

formably over Lower Llandovery, Caradoc, Llandeilo, Cambrian, and pre-Cambrian rocks.

Among the fossils are some traces of fucoids: sponges (*Cliona*, a burrowing form like the modern *Cliona*); species of *Monograptus* (*M. Hisingeri*, *M. intermedius*, *M. crenularis*), *Rastrites* (*R. peregrinus*), *Diplograptus* (*D. Hughesi*), *Cephalograptus* (*C. cometa*); a number of corals (*Petraia*, *Heliolites*, *Favosites*, *Halysites*, *Syringopora*, etc.); a few crinoids and the earliest known sea-urchins (*Palæchinus*); the genus *Tentaculites* is particularly abundant; a number of trilobites, of which *Phacops Stokesii*, *P. Weaveri*, *Encrinurus punctatus*, *Calymene Blumenbachii*, *Proëtus Stokesii*, and *Illænus Thomsoni* are common; numerous brachiopods, as *Atrypa hemispherica*, *A. reticularis*, *Pentamerus oblongus*, *Stricklandinia lyrata*, *S. lens*, *Leptæna transversalis*, *Orthis calligramma*, *O. elegantula*, *O. reversa*, *Strophomena compressa*, *S. pecten*, and *Lingula parallela*; lamellibranchs of the mytiloid genera *Orthonota*, *Mytilus*, and *Modiolopsis*, with forms of *Pterinea*, *Ctenodonta*, and *Lyrodesma*; gasteropods, particularly the genera *Acroculia*, *Raphistoma*, *Murchisonia*, *Pleurotomaria*, *Cyclonema*, *Holopella*; heteropods, especially the species *Bellerophon dilatatus*, *B. trilobatus*, and *B. carinatus*; and cephalopods, chiefly *Orthocerata*, with some forms of *Actinoceras*, *Cyrtoceras*, *Tretoceras*, and *Phragmoceras*, and the old species *Lituites cornu-arietis*.

(c) *Tarannon Shale*.—Above the Upper Llandovery beds comes a very persistent band of fine, smooth, light gray or blue slates, which has been traced from the mouth of the Conway into Carmarthenshire. These strata, termed the "paste-rock" by Sedgwick, have an extreme thickness of 1000 to 1500 feet. Poor in organic remains, their chief interest lies in the fact that the persistence of so thick a band of rock between what were supposed to be continuous and conformable formations should have been unrecognized until it was proved by the detailed mapping of the Geological Survey. The occurrence of certain species of graptolites affords a palæontological basis for placing on this horizon a considerable mass of slaty and gritty strata in Cardiganshire, and for identifying these and the typical Tarannon Shales with their probable equivalents in the Lake District and in Scotland. The following graptolitic zones in ascending order have been determined in the Tarannon rocks: (1) *Rastrites maximus*, (2) *Monograptus exiguus*, (3) *Cyrtograptus Grayæ*. Other common species are *Monograptus*