

Article XI.—AN ONYX JAR FROM MEXICO, IN PROCESS OF MANUFACTURE.

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PLATE VII.

In making vessels from stone the ancient Mexicans had attained a high degree of proficiency, judging from the few specimens which have been preserved in museums and private collections. The most remarkable are those made from obsidian and onyx. The best examples are in the National Museum in the City of Mexico. They are sometimes plain, unadorned cups, but more often have the representation of an animal, with the head and limbs standing out from the body of the vessel. A notable piece in the National Museum in Mexico is made of obsidian, brilliantly polished, and represents a monkey, crouching, with its arms hanging to a hoop which is carved around the rim of the vessel. There is in the same museum an unfinished vessel carved out of onyx. It is hollowed out, and the outside is completed with the exception of polishing. It represents an animal similar to that on the one here described and figured belonging to our collection. These vessels are hollowed out of a solid mass, leaving their walls of varying thickness, but about 5 mm. on an average around the sides. They are in most cases well finished and highly polished.

During the exploration of mounds and tombs at Xoxo, in the State of Oaxaca, which I made in March and April, 1898, for the Museum, I found the fragments of an onyx jar 135 mm. in height and 115 mm. in diameter, the thickness of which averaged 5 mm. The surface had been coated with stucco; and the remains of red, blue, and green paint showed that it had been decorated with paintings, probably symbolic figures. In the famous Solögren collection in the city of Oaxaca are several fine specimens, and one, of a decidedly green onyx, in process of manufacture. A specimen, belonging to the American Museum of Natural History, was found several years ago near the city of Tlaxcala, State of Tlaxcala, and is a relic of Nahuatl art. It is blocked out and symmetrically shaped, and is 160 mm. high, 145 mm. in

diameter at the base, 95 mm. at the rim, and 485 mm. circumference at the centre. The maker cut the stone so as to leave the head of an animal, probably a dog or coyote, projecting from one side, just below the rim, with the limbs in low relief on the sides, showing the animal resting on its haunches. The lower part and feet project from the base of the vessel. The tail curves upwards from the base of the vessel. The four feet and the tail of the animal thus make five slight projections around the base of the vessel, 4 mm. in height, on which it rests. The toes on the feet of the animal had not been carved; nor had the teeth, eyes, or openings of the ears and nose. The surface of the stone is somewhat disintegrated, so that the irregular striation of the stone, where the softer material has decomposed, gives a series of ridges running parallel with the base of the jar.

The most interesting feature of this specimen is the way in which the interior was being hollowed out, which is clearly shown, and indicates the abandonment of the work at an early stage in the process of manufacture. The method employed was drilling, probably with a bow- or pump-drill, the shaft of which was a hollow *otlati*, the common reed found generally in Mexico. A series of cores averaging 9 mm. in diameter were drilled around the inner edge, leaving a scalloped rim varying from 3.5 to 9.5 mm. in thickness, and an average diameter of the inner wall of the jar of 81 mm. These cores, thirteen in number, have been broken off with the exception of two, and at varying depths, 34 mm. being the greatest, while four of the cores were broken off at a depth of only 10 mm. The thickness of the walls of the hollow drill, as indicated by the spaces left, must have been about 2 mm. These outer cores being removed left a large inner scalloped core in the centre, about 42 mm. in diameter, and three cores were made across it with a smaller drill, they being but 7 mm. in diameter and 8 mm. in depth. Had the work been carried on, this would have left two walls which could have been easily broken off, leaving the first stage of the work complete, and ready for repeating the process below, until the whole mass had been hollowed out.

An interesting onyx tablet from the Valley of Mexico is described and figured by Prof. W. H. Holmes in his 'Archæological Studies among the Ancient Cities of Mexico,' Part II, pp.

304-309. In this specimen the use of a hollow drill is shown. When it was received in the Field Columbian Museum, Chicago, it was found broken in two pieces, and an examination of the smaller fragment revealed the end of a tubular bone projecting from the opening of the longitudinal perforation. I quote from the author's description the following: "The hollow bone, probably from the leg of a crane or other large bird, is $2\frac{3}{4}$ inches long and $\frac{3}{8}$ of an inch in diameter. It is shattered and worn at the upper end, while the lower end or point has the appearance of having been freshly cut off. . . . On cleaning out the earth (from the perforation) the fact was developed that the borings from opposite ends of the tablet had not met accurately, and the conclusion was at once reached that the drill was probably being employed, when the work ceased, to enlarge the bore with the intention of making more complete the connection from end to end.

"The use of the tubular drill of cane, bone, or native metal by primitive peoples, and even by many well advanced nations is well known. The tube was twirled by rolling between the hands, or by a pump- or bow-drill, and sand of suitable fineness and hardness was employed as a cutting agent. That a tubular drill was used in the present case is proved by the presence of a well developed core at the base of the boring from the upper end."

Sahagun does not tell us how drilling was done by the ancient Mexicans, but states that they polished hard stones by means of a bamboo.¹ This is undoubtedly the way in which the high polish was obtained on the vases of obsidian and onyx to which I have referred at the beginning of this paper.

The use of a reed or bone for a hollow drill was common in other parts of North America, as shown by unfinished gorgets and banner stones in various collections.

¹ In the Bustamente edition of Sahagun's great work on the 'Things of New Spain,' the chapter on Stone-working is missing. Dr. Seler has published this chapter, giving the original Nahuatl text and a translation into French in the *Compte Rendu du Congrès International des Americanistes*, Paris, 1890.

