V. MINERALS OTHER THAN GOLD.

Tungsten-ore.

The quantity of tungsten-ore exported during the year amounted to 226 tons, valued at £49,070, as compared with 194 tons, valued at £27,784, in 1915. The following statement shows the quantity and value of ore exported :—

Year.	Quantity.	Value	Year.	Quantity.	Value.
	Tons.	£		Tons.	£
1899	32	2,788	1909	58	4,263
1900	54	2,635	1910	143	15,070
1901	2	83	1911	138	11,853
1902	39	1,200	1912	135	13,347
1903	42	1,439	1913	221	22,933
1904	17	791	1914	204	21,498
1905	28	1,848	1915	194	27,784
1906	55	3,407	1916	266	49,070
1907	137	15,486			
1908	68	6,055	Totals ..	**1,833**	**201,550**

The quantity of tungsten-ore mined during the year was 285 tons (value £47,374) as the result of treating 19,360 tons of scheelite-bearing quartz, from which gold to the value of £7,651 was also obtained.

There has been considerable activity in mining and prospecting for tungsten-ore in the form of scheelite, due to the commandeering of all British supplies by the Imperial Government at a fixed import price of £2 15s. per 1 per cent. of tungstic acid in the shipment, c.i.f. London or Liverpool, being an increase of about 80 per cent. above the average price for several years previous to the war.

The principal operations have been carried out in the locality of Glenorchy, where the lodes occur in the mica-schist of Mount Judah in the Richardson Range, which flanks the lake to the eastward. The area over which these lodes occur and mining operations are in progress is considerable, extending from the Junction Mine, a few miles to the east of Glenorchy, at an altitude of about 3,500 ft. above Lake Wakatipu, northward about twelve miles to Mount Alfred Mine, near Paradise, on the Dart River. At numerous points in this distance scheelite-quartz lodes have been found at altitudes varying up to 5,000 ft. above the lake. All the lodes developed have the general characteristics of those of the Macetown, Skipper, Shotover, Bendigo, and Carrick Range lodes as described by Professor James Park*—viz., as belonging to the class of replacement fissure lodes in which a zone of country rock lying between two more or less parallel fissures has become crushed and contorted by wall-movement, and more or less silicified and partially replaced by quartz and calcite containing scheelite and a little gold.

The scheelite-bearing quartz with calcite in the Glenorchy district occurs in the form of irregular lenses in the crushed country rock within the striated mica-schist and but slightly inclined walls, these lenses being connected by a ramification of small quartz veins of irregular course. From the form of the ore-body and connecting veins as exposed in the mine-workings I believe the contents to be derived from ascending solutions. The scheelite occurs in irregular veins not exceeding 20 ft. in length, and is generally associated with calcite, which the miners regard as a favourable indication that a vein of scheelite is being approached. The lenses of ore occur with a certain regularity, and so far as mining operations have extended they have continued. Driving in the lode through barren matter, in the form of crushed and contorted country rock containing feeble and irregular veinlets of quartz, is therefore carried on with confidence that a lens of ore is being approached.

The known ore-deposits are, however, too small and intermittent to warrant any large undertaking for their exploitation, and the present scale of operations by small and economically managed mines is to be commended.

The principal operator in scheelite in the Lake Wakatipu district is the Glenorchy Scheelite Company, a Dunedin concern. This company has three mines—viz., Glenorchy, Junction, and Mount Alfred mines—in addition to employing numerous working-parties obtaining ore from among the ranges. At the Glenorchy Mine the lode is inclined about 30° east. Eight levels have been driven from the outcrop, the vertical height between the top and bottom level being about 240 ft.; the longest level is about 850 ft. Owing to the slight inclination of the lode the ore and rock is lowered from the stopes by jigs, as in the bords of a coal-mine. The lode varies considerably in thickness up to 10 ft.

At the Junction Mine, situated at a considerably higher level than the Glenorchy Mine, and 2,500 ft. above the lake, the lode is also inclined at about 30°. Three levels are being driven to the southward ; stoping is also in progress. The lode averages about 4 ft. in width.

The newly opened Mount Alfred Mine, near Paradise, has been considerably prospected on the surface, and by three levels in a lode varying up to 6 ft. in thickness having an inclination of about 45° with strike south-south-west. This mine being situated in the western bank of the River Dart, and the lowest level being only a few feet above the river-bed, pumping and winding machinery will be necessary for deeper development; and there is every indication that the ore-bodies will be found to continue to deeper levels, therefore sinking is advisable here.

* Bulletin No. 7, N.Z. Geological Survey, 1909, p. 74.