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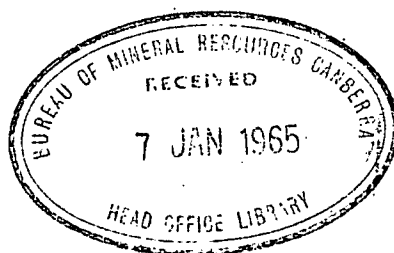
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NOTES ON PROSPECTING AND MINING IN THE AUSTRALIAN CAPITAL
TERRITORY AND ENVIRONS

Compiled by

E.M. Smith

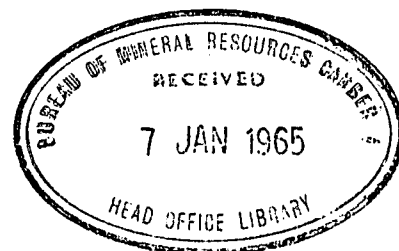
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NOTES ON PROSPECTING AND MINING IN THE AUSTRALIAN
CAPITAL TERRITORY AND ENVIRONS.

Compiled by E.M. Smith

(With revisions)

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Locality Map : Scale 1 inch = 4 miles.

NOTES ON PROSPECTING AND MINING IN THE AUSTRALIAN CAPITAL TERRITORY AND ENVIRONS.

INTRODUCTION

Most of the country around Canberra has been looked at more or less thoroughly since the early days of gold mining, and the records show small returns from scattered areas but not large or fortune-making finds. Minor rushes have been recorded to areas to the north, such as Back Creek, Brooks Creek, Dairy Creek, Gooda Creek, Mac's Reef (near Sutton), Nanima and Spring Range, but yields, as indicated by published returns, have not justified the high hopes. Some areas have been worked fairly consistently by a few men as a supplement to other sources of income such as farming, shearing, rabbit-trapping, and old age pension. Bywong and Brindabella are examples. Captains Flat (Lake George Mines) which closed down in March 1962 is the only deposit in the region that has been worked systematically on a large commercial scale.

The region covered includes Michelago and Brindabella in the south, Gooda Creek, Nanima, Dairy Creek, Brooks Creek, Fairy Meadow and Mulloon in the north-west, north and north-east, and the Molonglo River and Queanbeyan River catchments in the east.

The mineral fields in the region have fallen at various times within the jurisdiction of mining registrars of Queanbeyan, Gundaroo, Bungendore, Cooma, Yass and Captains Flat, and the boundaries of their respective divisions have been altered from time to time to include or exclude some particular field.

Not all prospecting work, especially that on private property, was reported to the Mining Registrars; their reports, therefore do not deal with all activities. However, the reports cover anything which could be considered at all successful, and from them most of the information contained herein has been drawn (see Annual Reports of the N.S.W. Department of Mines, 1877-1960).

Very little systematic exploration for metallic deposits, using modern prospecting techniques, has been done in the region. Lake George Mines Ltd carried out extensive geological and geochemical work over a number of years over a belt extending north and south of Captains Flat, and in 1961-62 the Bureau of Mineral Resources and the Geological Survey of New South Wales carried out systematic geological mapping of the Captains Flat (Hoskinstown-Jerangle) district, supplemented by geophysical and geochemical exploration by the Bureau. In addition a great deal of geological mapping by Universities and Surveys has provided a fund of information on the geology of the region. This has been brought together in a generalized form in the Canberra 1:250,000 geological map sheet.

The A.C.T. was part of the Queanbeyan Division until the Federal Capital Territory was constituted in 1910; since then reports on the A.C.T. have not been furnished. At the present time mining matters within the A.C.T. come under the Mining Registrar, Lands and Survey Division of the Department of the Interior.

According to available records, 117 Miners Rights were issued by the A.C.T. Mining Registrar, up to April, 1963; the first was issued in 1932. Applications for Authority to Prospect total 31; of these, eight were issued, five of the eight were later granted extensions and one was withdrawn. There is no recorded production of metallic minerals within the Australian Capital Territory.

Matters outside the A.C.T. are dealt with by the Warden or Warden's Clerk in the appropriate Mining Division of N.S.W.

