may not be assigned to chance or symbolic use. We cannot, however, here use the argument that their mere presence proves their intentional abandonment, for, being as scarce as arrow-heads in an "Indian field," they might, like the latter, have been lost. All show design, all take the leaf-form, and all aim at a point and a cutting edge. That partly thinned blades occur among them proves here, as at the other quarries, that these jasper "turtlebacks" are inchoate Indian spears, knives, or scrapers, unfinished, rejected, or lost; but which were "rejects," and which were lost, which were too cross-grained to be thinned down, and which were not, we leave to the Indian now living, who forty years ago was making stone arrow-heads on the Sacramento, to tell us. The point is almost immaterial; the main fact remains that all obviously are steps in the process of fashioning.

(d.) The thinned-down blade, still very rude but of recognizable Indian pattern, of which we found 29 specimens, 7 were only fragments, 4 would have measured 5 inches in length and done for large spears, 14 would have worked into arrow-heads. There was nothing like a buried cache of blanks to prove exactly how far the chipping work was carried at any one time at the quarries or that it always stopped at the same degree of finish. Sometimes it may have been large or small thinned ill-worked blades that were bundled up and carried off; sometimes pressure-finished knives or spears; sometimes back-breaking loads of "turtlebacks" themselves, heavy but still workable; while that the Indian sometimes carried away still heavier raw lumps is proved by a mass of native brown jasper weighing eight pounds found on the village site of upper Blacks' Eddy, ten miles from the nearest (Durham) quarry, and a smaller fragment noticed at the Frys' Run site, about five miles from the Durham diggings. On the other hand, two perfect arrow-heads of jasper and a curious notched jasper form (which I suggest was used instead of the notched bone in the finer chipping) found close to the pits seem to prove that the process was sometimes completed there, while two broken quartzite arrow-heads, a third of argillite, and a fourth of quartz point to material found and work done elsewhere. But granting all this, the immensely greater proportion of rougher forms places it beyond a doubt that the rude preliminary work above described and little else characterized the immediate quarry sites.

That the traces of thinned blades were so much rarer than the "turtlebacks" in the refuse was doubtless because they had reached a stage when they were more valuable to the maker, and when they would have been discarded far less often than the rough half-tested forms. That they represented the later steps in the work of which the "turtlebacks" were the beginnings, there could be no doubt.

A few blows of the pebble-hammer gave us the rough, leaf-shaped profile; others more careful and probably dealt with the smaller hammerstones produced the unmistakable closer chippings all round; then, if the mass, ceasing to be tractable, were not thrown away, still finer work—possibly pressure, was applied until the "turtleback" was thinned down to the last-mentioned form—which already in some cases as well finished as the stone knives found in Arizona cliff dwellings, still lacked the final notching and finishing touches to specialize it into a completed spear.

The Quarries as Places of Habitation

Quarrymen dwelt at the diggings for prolonged intervals—must have done so. How can we doubt it when we consider the amount of work done, which, at Macungie, may be roughly estimated at one million cubic feet of earth excavated and carried from pit to pit. On the bottom of one of the shallow pits at Durham I found the jaw and teeth of a deer mingled with charcoal and ashes, and, as the quarrymen must have eaten while they worked, similar fire sites must exist at Macungie. The three fragments of polished celts above mentioned found with the refuse, the four arrow-heads of foreign material and a fragment of unio shell found in shaft 18, attest habitation, and no doubt systematic search will discover pottery and all the other traces of regular Indian occupation near the pits.