veins of hematite and followed the trend of the Lehigh hills from the Delaware almost to the Schuylkill. Messrs. Charles Laubach and J. A. Ruth, of Riegelsville, had known the nine flake-strewn pits on Rattlesnake hill, about a mile from the Delaware, for several years, and the former called our attention to them in 1891.

The twenty pits at Saucon creek (Wieder farm, two miles west of Limeport, Lehigh county, Pennsylvania) were discovered by Mr. Laubach and myself in 1891, on following the clue of a farmer who described the dump-heaps as “Indian mounds.” I discovered the ten diggings on the Mast farm, a mile and a half south of Limeport, in 1891. The existence of the sixty hollows at Vera Cruz (Lehigh county, Pennsylvania), on September 20, 1892, and to the five at Feuersteinberg (near Bowers station, Berks county, Pennsylvania) shortly after. I discovered the two pits at Coopersburg (Bucks county, Pennsylvania) and the twenty at Leinbach’s mills (Berks county, Pennsylvania) in 1892.

All the diggings, except those at Saucon creek, Coopersburg, and Long Swamp, are at ill-watered and rather uninhabitable sites. The pits, save the larger ones at Vera Cruz and Macungie, are small in comparison with the Flint Ridge (Ohio) workings, while the chips, where cultivation reveals them, are coarse and the material comparatively intractable. “Turtlebacks” are very rare in comparison with the numbers found at Flint ridge and at Piney branch.

At Saucon creek some arrow-head workshops and a small mound in a neighboring swamp yet remain to be fully explored, but Macungie, explored in September and October, 1892, with its 108 pits and its half-wooded area of about six acres, will serve as a type of all the quarries.

The Possibility of Sink-holes

Where there is jasper there is limestone, and where limestone, sink-holes. We were on the north slope of the Lehigh hills and hence overlooking the valley which, margined west by the Alleghenies and east by highlands variously named, stretches from New York to Alabama.

Rain-water, with its carbonic acid trickling through the jasper-bearing, clay-bedded magnesian limestone under our feet, had made caves, and their roofs had fallen in, so there were sink-holes in the neighborhood. Four small depressions of the surface, like large woodchuck holes among the tree roots, at the southwest corner of the quarries, lacking dump-heaps, looked like sink-holes, so that there seemed a chance that men had not dug the 108 holes outright, but had scratched upon the slopes of natural funnels against already-denuded jasper layers. But eight shafts sunk here and there in the pit margins through disturbed soil, charcoal, and refuse, sometimes reaching the undisturbed stratum of forest mould (as at shafts 4, 6, 10, and 11); and sometimes not getting below the disturbance (as at 7, 5, 13, and 9), satisfied us that the margins were not level as at the sink-holes but artificially piled-up heaps.

The shallowest dumps are at shafts 6 (3 feet) and 10 (2 feet 4 inches). Then comes 11 (4 feet 3 inches) and 4 (6 feet 4 inches), while at 5 there is no bottom at 8 feet 4 inches; none at 7 at 6 feet 4 inches; none at 3, at 7 feet; at 8, at 4 feet 4 inches, or at 9 at 5 feet. The small trenches 4½ and 6½ at distances of 60 and 30 feet from the pit margins showing no disturbance prove that the dumps did not extend so far. Moreover, a glance at the sectional drawings, taken from shaft 11 to shaft 5 demonstrates that in two cases, which fairly represent the measured instances, the cubic contents of the dumps equaled that of the holes; and we had done enough to prove that if we could have planed down the dumps to the original surface line the pits would have been about level. The depressions were therefore not sink-holes, but had been dug by men.