The Mines Department of New South Wales, publishes two helpful booklets "Guide to Mining Laws of New South Wales", and a New South Wales Prospectors Guide.

Only prospecting for, and production of precious and base metals are dealt with in these notes; non-metallic minerals such as barite, clay, building stone, aggregate and road-making material are excluded.

GOLD

Back Creek - About 5 miles south-west of Gundaroo. In 1908, a shaft was sunk 70 feet without finding payable ore. A flow of water prevented further sinking.

Brindabella - In 1881, William Reid, who had been living at Brindabella for about 12 years, formed a company to work deep alluvial ground; much work was done in constructing races for sluicing, but the Mining Registrar for Queanbeyan reported in 1883 that the company "appears to have got tired of laying out money, but if Mr. Reid's statement is correct I think he can easily form another Company". Next year Reid won 15 ozs gold but was hampered by lack of water. This difficulty continued and a tunnel was started in 1885 to reach the ground-sluicing claim. Other difficulties were lack of capital, and litigation. In 1887, another company was formed. The mining returns show that 8 men produced 15 ozs of gold from alluvium in the Queanbeyan Division. As Brindabella was the only place in that Division recorded as working alluvium, the returns presumably refer to that place. Ambitious water races were completed in 1889 in which year 64 ozs of gold were won. In 1890 the company closed down "on account of the poor returns obtained". Reid acquired the property and carried on prospecting work but does not appear to have been very successful. In 1903, it was reported that "several alluvial miners are at work at Brindabella, and it is understood that good wages have been made, but no definite particulars are obtainable". In 1909 "all operations at Brindabella were in abeyance, pending the repairing of the water race"; representations were made the same year to prohibit sludge in the Goodradigbee River since it would be carried into the Burrenjack Dam. In 1910, work was done preparatory to sluicing operations but it was stopped because of litigation, arising from a report that muddy water had flowed into the river from Reid's claim. In 1912 and 1913 another company attempted to work the deep alluvium and some prospecting was done on quartz reefs in the foothills. Neither activity was profitable and they were abandoned in 1914. A little fossicking was done for a few years after this and in 1928, a syndicate "obtained 4 oz. gold, valued at £12, from 7 tons of ore" before abandoning their claim.

In 1888, it was reported that "on the Cooleman Creek there are several men getting excellent results from alluvial washing", and in 1893, prospecting was mentioned at "Brindabella and Cooleman". It is possible that these references are both to the same place, a few miles south of the Brindabella workings, on a small tributary of the Goodradigbee River.

Brooks Creek - Alluvial gold was won here for many years. The Mining Registrar's report for Gundaroo Division for 1878 stated: "The alluvial mining on this gold-field is almost abandoned"; but a quartz reef discovered that year produced 54 oz 3 dwt. gold from a locality given as Diamond Hill, Brooks Creek. Six other claims taken up in the vicinity as the result of a minor rush did not locate any extension of the reef. The next year the discovery of another reef was reported "above the alluvial workings", however, the Warden of the Southern District remarked: "I have

received no authentic report from Dawson's Reef, but I have been given to understand that no permanent reef has yet been struck, and that nothing but what may be termed floating stone has hitherto been met with." The total amount of gold won in the area from quartz in 1879 was shown as 37 oz 4 dwt, while alluvium yielded 86 oz 6 dwts 15 grs. The Suburban Gold and Diamond Company was recorded as working the Hidden Treasure Quartz Reef, and two other prospectors' claims were registered. The company did not work for very long, however - by 1881, it had ceased work after trying several places in the Gundaroo Division, including Hidden Treasure Reef, Diamond Hill, Mac's Reef and Dairy Creek, and its machinery was lying idle. In 1881 alluvial mining produced 135 ozs of gold valued at about £513, divided among eight men. At the end of the year there were four men left, described as "fossickers", gaining a scanty and precarious livelihood, working on old abandoned ground, being too poor to remove to a better field of operations; in the following year there was "nothing worth reporting". A claim was taken up again in 1889 for sluicing, but nothing was done. In 1894 about 30 men were fossicking in the vicinity of Brooks Creek and about 140 ozs gold were won from alluvium: in 1895 there were still about 20 men there. In 1896, about 195 ozs were won and the "few men fossicking on Brooks Creek managed to make a little more than a living at the work". In 1897, the yield was down to about 48 ozs. A quartz claim was taken up and abandoned in 1899; and a little alluvial gold was won by fossickers in the years 1899-1905. Sporadic interest was displayed in quartz mining during the same period. Since then, the only time the area was included in reports was in 1929 when "S.E. Murray raised 4 tons of ore, which has not been treated".

