smaller tool, similarly worn, of quartzite and a rude point (of limestone) were found. While at the bottom again two cavities in the clay produced, on running in plaster of paris, the facsimiles of two sharpened wooden billets (long since rotted away and leaving only their moulds), one about 6 inches in diameter and of unknown length, as the upper part was destroyed in digging, the other with a diameter of about 2 inches and 2 1/2 to 3 feet long.

It is needless to go into details as to bark, twigs, slight charring at the ends, etc. The unique specimens now at the University of Pennsylvania's museum of American archeology speak for themselves. Granted that the Indian quarryman used copper tools not yet found, or pick-axes of deer antlers like the ancient flint-workers of Brandon, in England, can we suppose that he did not employ poles of various sizes charred, and sharpened like these with stone tools, both to scratch and delve the ground and pry up the boulders? And so, whatever we say of the quartzite implement at the fourteenth foot, shall we doubt that the ponderous chipped disc, showing unmistakable marks of usage, was handled as a digging tool in the fine yellow clay on which we found it?

The ochreous clay, or decomposed diorite interbedded with the limestone, at Macungie, is often highly tinted with yellow, that at Vera Cruz is sometimes red, pink, and bluish. Manganese is abundant at both places, besides a talcose slate that cuts easily, when freshly dug, into pipes and amulets; but as yet we have no proof that the excavations were made or altered for any of these substances. Thus far the study of the quarries proves that jasper was the material sought, and the questions remain: In what state did the Indian find it? How did he take it from the earth, and how reduce it to his desired shape?

A shaft of the Durham Iron Company encountered a solid vein of red jasper under the Indian jasper quarries, at Rattlesnake Hill, at a depth of about 100 feet, and at Macungie Mr. James Garr says that he reached a solid yellow ledge of it in his shaft, sunk for curiosity, in one of the pits at 30 feet beneath the surface. But our shaft, since it did not reach the undisturbed edges of the old hole, did not determine that no ledge existed, though it did prove that nodules were frequent. These are found on the surface, varying in diameter from 2 inches to 4 feet, at all the diggings; and one, with its thick, silicious coat, about 3 inches in diameter, was excavated at a depth of 19 feet from the undisturbed clay at the bottom of our largest shaft. Sometimes partly chipped, sometimes untouched, these nodules are found scattered everywhere in the dumps.

Yet as they, and the chips and splinters that accompany them, here bear only a proportion of about 10 per cent to the clay and are pretty evenly distributed through the mass, it is evident that the pits were to no great extent worked out of a solid ledge. If they had been, the constitution of the dumps would have betrayed it. We should have found more stone than clay in them. But we always found less, and very much less.

The evidence thus far indicates that after rolling away the surface nodules those lying deeper were pried up one by one with sharpened poles and the surrounding clay scraped away until the pits were made.

\section*{Traces of Fire}

Scattered fragments of charcoal were scarce in shaft 12 below the ninth foot, but all the other diggings and dumps were sprinkled thick with bits of charcoal. About 20 per cent of the chips and 10 per cent of the large blocks were reddened as if by fire, while reddened fragments were abundant in all the fire-places. Nothing was surer than that fire had played a great part in the quarrying process; but while four fire-places examined showed no trace of cooking, they also gave no sure clue to their purpose, and there would have remained a doubt whether the fires had not been built for warmth had not a fifth hearth discovered in shaft 2, at a depth