

10. Mining

M. J. Garratt

Mining activities in the study area were based on gold with minor associated metals such as stibnite, cobalt and rare occurrences of quartz mining (Figure 10.1). Mining operations commenced in the 1860s and flourished through to the 1870s with a few mines being reactivated in the 1930s and 40s. Generally the alluvial fields were exploited first. They were often very rich, shallow and short lived. Reef mining usually proceeded shortly after.

All the gold fields located within the area (known to the author) except the Goldie Field north-west of Kilmore within Ordovician strata, are found within the Silurian-Devonian strata. None are known to occur within the granites although the Tallangalook field occurs at the contact of the Strathbogie Batholith and the Silurian-Devonian strata. These goldfields included Tyaak and Clonbinane near Broadford; Strath Creek; Ghin Ghin north-west of Yea; Yea; Ti Tree Creek and Junction Hill south of Yea; Molesworth, Gobur and Alexandria. In the east of the study area, the northern portion of the major Walhalla-Woods Point Gold Province occurs (Figure 10.1).

Generally speaking information on amounts of gold, grade and tonnage of ore extracted, and the duration of mining on individual reefs and mines is incomplete, apart from those which were (re)worked and reported such as the Walhalla-Woods Point Gold Province (Whiting and Bowen 1976). Information on the other fields has been gleaned from the works of Brough-Smyth (1867), Kenny (1937, 1938a, 1939, 1940) and the 1890 Hunt Royal Commission.

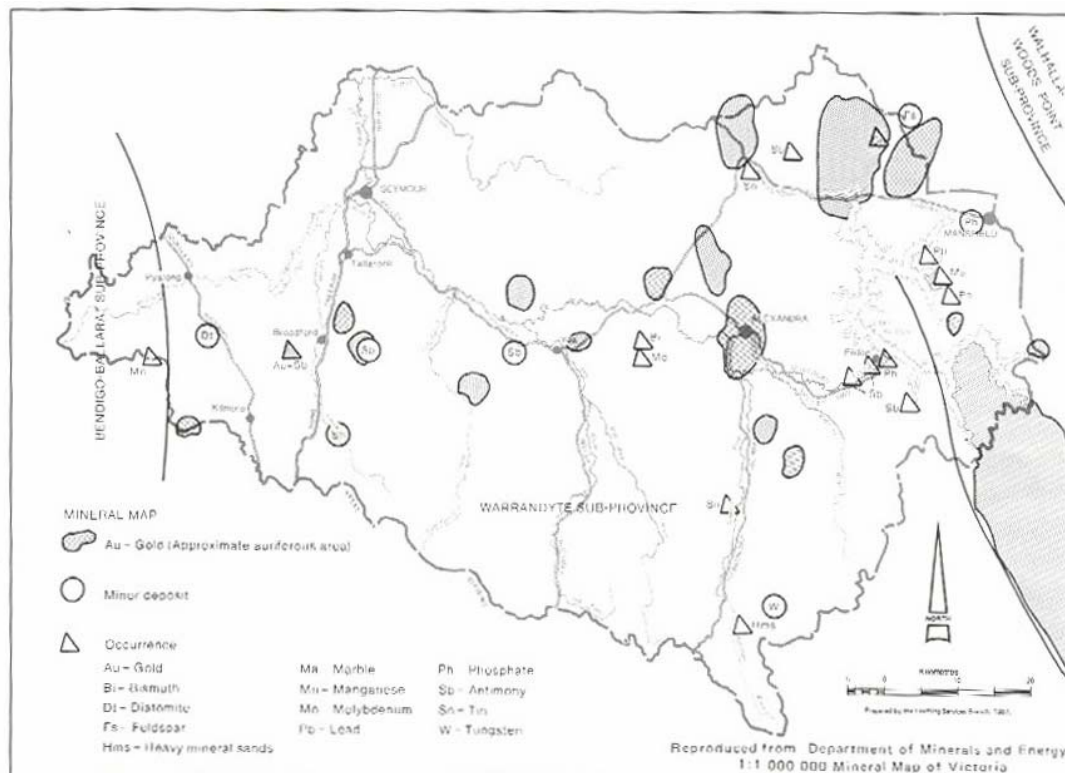


Figure 10.1 The principle finds of minerals within the study area.

The nature of mineralisation within the area can be practically placed into four groupings, all of which show that the surrounding sedimentary strata of interbedded sandstone and mudstone have relative increase in abundance of pyrite which may have a bearing on the sitting of the gold mineralisation.

- (i) Gold occurs in quartz reefs of variable thickness (3-45 cm) intersecting folded strata with pyrite.
- (ii) As above but controlled by strike-slip and/or dip-slip faults of varying magnitude.
- (iii) As above but associated with minor occurrences of antimony ores (stibnite).

- (iv) Quartz reefs intersecting diorite dykes and strata with pyrite. Faulting may or may not be important.

Cobalt ore has been mined at Molesworth (Pre 1867), near Yea. The occurrence, the largest known in Victoria (Brough-Smyth 1867) was discovered by Charles Verdon in 1866. It occurs as numerous large amorphous and botryoidal masses in the bed of Colonial Creek, Molesworth Creek and the surrounding strata. Individual blocks were reported by Brough-Smyth (1867) as weighting in excess of eight (8) pounds (3.7 kg) with an ore grade of 1-14% cobalt. In addition much of the ore was lost when the miners mixed the ore in spoil heaps. In the Hunt Royal Commission on Gold (1890) the cobalt ore was said to be confined to three closely spaced parallel reefs bearing 350° with a strike length exceeding 2.5 km.

