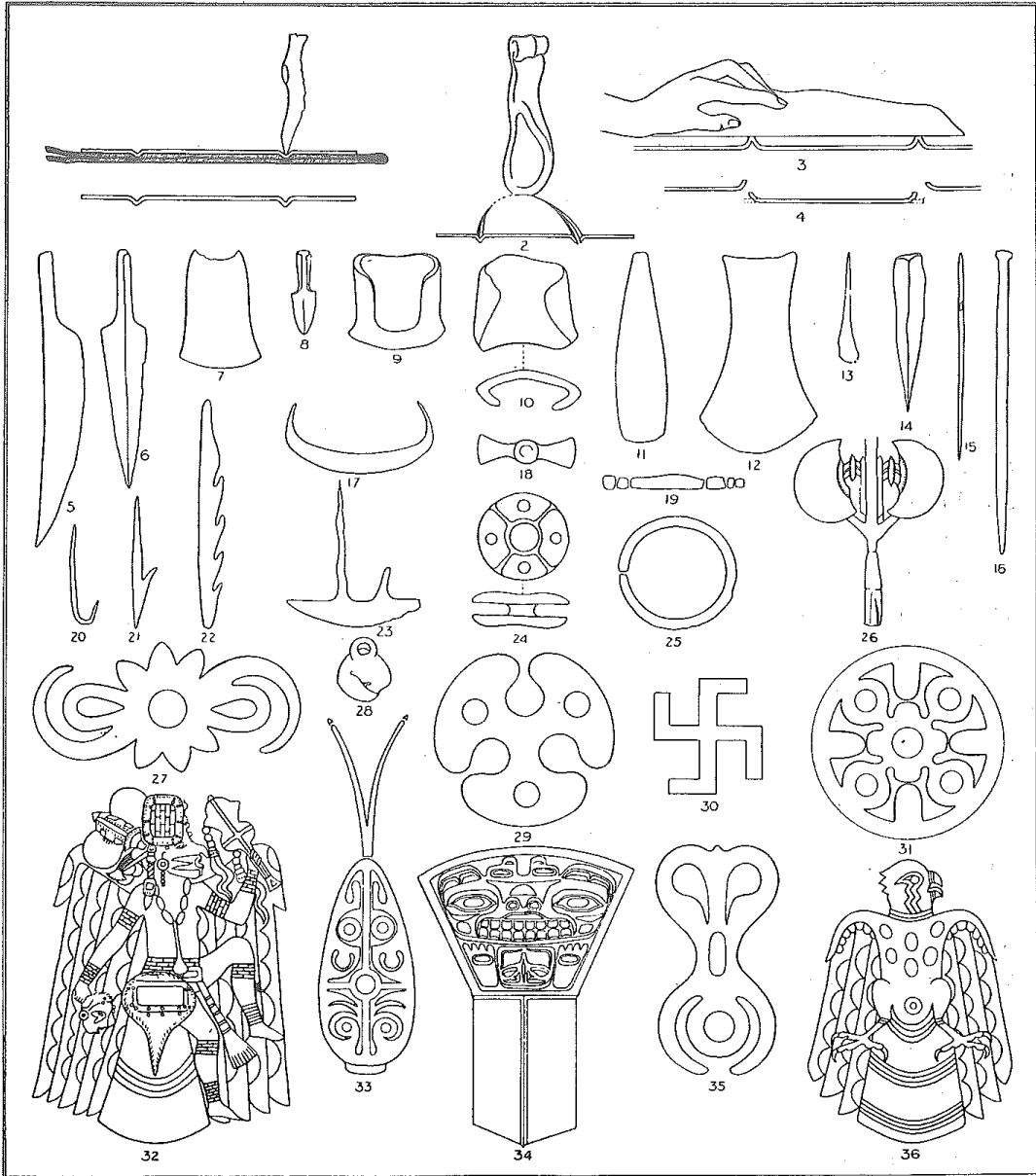


DENVER ART MUSEUM

1300 LOGAN STREET, DENVER, COLORADO

DEPARTMENT OF INDIAN ART

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Drawn by Betsy Forbes.

COPPER AND THE INDIAN

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1. INTRODUCTORY. At the time of their discovery the American Indians were still living in the Stone Age in the sense that stone was the principal material used for tools and weapons and that they had no knowledge of the working of metal by smelting, alloying, or casting. But if the rather widespread use of copper is considered it must be said that at least the beginnings of a Metal Age were in existence. This leaflet attempts to indicate the distribution of this copper industry and the forms it assumed.

