PREHISTORIC COPPER ARTIFACT JOURNAL

March 2013 Volume 9 Number 1

GREAT LAKES COPPER RESEARCH
AMERICAS AND THE WORLD

MISSION STATEMENT

Our research mission is to enhance the reservoir of knowledge and understanding about man's early use of copper. We wish to know all we can about his activities and belief systems involving ancient prospecting, mining, trading, crafting and use of copper, firstly in the Great Lakes area, secondly in the Americas, and finally in the world.

In pursuit of this knowledge, Great Lakes Copper Research will:

1. Collect and archive historical documents and research material relating to prehistoric use of copper.
2. Furnish library services and materials pertaining to the early utilization of copper.
3. Equip a museum for public display of copper and copper related artifacts to increase the awareness of, knowledge about and interest in man's early use of copper.
4. Advance the study of early copper and related subject matters by providing facilities and scholarships to students for the study of copper related topics. Make grants to universities and individuals to complete carbon testing and other costly procedures relating to the expansion of knowledge about early copper use.
5. Train and provide public speakers on the subjects of early copper mining, manufacturing and use.
6. Analyze and authenticate copper artifacts for non-profit institutions (without fee).
7. Engage in research and all other tasks to advance knowledge about the early use of copper in man's history.

We believe the study of primeval copper use will significantly increase our understanding of early human development.

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GREAT LAKES COPPER RESEARCH
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THE PREHISTORIC COPPER ARTIFACT JOURNAL

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Great Lakes Copper Research
Don Spohn, Ph.D., Founder and President

NOT FOR SALE

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Hopewell Ear Spools - Ross County, Ohio

Exhibited in the 1893 World's Fair by Warren K. Moorehead

The Flying Oval Flat Tang

Unlike so many other classified points and knives, the Flying Oval Flat Tang isn't a taxonomic class. It doesn't exist, or at least the class doesn't. But, here it is in full objective reality, in the flesh and blood or at least, in copper and patina. I might just as well have called it a Winged Oval Flat Tang, or a Pregnant Oval Flat Tang. In any case it begs for an explanation.

Fig. 1
A Hardly Recognizable
Oval Flat Tang Point.

This Michigan Upper Peninsula specimen has the basic shape of a fairly common taxonomic class, the symmetrical Oval Flat Tang. See figure 2 below. Following the rules of classification, symmetrical points are classified as projectile points. Another classification rule allows for exceptions. If a specimen's blade is worn asymmetrical in knife-like use, it can be classified as a knife. Or, if the copper salts have preserved the remnants of a knife handle, wood, bone, etc. or handle wrappings, leather or fiber, we can classify a symmetrical point as a knife.

In reality, all projectile points, except for harpoons, are symmetrical. And nearly all symmetrical projectile points were probably, at least occasionally, also used for knife work tasks. Is this a knife specimen?

This little specimen is different, it is not symmetrical, but it started out as a symmetrical Oval Flat Tang. See Fig. 2 below. However, a projection like a kangaroo pouch was pounded beneath the belly of the blade. Examining the rounded edge of this pouch, we find it sharp like a knife blade. There is little doubt but that this is a knife, but for what work tasks? And if it is a knife, why do we find only one example and what is the significance of having only one example?

Referring again to the rules for classification, we find that if we recover only a single example of an object, we study and analyze the single object, then set it aside and wait to see if two or more additional specimens show up. If they do, we are free to classify them as types or varieties of types.

Fig. 2
With Pouch Removed,
We Clearly Have an
Oval Flat Tang Point

This little knife illustrates another Old Copper Complex Technology principle, Template Technology. Over eons of time favorite designs were found to: (1) best endure under the stress of use, and (2) better perform the work tasks it was designed to achieve. Some highly valued combinations of parts, traits, and sets of characteristics were chosen as templates, and employed as template technology in creating different kinds of tools. Some tanged spear points, for example, are a combination of two straight back knives placed back to back. See *Straight Back Knife*.

This specimen is the result of an experiment. The belly of an Oval Flat Tang was extended (pounded) downward to form an unusual unilateral knife blade for an experimental work task. Or the parts, traits and set of characteristics employed to create an Oval Flat Tang point were used as a template upon which they added this unusual pouch-like knife. If nothing else, this specimen proves the culture that created it was capable of experimentation.

We can also assume that the experiment was not a success. Had the experiment succeeded, we would have found numerous Flying Oval Flat Tangs, but we have not. And if we did find more, perhaps slightly modified to make it successful, this specimen would be a prototype for a new taxonomic class knife type. Failure on the part of experimentation probably explains most of the 'one of a kind' copper specimens.

On the other hand, we have much proof that experimentation was both frequent and successful. Look at a single Division, the Projectile Point Division, sub-taxonomic classes of both Tool Kind and Weapon Kind. At least 5 Genres of Projectile Points, exist: the Arrow Genre, the Atlatl Genre, the Harpoon Genre, the Dart Point Genre, and the Spear Point Genre. And we might assume that at earliest times, only the Spear Point Genre existed and that the other genres are due to successful experiments in modifying the spear point for other work tasks.

If we look further, the Spear Point Genre is divided into at least a couple dozen sub-taxonomic classes of Types and most Types have their Varieties. Varieties are sub-taxonomic groups of a Type. Varieties consist of slight modifications like steps in sockets and pinholes for rivets. Varieties are the result of successful experimentation stimulated by various needs. Slight modifications of a Type provided for a variety of additional work tasks. Pictured below (Fig. 3), we have fitted our little specimen with a prehistoric bone handle to demonstrate possible use.

Fig. 3

A one of a kind experimental knife, based on an Oval Flat Tang Point. Knife characteristics suggest possible chopping work tasks. Curated by Great Lakes Copper Research

The Seven Major Taxonomic Classes Of Prehistoric American Indian Copper Artifacts

1. Kingdoms	Plant Kingdom Animal kingdom Mineral kingdom
2. Families (Minerals)	Silver Family Iron Family Copper Family Other Families
3. Kinds (Copper Family)	Tools Kind Ornament Kind Weapons Kind Modified Copper Kind Other Kinds
4. Divisions (Weapon Kind)	Knife Division Axe & Celt Division Projectile Point Division Other Division
5. Genre (Projectile Points Divisions)	Arrow Genre Dart Point Genre Atlatl Point Genre Spear Point Genre Harpoon Point Genre
6. Types (Spear Points)	Oval Rat-Tail Type Turkey-Tail Type Serrated Type Socketed-Triangulate Type Socketed–Ovate Type Other Types
7. Varieties (Socketed-Triangulates)	Pinhole Variety Step Variety Barbed Variety Round Shoulder Variety

Further taxonomic classes include: Parts, Segments, Traits and Characteristics of whole artifacts.

EDITOR'S CORNER

Did Prehistoric American Indians Export Michigan Copper?

By Don Spohn

Abstract

The prehistoric export of Michigan copper is a classic historical concept argued pro and con by those expounding two primary opposing historical paradigms; Cultural Diffusion and Social Evolution. And both use a guessed amount of prehistorically mined copper as one argument for or against the use of Michigan copper in the Old World Bronze Age. The copper-exporting concept also pits science against popular conceptions and professionals against avocationals. Twenty-first century technology may prove which historical concept best describes what occurred to Michigan's copper in Archaic Times. See Abridged Glossary Of Terms, page 35.

Cultural Diffusion and Social Evolution Paradigms

There are several paradigms, which explain the rise of civilization. Most people expound variations of only two, cultural diffusion, and social evolution. One or both of these two paradigms explain the rise of copper technology in the New World. These two models are summarized as follows.

Social evolutionists theorize ancient cultures in diverse regions of the world evolved independently of each other. They believe that phenomena such as taming fire, chipping stone, inventing of pottery, the wheel, writing and other innovations arose in parallel evolutions. Further, they reason that cultures evolved from non-organized savages to primitive barbarian societies of nomads and herders. And these early societies evolved further into militant town and nation states. The final stage of evolution became our industrial society. The social evolutionary theory grew out of Darwin's biological theory of evolution.

Cultural Diffusionists, on the other hand, believe that innovations, such as significant inventions, had a single origin. Pottery or the bow, for example, was probably invented by a single man or family, and then passed from culture to culture by imitation. Diffusionists do not rule out parallel innovations of ideas or inventions, but consider them very rare.

In United States, it has come down to pre-Columbian contact. The evolutionists believe the Aztec, Maya, Inca, Mississippian, Hopewellian and other indigenous cultures or complexes evolved in isolation from Europe, Asia and Africa, and to a lesser degree, even from each other. Diffusionists believe that those in the Old World influenced cultures in the New World; perhaps repeatedly, often, over long periods of time, and probably from several Old World cultures.

Social evolution requires more time than does cultural diffusion, and Evolutionists are scientists, while Diffusionists are mostly laymen. In the past quarter to half century, science has moved slightly closer to the cultural diffusion paradigm. In the New World the controversy now swirls around pre-Clovis cultures, the origin of First Americans and the possible export of Michigan copper to help fuel the Old World Bronze Age.

How Much Copper Was Mined From Prehistoric Michigan Mines?

During the middle of the 19th century mining engineers, prospectors and copper speculators poured into Michigan's Upper Peninsula. Looking around, they noticed ancient pits and suspected prehistoric mining activity. In due time several of these pits were excavated and huge copper boulders were recovered together with a few copper artifacts and a handful of crude mining tools.

Perceiving that ancient miners had an uncanny instinct for locating copper, every successful modern copper mine was located over one or more prehistoric mining pits. Eventually miners, engineers and students of copper attempted to estimate the amount of copper mined in prehistoric times.

Fox (1911: 88-90) estimated that at the very least, ancient Indians mined 35,000 tons, which he said, *"left a tremendous amount of copper unaccounted for."* Fox further stated, "From the extent of the workings on Isle Royale, this estimate is extremely conservative. An estimate of 1,000,000 tons would appear more nearly correct." He further ventured that those who argue that the amount is probably 2,500,000 tons might be justified.

Du Temple (1965: 15-17) states "It is estimated that 500 million pounds to perhaps more than a billion (1.5 billion) pounds of copper were mined prehistorically in the Lake Superior area." And he stated, "*Where this copper went is still a mystery*."

Fox, Du Temple and many others were referring to the fact that if we add up the copper artifacts found to date, they might weigh a small fraction of the total estimated weight of the copper excavated by prehistoric miners. Diffusionists often connect this New World mystery with an Old World enigma. Some wonder where Europe, Asia and Africa found adequate copper to fuel the Bronze Age.

The problem is not a simple one. Many believe Old World mines provided ample copper ore to sustain the Bronze Age. American Archaeologists disagree with Diffusionists, and as Martin (1999: 20) succinctly put it "To my knowledge there is no evidence whatsoever for pre-Viking contacts between Europeans and North American Natives."

The debate, swirling around a guessed amount of prehistorically mined Michigan copper, is not as simple as copper is missing from Michigan, therefore, it must have wound up in the Old World. Many assumptions must first be made. Diffusionists' unproven assumptions may include the following:

(1) An assumed amount mined copper.
(2) An assumption that Indians could not have used all of the supposedly mined copper.
(3) An assumption that copper is, therefore, missing.
(4) An assumption that the missing copper is no longer in the Americas.
(5) An assumption that the Old World Bronze Age cultures knew of or found out about Michigan copper.
(6) An assumption that Old World Bronze Age people were capable of sailing to the Great Lakes area.
(7) An assumption that Old World people were capable of exploiting Michigan copper, finding, mining and processing it economically.
(8) An assumption that Old World cultures were successful in shipping copper from the Great Lakes area to the Old World.
(9) It is, therefore, assumed that missing Michigan copper helped fuel the Bronze Age.

As Diffusionists have not proven their assumptions, it isn't technically necessary for Evolutionists to disprove them, but some of the following assumptions are pertinent to the argument.

(1) Diffusionists over-estimated the amount of copper mined during Archaic times in Michigan, or
(2) The missing copper remains in some undiscovered location.
(3) That Bronze Age people didn't know about Michigan copper; or
(4) Didn't need Michigan copper to fuel the Bronze Age, having sufficient amounts of their own; or
(5) Bronze Age cultures were not technologically capable of exploiting Michigan copper; or
(6) Bronze Age cultures could not economically exploit Michigan copper and therefore,
(7) Michigan copper was not exploited by Old World cultures to help fuel the Bronze Age.

The Evolutionists' arguments boil down to two major points: (1) the Diffusionists' overestimated the amount of copper minded anciently in Michigan and (2) We have no proof that any Old World culture (prior to the Vikings) explored any part of the Americas or knew of and exploited Michigan copper.

Conclusions Based On Logical Analysis

Most archaeological data and analyses are based on the excavation of gravesites and old surface find collections often assumed to be mortuary copper. Collectively, this copper cannot come close to explaining prehistoric mining activity. However, over the last 35 years or so, a new reservoir of prehistoric American Indian copper artifacts has arrived on the scene – metal detected copper.

An analysis of this new reservoir of copper is significant to the debate in two respects. First, the new reservoir of prehistoric Michigan copper is huge. It is many times over, greater in numbers and weight than all previous prehistoric American Indian copper artifacts combined. Second, this enormous group of artifacts was recovered from a tiny part of a huge potential site or sites. This leads us to believe there are hundreds (perhaps thousands) of copper artifacts remaining in the ground for every one recovered since 1492.

If we are correct, social evolutionists need not minimize the productivity of ancient mines for the sake of their argument. Cultural Diffusionists were probably correct or close to being correct in estimating the productivity of ancient mines. However, the missing copper, in the form of prehistoric copper artifacts, may still be in the ground.

On the other hand, if we look at all the facts, especially those in the Old World during the Bronze Age, we may see some logic in the argument for an Old World presence in the Great Lakes area during Archaic times. Bronze age rulers clearly had the technology, ships, trained sailors, and experience to locate, exploit and ship home tons of copper from lands as far away as the Americas.