As far as is known no further exploration of this deposit has ever been undertaken.

Areas of most potential for exploration in the study area appear to be the Yea-Molesworth area, the Alexandra district and the Walhalla-Woods Point Gold Province. Alluvial deposits in these districts have all been heavily worked in the 1860s-1870s, and their potential for further exploitation, apart from the Woods Point Goldfield, is considered low. Reef mining potential however, projects a different picture in the above areas, as illustrated by the known histories of some individual mines.

Yea-Molesworth area

Providence Mine: Located near the junction of Boundary Creek and the Yea River, north of Yea and on the western flank of the Yea anticline. This mine was worked in the late 1860s to 1870s down to a depth of 350 ft (107 m), nearly 7,000 tonnes of ore was extracted for 200 kg of gold. Yields in the upper levels were in excess of 400 g/tonne. At least four ore shoots were worked, these branches off the main reef system. Strike of the main reef parallels the bedding 350° with the reef cut off to the north by a cross course – which may be an important east-west fault.

Alexandra area

This area has all the hallmarks of potential for mineral exploration. The structure, nature of mineralisation and stratigraphy reflect this. A major NNW-SE trending anticlinal fault is located west of similar trending diorite dyke greater than 3 m thick, the sedimentary stratas are peppered with pyrite and quartz reefs up to 2 m thick, which intersect both the anticline and diorite. The quartz reef-diorite intersections were mined in the 1870s, yielded 180 gms/tonne (6oz/ton) of gold in the Gemba Mine and Strathmore Mine. Intersections of quartz reefs and major anticlines have likewise been mined with over 125 kg of gold being extracted from the Luckie Reef.

Tallangalook Goldfield is situated approximately 14 kilometres north of Bonnie Doon and the northern shores of Lake Eildon. It is unique in that the gold has developed at the contact between the granite and the surrounding metamorphic aureole. The gold is fine grained, associated with pyritic mineralisation (Murray 1892, Kenny 1938b) and concentrated in ferruginised joints, fault pug and the metamorphosed sedimentary strata.

The field was worked between 1878 and 1898, under the name of Golden Mountain Mine and has been held under licence in one form or another since that time. Production Figures between 1878 and 1898 show that 4674 ounces of gold was obtained from the crushing of 56,694 tons of ore, with a yield ranging from 1.65 dwts/ton. In 1935 a minimum reserve of 162,433 tons with an average grade of 3.6 dwts/ton was reported, giving a possible return of 30,000 ounces of gold (Baragwanath, 1937; Kenny 1938b). As far as is known this gold has not been extracted.

There is no doubt that this area is encouraging for prospectors and further exploitation should proceed to define the viable mines of the field.

Tallangalook is also known for the occurrence of piezo-electric quartz specimens. In the 1940s, nearly 350 lbs of quartz crystals was extracted from the alluvial wash in Moonee Moonee Creek and at the Crystal Mine. The quartz was mined from weathered granite down to a depth of 60 feet (Crohn 1952).

Walhalla-Woods Points Sub-Province

The study area includes the northern extension of this major gold province and is delineated on Figure 10.1. This northern extension is known as the Woods Point-Jamieson Goldfield and includes the major goldmines of Al Gold Mine, Morning Star and Loch Fyne.

In all these mines the gold is intimately associated with vertical diorite and/or lamprophyre dykes intersected by alternately east and west dipping 'ladder veins' (Whiting and Bowen 1976). These ladder veins occur in the bulges of the dykes where they have increased from 4 m width to 100 m and extend up to 500 m long (Whiting and Bowen 1976, Figure 12:19).

The age of mineralisation post dates the Tabberabbera Orogeny (late Middle Devonian) and pre dates the Late Devonian. It is associated with the Woods Point Dyke Swarm and must be late Middle Devonian in age.

These mines are the deepest in the Alexandra Region (700 m for Al Mine and 760 m for the Morning Star) and both have been worked for over 100 years. In excess of 1 million ounces of gold has been won from this field and the exploration potential for the field must be rated high.

Of the areas known to the author, the Yea-Molesworth, Alexandra, Tallangalook and Woods Point areas appear to have the best mining potential. Major considerations of the areas potential must include an evaluation of the reasons for mine closures that occurred in the past.

The following factors should be borne in mind and all factors may or may not be relevant for any of the mining fields in Victoria (Garratt, 1985).

- (i) Grade of ore diminishing with increasing depth will be non economical for extract.
- (ii) Too much water in mines and drives nowadays presents problems to immediate environment if controls on its release are not introduced.
- (iii) Management of mine operations
- (iv) Relative high cost of production of gold in 1860s-1880s, (cost of 1 oz/ton). Probability can be attained on ore grades as low as 5 dwts/ton, ie one-quarter of what it was a hundred years ago.
- (v) Lack of geological and structural knowledge in mine areas at the time of their exploration.
- (vi) Inability of miners in 1860s-1870s to treat ore if gold occurred in unoxidised rock, and as fine inclusions in pyrite or quartz reefs.

It should also be noted that with more detailed geological surveys in the region other areas with mining potential may be delineated.