

tuffs, and silky schists with sheets of olivine-diabase and andesite, and intrusive quartz-porphyrines.¹⁶ It is this volcanic group which Dr. Hicks has proposed to class as a pre-Cambrian formation under the name of "Pebidian." In Carnarvonshire the Llanberis Slates, which form the lowest member of the Cambrian sedimentary series, are interleaved at their base with bands of volcanic tuffs and rest upon a mass of quartz-felsite which is the lowest rock visible in the district.¹⁷

The *Olenellus*-zone which is the characteristic feature of the lower Cambrian group has not yet been certainly established in Wales.¹⁸ It was first detected in the British Isles by Prof. Lapworth, who in 1885 found fragments of *Olenellus* on the flanks of Caer Caradoc in Shropshire, associated with *Kutorgina cingulata*, *Linnarssonina sagittalis*, *Hyolithellus* and *Ellipsocephalus*.¹⁹ It has been found by the officers of the Geological Survey in the west of Ross-shire, where the following lower Cambrian strata may be traced in a narrow strip of country for a distance of more than 100 miles:²⁰

Base of Durness limestones with *Salterella*.

Band of quartzite and grit (Serpulite grit) with abundant *Salterella Maccullochii* and occasionally thin shales with *Olenellus*.

Calcareous and dolomitic shales ("Fucoid beds") with numerous worm-casts usually flattened and resembling fucoidal impressions. *Olenellus* occurs in bands of dark blue shale.

Quartzites, in two divisions, the upper crowded with worm-burrows, the lower becoming pebbly at the base and resting unconformably on pre-Cambrian rocks (Torridonian or Lewisian).

MIDDLE.—This group appears to be most fully developed in South Wales, where it was first studied by Dr. Hicks,

contains figures and descriptions of this the oldest known distinct assemblage of organisms, and gives a bibliography of the subject up to the year of publication. Some of the other more important memoirs will be cited in subsequent pages.

¹⁶ Quart. Journ. Geol. Soc. xxxix. 1883, p. 294, C. Lloyd Morgan, op. cit. xlvii. 1890, p. 241.

¹⁷ Op. cit. xlvii. 1891. Presidential Address, p. 90, and authorities there cited.

¹⁸ Dr. Hicks believes that it exists there, Geol. Mag. 1892, p. 21.

¹⁹ Lapworth, Geol. Mag. 1888, p. 484; 1891, p. 529.

²⁰ Brit. Assoc. Rep. 1891, p. 633. Peach and Horne, Quart. Journ. Geol. Soc. xlviii. 1892, p. 227.