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Gal. 1. Mining. Saunder's paper. London Mtg. 80Y.

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TIN-MINING IN THE STRAITS SETTLEMENTS.

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About 60 per cent. of the world's supply of tin comes from the Straits Settlements.

Alluvial Deposits.—For years past, most of the tin has been obtained from alluvial deposits; and, while there appears to be a never-failing quantity of this for treatment, much attention is now being given to lode-mining.

Alluvial mining is carried on almost entirely on the western side of the peninsula, although large bodies of alluvial tin are known to exist on the eastern side. Some of these eastern areas in the state of Pahang have recently been leased from the Government for the purpose of extensive working.

Lodes.—Lode-mining is in operation on the eastern side. The principal mines belong to the Pahang Corporation, Limited; the Pahang Kabang, Limited; the Royal Johore; and the Bundy.

The most important mines are wrought by the Pahang Corporation, Limited, and the Pahang Kabang, Limited. These mines are situated about 40 miles up the river Kwantan from the port of Kwantan. Transport is carried on by steamer from Singapore to the port of Kwantan—a distance of about 225 miles—and thence to the mines by boats worked by Malays. The river being shallow, with numerous rapids in the upper reaches near the mines, this transport constitutes a difficult and somewhat costly business, as the boats are necessarily small (not carrying more than 5 tons of cargo) and taking about 4 days to reach the mines. The freight from Singapore (whence all stores, machinery, food, etc., are shipped) to Kwantan costs about 14s. per ton and boatage thence to the mines, costs about 17s. per ton.

At present, the principal workings of the Pahang Corporation, Limited, are confined to four lodes, known respectively as Willink's, Nicholson's Bell's North and Bell's South, worked from Willink's shaft, sunk to a vertical depth of about 350 feet below adit-level.

Other lodes have been developed, notably Pollock's and Jeram-Batang. A vertical shaft, about 520 feet deep, has been sunk on the former lode, which has returned a large amount of valuable stone, but it is not being worked at present, partly on account of the inefficiency of the pumping- and winding-machinery (which is being remodelled) and partly because the Willink's shaft is in a position to produce as much stone as the mill is capable of crushing.

The Jeram-Batang lode is worked from a vertical shaft about 300 feet in depth, but is at present idle pending the completion of a tramway to facilitate transport to the mill.

The principal workings of the Pahang Kabang, Limited, are on Fraser's lode, present supplies being drawn from above adit-level. A shaft is now being sunk on this lode for deep developments. Another shaft is also being sunk on the Myah lode.

The formation is slate, the tin-bearing ground traversing the country-rock in an east-and-west direction. The lodes have a varying dip, sometimes to the north and sometimes to the south. They vary greatly in thickness and, for the most part, are undefined by any distinct walls.

The concession of the Pahang Corporation, Limited, comprises an area of about 500 square miles, and is leased from the Colonial Government, who exact a royalty of 5 per cent. on the tin worked.

The stone, from both mines, is crushed in the same mill. The mineral is conveyed from the mines to the mill by a tramway of 2 feet gauge, worked by two small locomotives.

The mill comprises a stamp-battery with 60 heads of 850 pounds, vanner-tables, buddles, grinding-pans, furnaces, etc. The monthly crushing averages about 3,500 tons. The stone varies

greatly in value, the Pahang Corporation, Limited, running from 2 to 2½ per cent., and the Pahang Kabang, Limited, bearing rather less to the ton.

The oxide carries from 71 to 72 per cent. of metal, which is a very high value compared with Cornwall, where tin-ore is rarely dressed higher than 65 per cent.

Labour.—The labour is practically all Chinese. The native Malay, with very few exceptions, is absolutely useless for any work other than boating and procuring timber suitable for mining and structural purposes. The cost and the difficulty of obtaining timber have greatly handicapped the development of the mines.

The Chinese are procured from agents in Singapore for £5 to £6 per man, and are brought to the mines under an agreement to work 300 days. In compliance with their agreement, they are supplied with food and clothes, and sufficient money to purchase tobacco or opium. At the end of this agreement, they, in nearly every instance, continue in the service of the company as free men, and not infrequently (for them) build up big fortunes. As free labourers, they start at a wage equivalent to about 8d. per day and advance as they become proficient as fitters, engine-drivers, miners, tin-dressers, etc., to £3 to £5 per month, and on contract-work frequently make considerably more. Some of the expert fitters are paid from £6 to £8 per month.

Whenever practicable all work is let by contract, the management dealing with the contractors who engage their own gangs of labour and purchase their own tools, explosives, etc., from the company's stores, which are well-stocked with all necessary materials. The contract-price of driving levels runs from £4 to £7 per fathom (according to the nature of the rock). When the driving is done by machine-drills, the task is done by day-work, under constant European supervision.

Fuel.—The fuel used for the boilers and for the roasting-furnaces, etc., is wood; and light tramways are run into the jungle for conveying it to the works. The wood-cutting is done by contract by Chinese. The wood is delivered cut into lengths of 4 feet, and split to a suitable size. The contractors are paid from 10s. to 12s. per cord or stack, measuring 8 feet by 4 feet by 4 feet. The erection of bridges, tramways, transport, etc., brings the total cost of the wood to about 16s. per cord. The wood is soft, and has very poor calorific properties: 1 ton of fair-quality Welsh coal, being equivalent to 2½ to 3 cords of wood. There are large areas of virgin-forest or jungle within (comparatively speaking) easy distance of the mines; but, owing to sickness amongst the coolies engaged on this work, and the frequent damage to the tramroads caused by the heavy rains and floods (particularly during the wet season), the maintenance of an ample supply of fuel is very difficult, and latterly the wood has been supplemented by coal. The writer found, despite the high cost of transport from Singapore to the mines, that coal is not a more expensive fuel than wood; but, under existing conditions, it is not possible to transport up the river a sufficient quantity to supply the mines entirely with this fuel.