Bywong-Mac's Reef-Sutton - In 1879, a rumour that efforts were being made by the Suburban Gold and Diamond Company to again start work on Mac's Reef was reported by the Warden. In 1883, Hill and Ormond took out 70 tons of stone from an 80 foot shaft. In 1887, interest was revived in the area and two parties took up leases and started shaft sinking. Work continued in 1883 and several other leases were taken up, but enthusiasm waned and little work was done in 1889. In 1890, according to the Warden, "the Mac's Reef Gold-mining Company are still tunnelling into the hill, and are now in 490 feet. Four men are employed, and a tramway has been put down. No gold has yet been won". In 1894, Mac's Reef was taken up again and a small plant and battery were erected. In 1895, it was included in the Bywong Gold-field and when a minor rush occurred, was reported on by Carne. The area covered lies between the village of Sutton and Shingle House or Brooks Creek (about 10 miles from Bungendore), and the reefs are concentrated in a belt roughly 3 miles by 1 mile that include Mac's Reef and Bywong Hill. After describing all the claims held in the area, Carne wrote: "From a careful examination of the locality I am of opinion that the conditions which prevail in the majority of instances, viz., thin rubbly veins separated more or less by country, are not promising for permanency; also, that the winning of available stone in these affords more legitimate scope for small parties of miners than for the more extended and systematic exploitation of companies. I am also of opinion that other similar veins will be discovered in the vicinity". However, in 1896, the Bywong Gold-field produced only 363 ozs compared with 814 ozs in 1895. Very little work was done in the area, and by the end of the year Mac's Reef was practically deserted again. In 1897, 48 tons of stone, which yielded 50 oz gold was raised at the Lone Hand Plain at Mac's Reef; there was little activity at Bywong. In 1898, about 150 oz of gold was raised from the whole field and since then only small amounts have been raised in any one year, though the returns show that some gold was produced in most years. In 1902, J. Seymour won 53 oz from 13 tons of stone

and in 1903 his returns showed 4 ozs from 2 cwt stone. That year J. Shepherd erected a small battery and won £172 worth of gold. It was stated in 1908 that "It is the general opinion that the reefs on this field have now been worked out". Three tons of stone taken from a new reef "on the public road at Sutton" in 1909 produced 1 oz 15 dwts gold. In 1910 some gold was won by cyaniding old tailings. In 1933 about 125 oz gold was won "principally from reefs" but amounts generally in any one year have been nowhere near this figure. Small amounts of gold have been won by fossickers in recent years, and in 1957, 42 oz gold was won from the Low Aulchin Mine at Bywong. Some prospecting was carried out in 1958.

Captains Flat The small town of Captains Flat was built at one of the oldest major base metal mines of Australia. Gossans were discovered by J.E. Wright in 1874. Mining commenced in 1882 when about 230 tons of the gossan was crushed, yielding 1,160 oz gold. By 1890 sulphides were being roasted at the Kohinoor Mine (Elliot's ore body), and a revolving calciner for fines was erected at the Commodore Mine (Keating's ore body).

Between 1887 and 1896 two companies the Kohinoor and the Commodore - Vanderbilt, treated 92,947 tons of ore for a yield of more than 583,960 oz silver, 8420 oz gold, and 2397 tons copper; figures for the years 1888, 1890 and 1891 are not available. The two companies then amalgamated as the Lake George Mining and Smelting Company and between the years 1896 and May 1899 treated 112,760 tons of ore for a yield of 276,835 oz silver, 7,720 oz gold, and 1,384 tons copper.

