expected to form rapidly, the regions where they are found must have been subject to very little erosion for a long period or else the limonite would have been removed by erosion.

During the period of stability in Tertiary time when the Somerville peneplane, so well represented in the limestone valleys, was developed, conditions were favorable for the formation of ore bodies in this manner, and no doubt many of the brown iron ore deposits of the valley-ore type were formed at that time. Similar ore bodies probably were formed during the periods of Harrisburg and Schooley peneplanation, but these deposits have been largely if not entirely removed by subsequent erosion, which has destroyed all portions of these peneplanes in the limestone valleys.

Prime in his discussion of the iron ores of the region, suggested a secondary origin of a different character for some of the deposits then being worked. He says:

The whole appearance of the mine is that of a secondary deposit and seems to point to the ore not being in place. All through the yellow clay there are fragments of rock—limestone, damourite slate, and quartzite. The two former are angular, the latter more rounded. The conclusion arrived at by the writer is that the entire deposit has been formed during the Drift period; the ore, rock and clay having been pushed down from deposits to the north or northwest and deposited here in a depression of the limestone rock.

There is no doubt that much of the limonite picked up in the fields owes its present position to transportation by the ice during the glacial epoch but it is extremely doubtful whether any workable deposits have been formed in this manner, as suggested in the passage quoted.

The clay that is associated with the limonite ore represents the residual materials left by the decomposition of aluminous and siliceous strata. These clays were formed at the same time the secondary concentration of the ore took place. In many places shaly laminae or shale partings are interbedded with the limestones and sandstones, and these strata would yield much clay. Prime believed that the black clays had been formed from some of the overlying Ordovician black slates, which he called Utica slates. In some of the descriptions of individual mines quoted from his report on later pages, statements of this kind are made. The irregular distribution of the black clay and its occurrence in some places in detached masses beneath clays unquestionably formed from strata interbedded with the limestones and sandstones preclude such an origin. It must be admitted, however, that the formation of the different kinds of clay—red, white, drab, blue, and black—found in the mines of the region, presents

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