Costs.—The working-costs of these mines necessarily fluctuate, owing to the varying rate of exchange of the dollar, in which coinage all wages are paid and working cost-sheets made out.

The cost per ton of crushed stone may be taken as an average, with the dollar at about 1s. 9d., as follows:—

	Dollars.	£	s.	d.
Development	2·00	0	3	6
Mining	4·00	0	7	0
Dressing	2·28	0	4	0
General expenses, including royalties, tin-charges, maintenance and repairs, office and all other expenses	4·00	0	7	0
Totals	12·28	1	1	6

The production of 1 ton of oxide, in which form the ore is sent from the mines, costs from £45 to £60, but it, of course, varies greatly owing to the variable percentage of oxide in the stone treated.

The produce of these and nearly all other tin-mines in the Straits is sent for smelting into metal to the Straits Trading Company, Singapore, who are the largest tin-smelters in the world, producing over 100 tons of metal per day.

Chinese Labour.—The fact that Chinese labour is shortly to be introduced into South Africa may make a few remarks on the characteristics and treatment of Chinese of some interest to those connected with mining in that country.

The ordinary Chinese coolie, coming straight from China, being unaccustomed to the class of work (and method of doing it) to which he is put under European supervision, he has to learn everything from the very beginning, with the disadvantage of being unable to understand any European language and Europeans being equally unable to understand Chinese, for very few Europeans can speak the Chinese language. There are seven distinct dialects of Chinese and several derivatives from each of these; and in a batch of 50 or so coolies from China, it will frequently be found that there are several dialects among them and that they cannot converse among themselves.

In the Straits Settlements, the language universally spoken is Malay, and it is easily and quickly acquired by both Europeans and Chinese. It is very noticeable in the Straits Settlements, that when gangs of Chinese are talking with one another they frequently use the Malay language.

Like most (if not all) other races, the Chinaman is not a good workman when working by the day, in fact he is inefficient; but, when working on contract or paid by results, he is an excellent workman and capable of performing a fair day's work. He is, however, very apt, and quickly acquires the method of doing work according to European ideas.

A good trait of the Chinese labourer is that when justly punished he bears no illwill. It may be mentioned, however, that whatever punishment a European might inflict upon him for an offence, it is infinitesimal when compared with the punishment meted out to him in his own country.

From a European point of view, the Chinese are, perhaps, decidedly cruel amongst themselves, but one must bear in mind the fact that they are a people of a different race, and as regards nerves, temperament, etc., it must be remembered that they are very differently constituted from Europeans. The most satisfactory punishment for wrong-doing is financial, that is, to stop a portion of their pay or to fine them. They feel a fine more severely than any other form of punishment.

The usual food of the Chinese is rice, salt and fresh fish, pork, poultry (especially ducks), and dried fruits and vegetables from their own country. Unlike Mohammedans and many of the Indian races, their religion does not prohibit them eating any food which takes their fancy, and they quickly accustom themselves to vegetables and meat produced in the country of their adoption.

The system usually adopted of feeding coolies is to allow the Mandor (equivalent to a European foreman) a certain amount of food and money to feed the gang in his kongsi (or building in which they are housed). Should these remarks be read by anyone employing Chinese labour and not accustomed to it, the writer would strongly advise that a sharp eye be kept upon the feeding of the coolies. Fear of the Mandor and inability to express themselves properly in a European language may for a considerable time prevent the fact of their being underfed and the Mandors making money on the food-allowance from coming under the notice of the Europeans in charge.

In the Straits Settlements, where most of the work is done by contract, the contractor takes over his coolies from the company paying whatever they have cost for them. This is the best system for everyone concerned, as the contractor is alive to the fact that a badly-fed coolie cannot work efficiently, and also, if he falls sick or dies, it is a considerable loss to the contractor personally. In the case of coolies employed at odd work (and in a mine or works a large number are usually so employed) a sharp eye should be kept on the food, etc., supplied to them, as the Chinese Mandor is indifferent to their condition of health, he suffers no loss if they die, and, in nearly every case, he will make as much as he can out of the coolies unless carefully watched.

The principal ailments of coolies in tropical and hot countries are malaria, acute diarrhoea, dysentery, and beri-beri. The latter is a disease peculiar to Asiatic and African races (Europeans very rarely contract it), and although the medical profession have devoted considerable attention to this disease of late years they have not so far discovered a satisfactory cure. The symptoms are much the same as dropsy, that is, the patient swells abnormally (usually in the legs). Beri-beri carries off thousands of Asiatics yearly, and, speaking generally, once contracted it

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invariably proves fatal, unless the patient is removed to the coast, where he can be treated with salt-water baths, the best treatment now known. The diarrhoea is usually the result of the hot climate and indiscrete feeding on such things as fat pork, etc., a somewhat dangerous diet in a hot country.

Another ailment which causes trouble is mosquito-bites: the coolies scratch these with nails not over clean and their blood being poor the wounds fester (on their legs more particularly) and frequently necessitate their being sent to hospital for treatment. A good deal of sickness may be prevented by the European staff, if they see that all wounds are dressed with iodoform or some other disinfectant, and by giving to the coolies occasional doses of salts and quinine.

In conclusion, the writer thinks that it would be money well spent if the Chinese were assisted with money-grants in the building of a joss-house (a house of religion). A few tom-toms and musical instruments should be kept in each kongsi, affording them a means of recreation when the day's work is done, keeping them more or less contented and happy and to some extent preventing them from seeking other and undesirable forms of amusement.