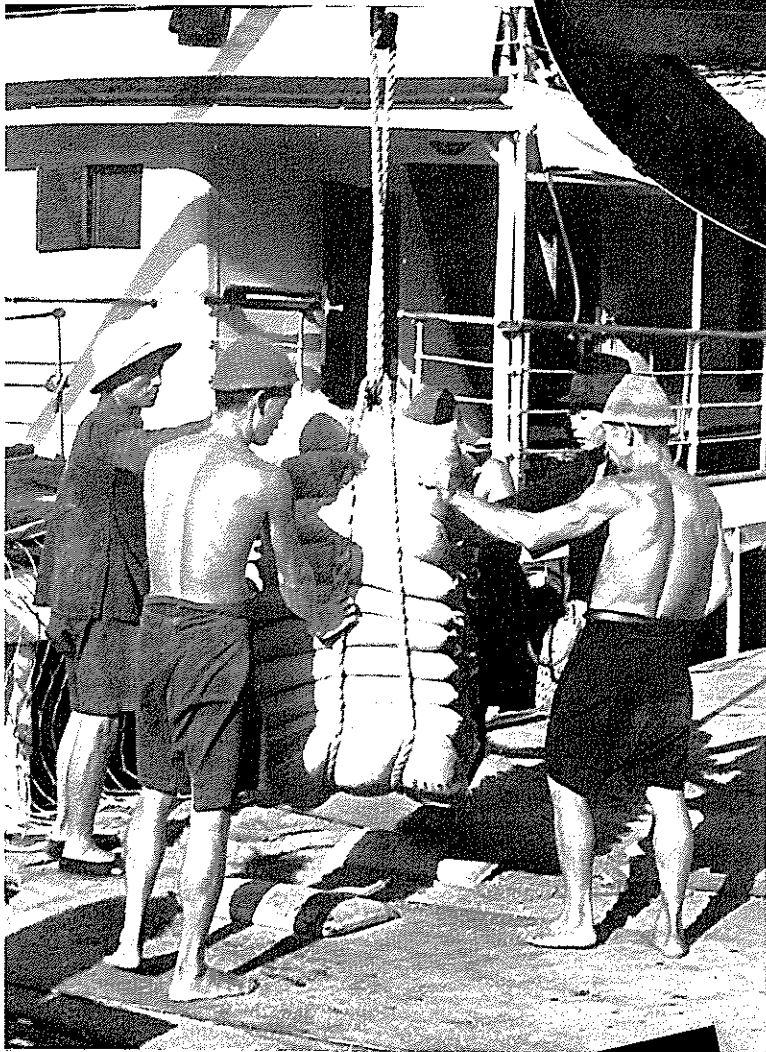
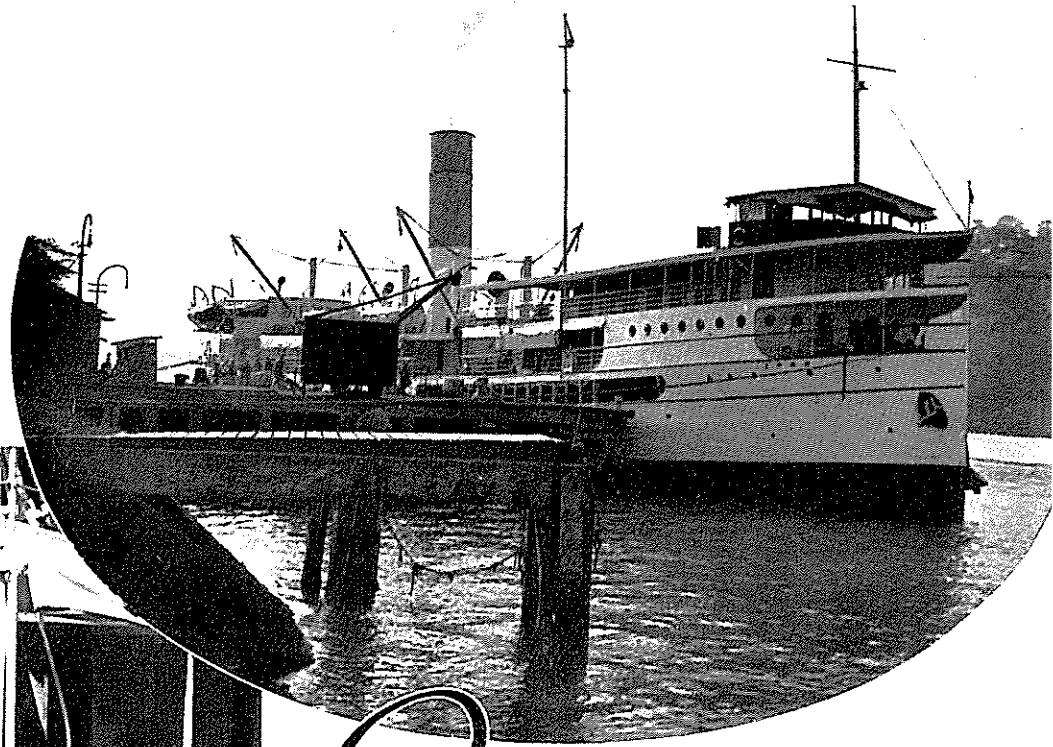


Right: A coasting steamer of the Straits Steamship Company unloading tin ore at the island of Pulau Brani. Deep-sea freighters from many parts of the world also bring ore to this wharf.