Production practically ceased from 1900 to 1928 and very little mining was done from 1928 until 1937, when Lake George Mines Pty. Ltd. commenced work. From 1940 until 1962, when ore reserves were exhausted and the mine closed down, production was 3,946,650 tons of ore averaging 6.24% lead, 10.70% zinc, 0.63% copper, 1.63 oz silver and 1.11 dwt gold.

During 1961 and part of 1962, in a search for new ore deposits, a belt of country centred on Captains Flat, 8 miles wide and 32 miles long, trending 010 degrees, was mapped by the Bureau of Mineral Resources and the New South Wales Geological Survey. A geochemical survey of the northerly plunging Silurian synclorium, in which the Captains Flat ore bodies occurred, was carried out by the Bureau. No new ore body was discovered.

Coolleman Creek - See Brindabella

Cowhill - In 1897, it was reported that "at Cowhill a shaft has been sunk some 80 feet on the underlay, and the reef continues about the same width, from 8 to 10 inches. The stone looks promising, but shows no gold to the naked eye. Twenty tons sent to Sydney for treatment yielded something under $\frac{1}{2}$ oz per ton.

Dairy Creek - This area was explored and abandoned by the Suburban Gold and Diamond Company about 1880. What was described as "a slight rush" occurred in 1895. In 1896, the only payable claim, owned by Kershaw and party, produced 80 ozs from 26 tons of ore. Jaquet made a geological report on the Dairy Creek gold-field. In 1897, five claims each treated small parcels of stone for a few ozs gold (about 60 ozs altogether). A battery was installed during 1898, when gold was being won from only one claim. By the end of 1899 no claims were being worked, though two had been taken up and abandoned during the year. In 1910 a little gold was won in the area by cyaniding the old mine tailings. Some alluvial gold was won in 1915 and small amounts have been reported intermittently since then.

Gininderra - Prospecting was reported here in 1898: "The prospects are very promising, as a large ironstone formation, of a gossany character, runs through the country for several miles. As this carried gold in many places, the miners look upon it as an indication of a good lode beneath." Work was suspended because of lack of water.

Gooda Creek - Some excitement was caused here in 1896 when a discovery made by O'Rourke yielded $12\frac{1}{2}$ ozs per ton from a parcel of 8 tons sent to Sydney for treatment. Another strike was reputed to have been made about 2 miles south, on private land. Jaquet reported on this area, described as "near the head of Gooda Creek" and concluded "small parcels of very rich ore will probably be obtained, but the ore bodies are too small and irregular to permit of any large output being made. As a depth is reached some very hard rock will be encountered, and it is probable that the ore will yield less gold beneath the zone of oxidation. Gold in small quantities has been found in many places around the field, and it is possible that other discoveries of payable ore may shortly be made". More work was done in this area in 1897 and Watt furnished a geological report supplementary to Jaquet's. He concluded: "It may be pointed out that the prospects at Gooda Creek are very encouraging, but as greater depths are reached, and where the veins pinch, it will not be an easy matter to follow them. Moreover, the expenses incurred in sinking in the hard country will be very heavy". One claim was still working in 1899, though not very profitably. A small parcel of stone treated in 1904 gave encouraging results, but operations were discontinued in 1905.

Goorooyarroo - In 1917, a small strike was made on private land "in the parish of Goorooyarroo, County Murray" and several "Authorities to Enter" were issued. No production of gold resulted, though prospecting work was continued in 1919.

Hall - In 1897, it was stated that "At Hall work has ceased and the ground deserted. The locality is well worth a further trial, and will, probably, be again prospected when the ground is available". This note could refer to prospecting for copper, rather than for gold; a shaft has been sunk on a copper prospect half a mile west of Hall, but no record of this work has been found.

