductory chapters dealing with the topography of the district, and the relation (palæontological and otherwise) of its fauna to that of the rest of Great Britain. As the value of such a work consists mainly in the number and the accuracy of its details, little need be said of it in a review, save in

general terms. And, as we have already indicated, the painstaking labour which has been bestowed upon this Fauna appears to us to leave nothing that can be desired in the way either of addition or subtraction. We heartily recommend both these Faunas to all systematic zoologists, and sincerely hope that their authors may be able to continue their researches through other areas of Great Britain. G. J. R.

Dictionary of Photography. By E. J. Wall. (London: Hazell, Watson, and Viney, Limited, 1889.)

THIS work is practically a complete encyclopædia of photography, and will form a very useful addition to photographic literature. It is written throughout in plain and straightforward language, each heading being thoroughly treated. The subject-matter under the heading of "Lens" is accompanied by excellent illustrations of the various forms of lenses, showing by shaded lines the different combinations of crown and flint glass. Developing, printing, &c., receive their full share in the work, and under "toning" no less than twenty-nine different baths are discussed. At the end there is a collection of miscellaneous tables that have not been inserted in the dictionary part of the book, such as sizes of French and Italian dry plates, a list of dry plates and sensitometer numbers, solubilities, freezing mixtures, &c.

For photographers in general this work ought to prove most useful. It will make it unnecessary for them to refer to other works for a hint or remedy, or anything else that may be wanted at a moment's notice.

LETTERS TO THE EDITOR.

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Upper Wind Currents over the Equator in the Atlantic Ocean.

IN January last I addressed you a letter from the Straits of Magellan, with an account of the upper wind currents observed over the equator during a voyage to South America in the month of December. Then I described how the north-east and south-east trades both turned into a common light surface easterly current along the line of the doldrums; how low clouds from south-east drove over the north-east trade up to 15° N.; how the highest clouds moved from south-west, north of the equator; and how, from 300 miles south of the line, a very high current from north-west prevailed over the south-east trade. No high observations were obtained in that belt of 300 miles, nor were any middle-level clouds seen over the south-east trade.

Now, I have just crossed the same route in the month of May, under a somewhat different wind system. The north-east trade turned to north as it approached the doldrums, instead of towards the east, as in the previous voyage. In the calm belt, it met a light easterly current, without much conflict in the way of rain; while further south the regular south-east trade was experienced as far as 8° S., when the north-east monsoon of the Brazilian coast prevailed nearly down to Rio Janeiro.

No signs of south-east wind could be discovered at any level over the north-east trade, which wind, on the other side, blew at low or middle levels over the south-east trade, till surface, low, and middle currents combined to form the Brazilian monsoon.

Very few observations were obtained of the highest clouds, but in 6° S. a high north-west prevailed; from 2° S. to the equator, both the middle and highest clouds came from the east; and nothing more could be determined till a high south-west current was found over the north-east trade, in 7° N. latitude.

These results confirm in a most striking manner the discovery which I have announced from time to time in your columns, and which was most conclusively proved by the labours of the