Below: Ore from the alluvial tin-fields of the Malay Peninsula arrives at Pulau Brani in sacks, which are unloaded from the ships by Chinese coolies.



Straits

by Ivan Palmer

TIN ore from all over the world—from French Indo-China, Siam, East and South Africa, Yunnan (China) and Alaska—is brought for smelting to the works of the Straits Trading Company, Ltd., on Pulau Brani, the island a few hundred yards off the coast of Singapore at Keppel Harbour.

Most of it, of course, comes from Malaya itself, which this year will produce a third of the world's entire output of tin of nearly 120,000 tons.

Won from the earth by an industry which gives direct employment to over 50,000 people, Malayan ore comes to Pulau Brani by sea.

It was a fascinating romance of modern industry I saw as I watched the journey of a bag of ore through the smelting works from the time it was landed from a Straits Steamship vessel at the jetty until—a glistening ingot of pure tin—it was ready for shipment. It reminded one of those "story-of-a-shilling" essays one had to write at school.

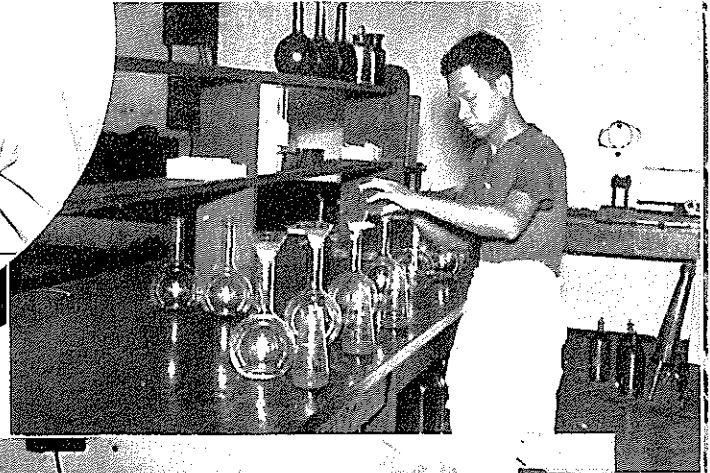
BUT it was in the laboratory that I got the real thrill. While the huge furnaces were reducing tons of ore at a time to tin metal, chemists in the laboratory were "smelting" samples of ore weighing only half a gramme—just sufficient to cover thinly a five-cent piece—and ground so fine that the

THE WORLD'S
BIGGEST
SMELTER



From left to right: Sir John Bagnall, managing director of the Straits Trading Company; Mr. H. T. Earle, works manager of the Pulau Brani smelter; and Mr. B. J. Cramer, chief chemist and metallurgist.

Below is a series of pictures illustrating the process by which the ore is sampled in the laboratory and the percentage of tin ascertained. Below, on the left, the titration operation is seen.



TIN

dust could pass through a silk handkerchief. And that half gramme represented the quality of a "parcel" of 20 tons of ore.

The laboratory work goes on all the time sampling and testing every "parcel" of ore which reaches the smelting works. A little is taken from each bag, mixed carefully and gradually the amount of the sample is reduced to the size of a pinch of salt.

In the laboratory assay to determine the tin content of the ore, the sample is not smelted in the strict sense of the term; it is reduced to metal by hydrogen in a small electric furnace.

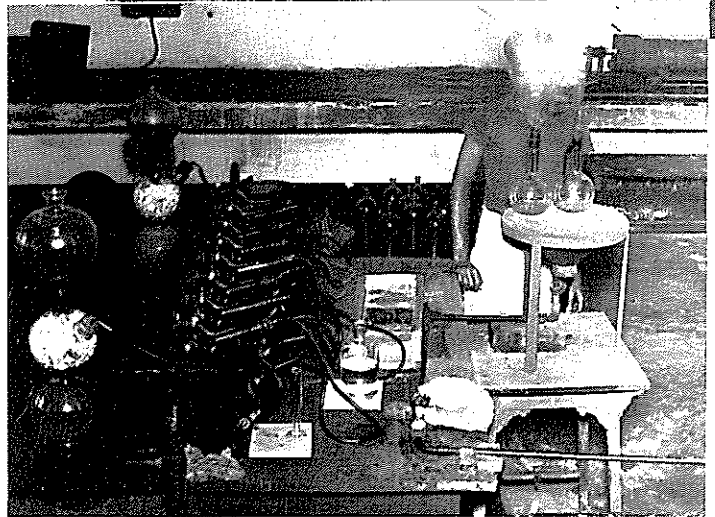
It is then dissolved in acid, treated to remove any interfering impurities and finally titrated with a standardised iodine solution. The amount of iodine required gives the proportion of tin present in the ore.

