

tains, and, among the rest, to a red granitic gneiss, which must have been exposed over wide areas at the time of its deposition, and which, after the lapse of a period which extended from at least the times of the Lower Old Red to those of the Upper Oolite, was again thrust upwards to the surface, to form the rectilinear chain of precipitous eminences to which the hills of Cromarty and of Nigg belong. This rock is now almost the sole representative, in the north of Scotland, of the ancient rocks whence the materials of the Old Red Sandstone were derived. It abounds in hæmatic iron ore, diffused as a component of the stone throughout the entire mass, and which also occurs in it in ponderous insulated blocks of great richness, and in thin, thread-like veins. When ground down, it forms a deep red pigment, undistinguishable in tint from the prevailing color of the sandstone, and which leaves a stain so difficult to be effaced, that shepherds employ it in some parts of the Highlands for marking their sheep. Every rarer fragment of the rock bears its hæmatic tinge; and were the whole ground by some mechanical process into sand, and again consolidated, the produce of the experiment would be undoubtedly a deep red sandstone. In an upper member of the lower formation — that immediately over the ichthyolite beds — different materials seem to have been employed. A white, quartzzy sand and a pale-colored clay form the chief ingredients; and though the ochry-tinted coloring matter be also iron, it is iron existing in a different condition, and in a more diluted form. The oxide deposited by the chalybeate springs which pass through the lower members of the formation, would give to white sand a tinge exactly resembling the tint borne by this upper member.

The passage of metals from lower to higher formations,