A Malayan Hydro-Electric System

The Raub Australian Gold Mine, Pahang, Federated Malay States

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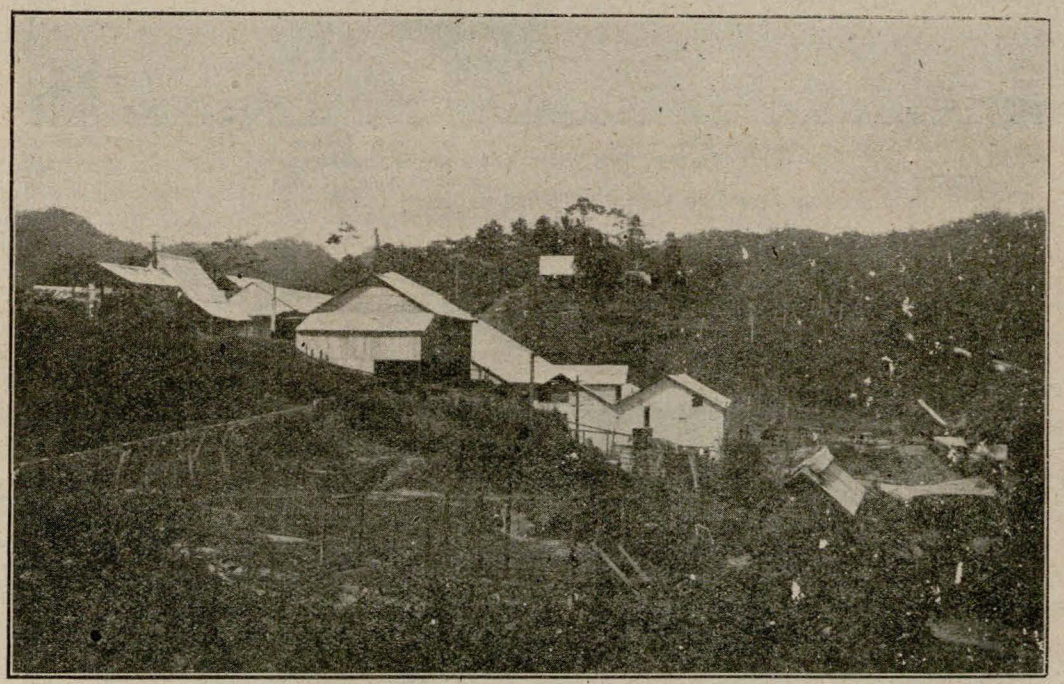
The Raub Australian gold mine, which has been operating for about 30 years, is situated among the hills in Pahang, one of the Federated Malay States. The nearest railway station is Kuala Kubu, at a distance of 21 miles direct. The road to the mine follows the contours of the ranges, in order to avoid cuttings and bridges, and takes such a circuitous route that it stretches out to a distance of 40 miles. This road passes through dense jungle, full of ferns and tangled growth, accompanied here and there by the splash of jungle streams, and guarded by forest giants which cast a permanent shadow over the path.



Raub Australian Gold Mine, showing mill, workshops, store, etc. The battery contains 50 head of stamps.

Numerous large and beautiful butterflies and occasionally the gambols of monkeys add further interest to this fascinating drive.

Originally there were several mines about Raub, all operated by steam. The Raub Australian Co., with its main battery and works at Bukit Koman, two miles from Raub, is now the only company working. Some of the others have closed down, and the rest have been absorbed by the Raub Co. The above company obtained a concession to utilise water power in the Simpam Valley, and the plant, then erected, 7½ miles from the mine, has been in operation about 25 years. The source of supply is a jungle stream called the Simpam River, capable of supplying about 1,000 b.h.p. at the station, with efficient plant, in the driest periods.

The water is diverted by a weir, just above the Berrumbun falls, first into a cement race, and then into a flume 1,860 ft. long, 3 ft. 6 in. square. This flume is built of chenghai, one of the best F.M.S. timbers; a heavy, yellow wood, as hard and as durable as jarrah. Two small settling tanks, 10 ft. deep, are constructed in front of the forebay, with the necessary by-passing arrangements for cleaning.

The pipe line, of ¼ in. steel, is 2,900 ft. long, and has needed practically no renewals. At a recent inspection, it was found still in a very sound condition. This pipe line is divided into three equal sections of different diameters, viz., 32 in. at the forebay, followed by 29½ in. and 27¼ in. The static head at the station is 150 lb. per sq. in. When the plant is running on full load the pressure is 135 lb. per sq. in.