Bronze age copper had great value regardless of its location. Known copper mines were controlled and jealously guarded by Bronze Age Lords. And possession of these mines made their owners very rich. The discovery of new mines free for exploration might make others just as rich. Based on facts and simple logic, Michigan copper might not have been overlooked.

And then we have the great coincidence. Most Prehistoric American Indian copper artifacts were produced during the American Archaic times, which roughly corresponds to the Old World Bronze Age. And as the Bronze age ended in the Old World, the production of copper artifacts declined in the Great Lakes area Woodland

period. Still, although we have much evidence, no proof exists that Michigan copper was used to help fuel the Bronze Age.

Sometimes technology catches up with contending theories. And today we stand at that crossroads. And in the end we'll smoke a peace pipe and move together in the direction technology takes us. Science is now capable of fingerprinting copper. Samples from most copper mines around the world, modern and ancient, have been tested for their trace elements. Dozens of trace elements like magnesium, silver, led, zinc, mercury, gold, arsenic, iron, nickel, etc. can be quantified down to a thousandth of a percent. We can, therefore, test the trace elements in Bronze Age ingots and artifacts then fingerprint them to the mine of their origin.

European and Asian laboratories are already testing the copper and tin in Bronze Age artifacts to determine the source of their metals. We have a few native copper mines in our New England states, the Appalachian, the Northwest Coast, Alaska, Canada and other places. New England states recently tested local copper artifacts to see if their copper came from Michigan or from local mines. Some came from Isle Royale and others came from local mines.

We have have beyond assumptions and assorted evidences. If we theorize that Michigan copper was used to help fuel the Bronze Age, it is time to test the theory, prove it correct or incorrect. And it is time to accept and respect the truth, then move on to new challenges.

A Copper Zoomorphic Effigy Of A Horseshoe Crab Carapace

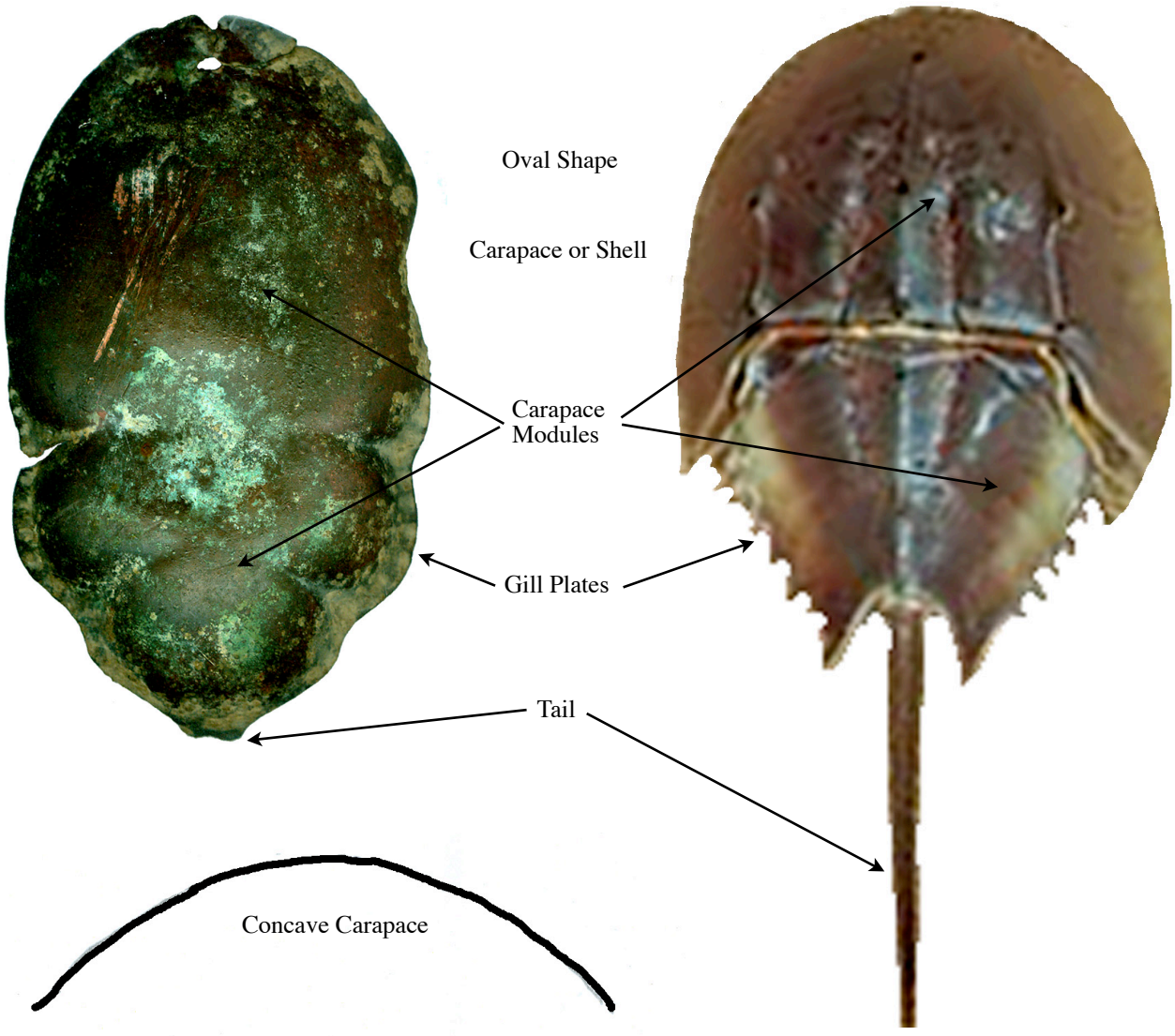
Scott Reed from Roger City, Michigan ordered a load of gravel for his driveway and while spreading it around, he made an interesting discovery. He noticed something in the gravel that looked different. Picking it up and examining the object, it appeared to be copper with designs pressed into it. Scott did two things: first, with the help of his family, he searched his newly delivered gravel to see if he could find anything else, and he did. He found a little odd shaped object composed of a heavy white metal, which he thought might be silver. A local jeweler later confirmed that it was indeed, silver. It has the color, weight and hardness of native silver.

Second, Scott called us here at Great Lakes Copper Research and made arrangements for me to analyze the two objects. Scott contacted the gravel company that made his delivery and based on what they told him, he believes the gravel was probably originated at the Ocqueoc Spit.

Large spits, found primarily on the North-east side of the southern peninsula of Michigan, were formed within glacial Lake Algonquin (Krist 2001: 1-16). Various cultural remains have been recovered from spits along the shores of ancient Lake Algonquin, todays's Lake Michigan and Lake Huron. After talking with the gravel pit owner, Scott believes cultural artifacts have been privately recovered at their source, the Ocqueoc Spit.

A Copper Zoomorphic Effigy Of A Horseshoe Crab Carapace

Pictured below is a genuine copper artifact, probably Hopewell, depicting a Horseshoe crab. Scott Reed (Roger City, Michigan) found this artifact in his driveway after a gravel delivery. We find 6 traits on the effigy which corresponds to biological parts of Horseshoe crabs.



Krist, Frank Jr.
2001 Paleo Wind 11,000 BP Directions Derived From Lake Spits In Northern Michigan. Geomorphology 38 (2001) 1-18.

A Copper Zoomorphic Effigy Of A Horseshoe Crab Carapace

After finding the Horse Shoe Crab effigy, Scott scratched around his driveway to see if he could find anything else. He picked up an odd shaped heavily patinated object. After cleaning it, he found that he'd found an apparent native silver nugget, and it resembled a walking turtle or possibly a snail. See below.

Turtle-Like Silver Silver Nugget

Provenience: Rogers City, MI
Thickness: 4mm Width: 29 mm
Length: 45 mm Weight: 17 g

This copper effigy is an enigma. Horseshoe crab species are not native to Michigan. Yet here is an effigy of an obvious Horseshoe Crab, hammered out in detail with a hole punched in one end to hang around the neck as a pendent, emblem, or insignia. But, where did Michigan Indians find a model to use as an effigy template?

While it is true, horseshoe crabs were once native to Michigan, that was long before man arrived on this continent, or this is what science teaches. In considering possibilities, we must examine six conceivable hypothesis.

Hypothesis One

The Horseshoe Crab species did not actually go extinct as far distant in the past as we presently believe. We do not consider this a viable theory.

Hypothesis Two

Men have existed in Michigan for at least tens of thousands of years before our anthropological paradigm currently provides. We do not consider this a viable theory.

Hypothesis Three

The Hopewell, or Indians representing some culture after the Hopewell, found fossils of Horseshoe Crabs and created a copper effigy using Horseshoe Crab fossils as a working template. We consider this a possible, but improbable theory.

Hypothesis Four:

Indians from MIchigan traveled to the East Coast, saw Horseshoe Crabs and imitated one in copper. We consider this a viable theory

Hypothesis Five

Indians from the East Coast, familiar with Horseshoe Crabs migrated to MIchigan. We consider this a viable theory.

Hypothesis Six

This copper zoomorphic effigy of a Horseshoe Crab was hammered out by East Coast Indians and traded to Indians living in Northern Michigan. We consider this a viable theory

Was Copper Discarded Prehistorically?

Abstract

Students of copper have long marveled over large numbers of worked nuggets, 'modified coppers,' recovered in caches, found together with completed artifacts or unearthed individually. Modified coppers, weighing from less a tenth of an ounce to multiple pounds, prompt many questions. They are found in large numbers. Most exhibit the 'mark of man' (hammer, chisel or roll marks). Most appear flattened and compacted, while some appear too small for utility, yet these worked nuggets were obviously conserved by ancient Indians. In addition, modified coppers are: recovered from activity sites, seldom found in graves and little noted or studied by archaeology. At Great Lakes Copper Research, we have constructed a number of hypothesis to help explain the existence and purposes of these and other eccentric 'scrap-like' coppers. See Abridged Glossary Of Terms, page 35.

For the past 20 to 30 years, modified coppers are by far the most commonly recovered copper artifacts (Spohn 2007: 21). All copper artifacts can be divided into two classes: *Fig. 1*

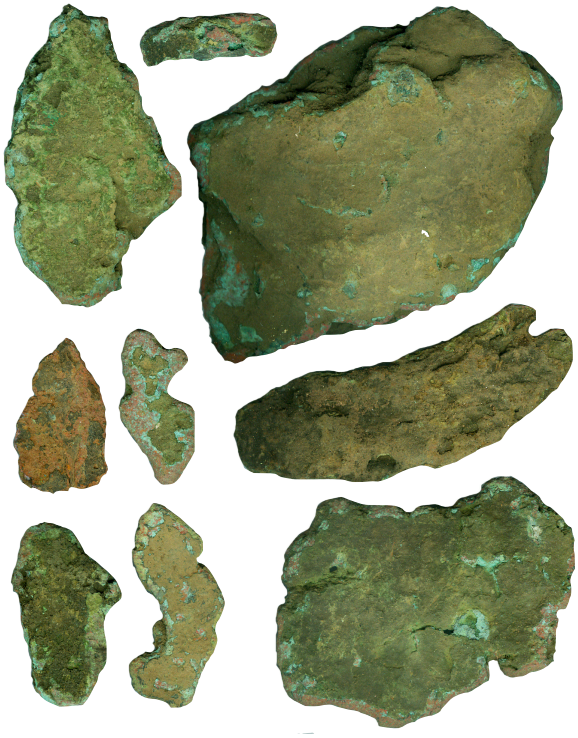


Fig. 1 Base Units

Base Units range in size from a tenth of an ounce multiple pounds.

(1) completed artifacts and (2) modified coppers, specimens exhibiting the mark of man (tool marks), but lacking completion (Binford 1961: 9, Brown 1910: 161-234, Popham 1954:3-20 Martin 1993: 132). Ninety-some percent of modified coppers are found on activity sites. Perhaps 1 percent or less are recovered from gravesites (Spohn 2006: 7-9, Livernash 2006: Personal Communications).

We hypothesize (I) that most modified coppers represent unfinished stages of production. But the vast majority (scoured units, base units and bars), the early stages of production, provide us with little evidence of what they might have become when completed. Later stages of production, preforms and blanks, do suggest the intended end product. Other sub taxonomic classes of modified coppers include: miniature objects, effigies, extemporaneous tools, copper boulders, fragments, waste, damaged objects and more (Spohn 2007:26-32). See Modified Copper and Stages of Production, page 24.

The most commonly recovered sub-taxonomic class of modified coppers are 'base units,' one of the beginning stages of production. See Figs. 1-9 Page 33. Base units are various sized nuggets of mined copper compacted and prepared for storage and shipping. Smallest base units weigh only a tenth of an ounce, while large base units may

may weigh multiple pounds. A base unit's dimensions determined its eventual size as an artifact. And every implement and ornament passed through the base unit stage of production.

A bizarre, but common sub-taxonomic class of base units are 'mini units,' which are sometimes likened to flint knapping scraps. Mini units are like base units in every way, except in size. They never weigh more than a tenth of an ounce and often weigh much less. See figs. 2 & 3, and Appendix 1. Mini units are found in caches and with other sub-taxonomic classes of modified coppers. Surprisingly small, some are a little like lima beans in size, while others are as tiny as a pea. Rarely, the tiniest are as diminutive as a large grain of rice. Still, they were worked and show the mark of man. Even so, some students of copper have argued that since prehistoric Indians could not truly fuse two pieces of copper together, these tiny pieces could only be scrap. Some other possible options for mini units included a type of coinage (Neiburger 2010: Personal communications) or for spiritual purposes (Trevelyan 2004: 1-2).

