

Agricola, Herbert Hoover, and the "Pyramid Iron"

As mentioned in the backbone, **Herbert Hoover**, the 31st President of the United States from 1929 to 1933, was also a scientist and translated [Agricola's "De Re Metallica"](#) from Latin to English in 1912. He did that together with his wife, Lou Henry Hoover.

Agricola began his seminal book around 1533; it was published 1555 - after his death.

The comment about the history of iron technology can be found on p. 420 and 421 in my copy. Here it is:

Illustration

HISTORICAL NOTE ON IRON SMELTING. The archaeologists' division of the history of racial development into the Stone, Bronze, and Iron Ages, based upon objects found in tumuli, burial places, etc., would on the face of it indicate the prior discovery of copper metallurgy over iron, and it is generally so maintained by those scientists. The metallurgists have not hesitated to protest that while this distinction of "Ages" may serve the archaeologists, and no doubt represents the sequence in which the metal objects are found, yet it by no means follows that this was the order of their discovery or use, but that iron by its rapidity of oxidation has simply not been preserved. The arguments which may be advanced from our side are in the main these. Iron ore is of more frequent occurrence than copper ores, and the necessary reduction of copper oxides (as most surface ores must have been) to fluid metal requires a temperature very much higher than does the reduction of iron oxides to wrought-iron blooms, which do not necessitate fusion. The comparatively greater simplicity of iron metallurgy under primitive conditions is well exemplified by the hill tribes of Northern Nigeria, where in village forges the negroes reduce iron

sufficient for their needs, from hematite. Copper alone would not be a very serviceable metal to primitive man, and he early made the advance to bronze; this latter metal requires three metallurgical operations, and presents immeasurably greater difficulties than iron. It is, as Professor Gowland has demonstrated (Presidential Address, Inst. of Metals, London, 1912) quite possible to make bronze from melting stanniferous copper ores, yet such combined occurrence at the surface is rare, and, so far as known, the copper sources from which Asia Minor and Egypt obtained their supply do not contain tin. It seems to us, therefore, that in most cases the separate fusions of different ores and their subsequent re-melting were required to make bronze. The arguments advanced by the archaeologists bear mostly upon the fact that, had iron been known, its superiority would have caused the primitive races to adopt it, and we should not find such an abundance of bronze tools. As to this, it may be said that bronze weapons and tools are plentiful enough in Egyptian, Mycenaean, and early Greek remains, long after iron was demonstrably well known. There has been a good deal pronounced by etymologists on the history of iron and copper, for instance, by Max Müller, (Lectures on the Science of Language, Vol. II, p. 255, London, 1864), and many others, but the amazing lack of metallurgical knowledge nullifies practically all their conclusions. The oldest Egyptian texts extant, dating 3500 B.C., refer to iron, and there is in the British Museum a piece of iron found in the Pyramid of Keophron (3700 B.C.) under conditions indicating its co-incident origin. There is exhibited also a fragment of oxidized iron lately found by Professor Petrie and placed as of the VI Dynasty (B.C. 3200). Despite this evidence of an early knowledge of iron, there is almost a total absence of Egyptian iron objects for a long period subsequent to that time, which in a measure confirms the view of its disappearance rather than that of ignorance of it. Many writers have assumed that the Ancients must have had some superior art of hardening copper or bronze, because the cutting of the gigantic stonework of the time could not have been done with that alloy as we know it; no such hardening appears among the bronze tools found, and it seems to us that the argument is stronger that the oldest Egyptian stoneworkers employed mostly iron tools, and that these have oxidized out of existence. The reasons for preferring copper alloys to iron for decorative objects were equally strong in ancient times as in the present day, and accounts sufficiently for these articles, and, therefore, iron would be devoted to more humble objects less likely to be preserved. Further, the Egyptians at a later date had some prejudices against iron for sacred purposes, and the media of preservation of most metal objects were not open to iron. We know practically nothing of very early Egyptian metallurgy, but in the time of Thotmes III. (1500 B.C.) bellows were used upon the forge.



Herbert and Lou Hoover