

FEDERATED MALAY STATES.

GEOLOGIST'S ANNUAL REPORT FOR THE YEAR 1920.

The Assistant Geologist, Mr. E. S. Willbourn, returned from military service and leave on 11th March, 1920. He was unable to resume field-work for some time owing to illness contracted on the voyage out. He continued the survey of South Selangor and Negri Sembilan, which was completed by the end of the year. The map and explanatory memoir will be published as soon as possible.

2. The Chemist, Mr. J. Shelton, reports as follows:

"Much of the work in connection with the development of the mineral resources of the Federated Malay States has been indefinitely delayed owing to lack of staff.

"The following is a statement of the chemical work carried out during the year 1920:

	Federated Malay States.	Straits Settlements.	Protected States.	Foreign.	
				Siam.	Burmah.
Tin assays	208	100	—	13	—
Wolfram and scheelite assays	4	2	—	2	—
Gold assays	1	—	—	2	—
Silver assays	15	—	—	6	—
Lead assays	15	—	—	3	—
Zinc assays	15	—	—	—	—
Qualitative reports	16	—	2	9	4
Miscellaneous assays	56	3	—	12	—

"The estimated revenue for assays, etc., was \$3,000. The amount collected was \$3,595: the revenue for the year was \$3,363 as against \$2,737.34 for 1919."

3. The sale of a volume of photographs illustrating Malayan tin-mines realized \$236.80.

4. The Geologist continued the survey of the Kuala Kangsar and Upper Perak districts and is indebted to the District Officer, Upper Perak, for assistance without which work in his district would have been very difficult.

5. The survey of the Langkawi Islands, begun in 1919, was completed by the Geologist. A map and description of these islands will be published later.

6. A map was prepared showing areas in the Federated Malay States where further mineral developments are most probable, where they are least probable, and areas where further information is wanted. The map was prepared as the nearest approach to a map, which had been asked for by the Federated Malay States Chamber of Mines, showing mining and agricultural areas; but the author did not consider it definite enough for publication. Copies were distributed to certain Government Offices.

7. One report was given on a dam-site and three on road-metal.

8. Two reports were given on water-supply.

9. Further specimens of the black, lustrous, carbonaceous shale common in the Federated Malay States were received for report, but the amount of carbon which is present in a state resembling graphite was not sufficient to be of any value in any sample, nor was it sufficiently free from quartz. Graphite occurs as small flakes in the crystalline limestone at Lenggong, but not in sufficient quantities to be worth concentrating.

10. A deep bore was started for oil on the Erik Estate, where, as mentioned in the annual report for 1919, a discovery of oil had been reported. Specimens from the bore are being sent to this Department.

COAL.

11. Boring on the Perlis coal was temporarily suspended.

The following sections were obtained in the two bores put down:

Clay	5½ feet
Chocolate stone	2 "
Coal	1½ "
Black Chocolate clay	7 "
Green Soft Clay	4 "
Black Soft Clay	3 "
Green Soft Clay	6½ "
Coal	10 "
Green clay and white small stone	4 "
Black soft clay	1 "
Chocolate stone	3 "
Coal stone	1 "
Black chocolate clay	2 "
Coal	1 "
Chocolate clay	5 "
Green soft clay	4 "
Chocolate clay	3 "
Green soft clay	8 "
White hard stone	1 "
Green soft clay	4 "
Black chocolate clay	1 "
Green soft clay	14 "
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	81 feet
Surface overburden	5' 6"
Soft clay	1' 6"
Coal	0' 6"
Soft clay (black)	2' 6"
Black clay with coal streaks	5' 0"
Green and white clay	4' 0"
Coal	0' 6"
Black clay	2' 0"
Coal	0' 6"
White clay	7' 0"
Black clay	1' 0"
Shale	2' 6"
Black clay	1' 0"
White clay	3' 6"
Green and white mottled clay	11' 0"
Green clay	11' 0"
Limestone	2' 0"
White clay	7' 0"
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	68' 0"

12. A discovery of coal was reported not far from the railway between Slim River and Behrang stations but on investigation only the black carbonaceous shale was found. It is, however, quite likely that coal may be found in the country between the Malayan Collieries and the Bidor River. In this case a piece of coal resembling Malayan Collieries coal was stated by a Malay to have been found by him in a pit. No further specimens were heard of.

13. Enquiries were received about the Enggor coal and further prospecting was carried out privately, but no extension of the deposit has been reported as proved.

14. Enquiries were received about supplies of bauxite, quartz, pebbles of a specified size, uses to which electric power could be put, materials for glass-works, and marble.

15. Specimens of "Slimes" from streams in Upper Perak were submitted for measurement of the individual particles of mineral matter. The largest grains (quartz) measured about .03 mm. in diameter. The average diameter of the grains was about .006 mm.; the smallest grains were about .0003 mm. in diameter ($\frac{1}{100,000}$ inch). Tourmaline prisms were found to be abundant averaging .03 mm. by .0045 mm. by .0045 mm.

16. Acknowledgments are due to the Director of Museums for specimens from islands in the Straits of Malacca and near Junk Ceylon.

BATU GAJAH,
24th January, 1921.

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