

to be considered as a separate formation of less extent and thickness than the others.

*Organic Life.*—In all the enormously thick masses of gneiss and mica schist, and in all the included limestones and quartz rocks, we find few or no traces of organic beings.\* To judge from this extraordinary, and, perhaps, complete deficiency, we should say there were neither plants nor animals in existence on the globe at the time of the deposition of these rocks. But, before admitting this conclusion, it is necessary to determine whether any thing that is known of the history of these rocks would justify a suspicion that the traces of organic remains were peculiarly liable to be extinguished in them by heat or any other cause. It is a favourite speculation among a certain class of modern geologists, that the peculiar mineral, and structural characters of gneiss and mica schist are not original, but derived from the influence of heat upon common sandstones and shales — a greater effect of which heat would convert the gneiss to granite; and they suppose that such transformation of the substance of the rocks was accompanied by a complete extinction of the substance and impressions of the imbedded organic fossils.

Were this speculation of the origin and metamorphism of gneiss true to the extent stated, the supposition depending upon it, with regard to the contemporaneous extinction of all traces of organic fossils, would become plausible, perhaps probable; but if the view which we have given of the origin of gneiss, from disintegrated granite, be correct, there is no need of supposing any considerable change of the texture of the rock by heat, and the supposition concerning organic remains is of no authority. Independent of this circumstance, we know, *first*, that the forms of plants, crinoidea, and shells, do remain among limestones rendered completely saccharine by heat (Teesdale); among shales indurated to a great degree (Coley Hill Dyke); among coarse and fine slaty

\* The notices of orthoceratites at Loch Eribol, by M'Culloch, and of zoophytic remains, in clay state, associated with gneiss in the Riesengebirge (Von Dechen's Transl. of de la Beche), require further consideration.