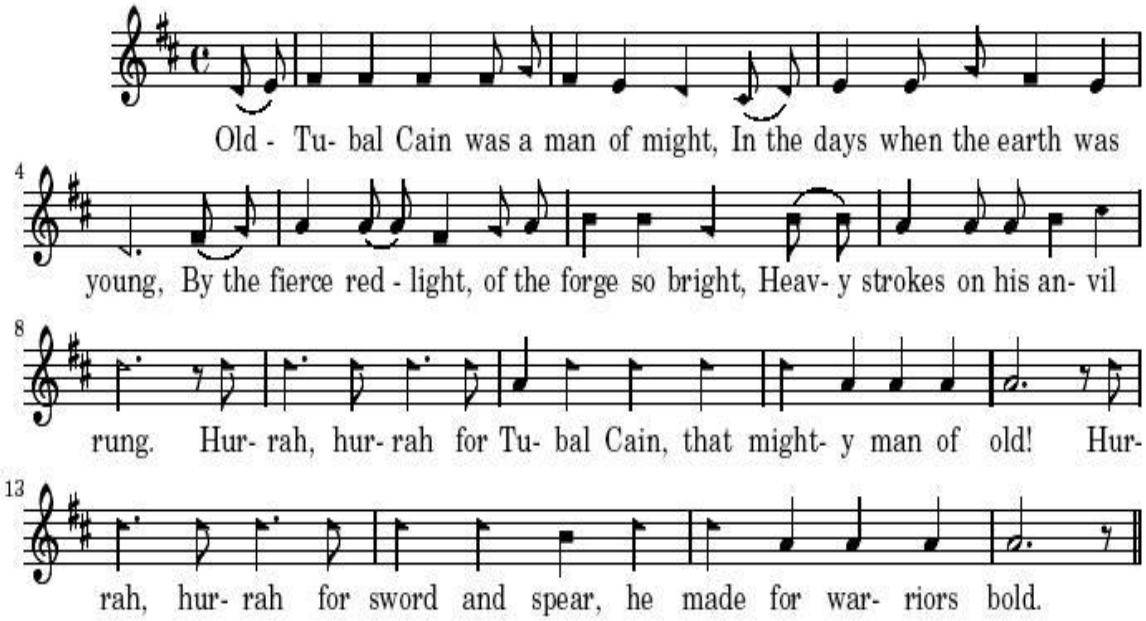
Tubal-Cain's Art…
Metallurgy and Masonry

Tubal-Cain at his forge

Tubal-Cain is mentioned in the Bible in Chapter 4 of Genesis. He was the eighth generation after Cain, the son of Lamech and Zillah, brother of Na'amah and eventually he became the King of Ur. He was well versed in what was known as Plutonic theory (that is, the knowledge of the actions of internal heat) and was, therefore, a prominent alchemist and teacher of his time in history. In my research I was not able to ascertain with any certainty why he had a dual or hyphened name. It has been suggested by several Masonic researchers that the name "Cain" means "smith", which would explain the remarks about his metal-working skills.

As Masons, we are taught in our ritual that Tubal-Cain was a skillful worker in brass and metals, or by today's job title, he would be a highly-skilled metal smith. His place in history was in the days when primitive man used tools of stone or flint to work with naturally-occurring pieces of gold, silver, copper and meteoric iron and fashion them into weapons of war, or into tools and ornaments for peace. I even discovered an obscure song, written in 1884, by R.H. Randall about our famous metal crafter.



At some point, man utilized fire to separate metal from the ore, and there came that magic moment, thousands of years ago in Mesopotamia, when copper ores bearing tin were smelted; this first alloying of metals launched the Bronze Age, a giant step forward in the ascent of man.

This early metallurgy prompted the development of international trade, as bronze coinage became a novel means of exchange. With the advent of commerce, the cradle of civilization in the Eastern Mediterranean area quickly spread into Europe, and eventually to the rest of the world.

There is a definite metallic streak running through our Masonry. We were divested of money and metallic substances even before we entered the Lodge. In one of our degree lectures there is a strong allusion to metallurgy with the reference to chalk, charcoal and clay as the emblems of freedom, fervency and zeal. Clay, or 'Mother Earth', provides both the metals and the refractory's to contain them at high temperatures; from charcoal, we derive the heat energy to smelt and refine them; chalk becomes the flux that will alloy with the worthless rock or other material in which valuable minerals are found and can then be separated.

That was then…what about metals in modern times? There are five principal methods of shaping metals. The first is….

1. *Casting…* this involves making a mould, a cavity of the intended shape, in a pliable material, usually sand, then filling the mould with liquid molten metal; it constitutes the foundry industry,

2. *Working…* includes forging, rolling, extrusion, rod and wire drawing, and pressing the metal in many ways. Both casting and forging metal to shape date from the days of Tubal-Cain.

3. *Machining…* is only a couple of hundred years old; generally, it includes turning, boring, milling, shaping and grinding, and is a finishing process for work-pieces that are first cast or wrought into a rough shape.

4. *Fabricating…* this is the process of assembly and joining, such as bolting and riveting, welding, brazing, and soldering. Many of the majestic bridges modern man has conceived are of fabricated metal. And finally,

5. *Powder Metallurgy*…While a crude form of iron powder metallurgy existed in Egypt as early as 3000 B.C, and the ancient Incas made jewelry and other artifacts from precious metal powders, mass production of P/M products did not begin until the late 19th century. This process has been highly refined in just the last 50 years or so, and involves the compacting of metal powders in a die, followed by sintering. Sintering is a method used to create objects from metallic powders. It is based on atomic diffusion.

Diffusion will occur in any metal material above absolute zero, but it occurs much faster at higher temperatures. In case you forgot some of your high school physics, absolute zero is defined as 0°K on the Kelvin scale and −459.67° on the Fahrenheit scale. In most sintering processes the powdered material is held in a mold and then heated to a temperature just below its melting point in order to allow it to crystallize them into union; many parts can be produced by mass production methods, ready for use without machining.

If Tubal-Cain was indeed the first known artificer in metals, his disciples today would have the job description of tool engineers, who provide the expertise to design and build the machines, and devise the methods and create the tools to be used. It's not surprising that many of the 'working tools' presented to us in our degrees are essential tools in the basic fabrication of metals; one cannot imagine a tool engineer without the benefit of the gauge and the square and the compasses.

The discovery, refining, and use of metals are like shining threads weaving through the tapestry of human history; besides the invention of coinage, they have played a critical role in the invention of printing, the harnessing of steam and the internal combustion engine, the discovery and use of electricity, the achievement of powered flight, and the advent of today's efficient nuclear energy.

So, Tubal-Cain's art, now called metallurgy, has unfolded many of the secrets of nature and science. The Great Architect has provided the materials we need in the firmament, and man's inspiration has fashioned them by the use of tools. I would call that 'stamping our work divine'.

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 ***Another nugget from the Quarry…***