We occasionally observe another odd group of artifacts among the 'Damaged-Object,' sub-taxonomic class of modified coppers. These are worn out and broken pieces, wadded up, twisted up, folded up, bent up, crumpled up, loosely pounded together or otherwise slightly compacted specimens. Occasionally two or more pieces are lightly hammer fused together. They remind us of paper wadded up to be thrown away. See fig. 4.

These crumpled, broken pieces are usually identified as discards. And for the most part, it is thought that copper objects, similar to objects produced from other mediums, were occasionally damaged beyond repair, used up or discarded for other reasons.

For whatever causes miniature pieces of copper were collected and pounded, we hypothesize (II) that prehistoric American Indians conserved the tiniest pieces of copper and pounded them into mini utilities. And we further hypothesize (III) that discarding copper, unlike throwing away most other medium scraps, was probably taboo. It likely violated their copper technology application, transgressed their principles of conservation, utility, and environmental adaptation while defiling cultural and spiritual perceptions about copper. But this is not to say it was probably taboo to sacrifice bits of copper as Indians commonly sacrificed pinches of tobacco.

Copper And Spiritual Symbolism

Copper has many unique qualities recognized and appreciated by ancient copper cultures. All mediums used by primitive man had useful traits. Chert, for example, is extremely hard and appreciated for its ability to form exceptionally sharp blade and bit edges. Softer copper, however, was often used to break apart and shape harder flint tools. Most useful mediums have a few desirable traits. Copper has many. We hypothesize (IV) that some of the following twelve unique characteristics may have encouraged early man's perception of copper as spiritually symbolic.

(1) copper can be pushed or drawn out with a hammer to take nearly any desired form, creating new realities. (2) Copper can be renewed, given new life by pounding an old piece into a new creation, perhaps representing new birth. (3) Old copper or raw copper can be divided into two or more new pieces as in giving birth and representing fertility. (4) Copper becomes harder when pounded, made different, able to perform various desired work tasks. (5) Copper softens when annealed, placed in fire, likely symbolic of death and rebirth. (6) Copper has the color of fire, possibly representing death

Continued on page 18.

Mini Units

Mini units may include, various stages of production, scoured copper, base units, bars, preforms, and blanks. They may also include extemporaneous tools and effigies. For the most part, mini units include most modified copper sub-taxonomic classes, but at a tenth of an ounce or less. The majority are tiny base units. We hypothesize that mini units and occasional slightly larger modified coppers were created for emergency copper tool kits and hung from the necks or waists of most copper culture adults. Effigies were included as totems or talisman.

Fig. 2
Mini Units

Mini Units, Fig. 2, are curated by Oliver N. Anttila form Thunder Bay, Canada. Oliver has identified all 25, sorted from different caches, as miniature thumb nail scrapers recovered form the Doug Lake area.

The average weight is only 2.5 g or 0.088 ounces each, a dozen per ounce. Found scattered among cache mates or lost individually along paths between activity sites, most would call these scraps or throw aways, too diminutive for any practical use.

Mini Units show the mark of man. But few show as much work as do these. Mini Units (Fig. 1), were made for or used as tools and are classified as extemporaneous tools, a sub-taxonomic category of modified coppers. Extemporaneous tools might be later pounded into more permanent specimens. Alternately, these miniature thumb scrapers may have served in emergency copper tool kits, hung from the necks or waists of every OCC adult.

Fig. 3
Mini Units

Diminutive or mini unit tools curated by Oliver Anttila. These mini units range from base units, bottom row to preforms, second row from bottom, to blanks, third row from bottom, to finished artifacts. These specimens are exactly what we might expect to find in an emergency copper tool kit hung from around the necks or waists of copper culture people.

Fig 3a
17 copper beads on the surface of a Dime

Fig 3b
Tiny Bead
Width: 1/16”
Weight: .04 g
Weight .0014 oz

Figure 3a pictures 17 beads laying on the surface of a dime with room for many more. Figure 3b pictures a tiny bead sitting on the preverbal head of a pin.

and destruction or rebirth. (7) Copper is the color of the sun and like the sun, it was perhaps perceived as a symbol of renewal. (8) Copper is the color of blood and red ochre, symbols of death and the after life. (9) Copper comes from underground and might represent the under ground world of the dead. (10) Copper can be buffed to shine and glitter like the sun, which it may represent. As a symbol of the sun, copper might also have represented the heavens and the heavenly spirit world. (11) Copper can be smoothed and buffed to reflect light. It can reflect the sun's rays to spotlight an object or like fire, light up a darkened area. (12) Highly buffed, mirror-like copper can reflect the face or image of one looking into its polished surface, perhaps perceived as revealing or capturing one's soul.

Others have concluded that copper was an important spiritual symbolic medium for prehistoric American Indians. After studying 12,000 pieces of grave copper, Trevelyan (2004: 1-85) concluded the following: (a) Native copper was the most ritual medium used by prehistoric Indians across Eastern North America. (b) Medium (copper) was more important than motif (the actual artifact). (c) Throughout much of Eastern North America many aspects of copper-use remained remarkably consistent for thousands of years. (d) Trevelyan found it clear that when copper objects were produced in quantity, copper-work was fundamental in dealing with social and ecological stress throughout the Eastern Woodlands. (e) Trevelyan agreed with Levine (1957: 960) that among hunter gatherers, a work of art (any copper artifact) is the thing that it represents. (f) She also agreed with Lee (1960: 189) that the very act of creating something from raw material involved much more than a simple symbolic representation. It was perceived as an actual transformation from one type of reality (raw copper) into a new reality, (the new born artifact). And the new creation (new reality) actually became whatever it was perceived as in raw copper and created for by the artisan.

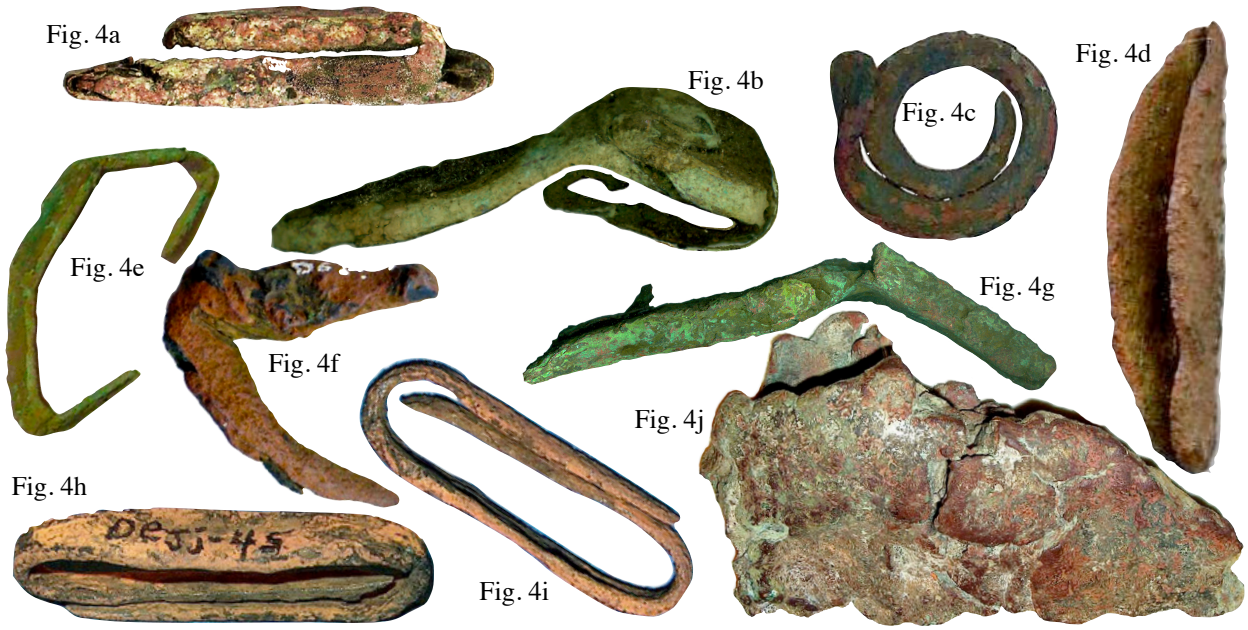
Considering the possibly perceived spiritual-symbolic nature of copper, prehistoric American Indians might have held the discarding of copper taboo. Copper, all copper owned by Archaic and Woodland Indians and even later Indian cultures, can be divided into two possible categories: (1) Spiritual-symbolic and (2) utilitarian. And some, like Trevelyan, Levine, perhaps Lee, and others, believe all copper, even implements like knives, spears, axes and hammers, retained their spiritual-symbolic status in addition to utilitarian expectations or work tasks actually performed.

Copper And Utility

If copper cultures established taboos against discarding copper, when did it happen? Was the practice passed from culture to culture down through the ages? And perhaps more importantly, in what manner were likely scraps dealt with? And how were potential wastes handled? Trevelyan believes basic ideas about copper and its ritual significance developed early on in Archaic times and continued in practice down into the historic era (Trevelyan 2004: 22). Others, like Trevelyan, argued that since most copper was associated with burials, it was created for that purpose or to give status to copper owners during their life (Binford 1962: 222-223). Many pieces were thought to be ceremonial rather than utilitarian.

Penman examined the nearly 1,000 pieces of copper found in the Hamilton collection for edge angles and surface wear to determine use. He concluded that the vast majority of pieces found in the Hamilton collection possessed signs of wear and tear created through utilitarian use (Penman 1977: 3-14). After an informal examination of more than 4,000 utilities between 1980 and 2013,

Crumpled Scrap-Like Specimens



Pictured above are one kind of scrap, crumpled scrap, waded up like a piece of paper to be thrown away. Most people classify or refer to these specimens as scrap. Upon closer examination, we find that some of these items, like thousands of similar items, are not scrap at all. Listed below are the real non scrap work tasks for some of the items pictured above. Flawed base units, bars, preforms, blanks and completed artifacts were broken apart by ancient craftsmen to create multiple smaller implements and ornaments. Fig 4e & 4e.a are curated by Doug Miller. Others in Fig. 4 are curated by Oliver Anttila.

Scrap To Non Scrap

Fig. No.	Work Task
4a	Bar broken at a flaw point or deliberately separated to create two objects
4b	Preform with impurities and flaws
4c	Serpent effigy
4d	A sleeve for repair work
4e	Waded up damaged knife

Fig. No.	Work Task
4f	Fishhook blank, damaged
4g	Bar broken at a flaw point or deliberated separated to create two objects
4h	Neatly folded bar
4i	Neatly folded bar
4j	Base Unit with several flaws

Fig.4e.a

Fig. 4e.a is the crumpled up knife Fig. 4e after it was restored by finder and curator, Doug Miller.

we at Great Lakes Copper Research agree with Penman. Most copper tools and weapons were designed and created for utility. And nearly all utilities were designed with specific work tasks in mind. After creation, most tools were used for the purposes created and we theorize that they were often employed for additional work tasks. We do not, however, wish to detract from the spiritually symbolic importance of the copper medium or the finished product as defined by Trevelyan.

In an examination of prehistoric copper artifacts, we find many, perhaps most, are small, under 3 ounces in weight, while many are little, 1/10 of an ounce to 3 ounces. Mini units, together with some completed artifacts, are in the tiny class, less than 1/10 of an ounce

It must be noted that little implements and ornaments including points, knives, awls, scrapers, drills and other little utilities might be produced from nuggets weighing less than half an ounce and from even smaller mini units, all less than 1/10 of an ounce. Nuggets of less than a tenth of an ounce were used to produce tiny pendants, beads and other small objects. See figs. 2 & 3. And then we have tiny fishhooks, fishing gouges, awls and other objects.

Our emphasis on tiny copper artifacts is due to our research on the possible practice of throwing away or discarding copper. And although the average copper artifact may weigh less than 3 ounces, many weigh more than 3 ounces and specimens weighing more than a pound each can be found in most larger collections.

Finally, we hypothesize (V) that leather bags of copper were hung from around the necks or waists of copper culture peoples during extended trips for emergency uses. On seasonal migrations, war parties, hunting parties, etc. implements were sometime lost, damaged, warn out, stolen or otherwise made unusable. The people's existence or perceived existence may have depended on replacing these implements. And the availability of various mediums might be less than dependable. But if every person possessed some skill in working copper and each carried a copper survival kit, disaster might be avoided.

Using a copper survival kit, people might create small crude imitations of larger, more sophisticated tools created by specialists at more permanent residences with professional tools. All that was needed to work annealed emergency kit copper was two ordinary stones (hammer and anvil) found almost anywhere. Implements produced from emergency copper tool kits might include awls for sewing, scrapers, tiny knives, points, gouges, fishhooks, etc. Effigies are commonly found with mini units and at least one effigy was probably included in every emergency tool kit.

Never knowing when an emergency might arise, every adult may have carried emergency copper tool kits at all times. Our hypothesis may also explain why modified coppers are found in caches on activity sites and individually on paths between activity sites (Livernash 2006: Personal communications). Hypothesis (V) further explains why mini unit caches are sometimes found in small leather or fiber bags (Martin 1993: 3-4).

Thousands of years ago some Indians surely used copper for utilities and spiritual purposes not conceive by us today. But, if we knew of such prehistoric practices, we might describe some of them as throwing away copper. An old collector, one of the first to explore ancient copper pits with a metal detector, told me a story. While metal detecting ancient mining pits tailings, he found a small lump of raw copper in every tailing, except one. And he supposed one also existed in that tailing, but he somehow missed it. He explained that each nugget was buried about 2 to 3 inches deep in the tailings. I asked if he found significance in

these findings and he confessed that he did. He concluded that these little nuggets were planted by prehistoric miners after exploiting the copper in each pit. He supposed their purpose was sacrificial or a kind of reseeding after the harvest. In either case, recoveries by a less thoughtful man might be seen as discards.

