

COSMOGONY AND EVOLUTION.

Entstehen und Vergehen der Welt als Kosmischer Kreisprozess. Auf Grund des pyknotischen Substanzbegriffes. Zweite und erweiterte Auflage. Von. J. G. Vogt. Pp. viii+1005. (Leipzig: Ernst Wiest, 1901.)

A REVIEWER can scarcely be expected to read the whole of the thousand and odd pages which Herr Vogt has required to express his views on the origin and decay of the world. As one looks down the table of contents, he feels that it would require a mathematician, a chemist, a physicist, a biologist rolled into one to do justice to the many various subjects which here come under notice, and if oppressed with this view he begins with the "methodologische" introduction and struggles with the adjectives, "fearfully and wonderfully made," he may be tempted to turn for a little relaxation to the "explanatory illustrations" scattered through the text. One of these (p. 260) is to explain the genesis of the solar system. The author gives some account of the cosmogony of Kant and Laplace, and recalls some of the objections which have been urged against these views. He is particularly severe on the insufficient explanation offered for the density of the planets closest to the sun. Saturn, he states, retired from the ring-making process when the mass of the ring was $1/118$ of its own mass; while in the case of Mercury the sun continued to produce a ring the mass of which is only $1/4,316,550$. The evident distaste of Saturn to form rings of smaller mass leads the author to abandon the ring hypothesis altogether and to offer an alternative theory. He conceives spheres of operation (Wirkungssphäre) and Deformierungssysteme (not so easily translated). But if we will imagine three circles, the centres of which form an equilateral triangle and each of the circles touches two others, the circles will form "Deformierungssysteme," while the enclosed triangular space bounded by the three circles is a "field of operation." Now in the small space near the points of contact we get the smaller planets formed, Mercury and the earth on one side and Mars and Venus on the other, each planet touching two circles and the next larger planet. Jupiter in this way has room for his giant bulk, pushing Saturn a little on one side, but otherwise is not inconveniently crowded. Of course, the whole merit of such a cosmogony depends upon the "Deformierungssysteme," and for the manner of working these the reader must be referred to the book itself. The second diagram (p. 949) is to illustrate the precession of the equinoxes. Here one would say there is no room for imagination; we have to do with a problem in rigid dynamics which is susceptible of but one explanation. But if any one thinks this, he has not reckoned with Herr Vogt, who, as a man of ideas, begins at the beginning. Before attempting to explain the cause of any modification in the position of the polar axis it is necessary, he tells us, to understand the laws which determine the constant position of that axis. These laws he proceeds to unfold on "phoronomische" principles, and in his endeavour to follow the author in these same principles the student will be not a little startled to find it necessary to project the plane of the Milky Way on a diagram to explain precession. But he will probably not read beyond the following sentence:—

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"The North Pole describes a circle on the sky in about 26,000 years. We can call this circle the projection circle of the absolute orbit of the earth, therefore indirectly the solar orbit, and denote these 26,000 years as the period of the sun in its orbit."

After this one is not surprised to learn that the sun will have a more or less intensive effect on the tension of the æther according to its position in this orbit, and thus to be led to a satisfactory explanation of the phenomenon of the Ice Age.

Herr Vogt is to be congratulated on having found a publisher willing to express these views in a book of handsome appearance, and when one learns that an earlier edition has long been exhausted he is tempted to doubt whether German education is of the elevated character that is sometimes represented. W. E. P.

OUR BOOK SHELF.

The Geological History of the Rivers of East Yorkshire. By F. R. Cowper Reed, M.A., F.G.S. Pp. vi+103. (London: C. J. Clay and Sons, 1901.) Price 4s. net.

SINCE Jukes, some forty years ago, explained how rivers cut through escarpments, the origin of their valleys has been well understood in a general way. Much, however, remained to be learnt about the development of particular rivers and the changes which have brought about present drainage areas; and these subjects have been so attentively and successfully studied by American geologists, notably by Prof. W. M. Davis, that their methods of interpretation have been followed by several observers in this country. The present work by Mr. Cowper Reed gained the Sedgwick Prize Essay for 1890, and is a capital exposition of the evolution of the rivers in East Yorkshire. After giving a general account of the various formations, he points out that the original "constructional surface" on which the present river system was initiated, was a plain formed by the Chalk and other Upper Cretaceous strata, and was upraised in early Tertiary times and perhaps partially eroded during the uplift. Having a greater elevation in the west, the direct ancestors of the present rivers took rise from the higher grounds and flowed eastwards, the Tees and Esk forming one river, the Swale and Ure flowing also direct to the coast, which formerly extended much further eastward, and the Nidd, Wharfe and Aire uniting and flowing out by the Humber. A long period of subærial denudation followed the initiation of these consequent streams, there was a gradual lowering of the area, and there arose the subsequent river Ouse, which captured the Swale and Ure, the Nidd and Wharfe, conducting their waters into the Humber drainage. Towards the close of the Oligocene period, when the area had been nearly reduced to base-level by the formation of an extensive peneplain and the rivers had attained old age, there was considerable upheaval, accompanied by further movements along pre-Cretaceous lines of flexure, especially in the Moorland range of the Jurassic region. The rivers thereby regained youth and activity, their directions were locally modified, and thus were produced some of the main features in the present topography. Further changes, however, led to other modifications; there was depression towards the close of the Pliocene period, and subsequent elevation in Glacial times. With regard to the Boulder Clay the author judiciously remarks that "the land-ice theory appears to offer fewer difficulties than any others and to explain matters more satisfactorily." In any case large tracts, excepting some of the higher grounds, were buried beneath drift deposits, and the valleys were choked up. When the land had lost its icy mantle, some