

A. *Archæan and Pre-Cambrian Rocks*.—The great complex of gneiss and crystalline schists which forms the basement of the oldest fossiliferous sedimentary rocks, and had always since Werner's time been divided according to lithological characters, was imbued with new interest when, in 1854, William Logan reported the presence of organic remains in limestone interbedded with the ancient gneiss of Canada. The *Eozoon Canadense* was regarded by Sir J. W. Dawson and W. B. Carpenter as a foraminiferal genus, and the supposed complex of Archæan schists and gneiss was accordingly placed in the series of sedimentary formations. Logan (1863) differentiated in Canada an older Laurentian gneiss formation and a younger Huronian formation resting upon it, and chiefly composed of mica schist and phyllite. Gümbel proposed a similar sub-division of the basement rocks in the area of the "Bavarian Forest." These divisions have not, however, been verified by subsequent researches; in some parts of North America it has been demonstrated that the Laurentian granitoid and gneissose masses are continuous with dykes and veins in the schists and phyllites, and these intrusions must be younger than the Huronian series into which they have forced their way.

The organic nature of the "Eozoon" was afterwards discredited by King, Rowney, and Moebius (cf. p. 386), but the adherents of the theory of descent argued the strong probability of the occurrence of organic remains in these ancient pre-Cambrian rocks. And now and again other evidences of organic life are found in the ancient schists and phyllites, *e.g.*, worm-burrows, sponge spicules, and traces of Algæ or Protozoa. Geologists have succeeded in areas where there has been a relatively small degree of metamorphism in determining a general chronological succession in the Archæan rocks. But in countries of repeated crust-disturbances and great regional metamorphism, the task is much more difficult and complicated, although it has frequently been attempted. Hicks (1877) distinguished in Wales and Scotland four divisions, *Lewisian*, *Dimetian*, *Arvonian*, and *Pebidian*; A. Nathorst, in Sweden, differentiated three formations, a Lower *Dal* formation, a Middle *Almesakra* formation, and an Upper *Wisingsö* formation.

In the year 1892, Van Hise published an exhaustive account of the pre-Cambrian formation in North America,