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DEPARTMENT OF GEOLOGY & MINERAL INDUSTRIES

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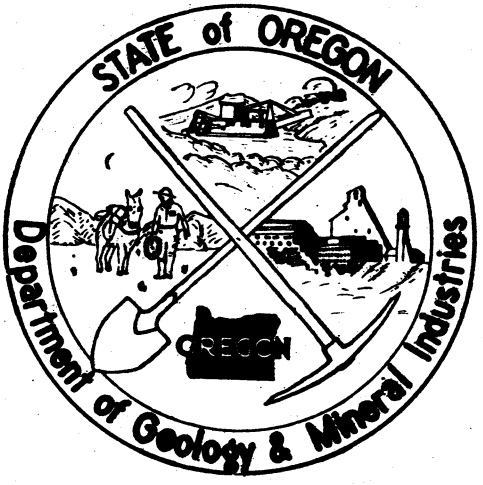

TIN

In National Geographic Magazine for November, Alicia O'Reardon Overbeck traces the history, occurrences and production of tin under the title "Tin, the Cinderella Metal". It is needless to state that the article is illustrated adequately. That is taken for granted in National Geographic.

Historically tin goes back into antiquity. Biblical references are numerous. Its industrial importance dates from the time when an ancient metallurgist discovered that by adding tin to molten copper the resulting alloy possessed greatly desired properties of hardness and strength. The Bronze Age resulted which meant a step or several steps forward in the social conditions called civilization. The end of the Bronze Age came with the discovery of iron, but that did not mean a lessening in the importance of tin, for its uses have continually expanded.

The fabulous voyages of the Phoenicians are connected with commerce in tin, probably with ancient Britons in Cornwall, famous for its tin mines. On down through the ages, the Bible, Herodotus, Pliny, Homer, writings of ancient Chinese and Egyptians, and the more modern writers which seem ancient to us now, mention tin or its alloys such as bronze, pewter and bell metal.

Known commercial occurrences of tin are really confined to a relatively few localities - the Federated Malay States, the Netherlands Indies, Bolivia, Siam (Thailand), Burma, China, Nigeria, and Cornwall. It is thus remarkable that it was one of the first metals discovered.

The romance of tin is intimately associated with early explorers and adventurers. Pizarro conquered Peru, and he and his associates gutted it and Bolivia, insofar as they were able, of all treasure. On Potosi Hill, Bolivia, in the 17th century, rich silver ore was mined through shafts by thousands of slaves - human ants - who passed endlessly up the notched poles used as ladders, each with a load of silver ore on his back. His life was valued about on a par with the ants. When he fell exhausted or made a misstep in the shafts, another slave was forced in to replace him.

Tin ore which occurred with the silver was thrown away as worthless and accumulated in huge dumps; it was not until the next century that tin in the dumps became of commercial importance. These dumps have continued to be worked over for tin minerals down to the present day.

Not all the dramatic stories of rags to riches are confined to gold mining or wild-cat oil wells. One of the most spectacular is that of the rise of Senor Simon I Patino, the Bolivian Tin King. As related in National Geographic, in the early part of the last century Patino was a young, impecunious clerk in a general merchandise store, owned by a German, in Chochobamba. Heavily in debt to the store was a Portuguese, and it devolved upon the clerk to collect the debt. After tracking down the debtor with much effort and difficulty, Patino finally made with the Portuguese the best bargain he could, which was that the Teutonic proprietor should accept title to a tin claim the Portuguese owned in settlement of the bill for merchandise. However, Patino's employer was enraged at the bargain and threw him out on his ear, telling him to keep the tin claim in

payment for back wages. Without a job and with no money the clerk turned to the tin claim as a means of livelihood. A friend staked him to some food and tools, and he started work. For many months he endured hardship and privation. With some Indians to help him, he mined the ore and concentrated it in the icy streams, packing the concentrate out on his back. Finally he struck some rich ore valued at over $500 a ton. It proved to be a real strike and soon he received an offer of a million dollars for his property. Counseled by his wife, he refused the offer. By mining his rich ore he was able to buy surrounding property which also proved to have valuable tin deposits. The Patino mines today supply about half of Bolivian tin production, and the Patino fortune is one of the world's largest.

