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THE INFLUENCE OF MINING AND METAL PRODUCTION ON THE PERIOD ASSOCIATED WITH THE MASONIC TRADITIONAL HISTORY

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The following paper was taken from the 1983 proceedings of the Victoria Lodge of Education and Research. We are again indebted to Jack Merrett, the author and past Secretary of that lodge for the tremendous effort he put in to copy, to store on disc their proceedings over nearly thirty years and to make these available to this Lodge.

Being interested in archaeology and having had mining as my occupation, I have often thought an interesting topic for a paper would be to attempt to provide a factual background of mining and metal production to many of the historical and associated references appearing in the Masonic ritual. This ritual does, in the Entered Apprentice degree, make reference to the beginning of time and it is trusted you will bear with me while I attempt to telescope this infinitely long period into this 25 minute paper.

Based on the rate of radioactive decay of uranium into lead isotope and on the knowledge of the amount of lead present in a uranium ore, physicists have computed the age of the earth in its present form to be about 41/2 billion years. However, this does not indicate the time of creation of matter, and from recent studies concerning the so-called "black holes" in space it is conjectured a continuous cycle of expansion and contraction of matter within the universe appears to be occurring in different regions in space at one and the same time. This then places the age of matter at the threshold of infinity.

Geological evidence indicates that the first forms of life, in the nature of algae, appeared on earth about 1.9 billion years ago, and from the work done by the Doctors Leakey at Olduvai Gorge and adjacent areas in Tanzania in Africa the "dawn man" or a very closely related, stone-tool using hominid existed about 21/2 million years ago.

Archaeologists accepted in 1819, the scheme for dividing pre history into a Stone Age, Bronze Age and Iron Age. it was formulated by C. Thomsen in Denmark. This categorization does not place a finite date on the various ages but rather indicates for relative comparison the stage of civilization attained by the peoples being investigated. These ages have been further divided. For example, the Stone Age was divided into two groups; the Old and the New. The latter being distinguished by the fact that while using stone tools and weapons they were now cultivating food crops and had domesticated animals. The Bronze Age was divided into the Chalcolithic or Copper Age and the true Bronze Age, with the Chalcolithic grouping being placed immediately following the New Stone Age.

It is at this point I will delineate the main area in this discussion and endeavour to put time limits to it. It will cover some of the aspects of the effect of the quarrying and mining of stone and metal ores on the development of the civilizations in the countries either on or adjacent to the Fertile Crescent *(Ed. See page 1 of the paper by Harvey Lovewell in our March 1999 issue for the map)* and to Greece. This area extends from Egypt and Greece on the west to Iraq on the east, and from the Aegean, Black and Caspian Seas on the north to the Red Sea and Persian Gulf in the south. The area is generally known as the cradle of civilization and my topic concerning it will span the time period from about 9000 B.C. to 586 B.C.

Recent excavations made near Qatal Huyuk in the south central Anatolian plain of Turkey indicate a large Neolithic city existed there about 9,000 years ago. Research has indicated that while it supported a large agricultural industry in grain growing and cattle raising, the main economy was based on the quarrying of obsidian, a volcanic glass occurring in a nearby lava flow. The obsidian was used to produce large quantities of cutting tools, weapon points and various other items including mirrors. These products were traded over a wide area and samples of them have been unearthed in excavations at Jericho, in Jordan and even as far afield as Knossos in Crete. At the same time in Turkish Armenia and at Susa in southwestern Iran, archaeological diggings have revealed copper tools and jewelry were being manufactured,

While these tools and other items were in all probability being made from native copper, it has not been definitely established when copper ores were first smelted. It could have happened when endeavouring to

melt native copper occurring with some of its ores or when making pottery with colorful copper ores being used to decorate the object. None-the-less it has been established that at least by 4000 B.C., copper ore was being smelted and that some time between then and 3500 B.C., bronze was produced.

The Chalcolithic and Bronze ages are very closely associated and, in some areas, were concurrent. When the ancients realized that the production of bronze was attributable to the presence of cassiterite. an ore of tin occurring with the copper ores, a widespread search was made for this type of ore. The search extended from the Armenian Caucuses to Spain and up to Britain. Their metallurgical research determined that a mixture of one part tin to eight parts copper produced a metal far stronger than copper itself or any other admixture. At the same time they discovered that other minerals could affect the copper metal being produced. They learned that certain minerals of zinc would change the appearance of the copper, and that mixture containing one part zinc to four of copper produced a brass, having the appearance of gold.

As the availability of zinc was much greater than that of tin, brass became the common material for casting objects in metal. The method by which this was accomplished is known as the "cire-perdu" or the "lost wax process". The desired shape was carved or formed in wax (in all probability bees wax), covered in clay and baked, with vents having been left for the melted wax to escape. Through the same vents liquid metal was poured in, to fill the cavity thus left. Large castings such as temple pillars were in all probability completed in several pours with each succeeding casting made abutting the previous one.