2. SOURCES OF COPPER. When the very first explorers reached the areas listed below they found the Indians in possession of copper in the forms of tools or ornaments which had been made from metal found in their own regions. The copper of New England and eastern Canada seems to have come principally from Nova Scotia. Sources in New Jersey supplied the natives of that and neighboring states. The metal which was found throughout the southeastern states came chiefly from many places in the southern part of the Blue Ridge Mountains. In the Great Lakes region and in the Mississippi Valley the great source was the deposit on Isle Royale in Lake Superior, with a number of other deposits in the general region. The natives around the Great Lakes obtained their copper directly from the mines. The tribes to the south gathered copper nuggets which had been carried down from the north by glacial action. Float copper is the term applied to such finds. Of all the sources in North America those around the Great Lakes were the most important. The scattered Indians and Eskimos of north central Canada obtained their metal from a number of deposits, of which the Coppermine River basin was the most productive. In the Southwest very small amounts of float copper were obtained in various localities, probably mostly in southern Arizona. Copper-working was very slightly developed in this region and definite information as to the sources of the metal is lacking. Southwestern copper-working is discussed further in Section 15. The tribes of the coastal portions of British Columbia and southern Alaska obtained their raw material from deposits located north of them in Alaska in the valleys of the White and Copper rivers in the general region of the Alaska-Yukon boundary.

3. FORM AND QUALITY. The metal was found in lumps or sheets in various rock formations, or wherever it may have been deposited by ice, water or other natural forces which tore it from its original locations and carried it away. In the latter form it is called float copper. The metal used by the Indians was not obtained from ore, but occurred in a pure, soft form which could be dug from the rock with very simple means. On Isle Royale in Lake Superior many shallow diggings and broken tools show the location and methods of Indian copper mining. The deposits range in size from small particles to large masses weighing several tons.

The copper thus found is very pure. Various chemical analyses have been made of prehistoric copper objects and of unworked lumps which show that the metal is between 99 and 100 per cent pure. This purity affords the best

way of distinguishing native copper from that imported from Europe, for the latter does not exceed 98 per cent purity and is usually lower. This difference seems slight, but metallurgists consider it a sure test as to whether Indian made articles are of native or imported metal.

4. METHODS OF WORKING. Copper was worked into the desired forms by pounding with a stone when cold or after heating. Modern tests described in reference 3 indicate that temperatures of from 900 to 1500 degrees Fahrenheit were obtained by heating. A very common working process was annealing. The metal was brought to a high degree of heat and allowed to cool slowly. This process removed brittleness from the metal and made it tough and flexible enough to be hammered into shape. Tests show that some pieces were worked only when hot and not during the cooling period. But the contrary seems to have been much more common.

Modern scientists, using only tools which were available to the ancient Indians, have reproduced by these methods of working many objects made by the Indians, thus proving the correctness of the opinions formed by laboratory analysis of specimens. There is no basis for the theory that the Indians had a process of hardening copper which has now been lost. Copper is hardened somewhat by hammering and this was of course done by the Indians. But the process was no art which has since been lost, only the inevitable result of the chief method of shaping the metal.

Massive objects such as spear points or axes were worked by heating and hammering, or by hammering cold. The most celebrated products of the ancient coppersmith are the very thin sheets of metal used in making ornaments. These were worked by hammering and annealing followed by grinding and polishing with sand and sandstone. The experiments of Cushing show that these plates were cut into sections by making a groove around the area to be cut out (1, 2) and grinding with sandstone through the ridge formed by this groove on the opposite side of the plate (3). To make open work patterns, sections were removed by grooving and grinding, and holes were cut by punching or drilling. After cutting through a groove the bent-up edges were flattened out by hammering (4).

5. METHOD OF DECORATING. Massive objects in the tool and weapon class were not decorated. Articles made from thin sheets were given their most elaborate patterns by pressing grooves into the surface (1), thus outlining the shapes and details of various living creatures and abstract forms. Patterns were also made by piercing at regular intervals. On the Northwest Coast painted decorations were applied (34).

6. HISTORICAL NOTES. The use of copper passed out of existence soon after the tribes in various parts of the country came in contact with the white man or his products. Copper made in Europe, and more commonly brass, superseded the native metal for a time for the making of ornaments. Copper tools quickly gave way to those of iron, while silver and brass be-

came the favored metals for ornaments. Native copper objects were made in the Great Lakes region as late as 1828, but in general the practice had died out by the middle of the 18th century. On the Northwest Coast copper-working lasted somewhat longer, though after 1800 the metal was largely imported. Until quite recent times the large shields called "coppers" were still used on this coast.

