

Whitfieldia (Meristella) tumida, Spirifer elevatus, S. plicatellus, Rhynchonella borealis (very common), R. cuneata, R. Wilsoni, Orthis elegantula, O. hybrida, Strophomena rhomboidalis, and Pentamerus galeatus. The lamellibranchs are abundant and are represented by species of Avicula, Pterinea, Cardiola, and Cucullella, with Grammysia cingulata, Orthonota amygdalina, and some species of Modiolopsis and Ctenodonta. The gasteropods are marked by species of Euomphalus, Murchisonia, Holopella, Acroculia, Cyclonema. The cephalopods are confined to five genera, Lituities, Actinoceras, Cyrtoceras, Orthoceras, and Phragmoceras; of these the orthoceratites are by far the most abundant both in species and individuals, Orthoceras annulatum being the most common form. The pteropods appear in the beautiful and abundant Conularia Sowerbyi, and the heteropods in the common and characteristic Bellerophon wenlockensis.

3. Ludlow Group.—This group consists essentially of shales, with occasionally a calcareous band in the middle. It graduates downward into the Wenlock group, so that when the Wenlock limestone disappears, the Wenlock and Ludlow shales form one continuous argillaceous formation, as they do where they stretch to the southwest through Brecon and Carmarthen. The Ludlow rocks, typically seen between Ludlow and Aymestry, appear likewise at the detached Silurian areas from Dudley to the mouth of the Severn. They were arranged by Murchison in three sub-groups—Lower Ludlow Rock, Aymestry Limestone, and Upper Ludlow Rock.

(a) *Lower Ludlow Rock*.—This sub-group consists of soft dark gray to pale greenish-brown or olive sandy shales, often with calcareous concretions. Much of the rock, however, presents so little fissile structure as to get the name of mudstone, weathering out into concretions which fall to angular fragments as the rock crumbles down. It becomes more sandy and flaggy toward the top. From the softness of the shales, this zone of rock has been extensively denuded, and the Wenlock limestone rises up boldly from under it. It attains a thickness of 750 feet at Malvern.

An abundant suite of fossils is contained in these shales. Eight species of star-fishes have been found, belonging to the genera Protaster (like the brittle-stars of the British seas), Palæodiscus, and Palæocoma. The graptolites which played so conspicuous a part in the marine fauna of Cambrian and Silurian time now appear for the last time. They