Finally, prehistoric Indians may have viewed copper as we view silver and gold today. The analogy is far from perfect. Currently, tiny bits and filings of silver and gold can, unlike ancient copper, be combined to form usable pieces of any size. But, aside from ancient spiritual perceptions about copper, or perhaps in part because of them, our ancient ancestors may have perceived economic value in the tiniest natural nuggets or production scraps.

If not used up locally, they might be traded to those of like mind, to others who might find utility or spiritual value in the tiniest of nuggets. And being of like mind they, too, may have observed possible cultural taboos against discarding copper. It is unlikely that copper cultures wasted copper.

Conclusions And Recommendations

Prehistoric American Indians may not have practiced the custom of throwing away copper scraps and waste copper. First, we have proved that tiny coppers exist in the tens of thousands, if not more. The existence and ancient curation of mini units prove perceived implement and ornament utility. The reality of many mini implements and ornaments prove they were created and conserved by prehistoric American Indians. Second, but just as important, if red metal was perceived by our ancient ancestors as gifts from the gods, they may have viewed throwing it away, however minuscule in sizes, as likely to anger the gods. And arousing the gods anger defeated one of their primary purposes for utilizing the copper medium.

We are restrained somewhat in our research despite the fact that hundreds of thousands of modified coppers are available for study. We are restrained because so few modified coppers are recovered archaeologically. This is true because: (1) Most archaeologically recovered copper is found at mortuary sites: i.e. Riverside cemetery site (Hruska 1967: 145-60), Reigh cemetery site (Baerreis 1957: 244-247), Osceola cemetery site (Ritzenthaler 1957: 186-203), Oconto cemetery site (Ritzenthaler 1957: 222-243), Menominee mortuary site (Quimby 1957: 37), Chautauqua mortuary site (Martin and Pleger 1992: 160-173), Petaga Point cemetery site (Bleed, Peter 1969: 45-51). And there are others. (2) Little modified copper is recovered from grave sites. (3) Most, up to 99% or so of the modified copper recovered to date, is found with metal detectors by collectors on activity sites. (4) Collectors do not preserve, record or interpret archaeological records. We, therefore, lack data (archaeological histories) normally provided by archaeology and must, therefore, investigate and hypothesize based on information gleamed from analyzing the artifacts themselves.

It is important that while great numbers of modified coppers remain in the ground that they be excavated together with their archaeological records. Modified coppers are far more than uncompleted implements, ornaments and scrap. And we can never understand ancient copper cultures until we understand the most common artifacts they produced and conserved, modified coppers. Excavated archaeologically, modified copper may provide us with vital data unavailable in the study of completed copper artifacts. We have modified coppers in abundance. We need archaeological attention.

We observed many tiny base units, 1/10th of an ounce or less in weight. Many theorized mini units were too small for utility. We hypothesized (Hypothesis III) that usable mini utilities were created from mini units. Searching through more than a thousand mini base unite, we found several mini utilities. See Figs. 2 & 3. We further hypothesized (Hypothesis V) that some or many, and possibly most ancient copper culture people carried leather or fiber bags of mini units around their wast or neck as emergency copper kits. One such bag-like kit (too large to be carried) was found and reported by Suzan Martin. Based on our hypothesis, we predict more and smaller ones will be recovered. See Modified Copper And Stages Of Production starting on page 24.

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The Purpose Of Our Prehistoric Copper Artifact Journal

We, the editor and readers of this journal, are all students of prehistoric American Indian copper. We want to know all we can about prehistoric activities and perceptions involving copper: prospecting, mining, production technology, trade, and the perceived spiritual symbolic qualities of both the copper medium and products manufactured from copper. There are many ways to distribute knowledge about the early copper industry and this copper journal is one way.

A wise man once said, "half of what I know is wrong. I just don't know which half." I may write as if I am very sure of myself and all the data I have analyzed, but I am not that wise man. Probably 60 percent (perhaps more) of what I think I know about ancient copper is wrong. Here at Great Lakes Copper Research, we are always reevaluating data, changing and refining our interpretation of facts.

Although we have a big library of books, some published more than a hundred years ago and others written this year, we base most of our research on actual copper artifacts and believe that all copper specimens have a story to tell, truth to reveal, if we can only understand what they are willing to divulge. And for that reason most of our research revolves around and is based upon techniques for rendering truth from prehistoric copper artifacts. Indeed, we spend much time developing and perfecting procedures and honing skills to do just that.

We use more information gathered by men and women like yourselves, field workers, collectors, and archaeologists, than we do from books, which we do not ignore. We need your help!

A Wisconsin Flat Tang Ovate Spear Point
5 5/8 inches in length - Curated by Great Lakes Copper Research

DECLARATION

The officers of Great Lakes Copper Research and your editor of the Prehistoric Copper Artifact Journal, like most of our readers, and nearly all serious students of copper, confirm the following: (1) Our respect for all laws, even those that we find wanting, and those based on bad research and false assumptions; further, we urge all others to do the same, until such laws are changed; (2) we respect private property; (3) we respect history, native Americans, and the ancient artisans who crafted the copper artifact we collect and study; (4) we respect the conservation of all copper artifacts, their provenience, and the private property sites which produce them; and finally (5) we respect those who disagree with us.

Workshop Materials

Seven Stages Of Production
From Raw Copper To Completed Artifact

Stage One Raw Copper | *Stage Two Scoured Copper* | *Stage Three Base Unit Phase III* | *Stage Four Bar* | *Stage Five Preform Step I* | *Stage Five Preform Step III* | *Stage Six Blank Level II* | *Stage Seven Completed Artifact*

Hypothesis I - Modified Coppers Are Stages Of Production

Observation	Hypothesi	Experiment	Results	Predictions
(1) During the past 35 years many thousands of crudely worked copper nuggets, 'Modified Coppers,' showing the mark of man, but uncompleted artifacts' were recovered in Michigan, Wisconsin, Ontario and other locations. (2) Although more numerous than any other copper artifact, the purpose and position of modified coppers in prehistoric copper cultures is questioned and	Most modified coppers are stages of production in the prehistoric creation of completed copper artifacts.	Sort, measure, weigh, examine, and analyze several thousand modified coppers to see if they fall into like groups that resemble stages of production. n = 8,009	(1) Most modified coppers fell into fairly distinct stages of production. (2) Five primary stages of production, Scoured Copper, Base Units, Copper Bars, Preforms, and Blanks were identified. (3) Several other taxonomic classes of modified copper were identified.	Nearly all future recovered specimens of modified coppers will: (1) Fall into specific, well defined stages of production; or (2) Fall into other specific, well defined taxonomic classes of modified copper.

Modified Copper And Stages Of Production

See Abridged Glossary Of Terms, page 35.

1. Observations

Beginning in 1903 and even before, but especially after 1980, we at Great Lakes Copper Research as well as other students of copper, have observed the following.

More copper artifacts (miner's hopper excepted) have been recovered since 1980 than from 1492 to 1980. The vast majority of these artifacts were recovered by metal detecting and more than 50 percent of those recovered are modified coppers. Modified coppers are specimens that show the mark of man, but are not completed artifacts. And as most copper studied in archaeology is from burial sites and because modified copper is recovered mostly from activity sites, modified copper has received little attention in the field of archaeology.

Yet, as early as the beginning of the last century, Willoughby mentions modified coppers in mounds (Willoughby 1903: 57). Brown, (1904: 57) described copper fragments, cut up and transported to local workshops in places like Two Rivers, Sheboygan, Green Lake and elsewhere for the construction of implements and ornaments. Brown also mentioned: "chips, scales and fragments … and lumps of metal exhibiting tool marks." In 1929 George West (1929: 118) informed us that catches are often associated with partially finished implements and fragments. Popham (1954: 3-20) mentions "46 indeterminate catch fragments" from Ontario, Canada.

Louis Binford (1961: 7-10) marveled at the first modified coppers brought to his attention: "Thirty-one pieces of copper scrap were included in the catch. All of the fragments have been pounded and worked at least on some edge. They give the appearance of being fragments of an artifact that has broken apart at annealing junctions. Although such a situation was suspected, no reconstruction was possible. That is, pieces could not be fitted back together. None of the fragments could be considered as complete tools."

Upon discovering his first modified copper specimen, Robert Ritzenthaler (1963: 15-16) reported "It is 2 & 1/2 inches wide, 1 1/4 inches high and 3/8 of an inch at its greatest thickness ... shows evidence of hammering ... one surface has a folded layer ... beaten into a more compact shape and eliminating sharp edges for convenience of transportation ... this piece should not be confused with float copper which occasionally shows evidence of battering (by the glacier) ... It might be an ingot is well taken ... a weakness in the ingot theory is that if this were a consistent practice one would expect to find more examples."

David Hoxie (1980: 25-30) analyzed the Late Woodland copper assemblage from the Sand Point Site, Baraga County, Michigan. He described modified pieces as follows: "The overall assemblage appears to be indicative of a moderately sized copper workshop ... 232 copper items recovered ... 64 unmodified nuggets ... 121 cold hammered chips, presumed wastage ... copper (pounded) chips recovered tend to be smaller than the finished artifacts."

Martin (1993: 120-170) described the contents of an early craftsmen's "factory" or bag of implements, discovered by collectors in 1987 with metal detectors. Martin describes part of the catch as follows: "The catch consisted of a carefully curated bundle or deposit of tools, 'partially worked nuggets,'... someone carefully collected and deposited thousands of unworked and partially worked fragments of copper ... materials from the catch are remarkable in their standardized

appearance ... from the largest awl or preform to the smallest bead preform."

Throughout literature we have vague references to fragments, chips, shavings, scales, waste, scrap, partially worked artifacts, nuggets, pounded nuggets, and of late, bars and blanks. Collectors often call them poundings. Halsey (1983: 35) notes that "… few have explored questions concerning where copper was reduced to some transportable form and what that form was."

The existence of modified coppers, artifacts showing the mark of man (tool marks), but still uncompleted, is an established fact. It is becoming clear that modified coppers were rarely found among grave goods, even at sites where completed copper artifacts were commonly recovered. However, James Fitting (1954: 33-39) mentions nuggets, two silver and one copper, taken from Converse Mound in Grand Rapids, Michigan. On the other hand, collectors using metal detectors are finding modified coppers in abundance on activity sites (Livernash 2005; Spohn 2006: 7-9).

The purpose of this research is to answer Halsey's question; In what form was copper transported? We know copper was transported from copper bearing areas in the Keweenaw Peninsula and Isle Royale to other parts of Michigan and especially to areas in Wisconsin. Old Copper Complex Technology specimens have shown up in Quebec, Ontario, and Manitoba, Canada, along the US Eastern Seaboard, possibly as far south as Florida and as far west as the Dakotas, and perhaps further abroad in North America.

Prehistoric American Indians have shipped copper for several millennia and in the process, they undoubtedly learned to ship it as safely as possible. Robert Ritzenthaler (1963: 15-16) observed "... beaten into a more compact shape and eliminating sharp edges for convenience of transportation ..." We also know that freshly mined copper, unlike float copper, is sprawling with many extensions, has sharp edges all around, is difficult to handle and hard to store.

James Griffin (1954: 130-133) described a huge copper cache opened by Edward Hulbert in Calumet, Houghton Co., Michigan. Hulbert, who was involved in 19th century mining in Michigan's Upper Peninsula, described the ancient manmade storage pit as 30 feet across and 10 feet deep, containing about 20 ton of copper. "... we found birch bark moccocks (baskets) of an oblong form (sic) used for (the) transportation of the copper product (modified coppers) to its place of deposit on the 'catch;' skeins of 'wattap' or narrow flat threads of spruce root, sheets of birch bark for repair of moccocks (copper storage baskets)."

Nor did Hulbert consider this huge cache unusual; rather, he reported "... there having been opened by our explorers probably not less than 200 (such pits)." All 8,000,000 pounds were devoured by the mining companies for which Hulbert worked.

We can deduce from this report that modified copper was very common and that it was stored in birch bark baskets. Freshly mined copper would quickly tear apart such baskets, even in transport between the mines and the storage pits, but especially over rough waters. It was necessary, therefore, as Ritzenthaler deduced, to compact freshly mined copper and make it safe for storage and transport.

2. Hypothesis

To explain the observations made here at Great Lakes Copper Research and by others, we have hypothesized that most modified coppers are stages of production in the prehistoric creation of completed copper artifacts.

Five Stages Of Production
Together with Descriptions, Work Tasks And Unit Standards

Stage	Work Tasks & Unite Standards	Description
1. Scoured Copper	1. Free of Matrix and non-copper materials 2. Ready for creating Base Units	Scoured copper is freed from its matrix and other non-copper materials. Scoured copper may exhibit pits from stone removal and minor hammer marks.
2. Base Unit	1. Copper flaws are revealed and reduced 2. Compacted 3. Increased stored intrinsic and industrial values 4. Made safe for storage or shipping 5. Made ready for trading with trade value increased 6. Made ready for pounding into bars or preforms	Base Units are compacted and made safe for storage and shipment. Extensions are chiseled off or folded in and pounded down. Base Units are flattened and somewhat oval. Hammer and fold marks are visible, as are copper flaws.
3. Copper Bar	1. Copper flaws further identified and reduced 2. Increased stored intrinsic and industrial values 3. Ready for storage, shipping and trade with trade value increased 4. Ready for creating preforms, blanks and completed implements and ornaments.	Bars are somewhat rough and irregular, but approach something like a cubed rectangle, thinner and longer than wide with 1 to 3 straight edges and rounded ends.
4. Preform	1. Copper flaws further revealed and reduced 2. Increased stored intrinsic and industrial values. 3. Ready for storage, shipping and trade, with trade value further increased 4. Associated with a menu of potential objects 5. Ready for creating blanks or finished specimens	A preform begins to take on a somewhat rectangular and thinned, but irregular shape. And a preform's shape only hints at what it will eventually become, tool, ornament, weapon, etc. Every preform comes with a menu of possible objects.
5. Blank	1. Copper flaws further revealed and reduced 2. Increased stored intrinsic and industrial values 3. Ready for storage, shipping and trade, with trade value further increased 4. Intended implement or ornament is revealed by its state of completion 5. Ready for quick and easy completion	A blank is the final stage of production before completion. And a blank suggests the object it is to become.

