

tigations in Berkshire, Mass., Vermont, eastern New York, and western Connecticut, aiming to prove the continuity of the rocks of the belt so as to use the Vermont fossils to prove their age, began in 1871, and were continued at intervals to 1887. The last four seasons were employed in obtaining data for a geological map of a large part of the region.

For papers by Dale, Dwight, Walcott, and the author, and an account of Wing's discoveries, see the *American Journal* for the years mentioned; and for a brief history of Taconic ideas, vol. xxxvi., 1888. The more important of the species of fossils discovered by Wing and identified by Billings, and their varieties, are mentioned beyond, on page 517.

The *Upper Taconic* of Emmons, as shown by the fossils at Reynold's Inn, north-east of Bald Mountain, Washington County, N.Y., is Lower Cambrian; and that of Georgia, Vt., another locality, is the same.

Quebec group in Canada.—The Quebec group of Logan (1861–63), established on rocks occurring near Quebec, at Point Levis, and to the south, included (1868): (1) the *Levis* beds, which were fossiliferous; (2) the *Lauzon* beds, green and purple shales, affording *Lingula* and *Obolella*; and (3) the *Sillery* sandstone, consisting of sandstones and shales. They were regarded by Logan and Billings as mostly of the age of the *Calciferous* and *Chazy* groups. The recent investigations of Selwyn (1877, 1882, and later), and the confirmatory studies of R. W. Ells (1889), have proved that the fossiliferous beds include rocks from the Hudson epoch to the Cambrian; that the *Levis* is *Calciferous* in its lower parts; that the *Sillery* is probably all Cambrian. (Selwyn, *Rep. G. Can.* for 1880, 1881, 1882; Ells, *ib.* for 1889; also Walcott, *Am. Jour. Sc.*, Feb., 1890; also on the *Graptolites*, Lapworth, *Trans. R. Soc. Can.*, 1886.) The Quebec group is for the most part a northern portion of the Taconic series.

In Newfoundland the Quebec series, consisting of limestones and sandstones, is described by Logan and Murray as occurring on the northwest and west coast of Newfoundland, along the Straits of Belle Isle, and to the south. It includes the *Calciferous*, *Cambrian*, and other beds overlying the *Archæan*. The thickness given for the Newfoundland-Quebec group is 4600'. For the original account of the Quebec group, see Logan's *Report on the Geology of Canada*, 1863, pages 225 and 844.

LIFE.

Of the terrestrial animal life of the Lower Silurian era nothing is yet known from American rocks; but Insects are already reported from those of Europe. The aquatic animals comprised, besides many new species of the several grand divisions represented in the Cambrian, other kinds showing progress; and among these, the earliest of Vertebrates—FISHES, as recently announced by C. D. Walcott; the first known of Barnacles, a group still common along all seashores, and the first of the Eurypterids, a tribe somewhat resembling Crustaceans, but having their only modern representatives in four species of *Limulus*.

1. CANADIAN PERIOD.

1. *Calciferous* Epoch.

In the rocks of the *Calciferous* epoch fossils are usually few, although the limestones have great thickness. Since such limestones are made mainly out of calcareous animal relics, the absence of fossils means that the triturating waters obliterated them by reducing them to the calcareous mud which became the limestone. At some localities fossils are abundant, and there is