

In the Harz, according to the researches of F. Roemer<sup>142</sup> and K. A. Lössen,<sup>143</sup> the Devonian system, which is there largely developed, consists of (1) a lower group of quartzites, graywackes, flinty slates, clay-slates, and associated bands of diabase (Taunus quartzite, Hundsrück shales, etc.), resting upon the graptolitic Wieda shales and Tanne graywacke; (2) a middle group composed of (a) Calceola-beds (*Spirifer cultrijugatus*, *Calceola sandalina*) and (b) *Stringocephalus* limestone (consisting of a lower crinoidal band and a massive limestone); and (3) an upper group consisting of (a) *Cuboides*-beds, limestones and marls, (b) *Goniatite* shales, (c) *Cypridina* shales. The eastern part of the region consists mainly of graywackes and slates which, with their associated igneous rocks attaining a great thickness in the Wieda shales, contain a number of simple graptolites and in the limestones underneath yield abundant trilobites belonging to genera familiar in the Upper Silurian rocks (*Dalmanites*, *Cryphæus*, *Phacops*, *Bronteus*, *Acidaspis*).

Representatives of the Devonian system reappear with local petrographical modifications, but with a remarkable persistence of general palæontological characters, in Eastern Thuringia, Franconia, Saxony, Silesia, the north of Moravia, and East Galicia. Among the crumpled formations of the Styrian Alps, the evidence of organic remains has revealed the presence of Upper Devonian rocks with abundant *Clymenias*, Middle Devonian limestones with the characteristic *Stringocephalus* and numerous corals, and Lower limestones and slates with cephalopods and brachiopods.<sup>144</sup> Perhaps in other tracts of the Alps, as well as in the Carpathian range, similar shales, limestones, and dolomites, though as yet unfossiliferous, but containing ores of silver, lead, mercury, zinc, cobalt, and other metals, may be referable to the Devonian system.

To the west of central Europe the system has been recognized by its fossils in the Boulonnais, where its middle and upper members (Givetian, Frasnian, Famennian) are well exposed. In Normandy and Maine, sandstones (with *Orthis Monnieri*), are followed by limestones (with *Homalotus*, *Cryphæus*, *Phacops*, etc.); and by upper graywackes

<sup>142</sup> "Versteinerungen des Harzgebirges," 1843; "Rheinisch. Uebergangsgebirge," 1844.

<sup>143</sup> "Geologisch. Uebersichtskarte Harz," 1881.

<sup>144</sup> G. Stache, *Zeitsch. Deutsch. Geol. Ges.* 1884, p. 358; Frech, *op. cit.* 1887, p. 660, and authors there cited; 1891, p. 672.