TIN - Sn

History

Tin is a white shiny metal that has been used by humans for around 5000 years. The most common use for it in ancient times was for alloying with copper to create bronze. The creation of bronze revolutionised the human civilisations that developed it and ushered them into what is archeologically known as the Bronze Age. Thanks to the hardness and durability of bronze, Bronze Age civilisations leaped ahead of those that did not possess the metal, as tools and weapons made out of bronze were a dramatic improvement over those of wood, stone or copper on its own. Because of the technological supremacy bronze provided to those that possessed it, tin became one of the most important commodities for over two millennia.

Geology

Tin resources have been identified on all continents. In 2011, China was the world's largest producer of tin – 110,000 tonnes, followed by Indonesia – 51,000 tonnes, Peru – 34,600 tonnes, Bolivia – 20,700 tonnes, Brazil – 12,000 tonnes, and Australia – 8,000 tonnes[i].

The principle mineral ore for tin is cassiterite, which is found in medium- to high-temperature hydrothermal veins and in greisen, granite, granite pegmatite, rhyolite, and in large alluvial placer deposits[ii]. The vast majority of Australia's economic tin resources (85 per cent) are at the Renison Bell deposit in Tasmania, a site which supports one of the world's largest underground tin mines. The second largest tin mine in Australia is at Greenbushes in Western Australia[iii].

Tin Ore, Cassiterite
Source: Wikimedia Commons

A tin plate can.
Source: Wikimedia Commons

Use

Aside from its use to create bronze, tin's unique properties make it very important for a variety of other uses[iv]. Today the most common use of tin is to create alloys for solder - 52 per cent, thanks to tin's low melting point and malleability, although lead was used extensively for solder in the past, it's toxicity has seen tin become the preferred solder. The second most significant use is to create tinplate - 17 per cent (steel coated with tin, this is used for food packaging, e.g. tin cans). Tin's usefulness in this application stems from its non-toxicity and its resistance to corrosion. The third most common use is chemical applications - 15 per cent. Tin is still used to create bronze – 5 per cent, and is also commonly used as an alloy for bearing metal and as an alloy in metallic coatings for its corrosion resistant properties[v].

Victoria

Victoria has a number of identified tin deposits although there has been limited tin production in the State historically. A total of approximately 11,250 tonnes of tin concentrate has been produced in Victoria with over 80 per cent of this coming from the area around Beechworth. Reedy Creek (near Beechworth) remains the State's most significant identified tin field. Most of the tin produced in Victoria to-date was a by-product of gold mining. Despite the State's limited history of tin production there is evidence that substantial tin lodes occur in the far north-east of the state around Koetong, Mount Cudgewa near the border. This area is also directly to the south of a productive tin field in New South Wales[vi].

[i] U.S. Geological Survey, Mineral Commodity Summaries (2012) Tin http://minerals.usgs.gov/minerals/pubs/commodity/tin/mcs-2012-tin.pdf
[ii] John W. Anthony, Richard A. Bideaux, Kenneth W. Bladh, and Monte C. Nichols, Eds. (2012), Handbook of Mineralogy, Mineralogical Society of America, Chantilly, USA. http://www.handbookofmineralogy.org.
[iii] GeoScience Australia, Australian Mines Atlas, Tin http://www.australianminesatlas.gov.au/education/fact_sheets/tin.html
[iv] London Metal Exchange, Tin Industry Usage, http://www.lme.com/tin_industryusage.asp
[v] Ibid GeoScience Australia.
[vi] Victorian Government, Department of Primary Industries: Tin Fact Sheet http://www.dpi.vic.gov.au/earth-resources/minerals/metals/tin