*** Name Origin:**

Symbol Sn from Latin: stannum (tin).

*** Sources:**

Principally found in the ore cassiterite (SnO_2) and stannine (Cu_2FeSnS_4) in Malaya and Indonesia, Zaire and Nigeria, Bolivia and Thiland. The pure metal is formed by reduction with coal.

*** Uses:**

Used as a coating for steel cans. Also in solder (33%Sn:67%Pb), bronze (20%Sn:80%Cu), and pewter. Stannous fluoride (SnF_5), a compound of tin and fluorine is used in some toothpaste. It is also used in the manufacture of super conducting magnets. While tin has many uses in alloys, it has few uses in it's pure elemental form.

*** Additional Notes:**

Known to the ancients. Tin is found chiefly in cassiterite (SnO_2). Most of the world's supply comes from Malaysia, Bolivia, China, Indonesia, Russia, Zaire, Thailand, and Nigeria. The U.S. produces almost none, although occurrences have been found in Alaska and Colorado. Tin is obtained by reducing the ore with coal in a reverberatory furnace. Ordinary tin is composed of ten stable isotopes; thirty five unstable isotopes and isomers are also known. Ordinary tin is a silver-white metal, is malleable, somewhat ductile, and has a highly crystalline structure. Due to the breaking of these crystals, a "tin cry" is heard when a bar is bent. The element has two allotropic forms at normal pressure. On warming, gray, or a tin, with a cubic structure, changes at 13.2°C into white, or b tin, the ordinary form of the metal. White tin has a tetragonal structure. When tin is cooled below 13.2°C, it changes slowly from white to gray. This change is affected by impurities such as aluminum and zinc, and can be prevented by small additions of antimony or bismuth. This change from the a to b form is called the tin pest. There are few if any uses for gray tin. Tin takes a high polish and is used to coat other metals to prevent corrosion or other chemical action. Such tin plate over steel is used in the so-called tin can for preserving food. Alloys of tin are very important. Soft solder, type metal, fusible metal, pewter, bronze, bell metal, Babbitt metal, White metal, die casting alloy, and phosphor bronze are some of the important alloys using tin. Tin resists distilled sea and soft tap water, but is attacked by strong acids, alkalis, and acid salts. Oxygen in solution accelerates the attack. When heated in air, tin forms SnO_2, which is feebly acid, forming stannate salts with basic oxides. The most important salt is the chloride ($SnCl_2 \cdot H_2O$), which is used as a reducing agent and as a mordant in calico printing. Tin salts sprayed onto glass are used to produce electrically conductive coatings. These have been used for panel lighting and for frost-free windshields. Most window glass is now made by floating molten glass on molten tin (float glass) to produce a flat surface (Pilkington process). Of recent interest is a crystalline tin-niobium alloy that is superconductive at very low temperatures. This promises to be important in the construction of superconductive magnets that generate enormous field strengths but use practically no power. Such magnets, made of tin-niobium wire, weigh but a few pounds and produce magnetic fields that, when started with a small battery, are comparable to that of a 100 ton electromagnet operated continuously with a large power

supply. The small amount of tin found in canned foods is quite harmless. The agreed limit of tin content in U.S. foods is 300 mg/kg. The trialkyl and triaryl tin compounds are used as biocides and must be handled carefully.