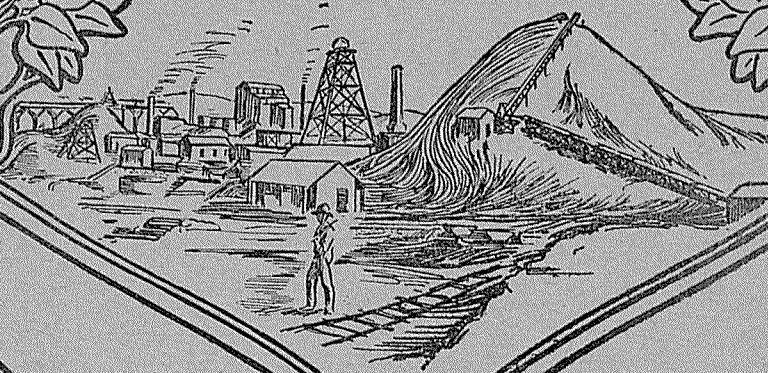




REPORT
OF THE
DEPARTMENT OF MINES
FOR THE YEAR
WESTERN · 1937 · AUSTRALIA



PRESENTED TO BOTH HOUSES OF PARLIAMENT

BY HIS EXCELLENCY'S COMMAND



H. D. CHIGGINS

than passing interest are referred to in Mr. Bowley's report which is attached. Amongst them several have been recorded in the State for the first time, viz.:—

Simpsonite: a new fluo-tantalate of sodium, calcium and aluminium. Full details of this mineral will shortly be published. It is associated with an alteration product provisionally named *Metasimpsonite*. Locality: Tantalite Mine, Tappa, N.W.

Beudantite: Hydrous sulphato-arsenate of lead and iron. Locality: Belvedere Gold and Lead Mine, Mt. McGrath.

Plumbojarosite: Hydrous sulphate of lead and iron. Locality: Belvedere Mine, Mt. McGrath, N.W.

Bindheimite: Hydrous antimonate of lead. Localities: Mt. Amy and Gorge Creek, N.W.

Beidellite: Hydrous silicate of magnesium, aluminium and iron. Locality: McCarthy's Diggings, near Bange-mall, N.W.

Triphylite: Phosphate of lithium, iron and manganese. Associated with several undetermined alteration products. Locality: Mt. Dockrell, Kim.

Carminite: Hydrous arsenate of lead and iron. Associated with other lead ores and scorodite (hydrous arsenate of iron). Locality: Hardey River, N.W.

Calcosamaraskite: Niobate of calcium, yttrium, uranium and radium. Locality: Hillside Station, N.W.

It is to be remarked that of this notable list of unusual minerals, not previously known in the State and mostly not in the Commonwealth, eight out of nine come from the north-west region, which must be looked upon as one of the most remarkable mineral regions of the world. Besides a large number of minerals of great rarity it has previously yielded six not known elsewhere in the world, viz., hydrothorite, maitlandite, nicolayite, pilbarite, tanteuxenite, and tantalopolyrase.

Petalite, Londonderry.—This very rare silicate of lithium and aluminium was first recorded in the State from M.L. 72 (now M.L. 80) worked for commercial felspar at Londonderry, where a very small specimen was discovered in 1933. Hearing that the quarry had been greatly enlarged in the last two years, I visited it in October of this year, and found that a very large quantity of petalite had been encountered and thrown on to the waste dump as being obviously not commercial felspar. Many tons of it, of the highest degree of purity, were visible on the dump and in the north face of the quarry. A detailed description of the occurrence is being prepared for publication. It is now worth while experimenting to see if petalite cannot be put to some industrial use.

Meteorites.—Three new meteorites have been examined during the year. They are all composed wholly of iron-nickel alloys, with sulphide, phosphide and carbide of iron. They have been given the locality names of Gundaring (S.W.), Kumerina (N.W.), and Wonyulganna (N.W.). The first is still in private hands, but the two last will eventually be shown permanently in the Perth Museum.

Bauxite.—This is a rock consisting largely of gibbsite (hydrated oxide of aluminium) which is the chief source of the commercial metal. In view of the proposal to start smelting aluminium in Australia some further investigations of our bauxite deposits have been made. These occur scattered through the Darling Ranges from Moora-Ballidu on the north to Northcliffe-Denmark on the south, an area 350 miles long by 25 to 50 miles wide. Pure gibbsite contains

65 per cent. of alumina (oxide of aluminium), and ores used for smelting abroad usually run from 50 to 60 per cent. Our bauxites are of lower grade than this, but several which are over 40 per cent. are worth considering as sources of aluminium, provided cheap caustic soda is available for preliminary concentration. Bauxites of this grade have been found at Boddington, Clackline, Dwellingup, Glen Forrest, Hoddy's Well, Kalamunda, Mahogany Creek, Quindaning, Sawyers Valley, Toodyay, Wannamal, Wongan Hills and Woorloo. The richest ores yet found have been at Sawyers Valley (Alumina 51.8 per cent.), Toodyay (51.0) and Glen Forrest (50.7).

Tantalum Ores.—A phenomenal rise has occurred in the price of these ores, for some as yet unexplained reason. In twelve months the price has risen from below £1000 a ton to above £2000. The search for them particularly in Pilbara has been intensified and the number of samples of tantalite and suspected tantalite submitted to us for determination and assay has correspondingly increased. The chief use for the metal in the past has been for rayon spinnarets and sulphuric acid concentrating basins. The sudden rise in price points to some new use having been found for the metal. Up till recent years Pilbara has produced the major portion of the world's supply, but Uganda threatens now to equal it in productivity.

The ore now exported from Pilbara is mainly manganotantalite, but contains minor amounts of several other minerals, the whole being blended to carry not less than 60 to 65 per cent. of tantalum oxide Ta_2O_5 , representing 49 to 53 per cent. of tantalum metal. The Pilbara manganotantalite ranges from 52 to 78 per cent. of tantalum oxide. Manganocolumbite, a poorer ore (20 to 51 per cent.), is used as a diluent, and several richer ores as "sweeteners." The chief of these are simpsonite (70 to 75 per cent.), microlite (72 to 77 per cent.) and tapiolite (75 to 85 per cent.). Simpsonite occurs only at Tappa, and tapiolite mainly at Strelley, but microlite has been found at a number of localities including Strelley, Tappa, McPhees Range, Wodgina, Kangan, Hillside and Western Shaw.

The specific gravity method devised by myself for the approximate determination of the percentage of tantalum oxide in tantalites and columbites, has been extensively used and has saved a large amount of time. Details of it have been published in the *Journal of the Royal Society of Western Australia*, Vol. XXIII.

Trace Elements in Animal and Plant Nutrition.—The spectographic investigations begun in the previous year, led this year to a very important discovery, viz., the cause and hence the prophylactic and cure for the serious Gingin sheep disease known as enzootic ataxia. Briefly it was found that whereas previously the disease had been suspected to be due to lead poisoning, it was proved in fact to be due to copper deficiency. This was especially noticeable in the livers, those of healthy animals showing 20 to 100 times as much copper, as those affected with the disease. A similar condition was found in regard to the blood and milk. It was proved by the field officers of the Agricultural Department that a small supplement of copper prevented and checked the