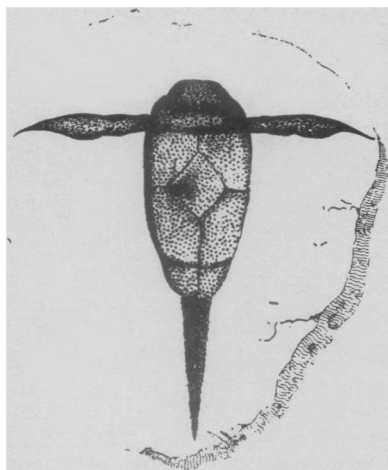


Classics of Science: Fossils in Old Red Sandstone



THIS ANCIENT FISH, described below in a quotation from *Old Red Sandstone*, is reproduced from one of the illustrations in that book

Description of *Pterichthys oblongus* Ag.

Of all the organisms of the system, one of the most extraordinary, and the one in which Lamarck would have most delighted, is the *Pterichthys*, or winged fish, an ichthyolite which the writer had the pleasure of introducing to the acquaintance of geologists nearly three years ago, but which he first laid open to the light about seven years earlier. Had Lamarck been the discoverer, he would unquestionably have held that he had caught a fish almost in the act of wishing itself into a bird. There are wings which want only feathers, a body which seems to have been as well adapted for passing through the air as the water, and a tail by which to steer. And there are none of the fossils of the Old Red Sandstone which less resemble anything that now exists than its *Pterichthys*. I fain wish I could communicate to the reader the feeling with which I contemplated my first found specimen. It opened with a single blow of the hammer; and there, on a ground of light-coloured limestone, lay the effigy of a creature fashioned apparently out of jet, with a body covered with plates, two powerful-looking arms articulated at the shoulders, a head as entirely lost in the trunk as that of the ray or the sun-fish, and a long angular tail. My first-formed idea regarding it was, that I had discovered a connecting link between the tortoise and the fish—the body much resembles that of a small turtle.

THE OLD RED SANDSTONE; OR, NEW WALKS IN AN OLD FIELD. By Hugh Miller. Edinburgh: Johnstone and Hunter, 1841.

Although not every one can discover Devonian fishes in the course of his day's work, it will well repay anyone to study and identify his local geological formations.

My First Discovered Fossil

In the course of the first day's employment, I picked up a nodular mass of blue limestone, and laid it open by a stroke of the hammer. Wonderful to relate, it contained inside a beautifully-finished piece of sculpture—one of the volutes apparently of an Ionic capital; and not the far-famed walnut of the fairy tale, had I broken the shell and found the little dog lying within, could have surprised me more. Was there another such curiosity in the whole world? I broke open a few other nodules of similar appearance—for they lay pretty thickly on the shore—and found that there might. In one of these there were what seemed to be the scales of fishes, and the impressions of a few minute bivalves, prettily striated; in the center of another there was actually a piece of decayed wood. Of all Nature's riddles these seemed to me to be at once the most interesting, and the most difficult to expound. I treasured them carefully up, and was told by one of the workmen to whom I showed them, that there was a part of the shore about two miles farther to the west, where curiously-shaped stones, somewhat like the heads of boarding-pikes, were occasionally picked up; and that in his father's days the country people called them thunderbolts, and deemed them of sovereign efficacy in curing bewitched cattle. Our employer, on quitting the quarry for the building on which we were to be engaged, gave all the workmen a half-holiday. I employed it in visiting the place where the thunderbolts had fallen so thickly, and found it a richer scene of wonder than I could have fancied in even my dreams.

What first attracted my notice was a detached group of low-lying skerries, wholly different in form and colour from the sandstone cliffs above, or the primary rocks a little farther to the west. I found them composed of thin strata of limestone, alternating with thicker beds of a black slaty substance, which, as I ascertained in the

course of the evening, burns with a powerful flame, and emits a strong bituminous odour. The layers into which the beds readily separate are hardly an eighth part of an inch in thickness, and yet on every layer there are the impressions of thousands and tens of thousands of the various fossils peculiar to the Lias. We may turn over these wonderful leaves one after one, like the leaves of a herbarium, and find the pictorial records of a former creation in every page. Scallops, and gryphites, and ammonites, of almost every variety peculiar to the formation, and at least some eight or ten varieties of belemnite; twigs of wood, leaves of plants, cones of an extinct species of pine, bits of charcoal, and the scales of fishes; and, as if to render their pictorial appearance more striking, though the leaves of this interesting volume are of a deep black, most of the impressions are of a chalky whiteness. I was lost in admiration and astonishment, and found my very imagination paralysed by an assemblage of wonders, that seemed to outrival, in the fantastic and the extravagant, even its wildest conceptions.

