

2. Upper or Ottweiler beds, from 6500 to 11,700 feet thick, consisting of red sandstones at the top, and of sandstones and shales, containing 20 feet of coal in various seams. *Pecopteris arborescens*, *Odontopteris obtusa*, *Anthracosia*, *Estheria*, *Leaia*; fish-remains.
1. Lower or main coal-bearing (Saarbrücken) beds, 5200 to 9000 feet thick, with 82 workable and 142 unworkable coal-seams, or in all between 350 and 400 feet of coal. Abundant plants of the middle and lower zone of the upper coal flora.

The Franco-Belgian Coal-field is prolonged across the Rhine into Westphalia. The Carboniferous Limestone here dwindles down as a calcareous formation, and assumes the "Culm" phase, passing up into the "flotzleerer Sandstein" or Millstone Grit—a group of sandstones, shales, and pebbly beds some 3000 feet thick, but without coal-seams. These barren measures are succeeded by the true Coal-measures about 10,000 feet thick, with 90 workable seams of coal, having a united thickness of more than 250 feet.

Southern Germany, Bohemia.—Carboniferous rocks occur in many scattered areas across Germany southward to the Alps and eastward into Silesia, including representatives both of the lower or Culm phase and of the Coal-measures. The Culm rocks reappear in the Harz, where they are traversed by metalliferous veins and inclose small patches of Coal-measures. The same structure extends into Thuringia, the Fichtelgebirge, Saxony, and Bohemia, the Culm yielding Carboniferous Limestone fossils, as well as *Lepidodendron*, etc., and containing sometimes, as in Saxony, workable coals. This union of fossils characterizes the series of shales, sandstones, graywackes, and conglomerates which forms the German Culm. The abundant fauna of the Carboniferous Limestone is reduced to a few mollusks (*Productus antiquus*, *P. latissimus*, *P. semireticulatus*, *Posidonomya Becheri*, *Goniatites sphæricus*, *Orthoceras striatulum*, etc.). The *Posidonomya* particularly characterizes certain dark shales known as "Posidonia schists." Of the plants, typical species are *Calamites transitionis*, *Lepidodendron veltheimianum*, *Stigmaria ficoides*, *Sphenopteris distans*, *Cyclopteris tenuifolia*. This flora bears a strong resemblance to