

CARBONIC ERA.

SYNONYMY. — Carboniferous and Permian periods, Lyell (*Elements of Geol.*, 1839), and other British geologists, German geologists, and D'Orbigny, 1851, in France. Carboniferous age (Permian included), Dana, *Man. Geol.*, 1st edit., 1863, 2d edit., 1874, 3d edit., 1880; Le Conte, *Elements of Geol.*, 1877, and later; A. Winchell, *Geol. Studies*, 1886. Permo-Carboniferous, Dawson, *Suppl. Acad. Geol.*, 1878. Carboniferous, Permo-Carboniferous, W. M. Fontaine and I. C. White, on *Permian Plants of W. Va. and Penn.*, 1880. Permo-Carbonifère, Lapparent, *Tr. de Géol.*, 1883. Permo-Carbonic, Portuguese Committee Internat. Congr. Geol., 1886. Carbonic (Permian or Permian included), E. Renevier, *Tableau des Terrains Sedimentaires*, 1874, *Int. Congr. Geol.*, 1886.

This first great coal-making era in the world's history commenced, both in Europe and America, with an extensive submergence of the land and a consequent formation of marine terranes of great thickness over parts of the continental areas. It passed its culmination during a long period of gentle oscillations in the surface, causing successive, more or less wide, emergencies and submergencies, the former favoring the growth of boundless forests and jungles, the latter burying the vegetable debris and other terrestrial accumulations beneath marine or fresh-water deposits. It declined through a period in which the Carboniferous marshes gradually disappeared, as the sea regained its place over the land; but again to retreat, as Paleozoic time ended, and the making of the Appalachian Mountains — the next great event in North American history — was commenced.

The occurrence in Europe of alternating conditions like those of eastern North America is part of the evidence that the coal formations of the two continents were essentially cotemporaneous in origin. Facts from the fossils sustain this conclusion. They lead to the following subdivisions of the era: —

SUBDIVISIONS OF THE CARBONIC ERA.

3. PERMIAN PERIOD. — Part of New Red Sandstone or Poikilitic group of J. Phillips (the rest Trias).
Lower New Red Sandstone or Magnesian limestone group, Lyell, *El. Geol.*, 2d edit., 1841.
PERMIAN, Murchison, *Leont. u. Bronn's Jahrb.*, 1841, *Phil. Mag.*, xix. 417; Murchison, de Verneuil, and Keyserling, *Geol. Russ.*, 1845; Lyell, *El. Geol.*, 3d edit., 1851. Permian System, Geinitz, 1848, 1858.
Part of Mercian (the rest Triassic and Jurassic), T. McK. Hughes, *Proc. Cambr. Phil. Soc.*, iii. 24.
Dyas, J. Marcou, *Dyas et Trias, Genève*, 1859, H. B. Geinitz, 1861, 1862 (Murchison's Permian having been made by him to include a small part of the Trias in Germany, though not of that in England).
2. CARBONIFEROUS PERIOD. — The Coal-measures, with the underlying Millstone Grit.
Carboniferous period of Lyell, Murchison, and other English geologists (the Mountain limestone commonly included).