METALWORKING IN THE BIBLE
TURNING SPEARS INTO PRUNING HOOKS

CLARENCE H. WAGNER, JR.

Metalworking was introduced into the Land of Israel during the Chalcolithic period (Fourth Millennium BCE), and revolutionized the culture as the technology developed. It enabled the cutting of stone, better farming, stronger weapons, and more durable utensils and tools. However, metal objects were expensive and therefore a very precious item in any household. Metal was also used for making idols, which was forbidden for the Jews.

During the biblical period, the metals worked in Israel were copper (bronze), iron, gold, silver and, to some extent, lead. Other than copper, none of these metals is found in Israel. Ezekiel knew that the metals used in Israel were brought by Phoenicians from Tarshish (Ezek. 27:12), who probably transported it in bars, and by merchants from Arabia (II Chr. 9:14) and Egypt.

MINING METHODS

The Bible mentions the tunneling method of mining (Job 28:1-7). However, where possible, extracting ore from surface veins was most desirable. Scripture also refers to smelting metal in the furnace (Deut. 4:20; Isa. 48:10; cf. Dan. 3:19-20). Solomon set up foundries in the Jordan Valley (I Kg. 7:46). The imported metal had to be purified by reheating it in a crucible, covered with charcoal, or placed over a charcoal fire and blown with bellows in order to remove any impurities. The molten metal was poured into a stone or clay mold, or onto a flat surface and hammered into shape. Today, evidence of ancient copper smelting operations can be clearly seen in Timna, just north of Eilat in the Arabah Valley.

The tools of the smith mentioned in the Bible are tongs, hammer (Isa. 44:12), and nails (Jer. 10:4). While no anvil has been found, it certainly existed in order to flatten the hot metal into blades. Bellows were also used to provide a steady draft of air to heat the coal to its maximum heat for forging.

Clarence H. Wagner, Jr. is the International Director of Bridges For Peace *in Jerusalem, where he has lived for over 25 years. He edits* Dispatch From Jerusalem*, bringing current news and insights from Israel and also is the host of the* Jerusalem Mosaic *television program, a TV magazine that brings the life of Israel into homes around the world.* *Reprinted with permission from* Dispatch From Jerusalem, *May-June, 1997.*

The bellows was a cylindrical, clay vessel covered with animal skin. When stepped upon, or squeezed, the air inside was forced through a tube into the furnace, causing it to burn hotter. Clay crucibles and bellows for founding copper and iron have been found in several sites in the region, as have molds for forming the molten metal into various objects. Egyptian overlords who worked the Timna mines used slaves. Life there often lasted only one day, because working on the bellows in incredible heat caused dehydration and quickly killed the slave.

WHAT DID THEY MAKE?

The earliest objects made were spearheads, arrowheads, swords, daggers, crowns and other objects of authority for both religious and temporal purposes. The first metal worked was copper and later bronze, which is a mixture of copper and arsenic or tin. However, it was relatively brittle and the introduction of iron, about the 11th Century BCE, allowed further advances in metal technology. In later periods, skilled metalworkers banded together into guilds, known as "families." These included those making military and agricultural objects, and also the goldsmiths and silversmiths. The great variety of objects produced indicates that the metal industry was flourishing and its products were in great demand.

COPPER AND BRONZE

The term "copper" in the Bible usually refers to bronze. Copper was mined in northern Syria, the southern Arabah (Timna mines near Eilat), the Sinai; and Cyprus, from which the English name "copper" derives [from Late Latin *cuprum*], and some from Asia Minor (Turkey) and Lebanon. Tin in small quantities was found in Egypt, with large quantities being found in Europe. It was brought to the Near East by the Phoenicians.

Copper, in its pure form, was rarely used. The ore was ground in stone mortars, smelted in crucibles, and then poured into molds or ingots. Weapons, agricultural implements, mining tools, household utensils and jewelry were all made of bronze. Solomon used bronze for some of the Temple objects (I Chr. 18:3). Because bronze melted at a relatively low temperature, bronze objects could be cast, which allowed "mass production." This gave it some advantage over iron, which had to be hammered into the desired shape.

IRON

Iron came from Asia Minor, and some from Lebanon, but it is not found in nature in its pure state. It is difficult to extract from its oxides, so it was the last of the metals that the ancient world learned to produce – not being used until about 2,000 years after bronze. Credit for its discovery goes to the Hittites. It found its way to Canaan about the same time as the Israelite arrival from Egypt. Good quality iron weapons, jewelry and tools have been found in both Israelite and Philistine sites. By the beginning of the monarchy period, it seems that the Philistines had a monopoly on iron working as told by Samuel (I Sam. 13:19-20).

Iron could not be cast, because it required high temperatures that could not be achieved in the furnace, so it had to be hammered. Iron was used for bolts for gates (Isa. 45:2), nails (I Chr. 22:3), agricultural implements (I Sam. 13:20-21), weapons (Num. 35:16), chains (Ps. 105:18), chariots (Josh. 17:16) and weights (I Sam. 17:7). In Isaiah's description of an ironworker doing an evil deed by making an idol, we get a good description of the difficulty of the ironworker's job, *The blacksmith takes a tool and works with it in the charcoal; he shapes an idol with hammers, he forges it with the might of his arm. He gets hungry and loses his strength; he drinks no water and grows faint* (Isa. 44:12).

LEAD

Lead is also mentioned in the Bible. It is rarely found in its pure form, and it, too, was smelted. It is found in large quantities in Syria and Asia Minor, but not Israel. It was used for idols, weights for fishermen's nets, and writing tablets in Assyria, the latter use mentioned by Job (Job 19:23-24). Although it was rarely found in archaeological strata from the biblical period, its use was known (Ex. 15:10; Amos 7:7). During the Second Temple period, it was used for weights, sling stones, idols, and as a binding material between stones used for building. At Mampsis, an ancient town east of Beersheba, an "ingot" of lead weighing 158 pounds was found with the symbol of the foundry and the exact weight stamped on it.

Today, some of the greatest treasures uncovered by archaeologists are made from metal. Metal objects could melt when a city was burned during war, or

remelted to make new items. If metal objects were buried and protected from moisture, they could remain intact until today. Since metal objects were precious, they were often preserved more carefully. Now, when large or intricate objects are uncovered, they make international news. Surely, the ancient metalworkers of the Bible had no idea that their wares would still be "marketable" thousands of years later.

RESPONSES from Rabbi Hayyim Halpern's book TORAH DIALOGUES

1. This was Adam's way of blaming God for his own disobedience. Nahmanides paraphrases: Since You gave her to me her advice must be good.

2. (a) Faith in God (12:4). (b) Pursuit of peace (13:8-9). (c) Family loyalty (14:14). (d) Idealism (14:22-24). More may be found in the next Sidrah.

3. Sarah speaks of her own inability to bear children and of her husband's old age. When God speaks to Abraham He delicately omits the latter. See Rashi on verse 13 for an explanation.