Every stage, phase, step and level, of production, together with each hammer blow aimed to reduce flaws, exploit utility and maximize value. More than 8,000 Modified Coppers and workshop materials studied for this research.

3. Experiment

Sort, measure, weigh, examine, and analyze several thousand modified coppers to see if the data collected supports our hypothesis that Modified Coppers will fall into like groups that resemble stages of production. n = 8,009.

4. Results

In our research, we found modified coppers of all sizes, from less than a tenth of an ounce to many pounds, but most are fairly small, a few ounces or less. Completed copper artifacts average well under 3 ounces, but also range from less than a tenth of an ounce to several pounds. We found the average modified copper specimen, those falling into stages of production, somewhat smaller than the average completed artifact and far more numerous than completed artifacts.

Modified coppers were found mostly in caches, but occasionally recovered individually. Some caches contained combinations of modified coppers and completed tools. But modified coppers usually exceed completed objects in quantity, sometimes twenty or more modified coppers to each completed artifact.

Caches often contain extemporaneous tools, make-use implements such as knapping implements, scrapers, gravers, anvils etc. Extemporaneous tools are often attached to base units or are an extension of a base unit. We hypothesize that the whole specimen, base unit and extemporaneous tool, were later pounded into another final object.

Examined caches also contained modified coppers that look like scrap. And effigies are occasionally found in caches of modified coppers. Curated coppers are commonly a mixed bag of several sub-taxonomic classes and cache mates are often very similar in sizes. Finally, stages of production units are generally small, less than an ounce to a few ounces each. but occasionally a Base Unit, Bar, Preform or Blank will weigh up to several pounds.

Most modified coppers fell into fairly distinct stages of production. Five primary stages of production were identified, described, named and classified. The five primary sub-taxonomic classes in the stages of production are: Scoured Copper, Base Units, Copper Bars, Preforms, and Blanks. These are five somewhat consecutive and harmonious production steps or stages between raw copper and a finished artifact. Each stage is related to: intrinsic value, industrial value, as well as potential (completed artifact) value and perceived functionality.

In the production of completed artifacts from raw copper, specimens advanced through an infinite series of steps in the process of development. In our system of classifying modified coppers, we condensed the countless steps into five fairly distinct stages. Each stage is based on: (1) the work tasks or functionality perceived by the copper smith for each stage, and (2) the general form or common appearance of mates within a taxonomic class stage of production. In addition, each step is related to intrinsic copper value and industrial (work investment) value, and the two together equaled trade or economic value.

To better accommodate a prolific range of differences found among samples within a tight range of stages, Base Units were further divided into three sub-taxonomic stages, Stage I, Stage II, and Stage III. To help understand the relationship between modified coppers, completed artifacts and waste, all modified coppers weighing less than a tenth of an ounce were classified as Mini Units. Preforms were additionally divided into two sub-taxonomic classes, Phase I (Kind)

	Intrinsic Value (The economic value of unworked copper based on size and quality)
	Industrial value (Added economic value due to amount and quality of work performed on specimen)
+	Shipping value (Economic Value added by transport, based on distance and difficulty)
=	Trade or Economic Value

Preforms and Phase II (Division) Preforms. We divided Blanks into 2 sub-taxonomic levels of completion, Level I (Type) Blanks and Level II (variety) Blanks.

Finally, many modified coppers did not fall into stages of production. These were identified, described, named and classified. Some were found to be: Effigies, Extemporaneous Tools, Boulders, Fragments, Damaged Objects, Eroded Objects, etc.

Stage One

Raw Native Copper: Mined native copper and float copper are 99.9+ percent pure copper, but matrix is often attached. Before it can be worked it must be scoured clean. The first stage of production is scoured copper.

Stage Two

Scoured Copper: As copper was pulled from the ground, it was scraped and pounded free of remaining matrix, if any existed, together with other impurities (scoured). Some edges may be folded down and it may have received an initial annealing (both marks of man) and immediately pounded into base ingots at the mining site. Not all specimens exhibit the mark of man. If the ancient miner's work was interrupted before he crafted the more numerous *base units*, scoured copper survived in its rough scoured form, but few scoured coppers remain.

Scoured copper is recovered in various sizes, is somewhat flattened and smoothed, often with slightly rounded edges. It commonly exhibits pockets or pits, evidence of stone removal.

Scoured copper lacks the compactness and well-worked look exhibited by most base units. Extensions often remain extended, while cavities and even holes are frequent. Scoured copper is often difficult to distinguish from impure and un-worked copper. It is only identified with certainty when it is recovered, together with more advanced stages of modified copper, and a close examination reveals the mark of man.

This rare taxonomic class of modified copper, which is formed at the mining sites, is the first step in crafting copper artifacts. The second step is the Embryonic Base Units.

Stage Three

Base Units - Phases I, II & III

Base Units: After raw mined copper was scoured, it was immediately modified at the mining sites for storage and made safe for shipping. It was compacted. Sharp edges, and appendixes were chiseled off or folded in and pounded down. Sometimes annealing aided the process and prepared Base Units for further pounding. In the second Base Unit stage of modification, fold marks are most characteristic and numerous. Base units are slightly quadrilateral in outline and cross-section. They are irregular in shape and their weight ranges from less than a tenth of an ounce (the Mini Unit form) to multiple pounds. Base Units were traded or pounded into copper bars, Preforms or Blanks. Some scholars believe nearly all base units were pounded into Stage Three, Bar Units. Others speculate that as bars are not as common as base units, preforms and blanks, Stage Three was sometimes skipped. The division of base units into phases of completion is somewhat subjective.

Phase I, Embryonic Base Unit: Embryonic Base Units are the initial rudimentary stages of production or the first phase in the formation of a Base Unit. Scouring was completed, rough edges were smoothed somewhat and initial folding may have begun. Most, but not all units were flattened somewhat in hammering, but remained bulky and irregular in shape. Fractures are common. Lap lines were not yet fused together, while compacting remained minimal. Embryonic Units were later pounded into phase II base units, but some were destined to become Bar Units.

Production Stage One - Raw Native Copper

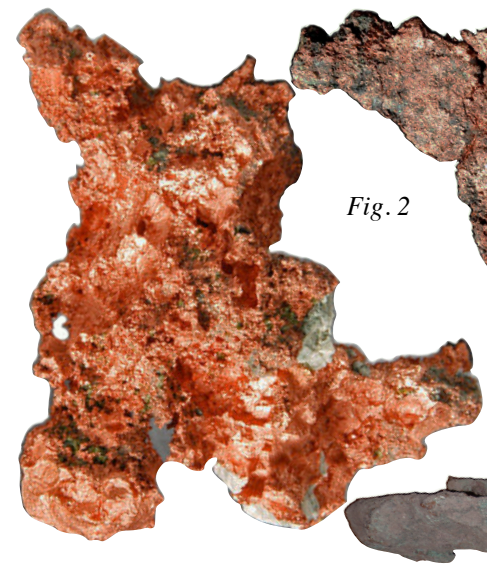


Fig. 1

Fig. 2

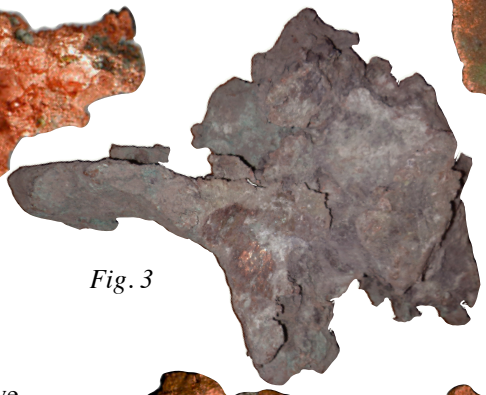


Fig. 3

Fig. 4

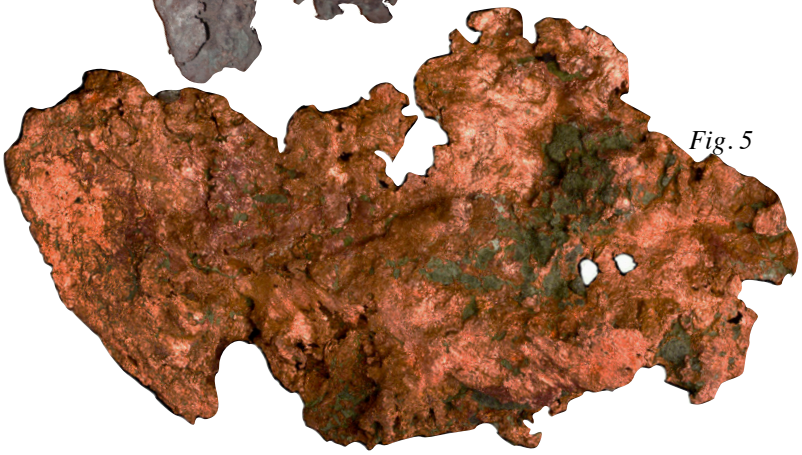


Fig. 5

Four samples of raw native, copper (Figs 1-5), sprawling and un-compacted, many with attached matrix, extensions, holes, uneven surfaces and sharp edges. Most native mined copper is unsafe for storage and shipping and native mined copper generally does not show the mark of man.

Production Stage Two Scoured Units

Native mined copper was scoured free of matrix, excessive oxide, organic materials, stones, etc, before it was pounded into base units. Scoured copper often exhibited sharp edges and was generally not safe for storage and shipping. It is very rare.

Fig. 1

Fig. 2

Fig. 3

Fig. 4

Fig. 5

Phase II Base Units: Phase II Base Units are often flattened slightly, compacted somewhat and a little more oval or more likely to be oval-like than Phase I Base Units. Some extensions were chiseled off or folded in and pounded down with an increase number of lap lines. Edges were smoother, but some roughness and many irregularities remained. Phase II Base Units are not as safe for storage and shipping as are Phase III Base Units.

Phase III Base Units: Phase III Base Units, however rough and irregular, were in general more regular than Phase II Base Units, and as Base Units, they were completed; compacted and made safe for storage and shipping. They might easily be pounded into copper bars or preforms. Some completed base units remain whole, while others retain flaws that required them to be further separated into multiple segments before or as they were pounded into advanced stages of production.

Stage Four

Copper Bars: In our study of copper, bars are the third stage of production, following scoured copper and base units. Copper bars may have served to highlight flaws and facilitate cutting bars into pieces along flaw lines. Bars, created from single pieces of freshly mined copper, float copper or base units, are also an ideal shape for storage, shipping, and trading. Almost any piece of copper can be pounded into a bar and bars can be pounded into any desired utility.

Bars are crude and informal, roughly quadrangular in shape and in cross-section, with two or more parallel horizontal lines and two or more plano-like surfaces. Bars appear rectangular-like or occasionally oval-like in outline. Some examples exhibit shorter vertical lines and a few approximate a rectangle or a square in cross-section. Bar ends are normally rounded or irregular. Rarely, one or both ends are squared off. Angles between top and sides may be rounded or irregular.

Bars, range in size from .1 oz. to at least 13 pounds or more and were often pounded into a fourth step, preforms. Some students of copper believe all copper artifacts were created from bars, yet copper bars are more rare than base units, preforms and blanks.

Stage Five

Preforms - Stages I, II & III: Preforms were created from base units, bar units, or from unworked copper and were an advanced step toward creating a completed object. Initial shaping occurred and a menu of objects was associated with each preform. There are three Stages of completion associated with preforms. The stage following step three is the taxonomic class, blank.

Step I Preforms, Pre-Kind: Step I preforms give us little hint at what they are to become. Bars or Base Units began to take on unidentifiable shapes and could become most anything.

Step II Preform, Kind: Step II preforms are too indistinct to identify and classify by the taxonomic class, Division: Knife Division, Axe Division, Projectile Point Division, for example. But Step II Preforms can be identified by Kind and are associated with a menu of Kinds, Weapon Kind, Tool Kind and Ornament Kind, for example.

Step III Preform, Division: Step III preforms can be identified and classified by the taxonomic class, Division, Knife Division, Axe Division, Projectile Point Division, for example, but not by Genre, i.e., Spear Point Genre, Socketed Knife Genre, or Axe Genre, etc. Step III preforms are associated with a menu of Divisions.

