tributaries from what are now Northern Scotland and Scandinavia, debouching somewhere off the north-east coast of England, the deltaic material of which (now consolidated) forms the Millstone Grit.

II.—Geologists' Association.

June 6, 1919.—Mr. J. F. N. Green, B.A., F.G.S., President, in the Chair.

The following paper was read: "Old Age and Extinction in Fossils." By W. D. Lang, Sc.D., F.G.S.

I. A Biological view-point.

The phenomena of old age and extinction must affect our general biological views; and these, in turn, are reflected in our attitude towards these phenomena. Vitalistic (or automatic) and mechanistic (or environmental) views are contrasted, and emphasis laid on the former. An organism has tendencies, or potentialities, towards developing in definite and not in haphazard directions; and these tendencies become actualized during evolution. They are kept in check by inhibiting factors, and on the removal of an inhibition there is an outburst of evolutionary activity; thus evolution is seen to be periodic. Potentialities tend to become exhausted on actualization; but, before this happens, may lead to the exaggeration of a character which, in turn, may cause the extinction of a lineage. Homœomorphy is the expression of common tendencies or potentialities becoming actual along many divergent lineages.

II. This view reflected on to the phenomena of old age and extinction in (*a*) Cretaceous cribrimorph Polyzoa; (*b*) Ammonites; and (*c*) Rugose Corals.

III. The consequences of this view.

A view which ignores, or at least slights, environmental influences is likely to overlook the truth in one direction as far as (so the author believes) a purely environmental or mechanistic view, such as orthodox Darwinism, overlooks it on the other side. As an organism is a synthesis of structure and function, so its structure is a synthesis of expression and impression — expression of potentialities and impression of the environment. A synthesis is not an aggregate, for it transcends the sum of its components. A transcendental theory of evolution would link the field of philosophical biology to the realm of general philosophy.

CORRESPONDENCE.

RECENT PAPERS ON THE DURHAM COALFIELD.

Sir,—In the Geological Magazine of April last (p. 163) I observed a paper by Dr. D. Woolacott relating to the above Coalfield, where he writes of "the little-known Ganister Series" of that district, and I wondered what might be the precise meaning he wished to convey by those words. Three or four coal-seams belonging to that Series (i.e. below the Brockwell Seam) have been vigorously worked for the past thirty years or more. The measures

have been sunk through and bored, perhaps in a hundred places, whilst scores of mining engineers, inspectors, colliery managers (whose success depends largely on their detailed knowledge of the strata of their mines) are and have been engaged in the exploitation of these seams, and we may presume that the sequence must be fairly well known lithologically. And so far as one can gather from his paper, it is solely upon lithological evidence Dr. Woolacott bases his conclusion that the boreholes he describes were in the Ganister Series. The generic names of the fossil plants he gives are quite useless in Coal-measure stratigraphy, and his quaint note that "no trace of any *characteristic fossil* [italics are mine] such as *Aviculopecten papyraceus* was found" leads one to infer that he has not followed recent palæontological work in the Coal-measures, or he would not place so much reliance for zoning purposes on the discovery of *Pterinopecten papyraceus*. It is to be hoped that Dr. Woolacott is in possession of other evidence of higher diagnostic value to warrant his opinion of the horizon reached by the boreholes. A perusal of this paper has suggested a fair reason for the disinclination of some mining people to seek the assistance of the geologists.

In the May issue of the GEOLOGICAL MAGAZINE (pp. 203–211) Drs. Trechmann and Woolacott were constrained "to put definitely on record" the fact of the occurrence of the zone of *Anthracomya phillipsi* in the Coal-measures of Durham. They omitted to mention that this had already been done in the following papers, viz. GEOL. MAG., 1905, pp. 536–7, and Trans. Inst. Min. Engineers, vol. XXX, pp. 453–4, 1906, where the stratigraphical significance of the discovery was clearly stated.

J. T. STOBBS.

STOKE-ON-TRENT.
May 21, 1919.

PRODUCTUS HUMEROSUS IN DOVE DALE.

SIR,—I had the good fortune recently to meet with two specimens of *Productus humerosus* (*P. sublævis*) in Dove Dale (Derbyshire). This discovery seems worthy of record in point of view of the fact that hitherto the species has only been recorded for the Midland area from Caldon Low (Staffs). The Dove Dale examples occurred in a loose limestone block on the screes immediately below Reynard's Cave. In general form the specimens are strongly convex, narrow, and smooth, resembling the narrow form from Caldon Low described in this Magazine for February, 1919, p. 64. The matrix, however, is quite unlike that of the Caldon examples.

J. WILFRID JACKSON.

MANCHESTER MUSEUM.
May 22, 1919.

MOUSTERIAN FLAKE-IMPLEMENTS.

SIR,—I notice that in my letter published in the GEOLOGICAL MAGAZINE for May, p. 240, I am made to speak of "the earlier Palæolithic 'cave' implements", and of "a normal Chellean or