

COPPER.

A geophysical survey of the copper deposits at Kawau Island was recently made by an officer of the Geological Survey, but the results were disappointing in not showing any extension of the known deposits, and further reserves of copper ore must be sought in depth. Accordingly it is proposed to explore by diamond drilling the ground below the old workings, and this work should commence at an early date. It is not expected that this deposit will be large enough to justify the construction of a copper smelter in New Zealand and make New Zealand self-sufficient as to copper supplies, but it is possible that a tonnage of ore sufficient to provide a useful amount of concentrates for shipment to Australia may be established.

NON-METALLIC MINERALS.

The development of many industries now calls for the search for, exploitation, and beneficiation of many non-metallic minerals. There is an increasing demand for such minerals in properly processed form in New Zealand, and the war has made increasing demands upon New Zealand's own deposits of these minerals.

While many of these minerals are known to exist in commercial quantity, the industry has suffered from the lack of fine grinding and processing equipment, and many have not been thoroughly investigated. It is accordingly of interest to report that a group with adequate financial resources and technical guidance is now making a thorough survey of the whole field, with a view to erecting a modern processing-plant. Such a plant would handle a range of minerals such as bentonite, talc, diatomaceous earth, &c., and it is conceivable that valuable export markets abroad will in time be developed for their products.

OIL-SHALE.

The main development in the investigation of New Zealand's oil-shale resources has been the testing of a representative sample of shale from Orepuke by the chemical staff of National Oil Proprietary, Ltd., at Newnes, in New South Wales. Results of the testing work were disappointing in indicating that the high sulphur content of the crude oil made the production of a satisfactory motor-spirit exceedingly difficult, if not impossible.

The Nevis deposits have now been surveyed in detail, and indications are that an immense tonnage of oil-shale can be developed at this locality, but the grade is consistently low.

It has now become increasingly apparent that any production of oil from shale deposits must be subsequent to extensive and exhaustive testing work. The facilities for such work at the present time under war conditions are not available, while any consideration of obtaining plant and equipment is out of the question. It follows that, despite the importance of the production of oil in New Zealand at the present time, exploitation does not come into the realm of practical politics and must be deferred till the post war years.

LABORATORY INVESTIGATIONS.

As in previous years, the Dominion Laboratory carried out a considerable amount of analytical and investigational work connected with the mining industry. A small number of prospectors' samples were examined for gold and silver. A further large number of samples taken in connection with the survey of the Onekaka iron-ore deposits and various other ores, including scheelite concentrates, were also examined. A number of samples of mine airs, gases, and stone-dusts were analysed in connection with safety measures in mines. The Coal Survey Laboratory continued the systematic survey of the coal resources of the Dominion, but the programme was modified to deal mainly with problems connected with war conditions and all long-range work was suspended. Besides the work of the survey, 289 samples were analysed, including producer fuels (char and charcoal), shales, peats, &c. The analysis of over one hundred samples of peat from the Chatham Island was a major investigation undertaken to determine the value of the deposit as a source of wax. The wax is being investigated as a possible substitute for montan or other waxes.

GEOLOGICAL SURVEY.

During the year ended on the 31st March, 1942, little detailed geological mapping was carried out, the time of most officers, in whole or in part, being devoted to the examination of deposits of useful minerals. In order to assist the oil companies in solving problems of stratigraphy and structure the palaeontologists identified mollusca and foraminifera in many samples. To the same end the petrologist determined the heavy minerals in extensive series of Tertiary rocks from the Rangitikei and North Westland districts. This officer also examined numerous samples for the Dominion Laboratory and ganisters for the railway workshops.

The bands of igneous rock impregnated with sulphides outcropping along or near the west coast of D'Urville Island were mapped and sampled. The deposits, though large, seem to be much too low in sulphur to be workable.

Barite, a fairly common mineral, is a valuable paint pigment. Small veins in the coal-measures near Stockton Mine, Westport, were found to resemble similar deposits long known to occur in this district.

Before the high-grade phosphate from Nauru and Ocean Islands came on the market, phosphate rock was quarried at Clarendon, near Milton. This locality was re-examined, and geophysical work to assist prospecting carried out. Sampling of the phosphatic horizons long known in North Otago confirmed the earlier unfavourable opinion.

Vast supplies of serpentine containing about 35 per cent. of magnesia are available in the broad belt of this rock extending north and south through the eastern part of D'Urville Island. Two areas where the rock may be conveniently quarried and shipped were mapped in detail and soundings taken of the adjacent inlets.

Talc of good quality occurs in connection with the serpentine of D'Urville Island and two localities there, and another on the neighbouring mainland were examined. The deposits are poorly exposed, and prospecting will have to be undertaken to ascertain their extent and general quality.

From time to time specimens of mica of good size and quality have been obtained in south Westland and north-west Otago. Two geologists traversed this inhospitable country, visited reported occurrences, and found a promising deposit. Tracks to the mountain tops where the rock is best exposed are necessary before prospecting can be efficiently undertaken.

Several deposits of clay in North Auckland were examined and samples were obtained from the Mangapehi, Ohura, Westport, and Grey coalfields in connection with a report on New Zealand fireclays and ganisters now being prepared.