Stage Six

Blanks: A blank is a step advanced beyond a preform and the final step before completion. It is associated with one specific item and its

Continued on Page 41

Production Stage Three - Base Units, Phase I

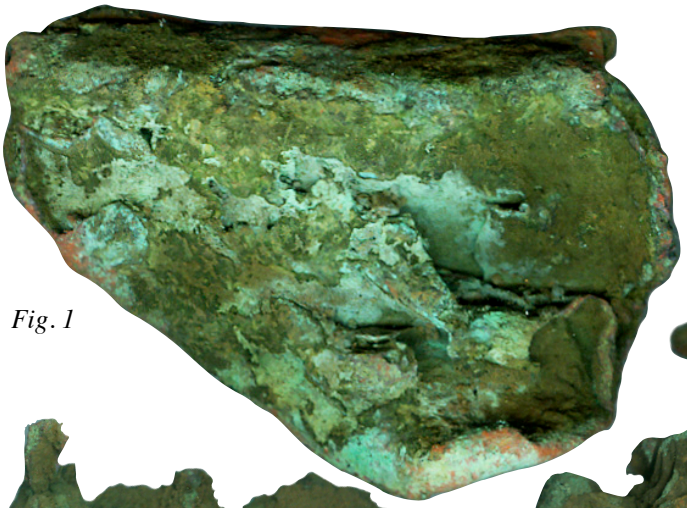


Fig. 1

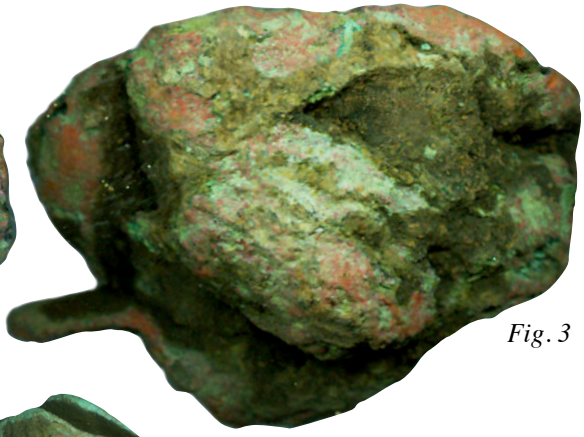


Fig. 3

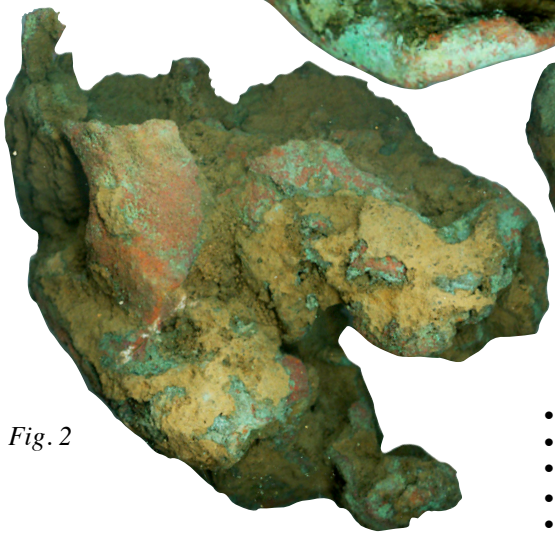


Fig. 2

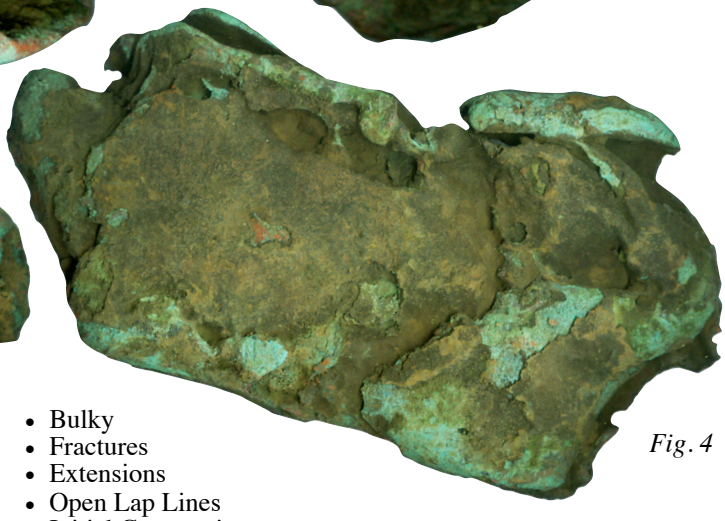
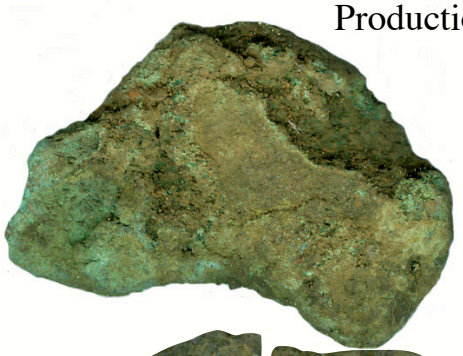


Fig. 4

- Bulky
- Fractures
- Extensions
- Open Lap Lines
- Initial Compacting

Production Stage Three - Base Units, Phase II



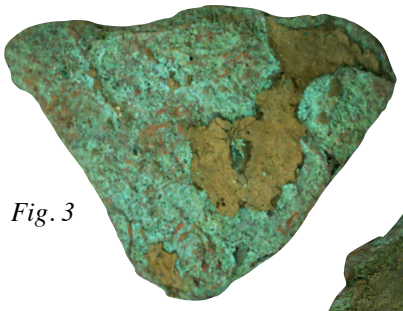


Fig. 3

Fig. 4

Fig. 2

- Thinner
- More Oval
- Less Bulky
- Less Fractures
- More Compacted
- Surfaces More Flat
- Lap Lines More Closed
- Edges More Even & Smooth

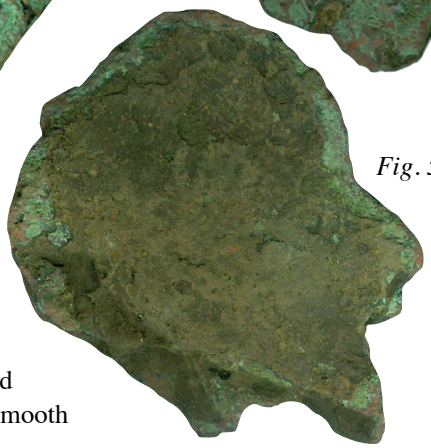


Fig. 5

Production Stage Three - Base Units Phase III

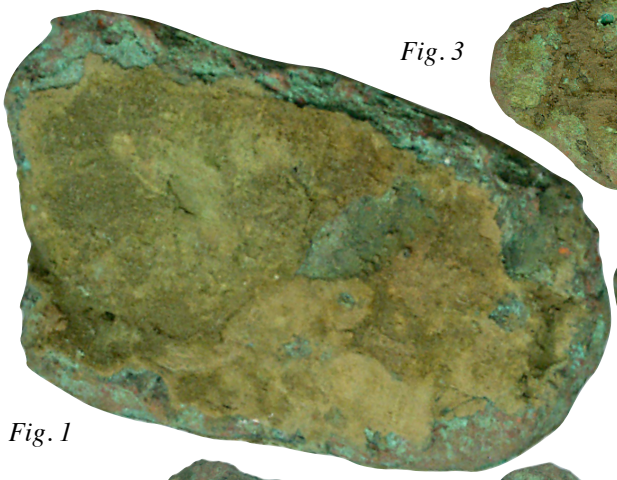


Fig. 1

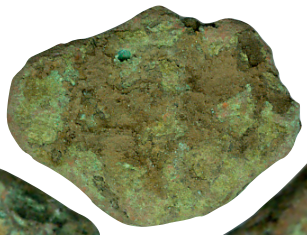


Fig. 3

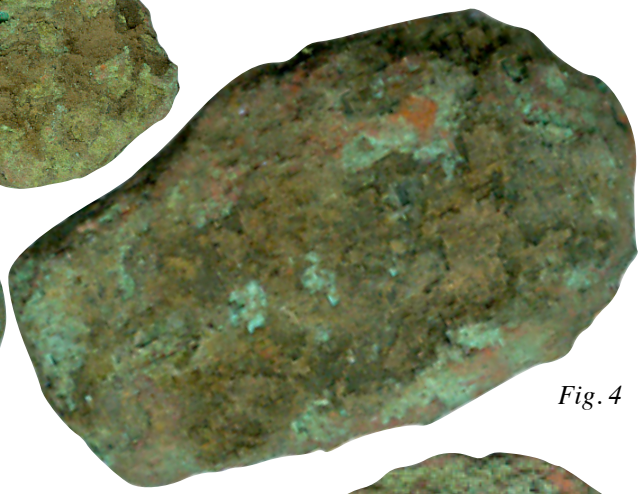


Fig. 4

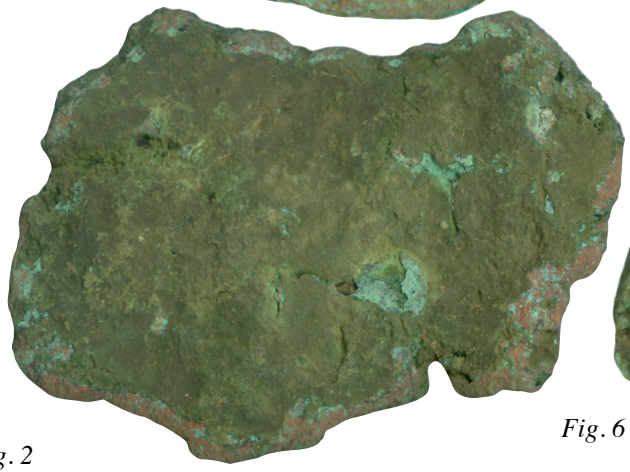


Fig. 2

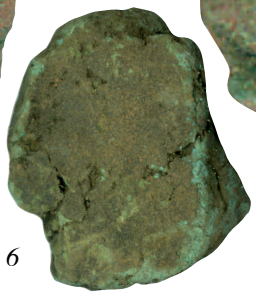


Fig. 6

Fig. 5

Fig. 7

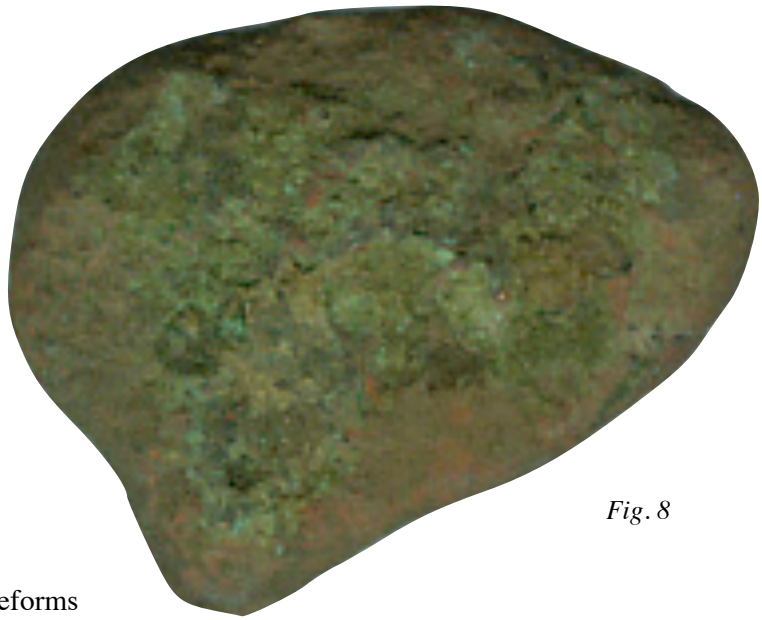


Fig. 8

Phase III Base Unites Traits

- Edges Smoother
- Less Fractures
- More Closed Lap Lines
- Less extensions
- Almost No Holes
- Thinner
- Smoother Surfaces
- Oval-Like to Round-like
- Somewhat Rectangular-Like
- Ready To Be Pounded Into Bars Or Preforms

Production Stage Three - Base Units, Assorted Sized

Fig. 1
Phase II Base Unit
4.3 Lb.

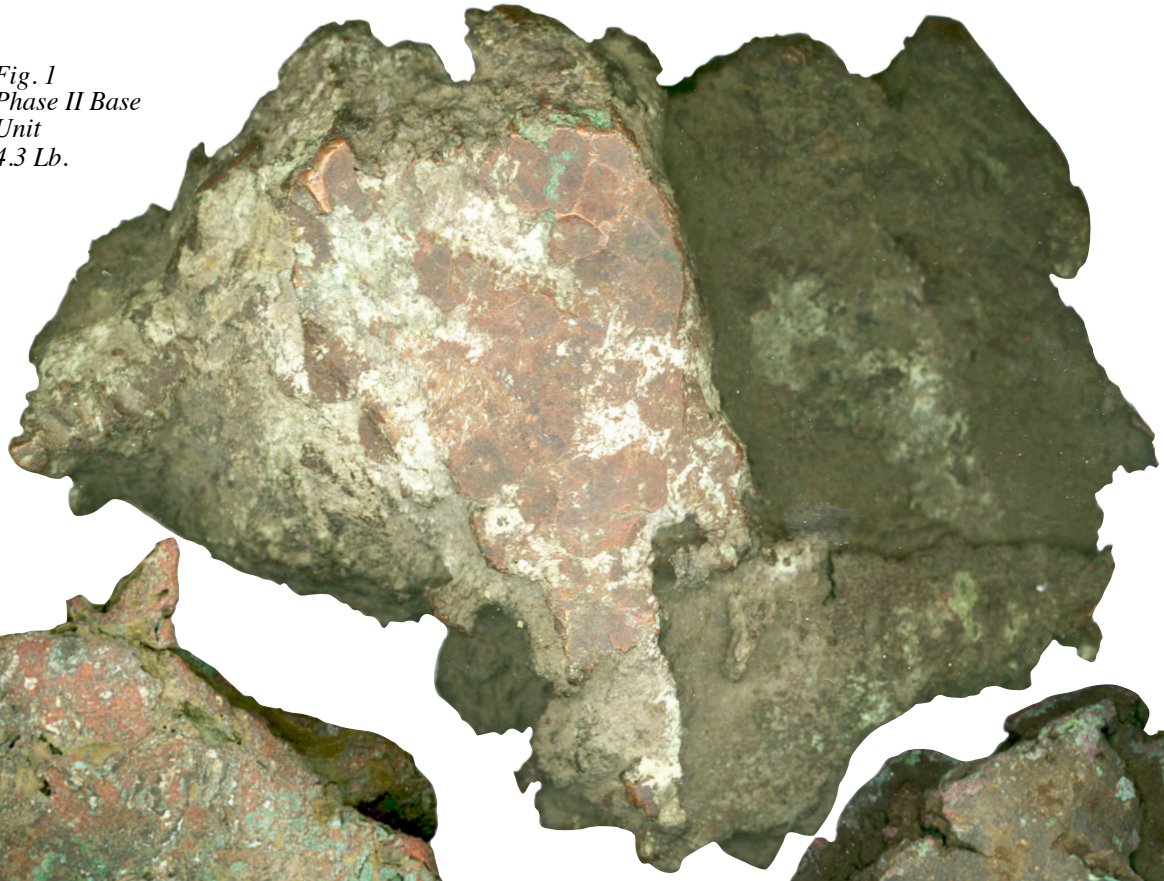


Fig. 2
Phase II
Base Unit -
1 Lb. 14.7 Oz.

