

Animal or vegetable substances found imbedded in rocks, are more or less impregnated with mineral matter, and hence have been called petrifications. The process of petrification consists in the infiltration of mineral matter into the pores of bone or vegetables. In some instances, the animal or vegetable matter has been almost entirely dissolved or removed, and the mineral matter so gradually substituted, as to assume the perfect form of the internal structure either of the plant or animal.

The process of petrification may be more rapidly effected than has generally been supposed. In the year 1817, I paid a visit to the celebrated Dr. Jenner, at Berkley, who informed me that he had made several experiments upon recent bones, by burying them in the dark mud from the lias clay : in less than twelve months, the bones became black throughout, and when dry, they were harder, heavier and more brittle than recent bone, and the surface was shining. The specimens which he showed me, presented the same appearance as the fossil bones in the lias clay. The effect was probably produced so speedily by the presence of the sulphate of iron, and other saline ingredients with which that stratum abounds. As this stratum is the most remarkable of all the secondary series, for the large animal remains which it contains, particularly of the saurian or lizard order, and as the bones are frequently covered with crystals or incrustations of pyrites, I will venture to hazard a conjecture respecting the manner in which these crystals, or incrustations of pyrites, or sulphuret of iron, are formed. The stratum before mentioned, contains much sulphate of iron or green copperas in solution. I suppose that the carbon in the animal matter had decomposed the sulphuric acid and the oxide of iron, and that the sulphur and iron, in their nascent state, had united, and formed the sulphuret of iron or pyrites. I was led to this conclusion by reading an account by Mr. Pepys, of some mice having by accident been immersed in a jar containing a solution of sulphate of iron : how long they had lain there was unknown, but the remains were partly covered with small crystals of pyrites, which could have been formed only in the manner above suggested. The stone surrounding the organic remains in the lias, I have observed to be considerably harder than the other parts of the same stratum. The organic remains of zoophytes and shells in limestone strata are also generally harder than the stone in which they are imbedded ; and on this account when the stone has been exposed to the atmosphere a long time, the organic remains rise above the surface.

Organic remains are generally coloured by the strata in which they are imbedded ; in roe-stone, chalk, and the upper fresh-water limestones, they approach to a yellowish or brownish white : in lias bituminous shale, and dark limestone, they incline to black ; and the shells in bituminous shale are sometimes filled with bitumen in a fluid state. In the strata above chalk, the bones and shells retain their