tially distinguished among themselves according to the bed which they occupy. Hitherto the remains are always petrified* (i. e. impregnated with the mineral substance in which they are imbedded; but lastly, in the strata which cover the chalk we find the shells merely preserved, and in such a state, that when the clay or sand in which they lie is washed off, they might appear to be recent, had they not lost their colour, and become more brittle. Here we find beds of marine shells alternating with others peculiar to fresh water; so that they seem to have been deposited by reciprocating inundations of fresh and salt water. In the highest of the regular strata, the crag, we at length find an identity with the shells at

* It would afford an interesting subject of enquiry to trace the various changes which organised substances have undergone in consequence of this inhumation. Bones have generally lost their phosphoric acid and gelatine if in regular strata, and have their spongy texture impregnated with the matrix in which they lie, limestone, clay, and iron pyrites; one instance of a bone penetrated by silex has occurred to the author, on the beach at Reculver. The calcareous substance of shells, echinites, encrinites, corals, &c. in its slightest change seems only to have lost its colouring matter and gelatine; next they become impregnated with the mineral matrix in which they lie, especially if that matrix be calcareous; hence they become much more compact; often at the same time their original calcareous matter undergoes a change of internal structure, assuming a crystalline form, and in some cases, viz. asteriæ, encrinites, and echinites, a calcareous spar of very peculiar character results, of an opaque cream colour: it would be desirable to ascertain the circumstances in the original texture of these three families, whence this uniformity in the spathose structure of their remains arises; often the original matter of the shell has entirely disappeared, leaving a vacant cavity. It is a curious question what menstruum can have dissolved the shell when buried in a calcareous matrix which must have been equally liable to be attacked by any agent which could have attacked the shell, and no less so to account for the hollow casts in solid nodules of flint or blocks of chert, completely environing these casts on all sides. In this case how did the testaceous matter which has disappeared escape from its apparently close prison? The space left by these hollow casts has often been filled up by an infiltration of some new substance, e. g. chalcedony which thus forms a model of the original shell; the chalcedony is generally disposed in those concentric rings which mark the stalactitic variety: this is generally the state of the fossils in the green sand of Blackdown, which are chalcedonic substitutions in place of the original shell, and are exquisitely beautiful. A similar substitution of chalcedony for the original matter of the shells imbedded in the lias of St. Donats, Glamorganshire, is much less easily accounted for as the matrix itself is there not siliceous but calcareous. In many of these instances some singular play of affinities, and the removal of the original substance in a state of solution through the pores of the surrounding rocks, must have taken place in the laboratories of nature in a manner which our own imperfect chemistry is scarcely competent to explain. It is much to be desired that Dr. Mac Culloch, or some writer possessing his accurate chemical knowledge and precision of thought, would undertake a full investigation of the phœnomena here alluded to.

Some remarks on the changes undergone by vegetable remains will be found in the first chapter of the book on the carboniferous strata.