XXIV. *Observations respecting the Limestone of Plymouth, extracted from two Letters, dated September 26, 1814, and January 19, 1815. addressed to HENRY WARBURTON, Esq. Secretary.*

By the Rev. RICHARD HENNAH, Junr.

CHAPLAIN TO THE FORCES AT PLYMOUTH.

Citadel, Plymouth.

SINCE the date of my letter of the 8th of August last, in which I mentioned that organic remains were found in our limestone at Mill Bay quarry, various shells and fossils have been discovered in our limestone at other places. The limestone between the Tamar and Plym rivers, extends over a tract above three miles in length; its strata run nearly parallel to one another from north-west to south-east, dipping towards the south-west, this being also the position of nearly all the stratified rocks in the neighbourhood. The westernmost point at which shells have hitherto been found is the Dock Yard. A few weeks ago some workmen found petrified bivalve shells imbedded in the solid rock, twenty feet below the surface, while removing the remains of a small mount called Bunker's Hill, which had been left when the Dock Yard was excavated. I have since visited the spot myself, and found several specimens in situ.

Further to the eastward organic remains have been noticed, on Stonehouse Hill, both above and below the road at the entrance of

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Stonehouse, and in other parts of the hill near Mill Bay. Some of the specimens of shells and madrepores, which I now send, are from a part of Stonehouse Hill, a little to the west of the quarry at Mill Bay. They were broken from detached stones lying in undisturbed ground considerably below the surface, and agreeing in appearance with the solid rock. The quarry at Mill Bay lies about a mile and a half east of the Dock Yard. The specimens from this quarry were also broken from detached masses of rock found at different depths.

Still further to the east, under the citadel, at the east end of the Hoe, I have found many well-defined shells belonging chiefly to the genus *Turbo*, some in detached masses, some imbedded in the solid rock; but the substance of the shell in these specimens is so altered, as to exhibit the colour and texture of the surrounding matter. Lastly, in a quarry at Cat-down, I have obtained shells or rather fragments of shells, as well as madrepores, but in small quantity, and not so perfect as elsewhere. It has hitherto been a point in dispute whether the limestone at Plymouth does or does not contain organic remains; but I hope that the specimens which I now send the Society will be considered as deciding the question; it must be admitted at the same time, that the instances where shells occur are by no means frequent, and that they are not then found in any quantity. I send herewith a tooth, which, together with many others, and the head and bones of a large animal, was found in the Breakwater quarries at Oreston, at the bottom of a cave or hollow in the limestone rock. It was sent by Mr. Whidbey to Sir Joseph Banks.

I take this opportunity of observing, that on the eastern side of the Sound, under Statten Heights, and nearly in a line with the great national work the Breakwater, there occurs a remarkable

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interruption in the natural position of the strata. The rock consists not of limestone but of a hard ironstone, which is used for paving. There is a sudden cleft or fissure which divides it from top to bottom, and the strata, instead of preserving their usual inclination from north to south, meet the eye in all directions, horizontal, perpendicular, and inclining one after the other, until they describe the radii of a large circle.

It may be worth mentioning, that from the western point of the hill called the Hoe, to the eastern, and at other places near it, I have remarked on the side of the cliff, about fifteen or eighteen feet above highwater mark, a stratum two or three feet in thickness, composed of sand and waterworn pebbles cemented together, and appearing to have been at some remote period the original beach.