

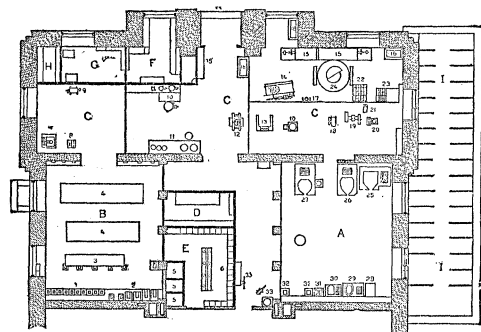
gold? 4. Will there be much waste in treating the ore? 5. If so, how much, and what means should be adopted to avoid it?

The rock was crushed fine in a stamp-mill, and the fine sand was conducted by the agency of water over a series of amalgamated copper plates, by which any active or free-milling gold was taken up, and the passive, rusty, included gold was allowed to pass on, together with the sand. This sand, before going to waste, was treated on a concentrator; and from the product or concentrate the greater part of escaped gold could have been extracted by chlorine.

The yield of gold per ton was as follows:—

	Nova-Scotia ore.	New-Hampshire ore.
	Coarse nuggets.	Very fine grains.
Gold in the amalgam of the stamp-mill	\$13.040	\$2.28
Gold on the first plate	0.200	1.35
Gold on the second plate	0.010	0.11
Gold on the third plate	0.030	0.09
Gold on the fourth plate	0.007	0.05
Gold on the fifth plate	0.002	0.03
Gold in the concentrates	0.150	0.37
Gold on the additional mercury trap	—	0.02

From these experiments the students ascertained that the Nova-Scotia gold is very coarse, is almost all saved in the stamp-mill, and less



A, furnace-room; B, assay-room; C, milling-room; D, supply-room; E, toilet-room; F, private laboratory; G, office; H, balance-room; I, vaults; J, entrance to vaults.

than five plates will answer for treatment, and that the concentrates yield very little additional gold; while New-Hampshire gold is quite fine, is not much more than half saved in the stamp-mill, that five plates are not enough, and if the series were continued to eight or ten the last would probably more than pay for itself, and that considerable gold is saved in the concentrates.

A third student had a lot of galena weighing one ton to treat for lead, silver, and gold. Aided by his classmates, he crushed the ore, sampled, calcined, sintered, and smelted it, obtaining base bullion. He extracted the gold and silver by the zinc process, followed by cupellation. The silver-gold brick obtained was carefully valued, as were also all his products throughout the test. The losses in the process were,—

	Per cent.	Per cent.	Per cent.
In calcining	Lead, 5.	Silver, 2.	Gold, 0.
In smelting	Lead, 12.	Silver, 7.	Gold, 4.
In cupelling	Lead, 8.	Silver, 6.	Gold, 1.
Total losses	Lead, 25.	Silver, 15.	Gold, 5.

From the results, not only did he learn with his own hands and eyes where the greatest difficulties are to be encountered in lead and silver smelting, but also the familiarity with this process rendered his reading upon the smelting of copper, iron, and other metals, far more intelligible and real.

When work by day only is called for, there is enough of the spirit of investigation in nearly every student to carry him over the tedious part of his task for the sake of the results he sees immediately within reach. When the test lasts through the night also, as happens three or four times during the year, there is always enough of the savor of camping out to help keep up the interest.

SILVER FROM A PENNSYLVANIA MOUND.

SITUATED near the town of Irvine, Warren county, Penn., on a very pretty and fertile bottom of the Alleghany valley, are two mounds, well known for the last seventy years. No opening had been made in either in this time, except a shallow pit dug in the side of the smaller about fifty years ago. While spending a few days last summer in that region, I obtained permission of the very intelligent and courteous owner, Dr. William A. Irvine, to make a thorough exploration of them.

The smaller, which is on the bank of the river, near the point where it is joined by the Brokenstraw Creek, is circular, fifty-two feet in diameter, and three feet and a half high, but has evidently been considerably lowered and expanded by the plough, as the land has been under cultivation for at least sixty years,

and for some time previous thereto was occupied by a band of Seneca Indians.

The chief features of this mound, as shown in fig. 1, which represents a vertical section of it, are the pit and large central stone vault (No. 1). The former was found to be two and a half feet deep below the natural surface-line, *ab*, and about forty feet in diameter, the diameter probably indicating the original extent of the mound.

The upper portion of the vault had fallen in, wedging the stones so tightly together that it



FIG. 1. — SECTION OF MOUND NEAR IRVINE, PENN.

was somewhat difficult to remove them; but the original form and mode of construction could easily be made out without the aid of imagination, as the lower portion was undisturbed. The builders had evidently miscalculated the proportions necessary for stability; as the diameter, from outside to outside, was fifteen feet, though the walls were very thick near the base, while the height could not have exceeded seven feet: hence it is probable that it had fallen in soon after the dirt was thrown over it. The stones of which it was built were obtained in part from the bed of the neighboring stream, and partly from a bluff about half a mile distant, and were of rather large size; many of them being, singly, a good load for two men.

The bottom was formed of two layers of flat stones, separated by an intermediate layer of sand, charcoal, and remains, five inches thick (at the time it was excavated). It was apparent that these layers had not been disturbed, save by the pressure of the superincumbent mass, since they were placed there. The intermediate layer was composed in great part of decomposed or finely pulverized charcoal. In this were found the teeth, decaying jaws, a single femur, and a few minute, badly decayed fragments of the bones of an adult individual, and with these the joint of a large reed or cane, wrapped in thin, evenly-hammered *silver-foil*. The latter had been wrapped in soft, spongy bark of some kind, and this coated over thickly with mud or soft clay. The weight of the stones was so great that the femur was found pressed into a flat strip, and the reed split. I was unable to determine certainly whether the burning had taken place

in the mound or not. The few bones found did not appear to be charred, and the same was true of the cane-joint: on the other hand, the bark, although wrapped in clay, was very distinctly charred.

A careful analysis of the metal-foil has been made by Professor Clark, the chemist of the geological bureau, who pronounces it comparatively pure native silver, containing no alloy. Although wrapped around the cane, a portion of it appears to have been cut into small pieces of various shapes, two of which are represented in fig. 2, *a* and *b*. Where the margins remain uninjured, they are smoothly and evenly cut. The joint of cane which has been taken between the nodes is nine inches long, and must have been about an inch in diameter. A small stone gorget was obtained from the same layer.

At No. 2, on the north-east side of the pit, were a few large stones which may have formed a rude vault, but were in such a confused condition, this being the point disturbed by the first slight excavation, that it was impossible to ascertain their original arrangement. Among them were found parts of an adult skeleton. The person who dug into the pit at this point, finding human remains, stopped work, and re-filled the opening he had made.

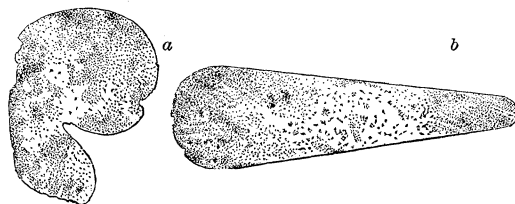


FIG. 2.

The Senecas, as I am informed by Dr. Irvine, who has resided here since 1822, protested that they did not know who built these mounds; which statement seems to be borne out by the fact that intrusive burials, probably of their dead, were discovered in the other tumulus.

CYRUS THOMAS.

A FOSSIL ELK OR MOOSE FROM THE QUATERNARY OF NEW JERSEY.

LAST summer Rev. A. A. Haines presented to the museum of Princeton college a remarkably perfect skeleton of a large elk or moose,