Fig. 3
Phase II
Base Unit
1 Lb. 9.5 Oz.

Fig. 4
100 Mini
Base Units
Less Than
1/10th Oz.
Each

Fig. 5
Phase III
Base Unit

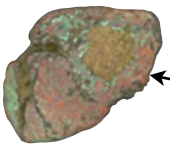


Fig. 6-7
Phase III
Base Unit.

Fig. 8

Fig. 9

Base Unit Sizes

Base Units Specimens Ranging From More Than 4 Pounds To Less Than A Tenth Of An Oz. Great Lakes Copper Research Curates Even Larger And Smaller Specimens. Value Increased Over Soured Copper.

Production Stage Four - Bar Units or Copper Bars

Fig. 1
8.5" long
2.25 Lb. MI

Fig. 2
12" long
3.66 Lb.
Wisconsin

Fig. 3
8.5" long
2.25 Lb.
Michigan

Fig. 4
WI

Fig. 5
WI

Figs. 6-10
Mini Bars
WI

Fig. 12

Fig. 12

Fig. 13

Fig. 14

Stage Four Bar Unit Traits and Purposes

- Rectangular-Like
- Square-like
- Oval-Like
- Highlight Flaws
- Facilitated Cutting Bars Into
- Convenient for storage
- Convenient for shipping
- Convenient for trading
- Anything can be made from Bars
- Bars cam be pounded from any sized piece of copper.

Production Stage Five, Pre-Kind Preforms, Step I

Fig. 1

Fig. 2

Fig. 3

Fig. 4

Fig. 5

Preforms, Level I

No sharp edges - Shaping - more flaw lines exposed. A large menu of options for each and increased value.

Production Stage Five, Kind Preforms, Step II,

Fig. 1

Fig. 2

Fig. 3

Fig. 4

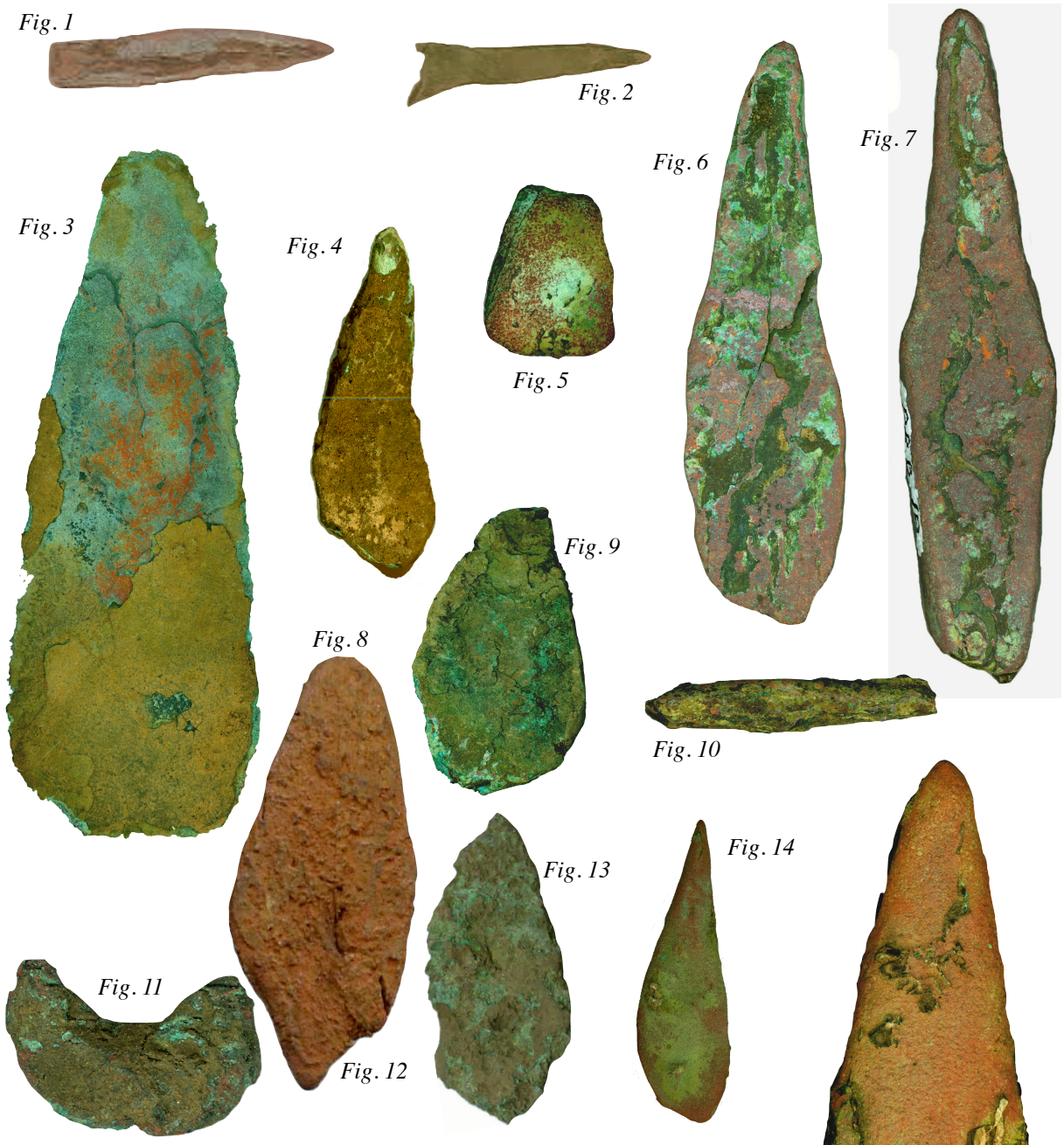
Fig. 5

Fig. 6

Level II Kind Preforms

Fig. 5 is a an Ornamental Kind. Figs. 1-4 & Fig. 6 are of the Tool Kind. Each specimen suggests a large menu of options. We will know more as they progress to Level III. Value has increased over previous stages of production

Production Stage Five Preforms, Division Step III



Genre Preform, Step III

A menu of options remains, but the possibilities for each specimen has narrowed from steps I to step III, while the value for each object has increased. Step III axe, knife, and point preforms, for example, can be distinguished, but their type cannot be established. Flaw lines were further identified and preforms were reduced by division along flaw lines, which has contributed to each specimen's increase in value. The next and final stage of production before completion is the Stage Six.

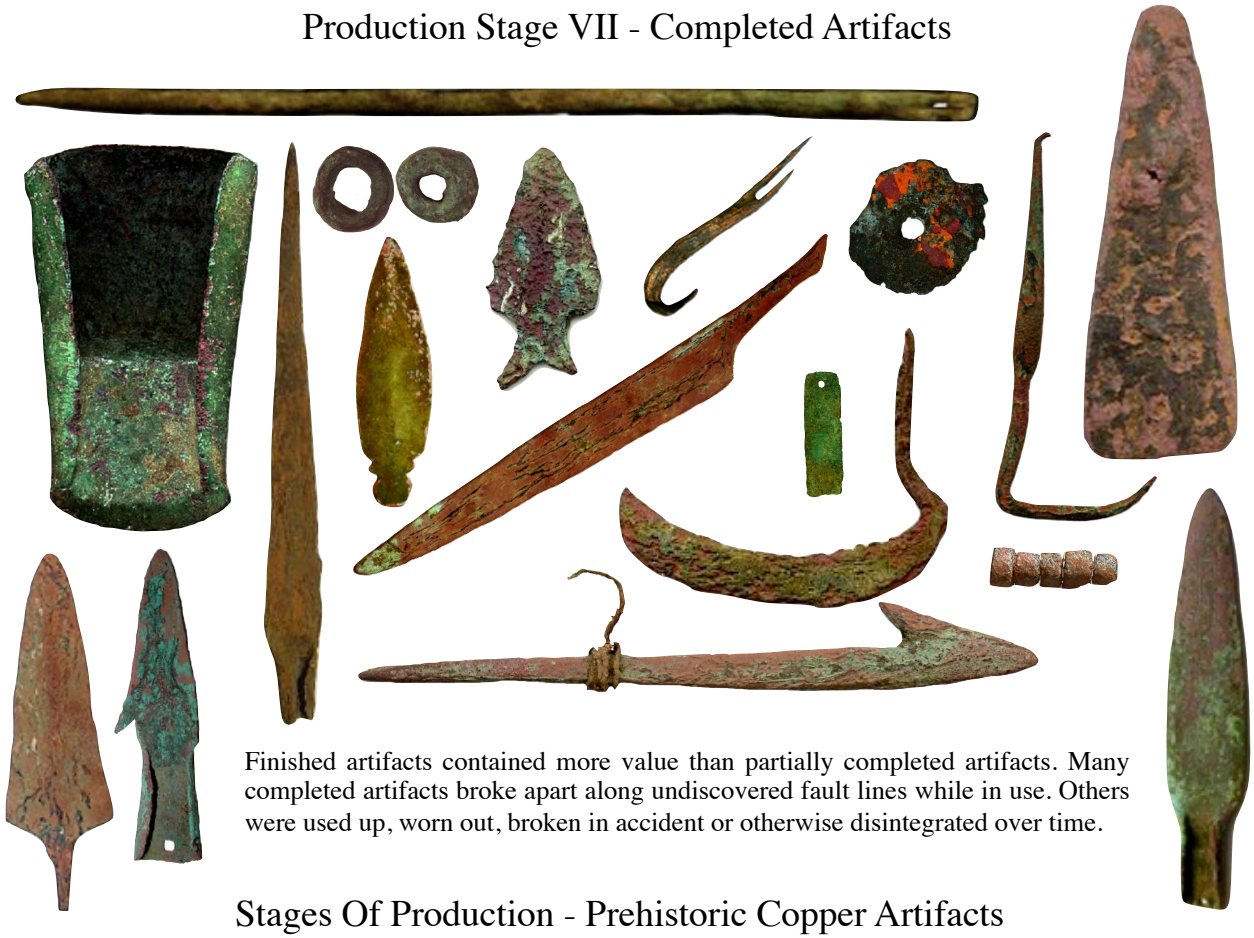
Production Stage Six - Blanks

Production Stage Six, Blanks

Level I, Genre & Level II, Type

Blanks can be recognized for what they were intended to become, either at the Genre Level I or more specifically at, Type, Level II. Blanks are artifacts not quite completed. Flaw lines were further reduced and value has increased. Blanks are the final production stage before completion. Fig 10 and 15 above, both conical points are nearly complete, but the mandrels around which their sockets were formed, remain in the sockets. These and other mandrels found in or with sockets prove our theory that mandrels were used by prehistoric coppersmiths.

Production Stage VII - Completed Artifacts



Finished artifacts contained more value than partially completed artifacts. Many completed artifacts broke apart along undiscovered fault lines while in use. Others were used up, worn out, broken in accident or otherwise disintegrated over time.

Stages Of Production - Prehistoric Copper Artifacts

Stages	Taxonomic Class Name	Notes
Stage One	(1) 'Raw' Copper	Unworked
Stage Two	(2) 'Scoured' Copper	Scoured Only - Very Rare
Stage Three	(3) 'Base Units'	Most common Modified Coppers
Phase I	Embryonic Units Base Units	Compacted
Phase II	Base Units	Made safe for storage
Phase III	Base Units	Made safe for shipping
Stage Four	(4) 'Bar' Units	Storage, shipping, trade
Stage Five	(5) 'Preforms'	Menu of items
Step I	Pre-Kind	Little hint at end result
Step II	Kind	Identify by Kind
Step III	Division	Identify by Division
Stage Six	(6) 'Blank'	An unfinished artifact
Level I	Genre	Identify by Genre
Level II	Type	Identify by Type
Stage Seven	(7) 'Completed Artifact'	Many distorted over time

Every stage, phase, step and level, of production, together with each hammer blow, aimed to reduce flaws, exploit utility and maximize value. More than 8,000 Modified Coppers & prehistoric copper workshop materials studied.

appearance suggests the genre or type the craftsman intended it to become, i.e., point, knife, axe, harpoon, etc. It can, therefore, be called an unfinished, object. The blank step consists of two stages, the genre stage and the type stage.

Genre Blanks: Level I Genre blanks can be identified and classified by genre, i.e., Spear Point Genre, Socketed Knife Genre, Axe Genre, etc. but not by type.

Type Blanks: Level II Type Blanks can be identified by Type. The Type Blank is the final stage before completion. On rare occasions the variety can also be diagnosed at the Type Blank taxonomic class stage. A step found in the socket of some spear point varieties is one example. Some variety characteristics, a rivet hole, for example, are added after the artifact is otherwise completed. As blanks can be recognized for what they were to become, they are often misidentified as a completed artifact.

Stage Seven

Completed Artifacts: After passing through the six stages of production, a raw piece of copper has become a finished artifact, one with the finishing touches completed. Use and wear marks, and even some break marks are evidence of a completed artifact. Blanks are often confused with completed artifacts.

Completed artifacts fall into many taxonomic classes: perfect or near perfect specimens, worn out specimens, broken specimens, eroded away specimens, etc. As an artifact passed through the various stages of production it surely increased in economic and trade value.