The plant is 2-phase, 4-wire, 50 periods, 5,000

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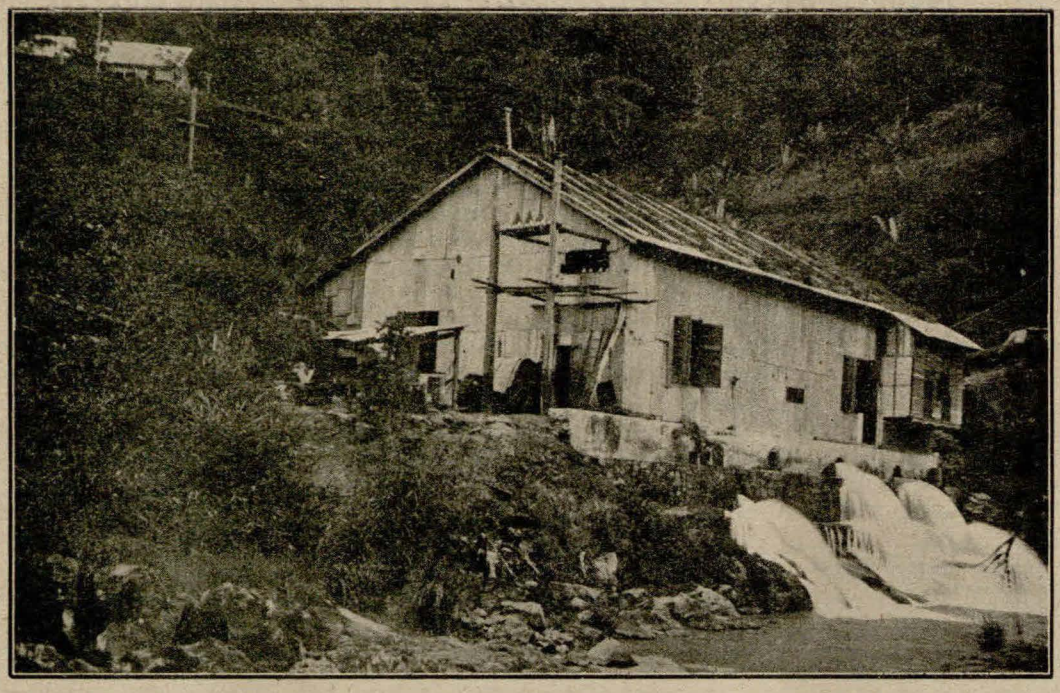
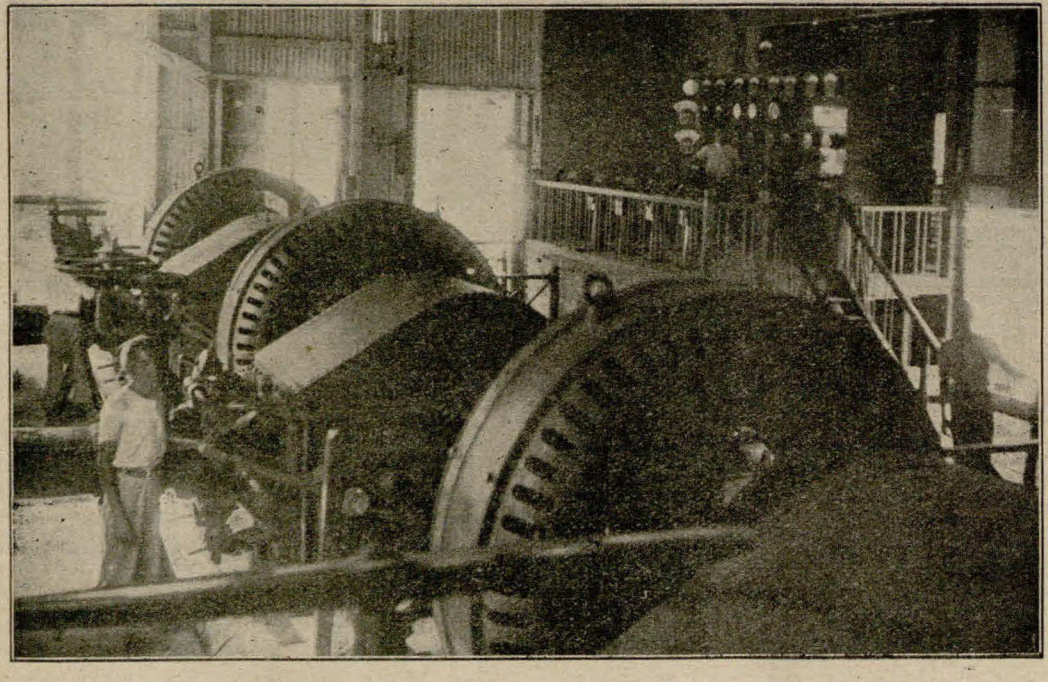


Raub Australian Gold Mine Power House, showing spillway, etc.



