

spines, hooked like the beak of an eagle; some with spines of straighter and more slender form, and ribbed and furrowed longitudinally like columns; some were shielded by an armor of bony points; and some thickly covered with glistening scales. If many ages must have passed ere fishes appeared, there was assuredly no time required to elevate their lower into their higher families. Judging, too, from this ancient deposit, they seem to have been introduced, not by individuals and pairs, but by whole myriads.

“Forthwith the sounds and seas, each creek and bay,
 With fry innumerable swarmed; and shoals
 Of fish, that with their fins and shining scales
 Glide under the green wave in plumps and sculls,
 Banked the mid sea.”

The fish-bed of the Upper Ludlow Rock abounds more in osseous remains than an ancient burying-ground. The stratum, over wide areas, seems an almost continuous layer of matted bones, jaws, teeth, spines, scales, palatal plates, and shagreen-like prickles, all massed together, and converted into a substance of so deep and shining a jet color, that the bed, when “first discovered, conveyed the impression,” says Mr. Murchison, “that it enclosed a triturated heap of black beetles.” And such are the remains of what seem to have been the first existing vertebrata. Thus, ere our history begins, the existences of two great systems, the Cambrian and the Silurian, had passed into extinction, with the exception of what seem a few connecting links, exclusively molluscs, that are found in England to pass from the higher beds of the Ludlow rocks into the Lower or Tilestone beds of the Old Red Sandstone.*

* “Upwards of eight hundred extinct species of animals have been described as belonging to the earliest, or Protozoic and Silurian period.”