Section 8 – BRIEF HISTORY OF BRASS

Brass has been made for almost as many centuries as copper but has only in the last millennium been appreciated as an engineering alloy. Initially, bronze was easier to make using native copper and tin and was ideal for the manufacture of utensils. Pre-dynastic Egyptians knew copper very well and in hieroglyphs copper was represented by the ankh symbol, also used to denote eternal life, an early appreciation of the lifetime cost-effectiveness of copper and its alloys. While tin was readily available for the manufacture of bronze, brass was little used except where its golden colour was required. The Greeks knew brass as 'oreichalcos', a brilliant and white copper.

Several Roman writers refer to brass, calling it 'Aurichalum'. It was used for the production of sesterces and many Romans also liked it especially for the production of golden coloured helmets. They used grades containing from 11 to 28 per cent of zinc to obtain decorative colours for all types for ornamental jewellery. For the most ornate work the metal had to be very ductile and the composition preferred was 18%, nearly that of the 80/20 gilding metal still in demand.

Before the 18th century, zinc metal could not be made since it melts at 420ºC and boils at about 950ºC, below the temperature needed to reduce zinc oxide with charcoal. In the absence of native zinc it was necessary to make brass by mixing ground smithsonite ore (calamine) with copper and heating the mixture in a crucible. The heat was sufficient to reduce the ore to metallic state but not melt the copper. The vapour from the zinc permeated the copper to form brass which could then be melted to give a uniform alloy.

In Mediaeval times there was still no source of pure zinc. When Swansea, in South Wales, was effectively the centre of the world's copper industry, brass was made from calamine found in the Mendip hills in Somerset. Brass was popular for church monuments, thin plates being let in to stone floors and inscribed to commemorate the dead. These usually contained 23-29% of zinc, frequently with small quantities of lead and tin as well. On occasions, some were recycled by being turned over and re-cut.

One of the principal industrial users of brass was the woollen trade, on which prosperity depended prior to the Industrial Revolution. In Shakespearean times, one company had a monopoly on the making of brass wire in England. This caused significant quantities to be smuggled in from mainland Europe. Later the pin trade became very important, about 15-20% of zinc was usual with low lead and tin to permit significant cold working to size. Because of its ease of manufacture, machining and corrosion resistance, brass also became the standard alloy from which were made all accurate instruments such as clocks, watches and navigational aids. The invention by Harrison of the chronometer in 1761 depended on the use of brass for the manufacture of an accurate timekeeper that won him a prize of £20,000. There are many examples of clocks from the 17th and 18th centuries still in good working order.

With the coming of the Industrial Revolution, the production of brass became even more important. In 1738, William Champion was able to take out a patent for the production of zinc by distillation from calamine and charcoal. This gave great impetus to brass production in Bristol.

Wire was initially produced by hand drawing and plate by stamp mills. Although the first rolling mill, Dockwra was installed at Esher, Surrey in 1697, it was not until the mid-19th century that powerful rolling mills were generally introduced. The Dockwra works specialised in the manufacture of brass pins, the starting stock being a plate weighing about 30kg. This was cut into strips, stretched on a water powered rolling mill and given periodic interstage anneals until suitable for wiredrawing.

With the invention of 60/40 brass by Muntz in 1832 it became possible to make cheap, hot workable brass plates. These supplanted the use of copper for the sheathing of wooden ships to prevent biofouling and worm attack.

Muntz metal plates were used for sheathing the wooden hull of the Cutty Sark, built in 1869 and presently in dry dock in Greenwich, South London since 1954. The Cutty Sark is currently undergoing restoration and regeneration.
See www.cuttysark.org.uk

With improvements in water communications, the centre of the trade moved to Birmingham to be nearer to fuel supplies and to facilitate central distribution round the country. Here in 1894, Alexander Dick invented the extrusion press that revolutionised the production of good quality cheap rods. Subsequent developments in production technology, mentioned in many of the references given, have kept pace with customers' demands for better, consistent quality in larger quantities.