Shortly after 3500 B.C., and before 3200 B.C., would appear the most likely time that Tubal Cain lived. The Bible refers to him as "an instructor of every artificer in brass and iron". The use of brass was already well known at that time but the reference to iron poses some problems unless it refers strictly to meteoric iron. This was to produce small iron blooms when heating concentrations of placer gold and magnetite. To date we have no evidence of it, but about 4000 B C. it is possible the peoples living at that time may have done the same as the Egyptians did in order to melt the gold into a mass. In either case, however, the iron produced would be soft and of poor quality, although repeated forging and hammering would have assisted in case- hardening the object being formed.

Gold jewelry has been found in excavations in Egypt and dates back to the period of about 4000 B.C. While some was of placer origin, the rest was obtained mainly from lode deposits in the mountain range between the Nile River and the Red Sea Rock carvings in Upper Egypt of the above date, indicate that at that time the crushing of quartz rock and gold refining processes were understood Stelae in the British Museum and dating about 2400 BC, show gold mining procedures both in lode and placer operations. The ancients had learned by that time that while nuggets of gold could be removed easily from placer and quartz- crushing operations, much fine gold could be lost To prevent this, they ran the fine sands across animal hides on which the hair was left. The gold and black sands being heavier sank into and were trapped by the hair. In their experimenting, they found the fleece from sheep provided the most effective trap. When the sand washing process was completed the fleece was dried and then shaken. The entrapped gold and magnetite would fall out. This material was then smelted to consolidate the gold but a layer of previously mentioned iron bloom would form between the gold and the surficial slag. It was the use of a wool fleece that gave rise no doubt to the Greek heroic-age myth, the Tale of the Golden Fleece. Two different versions of this appear in Greek mythology, one being a magic fleece that whenever shaken produced gold; the other being a fleece where the wool was hairs of gold. The Golden Fleece was the object of search by Jason and the Argonauts and the time dating of this legend would be about 2800B.C. Gold was also obtained from Punt (possibly Somaliland), from Marib, the home of the Queen of Sheba in southwestern Arabia, from Lydia the home of Croesus in western Turkey and several other locations.

Silver was not originally a mineral in common usage and was mainly obtained from the smelting of silver-lead ores. It does not remain in the metal state when exposed to the atmosphere over long periods. It was mentioned in the Codes of Menes who was supposed to have ruled Egypt about 3500 B.C. The Code decreed that one part of gold was equivalent to 2½ parts of silver. it would appear then, that for the basis of trade, this exchange value was set and therefore the use of gold and silver at this time was the precursor to the use of money and the minting of coins.

Sometime between 3200 and 3000 B.C. a tremendous flood occurred in the lower Tigris-Euphrates valleys. Test-pitting in that area has indicated the flooded area extended at least 400 miles upstream from the delta and was about 100 miles wide. This region was at that time fairly densely populated and later was the site of the Sumerian civilization which followed the flood era. On present day maps, the flooded area is still only marginally above sea level.

Many suggestions have been advanced as to the cause of the flood but it was undoubtedly attributable to a combination of several adverse factors. Evidence of ancient man-made dams having been broached by a sudden and exceptionally large spring run off accompanied by an off shore storm of hurricane proportions at a time of high tidal activity. According to the Bible, the rains continued for 49 days while the flooding lasted 150 days. In the first half of the 19th century, thousands of clay cuneiform tablets were excavated from the site of Assurbanipals' library in Nineveh. This King's reign was from 668 to 627BC in the second half of the 19th century, these tablets were deciphered and gave us another account of the great flood

This story is contained in the Epic of Gilgamesh which gives a detailed construction of the Ark, a vessel that would strike terror in the heart of every sailor and boat builder. In brief, it was square, measuring 128 cubits per side. It had a total of seven decks with six being below. Each deck was divided by bulkheads into nine sections. The whole structure took seven days to build and when launched presented problems in stability so ballast was loaded until 2/3 of the hull was submerged.

In addition to Gilgamish's immediate family, his cargo included his kin, the craftsmen who built the Ark, and all the beasts of the field both wild and tame. It also mentions he stowed aboard all the gold he could get his hands on. (- excellent ballast!).

It is known this epic was written down shortly after 2000 B.C., so the Nineveh version should not have suffered too much alteration.

Another account of this same flood has been translated from written tablets found in a library at the site of Boghoz Koy, the capital city of the Hittites or Hurrians and dates from about 1500 B.C. This account is similar in many respects to the Epic of Gilgamish.

