

Serpentine.—A broad belt of serpentine extends north and south through the eastern part of D'Urville Island and vast quantities of serpentine are available. Mr. Macpherson traced and sampled this belt and mapped most of the coast-line of the island. The most convenient places for quarrying the serpentine are the middle branch of the east arm of Port Hardy, and Staff Bay, near Copper-mine Bay, at the south end of the island. The serpentine of these localities contains about 35 per cent. of magnesia. Later, Mr. Wellman made contour plans of about a square mile at each of these areas and took soundings of the adjacent inlets.

Sulphides.—In addition to the serpentine belt, a broad strip of gabbro, basalt, and other basic rocks lies along or near the west coast of D'Urville Island. In parts this is strongly pyritized. Mr. Wellman mapped and sampled the sulphide deposits, which, however, are too deeply weathered to allow of accurate estimates being made of the proportion of sulphur present.

Mica.—From time to time specimens of mica of good size and quality have been received from South Westland and North-west Otago. Messrs. H. W. Wellman and R. W. Willett walked from Paringa to the Eglinton and visited several localities at which mica had been reported. They found a deposit which may have commercial value on the front range that extends between Paringa and Haast rivers. This range, which rises to about 5,000 ft., consists of schist traversed by a multitude of pegmatite dykes striking parallel with the schistosity planes and the length of the range. In most of the dykes the mica is too small to have value, but one was found containing books 6 in. across and estimated to form 5 per cent. of the rock, the remainder being coarsely-crystalline quartz and feldspar. This mica has been proved to be of a quality suitable for electrical condensers. The dyke lies north of the Moeraki River, a stream that cuts the range into two parts. Prospectors have found mica of similar quality and even larger size on the range south of Moeraki River.

Oil-shale.—Mr. R. W. Willett was engaged from December to March, inclusive, in an examination of the Nevis valley where last year he had made a reconnaissance of the large deposit of oil-shale. On this occasion he mapped the deposit in more detail and explored the valley north and south but saw little shale in these parts. Mr. Willett found that the main deposit covers about 2,200 acres and contains over 90,000,000 tons above the level of the stream-beds. The probable maximum amount in the deposit he estimates as approaching 2,000,000,000 tons. This estimate is based on geological deductions only; there are no bores proving the thickness of the shale.

The chief economic advantages of this deposit are its large size and the practical absence of overburden; the chief disadvantage is the low grade of the shale, the crude oil content of the samples tested so far averaging only about 13 gallons per ton.

Barite.—Mr. M. Gage examined a series of barite veins exposed in Fly Creek, near Stockton Mine, Westport district. The veins strike nearly north, dip steeply west, and occupy a series of joint planes in the grit overlying the coal. They are well exposed, traceable for considerable distances, and range up to 9 in. thick, but average only 2 in.

Mercury.—During March the writer visited the mercury deposits of Puhipuhi; Ascot, near Karangahake; and Mangakirikiri, near Thames.

At the first mentioned a company is actively stripping the overburden and treating the ore in an oil-burning rotary furnace with an efficient condenser plant. The ore is cemented quartzite grit lying between the argillite and quartzite of the basement rocks of the district and the basalt that caps Puhipuhi Tableland. Both the argillite and the basalt are profoundly decomposed, no doubt by the thermal solutions connected with the formation of the cinnabar ore-body.

At the Ascot claim, half a mile north of Karangahake, layers of dark massive sinter form an escarpment extending for 40 chains in an east-west direction. At the eastern end an upper layer 20 ft. to 30 ft. thick and a lower 40 ft. or more thick are separated by a band of softer sinter 3 ft. to 4 ft. thick. This weathers to a nearly white finely-laminated friable material. The old excavations for cinnabar-ore are along this band. Recently a short tunnel driven north down the dip (10°?) of the softer band exposed cinnabar-ore at the top of the band and lining vugs in the upper massive layer of sinter.

The mercury prospect in the hills three miles east of Thames and 600 ft. above sea-level is about a mile from the road up Kauaeranga valley and 20 chains west from Mangakirikiri stream. Under masses of sinter and partly-silicified rock on a densely-wooded ridge a tunnel 25 ft. long is driven in andesite breccia now decomposed to clay. There is a short branch drive to the right in country with narrow seams of quartz containing cinnabar in partings and lining a vug. A winze is sunk to an adit 40 ft. (?) lower driven 50 ft. in decomposed breccia. A staining of cinnabar, not seen by the writer, is reported in this adit. Another adit, perhaps 30 ft. lower and under sinter, has collapsed. A good deal of sinter and silicified rock is scattered about the area, but not in the form of great flinty masses such as occur at Puhipuhi and Karangahake.

DOMINION OBSERVATORY.

Acting Director: R. C. HAYES.

REPORT FOR THE YEAR ENDED 31st DECEMBER, 1941.

TIME SERVICE.

Control of Clocks.—The clocks were checked daily by short-wave radio time signals from abroad, whenever possible. The American time signals were employed chiefly. In September there was some interruption of the daily checking owing to radio fade-outs, and some difficulty was experienced in December owing to the American time-signal service being temporarily disorganized at the outbreak of war with Japan. The practice of taking local transit observations at intervals has been continued.

Time Signals sent out.—The usual time-signal service was maintained. In addition to the scheduled time signals, correct time was supplied by telephone, in response to frequent calls from the Army, Air Force, Government Departments, firms, and the general public. The total number of telephone calls during 1941 was nearly the same as in 1940, but there was considerable fluctuation from month to month.