The history of canning food really begins with Napoleon's determination to solve the problem of providing portable food. He offered a reward of 12,000 francs to anyone who could devise a satisfactory method. Nicholas Appert, after many experiments, discovered that by heating and sealing, foods could be preserved. But he knew only of glass as a container which was not practical for use of an army on the march.

Knowledge of tin plating goes back to antiquity. In more recent times, tin plate was made in Bohemia and Saxony between 1240 and the 1600's. A plant was started in England in 1673. In 1720 the industry was started in Wales, and by 1776 Wales led the world in tinplate manufacture. Wales maintained its leadership until the industry in the United States took over because of the McKinley Bill of 1890.

In 1825, an Englishman, Thomas Kensett, living in New York, obtained an American patent for a tin can to be used as a container. In 1810 a patent had been granted in England. From these beginnings has sprung an industry which now uses around 50,000 tons of tin annually in the manufacture of tinplate.

We take the tin can for granted without giving thought to its importance in our scheme of things, but if we pause a bit and think about our reliance on it for making possible the various human activities of the present day, the tin can then assumes gigantic proportions. We then realize something of our dependence on the metal tin.

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In Metals and Alloys for November, under the title "Tin Plate and Solder - from the Strategic Viewpoint", H. W. Gillett gives some timely facts about United States' requirements of this much publicized metal.

The tin content for finished products in the United States for 1937 was about 90,000 tons of which 73,000 tons was primary and 17,000 tons secondary metal. About 39,000 tons, all primary, was used in tinplate.

The most important use of tinplate is in tin cans for food products, in which industry about 60% of all tin cans are used. In cans used for food containers, the tin coating serves three purposes, (1) protection of outside from rusting, (2) protects inside from corrosion by contents, and (3) allows soldering of the body seam with great facility in can-making machinery.

Under war conditions, the amount of tin used in cans could be reduced very

materially without cutting down the number of cans required. Lacquer-enamel can be used for protection on the outside of cans. Also a large number of oils, dryfoods, and non-corrosive materials do not require tin for protection; "enamel" lined cans could be used. It is estimated that not more than 10% of the total cans made require tin for protection against corrosion due to contents.

In an emergency, silver might be substituted for tin in the food industry where protection against very corrosive materials is desired. Generally speaking silver would be uneconomic. Aluminum could not be used, since no solution of the problem of soldering on aluminum has been found.

The most essential need for tin is in soldering tin can joints. If required by shortage of tin, it would be feasible to tin and solder only the joints, thus saving the tin on about 95% of the area.

The use of solder is so varied and widespread that it affects nearly all industrial activity. In a 4,000,000 car year, about 9,000 tons of tin is required for radiators.

Some substitute solders which could be used under certain conditions are lead-silver and cadmium-zinc combinations. Also, a solder may be made by substituting cadmium for some of the tin in the usual 62% lead-38% tin solder.

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In U.S.Bureau of Mines' Mineral Trade Notes, dated Nov.20th, 1940, the following item shows measures taken in the United Kingdom for conserving tin supplies:

> "The Ministry of Supply has issued an order prohibiting the use of tin containers for face powders, shaving sticks, cigarettes, boiled sweets, and many other articles. The Ministry hopes thus to save approximately 50,000 tons of tinplate and sheet steel per annum, which can be diverted to the manufacture of munitions. In the case of biscuits, boiled sweets, coffee, cocoa, and drinking chocolate, retailers will receive supplies in large tins, which will have to be returned to the manufacturers after the contents have been sold to the public in small paper containers. Tin boxes and cans in general will be replaced by paper containers and bags. The public is urged to return all used tin cans at once to retailers or other authorized persons or agencies. (Vice Consul M. A. Colebrook, London, July 25, 1940)."

