

6. **Insects.** — *Dictyoneura anthracophila* Goldb., from Saarbrück; *D. Humboldtiana* Goldb., ib.; *Polioptenus elegans* Goldb., ib.; *Etoblattina primæva* Goldb., ib.; *Gryllacris lithanthraca* Goldb. (Locust), ib.; *Corydalis Brongniarti* Mant., Coalbrook Dale.

7. **Amphibians.** — The *Amphibians* included *Apateon pedestris* H. v. Meyer, Münsterappel; *Urocordylus Wandersfordii* Hux., Kilkenny, the tail with 75 vertebræ; *Ophiderpeton Brownriggii* Hux., Kilkenny, limbless, snake-like and 3' long; *Dolichosoma longissimum* Fritsch, from Ireland, probably about 3' long and much like the whip-snake; species of *Dendrophis*, and of other genera.

The following foreign Coal-measure Brachiopods occur also in the American beds: *Athyris subtilita*, *Spirifer lineatus* Martin, *Productus longispinus* Sow., *P. latissimus* Sow., *P. punctatus* Martin, *P. scabriculus* Martin, *P. costatus* Sow., *Orthotheses* (*Streptorhynchus*) *umbraculus* v. Buch, Devonian to Permian.

The Arctic Spitzbergen Coal-measure plants include species of *Lepidodendron*, *Stigmara*, *Sphenophyllum*, *Asterophyllites*, *Sphenopteris*, *Cordaites*; and the Subcarboniferous of Bear Island (30 m. south), the European species *Calamites radiatus*, *Lepidodendron Veltheimianum*, *Knorria imbricata*, *K. acicularis*, *Cyclostigma Kiltorkense*, *Palæopteris* (*Archæopteris*) *Ræmeriana*, *Sphenopteris Schimperii*, *Cardiopteris frondosa*, *C. polymorpha*, etc., made a basis by Heer for his *Ursa* stage, but supposed by Dawson to include some Devonian species. The beds of Spitzbergen contain the Permian species, *Productus horridus*, specimens twice the size of those of the European Permian, *P. Cancrini* Vern., *P. Leplayi* Vern., *Camarophoria Humbletonensis* Howse, *Strophalosia lamellosa* Gein.; Carboniferous species of *Euomphalus*, *Cyathophyllum*, *Syringopora*, *Chetetes*; and the Subcarboniferous includes a *Cyathophyllum* limestone in which there are 4 species of Corals, 2 of Crinoids, and *Spirifer incrassatus*, *Terebratula fusiformis*, and other Russian Brachiopods.

LIFE OF THE PERMIAN PERIOD.

PLANTS. — The Permian plants include no *Lepidodendroids*, a few *Sigillarids*; Ferns of the genera *Neuropteris*, *Sphenopteris*, *Pecopteris*, *Alethopteris*, *Tæniopteris*, *Sagenopteris*, *Glossopteris*, and others; also *Calamites*, *Annularia*, *Asterophyllites*; *Cycads* and *Conifers*. The Conifers included species of *Dadoxylon*, *Pinites*, *Ullmannia*, etc. The genus *Walchia*, Fig. 1147, *Walchia piniformis* Sternberg, characterized by lax and short spreading leaves, began near the close of the Carboniferous period, but is most numerous in species during the Permian. Tree-ferns of the genus *Psaronius* were common, as in the Upper Coal-measures.

Fig. 1144 is the pinnule or branchlet of a frond of *Neuropteris Loschii*, a species common to the Permian and Coal-measures; 1145, showing the venation. Fig. 1146, *Annularia carinata* Sternberg; in 1146, only the first joint and its whorl are shown, of natural size; in 1146 *a*, a branch is shown (of reduced size), consisting of its several joints and whorls, but the natural termination is wanting. The figures are from the work of Geinitz and Gutbier on the "Dyas" of Saxony.

The American Permian species that are common to the Permian formation of Europe, according to Fontaine and White, Pennsylvania Report (1880), are, for the several genera, as follows: *Equisetites rugosus*, *Calamites Suckovi*, *Sphenophyllum longifolium*, *Annularia carinata*, *A. longifolia*, *A. sphenophylloides*, *A. radiata*, *A. minuta*, *Neuropteris flexuosa*, *N. auriculata*, *N. cordata*, *Odontopteris obtusiloba*, *Callipteris conferta*; *Pecopteris ar-*