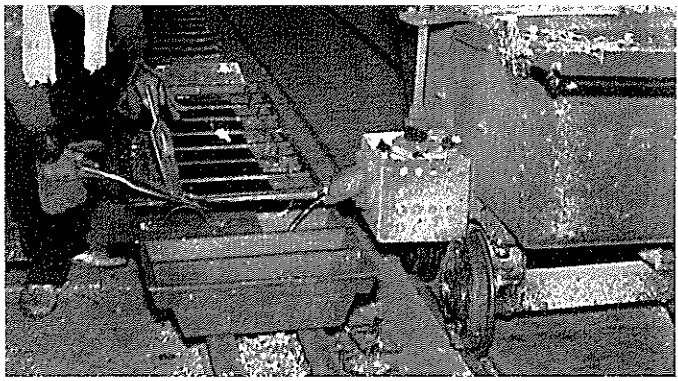
MEANWHILE in the smelting works giant furnaces are coping with tons of tin ore.

When it first arrives, all ore is weighed and then stacked according to origin. Samples are taken and chemists determine the quality of the ore.

Most of it is ready for direct smelting, but lower-grade ores are heated in huge roasters, a process which removes deleterious impurities such as arsenic, lead, bismuth, antimony and sulphur.

Ready for smelting, the ore is blended into charges, anthracite and fluxes being added together with intermediate products of previous smeltings. The anthracite converts the ore into metallic tin and the fluxes assist by making the





carthy residue in the ore sufficiently fluid to be tapped from the furnaces.

Each blend is about 25 tons. The charge is taken by overhead trucks to hoppers above the furnaces.

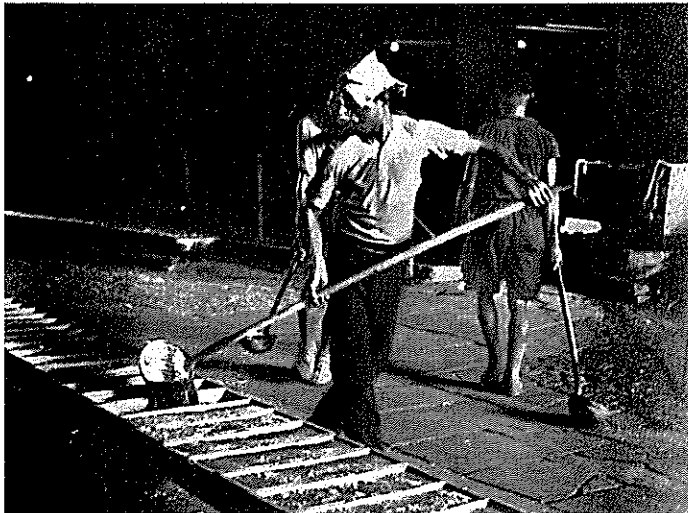
SMELTING takes up to 10 or 12 hours and the charge is heated to 2,372 deg. F., almost to a white heat. After the fourth hour tin is allowed to run off from the bottom of the furnace until the eighth or ninth hour.

The final heating of the remainder takes place and in about an hour it is run off as slag, containing a proportion of tin.

This slag goes through a further process of smelting which produces a final slag of very low tin content, which is discarded, and iron-tin alloy, an intermediate product which is used to form part of later ore charges.

The molten tin produced in the smelting process is ladled into moulds, whence after solidifying it is taken to a liquating furnace in the refinery, eventually passing into a 25-ton "kettle."

From the kettle the molten metal is pumped into casting trucks whence it is run off into moulds as 100 lb. ingots of 99.89 per cent. pure "Straits tin"—the most-sought-after brand of tin in the world.



At the top of the page, on the left, workmen are "rabbling" (stirring) the charge of ore during the heating in the furnace

Most of the employees at the smelter are Chinese, but in the second picture above these captions Javanese workmen are seen, ladling unrefined molten tin from the furnace pot.

Immediately above these captions is another picture showing the ladling of molten tin into moulds.

On the right, glistening ingots of tin are seen ready to be shipped from Pulau Brani all over the world.

In the picture at the top of the page refined molten tin is being run off into moulds, where it will be left to harden into ingots.

Right: An ingot of unrefined tin being put into a furnace for the liquating (refining) process.