It is to be noted in both the Biblical and Gilgamish accounts of the flood the builder of the Ark was aware of the properties of the mineral petroleum for in both accounts it is stated the Ark was pitched within and without with pitch. This was obtained from bitumen springs which occurred in that area. This same area is the source of much of the Arabian oil now being sold to the Western world.

During the 3rd millennium B.C., a bronze age civilization developed in Crete and was the result of a fusion of the Neolithic inhabitants with immigrants from Anatolia. The palace of Knossos was the fruit of this civilization which eventually collapsed about 1500 B.C., subsequent to an extremely violent earthquake simultaneous with the gigantic eruption of the volcano on the nearby Aegean Island of Thera, sometimes called Santorini. This catastrophe all but wiped out a civilization in this area of the Aegean and in all probability was the foundation of the stories of the legendary continent of Atlantis referred to in Egyptian hieroglyphical records of that time.

It is regretted that time does not permit a reasonable discussion of the developments in Greece but successive invasions of Indo-European tribes appeared in Greece as Ionians, Archaeans, Dorians and Thracians, and cover a period from about 1800 to 900 B.C. During this time, which includes the Homeric period, tremendous strides were made in art and architecture. First the Ionian and then the Doric, and subsequently. in about 500 B.C. the Corinthian forms of architectural columns were developed. Much later the Romans developed the Tuscan column of very simple design and then the Composite, which because of its ornateness, appeared ugly.

The Greeks, aided by iron tools, created structures unsurpassed in their architectural beauty in contrast to enormous structures erected by the Egyptians who by hand-grinding methods and wetted wooden wedges produced giant stone monoliths. The Greeks did however, receive their training from the Egyptians in the creation of statuary and in a very short time far surpassed their tutors in the beauty of their creations.

Turning back the centuries again to about 1900 B.C., it would appear that Abraham accompanied by his father, their followers, and their flocks took their leave of the city of Ur in Chaldea close to the Euphrates River, about 150 miles upstream from the Persian Gulf. They followed this river upstream to the Balikh River and then up it to Flarran. This treck was about 700 miles. Later they left Harran and crossed over the Euphrates River to the Orontes River. They travelled down it and on southward down the Litani River and eventually over and down the Jordan Valley to Beersheba about midway between the south end of the Dead Sea and the Mediterranean Sea. This added another 600 miles to their journey.

Subsequently, during a famine in Canaan, Abraham's son Isaac, his family and followers moved into Egypt where they remained until about 1400BC, when Moses lead the Exodus of the Israelites into the Sinai. Their

water crossing was probably at the Red Sea (Gulf of Suez) in the eastern delta of the Nile River. After many years of wandering in the Sinai and in fighting the resident peoples, the Israelites finally completed their conquest at Canaan about 1220 B.C.

Just three centuries before, somewhere in the Armenian area of the Caucasus the manufacture of steel was first discovered, The Hittites in whose country this occurred kept the process a secret until their overthrow about 1300 B.C. The first steels were manufactured only in small amounts and their quality varied considerably but were in great demand by the Hittites' contemporaries.. However, on the collapse of the Hittite empire, the Sea peoples, who were the maritime trading remnants of the Mycenaean world, obtained the secret of steel production. These peoples included the Philistines, Lycians, Archaeans, Danaoi, Sardinians and others.

The Philistines settled in the eastern Mediterranean adjacent to Israel and were firmly entrenched there in 1175 B.C. They produced weapons, armour, and agricultural implements made from iron. As the Philistines wished to occupy the land held by the Israelites they soon waged war with them and finally in 1050 BC, carried off the Ark of the Covenant that Moses had brought with him in the Tabernacle. At this time they were prohibited from using iron weapons and were not even permitted to sharpen their ploughs, hoes, their coulters, their axes or their mattocks. These items had to be taken to the Philistines as the trade of srnithing was prohibited in Israel.

In another war in 1010 B.C. the Israelites were again defeated. Saul was killed and Israel occupied by the Philistines. Shortly after 1006 B.C., David waged war with the Philistines and defeated them. One of the terms of the following peace treaty was that the Israelites should again be allowed to exercise the trade of smiths within their own country. He reunited the various tribes of the Israelites by waging war with those countries controlling them and on his death in 966 B.C., was succeeded by King Solomon

Solomon was a great diplomat but in spite of his abilities he lost the Aramean provinces in the northeast while in the southeast the Edomite Kingdom was re-established. Under his direction the economy of the country was vastly improved, mainly by the exploitation of the copper deposits in eastern Sinai, at the head of the Gulf of Aqaba, the northeast arm of the Red Sea. At the port of Ezion-Geber the largest copper furnaces to that date were constructed beside the Wadi Araba, a north-south trending.