When the use of copper began is not known, but from the available indications it had not been used for very long before the discovery of America. It seems to have reached its fullest development among various mound building groups in the Middle West which flourished perhaps 500 to 700 years ago.

7. DISTRIBUTION OF TYPES. The uses to which copper was put depended on the position of any copper-using group in relation to the source of its metal. If there was an ample supply close by many purely utilitarian articles were manufactured, more than those made for ornament. But if copper was scarce and had to be imported from far away it became more precious and was only made into ornaments for wealthy or important persons.

The greatest source of copper was the Lake Superior region and therefore the largest number of copper tools and weapons came from that section. In the central and southern Mississippi Valley where float copper was fairly abundant the metal was used more for ornament than utility. But there was enough of it for many people to have at least ear plugs and beads besides some tools. But in the Southeast, where it was apparently not common, copper was chiefly used in the manufacture of the elaborately decorated plates described in Section 13. And the rarity of the plates indicates that they must have been reserved for important persons.

8. EXTENT OF THE INDUSTRY. That, in certain areas at least, the Indians were well advanced into a Copper Age is shown by the number of specimens which have been recovered by scientists and collectors. Many years ago it was found that some 30,000 examples of copperwork were known in one state, Wisconsin. If all the specimens known today were counted, a total of at least 100,000 would be reached. And when the number of unexcavated mounds and sites is considered it is evident that many more pieces are yet undiscovered. A comparison of this figure with that of the native population in prehistoric times, as calculated by several investigators, shows that in the copper-using regions a large portion of the people must have possessed copper objects. It is clear that the use of copper was not a rare occurrence, but an important factor in the lives of thousands of Indians.

9. INDIAN IDEAS ABOUT COPPER. From the names given to copper by the various tribes which have used it in historic times it appears that the natives had no idea of metal as a separate and distinct substance, but supposed it to be a soft kind of stone.

VARIETIES OF COPPER OBJECTS

10. TOOLS. In this group are found chisels (11), axes (12), adzes (7), gouges (9), spuds (10), knives (5), awls (13) and drills. These range in size from almost miniatures to massive objects weighing over 30 pounds, and over 2 feet in length. The general forms are shown on the cover. Tools were especially common in the central states.

11. WEAPONS. This class contains the heads for spears (6) and arrows (8), and blades which are almost large enough to be called swords. Some arrow points were made of sheet metal bent into cones which slipped over the wooden shafts. Others were shaped like those of stone.

12. IMPLEMENTS. Pikes (16), punches (14), needles (15), pins, fish hooks (20), rods, and harpoons (21, 22) make up this group.

13. ORNAMENTS. The skill of the old coppersmiths is perhaps best shown by this group, for the sheet copper was worked into complex forms which were executed with great finish. The group includes crown-like headdresses, ceremonial standards (26), ornamental plates in the form of feather plumes, crescents (17, 23) and simple geometric forms, hourglass-shaped ear plugs (24), beads (19) and bracelets (25), rings, and teeth and buttons (18) covered with thin sheet metal. That the more elaborate pieces were overlaid is shown by a headdress with wooden antlers covered with copper. A few skulls have been found to which, after death, copper objects were added to replace the fleshy part of the nose. Knowledge of the uses of the various kinds of ornaments is based on their position in graves in relation to skeletons; on native sculpture showing ear plugs, etc.; and on pictures made by the first European artists to draw the Indians.

The most elaborate ornaments are those plates of sheet metal which are decorated by piercing, or by repoussé or embossing. That is, they show designs which are made by pressing grooves into the surface or by raising sections by hammering from the back. The designs used on these plates will be discussed in Section 14.

In historic times the Northwest Coast tribes have made copper neck rings of heavy twisted rods, ornaments of various kinds and the "coppers" mentioned in section 6 (34). Copper was also overlaid on wood and metal objects, such as masks and knives. In the mid-19th century the Navaho learned metal working from the Mexicans and made copper ornaments to some extent. But silver soon became the favored metal. Today copper is again being used for jewelry in the Southwest. Prehistoric southwestern copper work is discussed in Section 15.

14. DESIGNS. The designs which appear on copper plates, and the shapes into which the plates were cut are either abstract geometrical forms or more or less conventionalized representations of men, animals, and birds. In the

former group are found swastikas (30), circular and angular forms pierced with various abstract designs, and a number of curvilinear forms (27, 29, 31, 35). Many of these abstractions are extremely beautiful in composition, well illustrating the high degree of artistic ability possessed by these prehistoric Indians. The conventional idea that all Indian art is crude and barbaric is well confuted by these graceful forms, which may be favorably compared with the metallic productions of other peoples and periods.

