

# Appendix II

## Art of the Edge Tool

### I. Edge Toolmaking Techniques 1900 BC – 1930 AD

#### Shaping and forging by Hand

- A. Forge welding: Edge carburizing by heating, followed by hammering and additional heat treatment
- B. Steeling: The welding of a steel bit onto an iron shaft or body
- C. Pattern-welding: The welding together of alternating layers of sheet iron and steel, used by knife and swordmakers; seldom used by edge toolmakers
- D. Molding: The shaping of short lengths of hot malleable iron or German steel bar stock in an iron pattern; sometimes the iron pattern was water-cooled. This method was not used after blister steel became widely available around 1700.

#### Shaping and forging by Machine

- E. Rolling: The hot rolling of cast steel into bar stock, and its further shaping by the formation of sockets, grinding, and further forging, both before and after additional thermal treatment.
- F. Casting: The hot rolling of cast steel into steel bar stock compatible with its further shaping in molds or patterns by drop-forging, as in the drop-forging of cast steel axes.
- G. Drop-forging: The hydraulic pressing of low carbon steel and malleable iron into tool forms by using dies as patterns as in the mass production of factory-made hand tools.

Most hand tools made in the 20<sup>th</sup> century show no evidence of hand work, but, in a minority of cases, (e.g. the ax) there is no clear distinction between the hand-forged and the machine-made tool until the late 20<sup>th</sup> century. Most edge tools made before 1930 are “hand-forged” or “forge welded” to some extent, no matter the technique used to “steel” their edges. The trip hammer and the water wheel are examples of machines that assisted edge toolmakers in the forging of their tools. The advent of the modern rolling mill (Henry Cort, 1784) for hot rolling cast steel bar stock did not end the long tradition of hand-forging an edge tool. When the Collins Ax Factory began drop-forging all steel axes sometime after 1837, many smaller ax companies continued hand-forging and hand hammering axes they produced, often with the aid of other machinery, well into the 20<sup>th</sup> century. The evolution from hand-forging to machine forging (drop-forging) hand tools was thus a gradual process. One goal of the creative economy of the post-industrial era is the revival of handmade hand toolmaking strategies and techniques.