Mini Units: Mini units include all 5 stages of production, Scoured Copper, Base Units, Bars, Preforms, and Blanks. Mini Units also include tiny completed artifacts. A Mini Unit is by definition, any and all worked copper specimens weighing less than a tenth of an ounce. Although Mini Units are less likely to be completed artifacts, many are Blanks that require little work for completion. And surprisingly, tiny completed artifacts weighing less than a tenth of an ounce each appear to have served multiple work tasks.

Other Taxonomic Classes Of Modified Copper

Although most modified pieces of copper slipped fairly easily into the five stages of production, Scoured Copper, Base Units, Bars, Preforms and Blanks, many specimens did not. Further sub-taxonomic classes of Modified copper were defined for these other specimens. Some such sub-taxonomic classes of modified copper are as follows:

Effigies: Some modified copper caches contain effigies. We define an effigy as a small crude image used to capture, for its owner, the distinguishing powers attributed to the animal or thing symbolized. We hypothesize that many copper effigies are freaks of nature reminding prehistoric OCCT Indians of something in their environment and perceived as gifts from the gods. Most such natural specimens were sooner or later improved upon to make their appearance more realistic and its forces more powerful.

Extemporaneous Tools: Copper was the most common and easily accessible medium for copper miners, smiths and traders. When they needed to knap a rock, scrape a hide, pound a stake, etc, it was easy to grab a Base Unit and modify it, or a part of it, to perform the work task at hand. In most cases this did not detract from the economic or trade value

of the Base Unit, which was later processed into something else as a completed artifact.

Copper Boulder: Many copper boulders have been recovered with gouge and hammer marks evidencing smaller pieces worked off for the production of implements and ornaments. The remaining boulder with its tool marks is a large to huge modified piece of copper.

Fragments: Occasionally whole, completed copper artifacts were somehow fragmented, some due to unforeseen flaws in the copper itself and others caused by other events. Such fragments are occasionally found in caches among other modified pieces of copper or recovered individually. Occasionally fragments are recovered from annealing pits suggesting that fragments were saved and used to create smaller items.

Damaged Objects: Many copper objects were damaged or fragmented in war, accident and use. Others were partially used up in the performance of prolonged normal tasks. Another group of copper objects were subjected to extended or repeated exposure to air and moisture. Exposure caused a significant loss of copper electrons and sometimes destroyed identifying characteristics. A final group of copper artifacts were damaged by modern farm and construction equipment. Damaged objects are often confused with the various stages of production.

Sheet Copper: Sheet copper is a form of a Base Unit, Bar, Preform or Blank. Units or nuggets were pounded and rolled between two stones to form a desired gauge. Sheets were created in various uniform thicknesses, and ranged from less than an inch wide to more than a foot across. Copper implements and ornaments were traced onto sheets and chiseled or cut out. Some coppersmiths used chipped stone wedges to chisel copper objects from manmade or natural sheets (Workman 1976).

In nature copper sheets of various thicknesses were created between layers of slate and other stone. Some cultures crafted very thin sheets of copper (tin foil-like) to cover ear spools and other objects. In historic times all trade or scavenged copper pounded by Indians is classified as 'sheet copper' and divided into two subclasses 'kettle copper' and 'coin copper.' Modified pieces of sheet copper are classified as Base Units, Bars, Preforms or Blanks but with a prefix, sheet copper.

Fluffs: Copper is dense and heavy, yet some fairly rare tiny cache units are light and aerated, yet to be collapsed under the blows of the coppersmith's hammer. Although fluffs are most likely natural nuggets, they are found among and counted with their cache mates. Fluffs, like other modified coppers are also found singularly or mixed with other taxonomic classes of modified coppers. Fluffs are most likely a phenomenon of natural aeration, or internal migration of copper ions. Neither the origin or utility of Fluffs is clearly understood

Others: As our research matures, other classes or Modified Coppers are added.

Recovery Sites

Nearly all archaeological recovered copper comes from grave sites. Modified coppers is very rarely recovered from grave sites. Roughly 99 percent of metal detected copper is recovered from activity sites: village sites, camp sites, water sites, manufacturing sites, mining sites, depots, out areas, etc. (Spohn & Livernash 2007: 26-32).

5. Predictions

Based on our findings we can predict the following with considerable confidence:

(1) Most Modified Coppers recovered in the future will fall into specific well defined stages of production; or

(2) Fall into other specific well defined taxonomic classes of modified copper.

(3) Ninety percent or more of future Modified Coppers will be recovered from activity sites.

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We Were Not Alone !

People argue over the First Americans, who they are, how old they are, where they came from and if they were visited by sea voyaging cultures from other continents. But there is one thing we can agree upon. During Archaic times, while American Indians were pounding native Michigan copper, they weren't alone in hammering copper. Indeed, all the major cultures around the world at the time (Archaic) experienced what historians call the Copper Age.

Old World cultures ran out of pure native copper (roughly 99.99 percent pure). And to continue manufacturing metal implements and ornaments they learned to extract copper ore from rocks. Smelting led to casting which led to a new age, the Bronze Age (around the third millennium BC) in the Old World. The Bronze Age led to the Iron Age and finally industrialization. But, North American native copper was so abundant in Michigan, that smelting was never necessary. The pounding and annealing copper technology, therefore, lasted in the Americas until after the time of Columbus.

An Abridged Glossary Of Terms As Used In Our Research

Some of the following terms are narrowly defined to facilitate prehistoric copper research. These terms are for the most part based on cold-pounded and annealed implements and ornaments from raw native Great Lakes area copper. Other researchers may define these same terms in different ways for other purposes.

Bars: Copper Bars are the fourth stage in the production of copper artifacts. Bars are somewhat rectangular and occasionally square. Bars are also the most perfect shape for transporting copper. Bars are more valuable than Base Units, Scoured Copper and Raw Copper.

Base Unit: A Base Unit is the third stage in the production of prehistoric American Indian copper artifacts. The purpose of a Base Unit is to make raw mined copper compact and safe for storage and transportation. A Base Unit is more valuable than raw copper or Scoured Copper.

Blank: A Blank is the sixth stage in the production of copper artifacts. Blanks are so near completion that one can identify the object it is to become, either by Genre or by Type. Blanks are more valuable than all previous stages of production.

Class: A taxonomic group of copper artifacts having certain attributes or traits in common. Copper typology contains 7 taxonomic classes: kingdoms, Families, Kinds, Divisions, Groups, Types and Varieties, each with their sub-classes. Component classes consist of: *Parts*, *Segments*, *Traits* and *Characteristics*. Each taxonomic class and sub-class has its own class name and definition.

Extemporaneous Tools: Extemporaneous Tool are one taxonomic class of Modified Coppers. These tools were created and used by miners or copper smiths for extemporaneous work tasks. Most were created from Base Ingots. Such tools might later be pounded into more permanent implements or ornaments.

Genre: In prehistoric American Indian copper artifact taxonomy; *Genre* is a sub-taxonomic class of *Division*. The Projectile Point Divisions, for example, consist of: *Arrowhead Genre, Dart Point Genre, Atlatl Point Genre, Harpoon Genre,* and *Spearhead Genre*. The sub-taxonomic classes of *Genre* are *Types*. *Types* of the *Spearhead Genre*, for example, include: *Oval Rat Tail, Turkey-Tail, Serrated Point, Socketed-Triangulate*, etc.

Mandrel: In the *taxonomic classification* of prehistoric American Indian copper artifacts, a mandrel was a tool around which copper was pounded to form sockets and other depressions in copper. Mandrels were constructed from copper and other hard materials.

Mark Of Man: In our research the Mark Of Man refers to one or more tool marks showing that copper has been worked, however slightly, by man.

Mini Units: Mini Units are Modified Coppers, of any taxonomic class, which weigh less than 1/10th of an ounce. Mini Units include completed artifacts weighing less than 1/10th ounce.

Modified Coppers: In our research Modified Coppers are artifacts showing the Mark Of Man (worked), but not completed.

Native Copper: Copper that occurs naturally in elemental form as opposed to copper ore which must be smelted. The most significant source of pure copper metal in North America is found in northern Michigan: the Keweenaw Peninsula and Isle Royal.

Necessities of Life: In our research the Necessities Of Life are defined as food, clothing, shelter and the preservation of life. Everything else is a luxury.

Nomenclature: Nomenclature is the science or art of choosing names for the major or primary Taxonomic classes of copper artifacts; *Kingdoms*, *Families*, *Kinds*, *Divisions*, *Genres*, *Groups*, *Types*, *Varieties and their sub-taxonomic classes*, together with their *Components*: *Parts*, *Segments*, *Traits* and *Characteristics*. In our study, 'Nomenclature' is a major diagnostic tool.

Preform: A Preform is the fifth stage in the production of copper artifacts. Preforms, always associated with a menu of possible objects are followed by the sixth stage, Blanks.

Projectile Points: In our research a projectile point is the copper head of (1) an arrow, (2) a spear, (3) an atlatl, (5) a harpoon, and (4) a dart.

Raw Copper: For the purpose of our research, Raw Copper is defined as unworked mined or float copper.

Scoured Copper: Scoured Copper is freshly mined copper scoured free of matrix and other impurities.

Spear Point: A spear consists of a long shaft with a sharp head, customarily thrown, but sometimes used for jabbing. Spears were used in the hunt and in war, and in the beginning they were used on foot, but later also from horseback. Spears are sometimes called, lance, pike, javelin, harpoon, etc., but we do not classify harpoons as spears (But harpoons are projectiles). In our research spear heads (harpoons excepted) are symmetrical. We have many Spear Point Types and each Type has Varieties of Types.

Taxonomy: In our study of prehistoric copper artifacts, taxonomy is the art or science of using (1) t*ypology*, (2) *nomenclature,* (3) *analysis and (4)* other aspects of the *scientific method to* classify copper artifacts. Taxonomy is used to order copper artifacts into interrelated meaningful groups or classes. The primary taxonomic classes are *Kingdoms*, *Families*, *Kinds*, *Divisions*, *Genres*, *Groups*, ***Types***, *Varieties and their sub-taxonomic classes*, together with their Components: *Parts*, *Segments*, *Traits* and *Characteristics*. All copper artifacts, the Straight Back Knife, the Ace of Spades Point, the U-Spud, for example, take their name from their taxonomic class, ***Type***.

Type: In prehistoric American Indian copper artifact taxonomy, *Type* is a sub-taxonomic category of *Genre*. Samples of the *Spear Point Genre*, for example*, include: Oval Rat-Tail, Turkey-Tail, Serrated Point, Socketed-Triangulate,* etc. The sub-taxonomic class of type is variety. Varieties of the *Socketed-Triangulate Type Spear Point* include: the *Pinhole Variety,* the *Stepped Variety,* the *Round-Shouldered Variety,* th*e Barbed Variety,* etc. Type exhibits the general character or structure (set of characteristics) held in common by a number of artifacts. Type is an example or a model exhibiting the ideal features of a class, the essence of Copper Taxonomy. And Types are to some extent diagnostic of both age and culture.

Value: In our research value is described as something that can: (1) preserve or help preserve life, the necessities of life and/or the luxuries of life, (2) serve as a utility in obtaining or extending the necessities or luxuries of life, (3) may be traded for the necessities or luxuries of life, or for something that assists in obtaining or extending the necessities or luxuries of life.

Our Unabridged Glossary Of Terms Contains Several Hundred Items.

The Archaeological Record

The term, archaeological history or record, encompasses all archaeological evidence including the physical remains of past human activities found at archaeological sites. Archaeologists seek out and record the archaeological history in an attempt to analyze and reconstruct the past. Archaeology teaches that the value of an artifact lies primarily in the data that can be acquired about its culture – obtained in an interpretation or analysis of the artifact and its archaeological history during professional excavations. Archaeologists understand that without the archaeological record, much valuable data is lost and artifacts are sometimes made more or less useless.

Collectors, on the other hand, see value in artifacts themselves, as primitive art, valuable treasures, and objects of sentimental value. Some collectors accumulate much knowledge and experience in recognizing distinctive differences, even cultural distinctions between specimens with similar and contrasting traits. But most collectors do not perform professional excavations, nor do they note soil conditions, stratigraphy, features, artifact links, associated carbon materials, and other elements of an archaeological history. If untrained collectors dig, archaeological records are lost.

Most artifacts collected by amateurs over the years consist of surface finds. If they possessed an archaeological history, it was lost long before the artifacts were picked up by finders. For most of our nation's history, it was farmers following horses who found copper artifacts. Collectors walking freshly worked fields found still more, while construction workers uncovered the remainder as fortuitous finds.

Late in the game, archaeologists excavated burial sites and recovered the first copper artifacts with archaeological histories. Archaeologists' knowledge of copper is based upon these two groups of copper artifacts, old surface finds, without archaeological records, and later professionally excavated grave sites with clear archaeological histories.

Finally, since the 1980's or so, metal detecting has added a third reservoir of copper artifacts. Like the first group of old surface finds, metal detected copper no longer possesses an archaeological history. It often had one, a good clear archaeological history, but it was nearly always lost in the recovery.

Archaeology, for the most part, has chosen not to study metal detected copper. This is true, in part, because it contains no archaeological history. It is also true because archaeologists cannot professionally encourage the acquisition of copper artifacts in ways that assure the loss of archaeological data; a necessary element in the discharge of tasks required in the practice of their profession.

At Great Lakes Copper Research, we developed a paradigm designed to harvest previously unavailable data from copper artifacts separated from their archaeological record. We do not wish to encourage the separation of artifacts from their archaeological history. We wish all artifacts had archaeological histories and recognize the superior data associated with archaeological records. But, we also recognize the fact that most copper artifacts are shorn of their archaeological records, and we wish to benefit from potential valuable data that can be harvested from orphaned copper artifacts.

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