Possibly of greater interest because of the human element involved is the second type of design, that showing the forms of living creatures (32, 33, 36). Men (32) and eagles (36) are by far the most common subjects. The most striking of these designs show the figures of elaborately masked and costumed men, usually executing the steps of a dance (32). To one who knows little of Indians the figures should be of interest because of the pictures they evoke of a bygone epoch filled with brilliantly costumed men moving through the steps of savage ceremonials. To the student they have another interest. For the character of the costumes clearly shows the connection which once existed between the tribes of the Mississippi Valley and the more famous Maya and Aztec peoples of Mexico. In many details the figures of masked dancers from the two areas are almost identical. The resemblance is so close that there is no doubt but that there was some sort of connection between the two countries. Of interest to students of design is the presence of copper plates showing double-headed eagles. The use of this design by various Indian groups is often attributed to European influence. But these prehistoric plates prove that a form of the design is native to America.

15. SOUTHWESTERN COPPERWORK. Information on this subject is very scanty. The metal is found in many places in this region, but as the remains of native mining operations have not been found it appears that the Indians used float copper. Pieces of metal have been found near mines worked today. The copper objects which have been found are of two types, bells and beads. The bells (28) are small, being an inch or less in diameter. They are more or less globular, with an opening on the side or bottom and a ring for suspension on the top. The clappers are pebbles. The beads are cylindrical in shape and about an inch in length. Both types have been found in many places in Arizona and New Mexico. But they are rare everywhere in the region.

Scientific tests made of the structure of the copper show that the bells were made by casting by the lost wax method, see Section 19. The beads were made by hammering the metal into sheets and bending them into shape. Analysis shows that the metal used in making these objects came from the Southwest and not from Mexico.

These facts make up a puzzling picture. Metal casting was done in Mexico and apparently unknown in the United States. Yet the copper in these bells and beads came from north of the border. Reference 17 suggests that these contradictions and the small number of specimens may be explained by the

presence in the Southwest of wandering metal workers from Mexico who made a few pieces with the local metal. Most of these copper objects are found in ruins dating from the 14th to 16th centuries, though a few from southern Arizona are several hundred years earlier. During this period the casting of copper was well understood in Mexico. Reference 4 describes what appeared to be the remains of crude smelting ovens. But information is lacking as to whether these findings of over 40 years ago have since been supported by recent archeologists.

16. COPPER AS A PRESERVATIVE. This section has nothing to do with Indian use of the metal, but it is interesting to note that copper has the power to preserve perishable objects with which it has been kept in close contact for long periods of time. Most of our knowledge of the cloth and other substances which decay easily is due, in copper-using areas, to the finding of such materials wrapped around or lying in close contact with copper objects.

17. COPPER AS PAINT. Various compounds of copper have been used by Indians in the manufacture of blue and green paints. This practice exists today, and archeological investigations indicate that it did so in prehistoric times.

18. APPEARANCE OF COPPER OBJECTS. Copper which is long exposed becomes coated with a green basic carbonate often called verdigris. This is especially true where there is some moisture. The vast majority of old Indian-made copper objects show this mottled green color. The verdigris can be removed, restoring the red surface.

19. BRONZE. Because this metal alloy contains a large proportion of copper a brief note about it is included in this leaflet, though it was not made nor used by the Indians of the United States and Canada. Bronze is made by melting together about 90 per cent of copper and 10 per cent of tin. The proportions vary considerably, there often being less tin. Ore containing copper sometimes also bears small amounts of tin, so that when the ore is smelted the two metals combine. But the amount of tin is very small, not sufficient to produce bronze. This accidental mixture is sometimes found in the metalwork of native peoples.

But certain Indian groups in Peru, Bolivia, Argentina and other South American countries had learned how to add enough tin to produce true bronze, and had also discovered the art of casting the alloy. Many examples of their work, in a wide range of shapes, have been found in prehistoric sites. Casting was done by the *cire perdue* or lost wax process. A wax model of the object desired is made and covered with clay. The mold is heated and the melted wax runs out, leaving its impression inside the clay mold. Molten metal is then poured into the mold and cools in the form of the wax original.

Copper casting was done by the Indians of Mexico, but not bronze casting. And the tribes of the United States and Canada produced neither.

Compiled from the following sources by F. H. Douglas:

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