Raub Australian Gold Mine. A section of the generating plant.

volts, and consists of—

3-185 kw. Johnson and Phillips' Pelton wheel sets.

1-240 kw. Francis turbine and Oerlikon generator.

1-600 kw. Gordon-Crompton Pelton set, just installed.

The voltage is stepped down to 220 for the mine motors.

The pipe line is supplied with spring-loaded relief valves at the station. The latest machine is fitted with an oil pressure governor and combined needle deflector control. No trouble is experienced from excessive water pressure when the load is suddenly stopped.

The transmission line, 7½ miles in length, consists of four bare wires of No. 3 s.w.g., carried by light square chenghai poles, 10 in. at base, on a single cross arm, two wires on either side of the post. The spacing of the conductors is only 9 in. The height above the ground is about 25 ft. at the mine, and 22 ft. elsewhere.

The generators are connected direct to the line. The station is inadequately protected against lightning. In addition, the line passes over several very high peaks, and is singularly exposed to trouble from that source. A reliable supply of current is maintained during the dry season, but many interruptions occur during the stormy period of the year, nearly always between the hours of 2 and 5 p.m. The alternators are particularly accessible for repairs, and the native staff so well practised at rewinding that long stoppages are rare. No great care is exercised or advisable in replacing the coils neatly, as they often have to be disturbed several times in one week.

As a rule the atmosphere in those parts is perfectly still, and although the spacing of the conductors is very small, wind rarely causes any trouble on the line. Occasionally, however, falling branches or vampire bats in their flight collide with the wires and bring them together. There is no road along the line, and the passage on foot, especially up the steep inclines, is an exceeding rough and arduous one. With the heat and a humidity from 80 to 90 per cent., i.e., an atmosphere three times more humid than that of southern Australia, it is little wonder the line is patrolled more often by tigers than men. The policy usually followed is to send out parties of native linemen and coolies from each end to inspect the line and effect repairs annually or when breakdowns occur.

Birds and animals are frequently killed by coming into contact with the wires, and falling to the ground provide cheap meals for carnivorous animals. Tigers have learned to patrol the line in search of food, and on one occasion a tiger, recently electrocuted, was found by the natives while searching for a fault It was at a turn in the line where a stay post covered with creepers made it possible for the tiger to climb after a monkey which had become entangled in the wires.

Iron and Steel in South Africa.

Although some progress has been made with the local production of iron and steel in South Africa, the industry is not established on such a large scale as in Australia.

In 1913 the Union Steel Corporation commenced operations at Vereeniging with a 12 in. merchant mill, Siemens gas fired mill furnaces, and a 12 ton Siemens open hearth steel furnace. This was the first successful steel melting furnace in South Africa. The steel was cast in ingot moulds and forged down under a Davey high-speed steam-hydraulic press of 600 tons capacity, and then rolled into merchant bars, angles and light rails. Later a 20 ton open hearth steel furnace was erected and a 15 in. merchant mill and a 22 in. 3-high cogging mill. All these mills are electrically driven. There is also a 3½ ton Heroult electric furnace at work. These works have been doing well since the war, working on scrap iron, except for the small amount of pig iron purchased from the Transvaal Blast Furnace Company. During 1919 the company produced 10,318 tons of open hearth steel and 1,394 tons of electric steel.

The Transvaal Blast Furnace Co. produced 676 tons of pig iron, value £2,855, but operations were only carried on intermittently during 1919.

The Pretoria iron works had a six months' run, producing 1,286 tons of pig. A larger plant is being installed, and it is the intention of the promoters to produce not only pig iron, but also steel in its various forms, including rails.

The Dunswart Iron and Steel Works is employed in rolling rods, bars and angle iron, the output for 1919 being 5,596 tons. They have three mills—18 in., 12 in. and 8 in.

The Witwatersrand Co-operative Smelting Works is engaged principally on the manufacture of shoes, dies and liners for the mines.

The Newcastle Iron and Steel Ltd. expected to start operations in October this year. The blast furnace is of 120 tons per day capacity. It was designed by Messrs. McClure and Son, of Pittsburg, U.S.A., and is being built by Mr. S. Poole, late of Lithgow, New South Wales.

The work of installing the last of the machinery at the New Zealand Fertiliser Company's works at Te Papapa is almost completed, and grinding operations will be undertaken in about a fortnight. It is anticipated that the works will be fully equipped for the production of superphosphate before Christmas. The first year's output is expected to reach 60,000 tons, and after that the production should total nearly 70,000 tons a year.