QUICKSILVER

According to the U.S.Bureau of Mines, domestic production of quicksilver in October was 3,600 flasks - the same as reported for September. Consumption was given as 2,700 flasks which showed an increase of 600 flasks compared to September consumption and was the highest for the year. 757 flasks were exported; there were no imports. Stocks in the hands of consumers and dealers at the end of October amounted to 13,200 flasks compared to 13,100 flasks at the end of September; while producers' stocks were reported as 855 flasks, an increase of 478 flasks over the September amount.

Companies in Oregon responsible for 98% of Oregon's total in 1939 reported that the October total was 133% higher than the monthly average for 1939, and 5% higher than in September.

Of the October exports, 581 flasks went to the United Kingdom, 9 to Canada, and 94 to Australia.

Quoted prices continued throughout the month at about $170 a flask.

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NON-METALLIC MINERAL PRODUCTION

C. P. Holdredge has been employed by the Department to make a canvass of non-metallic mineral production of the state for 1940. Statistics of metallic production made by the U.S.Bureau of Mines are accurate and made available to the public with reasonable promptness. The Bureau's figures for non-metallics, however, are not complete for Oregon and are often delayed two years before being published.

In order to gauge the importance of the state's mineral industry and to answer intelligently the many inquiries concerning it, some of which are from industrialists, it is essential that the value of production of non-metallics be known. To get real value out of such statistics, they should be as nearly as may be current figures. Thus an accurate, up-to-date picture of the state's mineral industry is obtained.

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ASSESSMENT WORK - MILITARY SERVICE

The following item in the Oregon Journal, Portland, Dec.9th, is of interest to mining claim owners in military service:

"WASHINGTON, Dec.8 (Washington Bureau of The Journal). Holders of mining claims who were in military service on October 17 or enter at

"later date will not be required to perform the usual $100 worth of assessment work during their service.
"Regulations issued by Secretary Ickes of the interior department also permit time in military service to be credited for residence and cultivation of land under the homestead laws, suspending payments which fall due during the period of military training. Those claiming the benefit of this suspension should file notice of military service with the district land office on or before April 17, 1941, or within six months after entering the service.
"Those desiring suspension of assessment work on mining claims will be required to file notice in the county office where their certificates are recorded, before the end of the assessment year, which will be July 1, 1941".

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MINERAL FERTILIZER BROUGHT TO THE NORTHWEST

From the Oregon Journal, Portland, Dec.9th:

"The Weyerhaeuser line freighter Winona was at McCormick terminal Monday discharging 3000 tons of super-phosphate, the largest shipment of this mineral ever to be unloaded here. A total of 7000 more tons of the mineral is slated to come here in the near future on Weyerhaeuser and McCormick line vessels.
"Consigned to the agricultural adjustment administration, the superphosphate comes from Baltimore for distribution to Oregon and Washington farmers for replenishing soil employed for growing clover and legumes.
"A total of 20,000 tons of the mineral is destined for shipment to Portland and Seattle."

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Mr. B. H. Coffman, 1918 E 81st St., Cleveland, Ohio, desires to contract for large tonnage of manganese ore of 48% manganese minimum. Could use 3,000 tons or more per month.

Cuban American Holdings, Ltd., 367 Mills Bldg., San Francisco, wishes to acquire deposit of white diatomaceous earth running 90% plus in silica. Send samples, analyses, and full particulars to above named company.

Mr. F.S.Minshall, Philomath, Oregon, desires to get in touch with someone experienced in prospecting for gold, silver, and cinnabar, with whom he could go on a prospecting trip next spring. Share expenses.

Minor Blythe, 1003 West 35th St., Los Angeles, states that he is in the market for and wishes to receive information on the following ~~#~~ minerals: Molybdenite concentrates, 80-85% MoS_2 containing not over 0.5% copper; vanadium concentrates containing not less than 15% V_2O_5; beryl of a grade not less than 10% BeO; fluorspar, sillimanite, rutile, corundum, micaceous hematite, wolframite, magnesite, cryolite, monazite, colmanite, white talc free of carbonates, sepiolite, siliceous earth testing 85-90% silica and 10% alumina, pure white clay, bentonite suitable for filtering, and various other minerals.

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