Experience of Half a Lifetime

My curiosity, once fully awakened, remained awake, and my opportunities for gratifying it have been tolerably ample. I have been an explorer of caves and ravines—a loiterer along sea-shores—a climber among rocks—a labourer in quarries. My profession was a wandering one. I remember passing direct, on one occasion, from the wild western coast of Ross-shire, where the Old Red Sandstone leans at a high angle against the prevailing Quartz Rock of the district, to where, on the southern skirts of Mid-Lothian, the Mountain Limestone rises amid the coal. I have resided one season on a raised beach of the Moray Frith. I have spent the season immediately following amid the ancient granites and contorted schists of the central Highlands. In the north, I have laid open by thousands the shells and lignites of the Oolite; in the south, I have disinterred from their matrices of stone or of shale the huge reeds and tree ferns of the Carboniferous period. I have been taught by experience, too, how necessary an acquaintance with the geology of both extremes of the kingdom is to the right understanding of the formations of either. . . .

Advantages of Wandering

One important truth I would fain press on the attention of my lowlier
(Just turn the page)

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Old Red Sandstone

(Continued from page 235)

readers. There are few professions, however humble, that do not present their peculiar advantages of observation; there are none, I repeat, in which the exercise of the faculties does not lead to enjoyment. I advise the stone-mason, for instance, to acquaint himself with Geology. Much of his time must be spent amid the rocks and quarries of widely separated localities. The bridge or harbour is no sooner completed in one district, than he has to remove to where the gentleman's seat or farmstead is to be erected in another; and so, in the course of a few years, he may pass over the whole geological scale, even when restricted to Scotland, from the Grauwacke of the Lammermuirs, to the Wealden of Moray or the Chalk-flints of Banffshire and Aberdeen; and this, too, with opportunities of observation, at every stage, which can be shared with him by only the gentleman of fortune, who devotes his whole time to the study. Nay, in some respects, his advantages are superior to those of the amateur himself. The latter must often pronounce a formation unfossiliferous when, after the examination of at most a few days, he discovers in it nothing organic; and it will be found that half the mistakes of geologists have arisen from conclusions thus hastily formed. But the working-man, whose employments have to be carried on in the same formation for months, perhaps years together, enjoys better opportunities for arriving at just decisions. There are besides, a thousand varieties of accident which lead to discovery—floods, storms, landslips, tides of unusual height, ebbs of extraordinary fall: and the man who plies his labour at all seasons in the open air has by much the best chance of profiting by these. There are formations which yield their organisms slowly to the discoverer, and the proofs which establish their place in the geological scale more tardily still. I was acquainted with the Old Red Sandstone of Ross and Cromarty for nearly ten years ere I had ascertained that it is richly fossiliferous—a discovery which, in exploring this formation in those localities, some of our first geologists had failed to anticipate: I was acquainted with it for nearly ten years more ere I could assign to its fossils their exact place in the scale. . . .

Should my facts regarding it—facts constituting the slow gatherings of years—serve as stepping-stones laid

across, until such time as geologists of greater skill and more extended research shall have bridged over the gap, I shall have completed half my design. Should the working-man be encouraged by my modicum of success to improve his opportunities of observation, I shall have accomplished the whole of it. It cannot be too extensively known, that nature is vast and knowledge limited, and that no individual, however humble in place or acquirement, need despair of adding to the general fund.

Hugh Miller was born October 10, 1802, at Cromarty in Scotland, and killed himself in Edinburgh December 23, 1856, after a year of illness. He was employed as a stone-mason from 1820 to 1834, during which time he studied the geology of the formations in which he worked, and spent his leisure time in writing poetry. For the next five years he was an accountant for the bank in Cromarty, and gained considerable fame as a writer. In 1839 he went to Edinburgh to edit the *Witness*, a Whig newspaper. The series of articles on the Old Red Sandstone appeared in that paper in 1840. Miller, although writing much of the "connecting links" between different forms of life, would have nothing to do with the evolutionary theories of "the ingenious foreigner," Lamarck. But Miller's discovery in the Old Red Sandstone of the Devonian fish fossils filled in an important step in the record of the rocks which was in his day rapidly taking the form which led to the generalizations of Darwin and his contemporaries only a few years later.

Science News-Letter, October 8, 1927

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