Michelago - This area was reported on in 1878 by the Mining Registrar of the Queenbeyan Division who recorded that the parties working there "do not appear to be doing well". The returns for this year show that Maguire, Devlin and Another, working at Micalago Creek, won 1 oz 7 dwts and 3.6 grains from quartz mining. The next year, the Golden Crown mine at Michelago won 71 ozs from workings 60 feet deep. This was worked by Cornish miners who "manage to make good wages, though their battery and tables are of so poor a description that as much gold is lost over the tables as is saved on them". They abandoned the mine the next year, and the only gold won in the district was a little alluvial gold from the Murrumbidgee, near Michelago. In 1888, a claim was again taken up at Michelago and in 1889 it was reported that Lyons had a shaft down 104 feet and O'Leary one down 96 feet on the same reef. In 1890, these leaseholders formed the Bowery Company. They had two shafts with drives at the 100-foot level and erected crushing plant. The Bowery Company suspended work in 1891 for want of funds. Another party working in the area had got nothing by the end of 1890. They abandoned their claim in 1891 after driving 500 feet at the 200 foot level. In 1911, some prospecting was done with the aid of the Prospecting Vote. In 1912, assays gave $2-2\frac{1}{2}$ oz gold to the ton; in 1913 the area was still being prospected, and in

1914 it was abandoned.

Mount Blundell - In 1896, Jaquet reported on mineral deposits at Mount Blundell, about $2\frac{1}{2}$ miles north-east of Mount Coree. The deposits were found by tracing alluvial gold in creeks. The lode and its gossan cap contained oxidized lead ores with some gold and silver; a second lode about 40 yards west of the first contained zinc blende. Development work was carried on in 1897, but no gold was produced.

Nanima - In 1897, it was reported that "several of the reefs at the back of the old Nanima Homestead were again applied for" but lack of water for crushing operations prevented work being done. A geological surveyor Mr. J.A. Watt reported on the area involved in a small strike and defined the locality as "about 3 miles east of Murrumbateman, close to, and on the west side of, Nanima Creek" and "about $2\frac{1}{2}$ to 3 miles west of the old gold-field of Nanima, where well-defined auriferous quartz reefs have long been known to exist". These were taken up again but little work was done on them. Next year, 1898, two claims were still working, one of which yielded 103 oz gold from 11 tons of rock; work continued through 1899 but then ceased. A Mr. Young did a little work here in 1900 and 1901 without much result. In 1910 at Kirkdale on the Nanima gold-field, D. Roberts was prospecting in the hope of locating a continuation of the rich shoot worked in 1897, but he was unsuccessful. He abandoned his efforts in 1911.

Queanbeyan - A few reports have mentioned areas defined in relation to Queanbeyan. These, while not at Queanbeyan, are recorded under this heading.

(i) In 1889, some alluvial work was done "on the Molonglo River, about 6 miles from Queanbeyan" but "sluicing has not yet started". In 1890, what may have been the same locality was still being worked. The prospectors, identified as Guyormand and party, were constructing a race about 2 miles long, and a dam. Excellent prospects were said to have been obtained, but next year floods destroyed the work and the party abandoned their claim.

(ii) In 1893, auriferous drift was worked at Queanbeyan "upon a low hill, distant about half a mile from the centre of the town of Queanbeyan, on the right hand bank of the river". Gold was found in a deposit of gravel exposed in a small watercourse. The gravel was 1 foot thick, rested on altered slates and was covered by 3 feet of clay and alluvium; 2-3 grains per dish were washed out of it, but the work was hampered by lack of water.

(iii) In 1897, a locality referred to as "the valley property, 2 miles from Queanbeyan" was being investigated, and "a quantity of ore sent to the Cockle Creek Works proved to be valuable as a flux". It was not stated what minerals were present in the ore but a general report on the Queanbeyan district in 1898 stated: "Lately, more attention has been paid in prospecting the various gold, silver, lead, and copper deposits occurring in lode formation, and there appears a probability that in the near future the Queanbeyan District will rank largely in silver and copper if not in gold producing". In recent years, small amounts of gold have been won by fossickers; it is recorded that 2.19 oz fine gold were obtained in 1955.

Spring Range - Some work was done here in 1900 on alluvium and £753 worth of gold was won. In 1901, the return was 218 oz gold valued at £835.10.0. A slight stir here in 1903 came to nothing.

Other Places - Work was done in 1903 about 5 miles from Bungendore along the Captains Flat road on the property of Richard Hyles. "About twenty miners were prospecting on the land under private agreement with the owner, but had not at date met with any success". In 1918 and 1919 work was done "about 5 miles along the Captains Flat road from Bungendore". The property was identified as Woodlands but it was not stated whether it was the scene of the 1903 operations; unpayable gold-bearing stone was reported and shafts 100 feet and 25 feet deep were put down.

In 1884, there was a report on an area referred to simply as "private property near Molonglo". In that year gold was discovered there, but the water required pumping and the gold was "not in sufficient quantity to pay for working"; there is nothing to locate this occurrence. In 1919 "an attempt was made to search for alluvial gold close to the Molonglo River on Carwoola Station, in the vicinity of the turn off of the Queanbeyan road, but none of the prospectors were able to bottom owing to the heavy flow of underground water". Possibly the two reports refer to the same occurrence.

BISMUTH

Nanima - Bismuth was known in the Nanima district from the early days of gold mining. In 1899, it was reported that bismuth ore, valued at £90, was raised from the "Old Nanima" Mine. In 1900, "some 14 cwt of concentrates were produced averaging 50 percent metal"; small amounts were produced in the next two years, and in 1906. In 1908, a battery and concentrating plant were erected by the Praeterita Mining Company. Two tons of concentrate were produced during 1909 but the mine was abandoned and the plant sold and removed in 1910. Interest revived again in 1916, and it was reported that "J. Murray raised 2 tons of ore from his property in the Gundaroo Division". The 1919 report states "Messrs. Murray and Miller's bismuth lease of 10 acres is situated on portion 32, parish of Toual, county of Murray". The property was "cleaned out and re-laddered and all the workings got ready for raising stone" but the ore was "of a low grade and can only be made to pay when worked on a large scale". A stockpile of 5,000 tons, previously raised by the Praeterita Company was not treated. In 1936, three different men were reported to be raising bismuth ore at Murrumbateman, but next year the locality was given as "Nanima, Murrumbateman". The main interest was the gold content of the ore, and the bismuth was not treated separately. In 1938, the bismuth recovered was valued at £4.

COPPER

Bywong - In 1890, under the heading "At Queanbeyan", "Thos. Walsh's copper lode at Bywong", was mentioned but nothing further was reported of it. In 1895, two specimens from Bywong gave analyses showing 38.7% and 8.55% metallic copper, together with some silver and a trace of gold.

Captains Flat. See under Gold.

Carwoola - See Queanbeyan.

Fairy Meadow - See Mulloon.

Hall - See under Gold.

Mulloon - Copper was reported at Mulloon Creek in 1879 and during the next 20 years a few assays of specimens of copper ore were recorded from the locality, one of which (in 1895) was stated to be from the E.P. Scott Mine. In 1899, it was reported that a

local syndicate was arranging to reopen the old Mulloon Copper Mine between Braidwood and Tarago. 90 tons of ore raised and sent away for treatment "realised a gross return of £520". The principal metals in the ore were gold and copper, but silver, lead and zinc were also present. The area was not referred to again until 1906, when it was reported that "the old Mulloon Copper Mine was taken on tribute by two miners. They raised and despatched to Lithgow a parcel of $5\frac{1}{2}$ tons ore, said to assay 20% copper". Other lodes in the vicinity were being investigated also. Ten tons were raised in 1907 from a shaft 175 feet deep. In 1912, J. Griffin sank a shaft 40 feet and raised 6 tons, sold for £90. The Mount Fisher Mine, on private property south of Griffin's property, was worked and "the shaft was continued to 110 feet". 250 tons of ore were raised and 60 tons sold; the value was not given. Work was continued in both these mines during 1913 but only J. Griffin worked in 1914. He did not work the property in 1915, but in 1916 he produced 15 tons of ore averaging 22% copper and containing 19 oz silver. In 1917, he was working land at Fairy Meadow which was described in 1919 as "immediately to the north of the old Mulloon copper mine". He also investigated land to the south of the old mine. A.W. Scott was interested in an adjoining area where "a lot of work had been done many years ago"; it was on private property, the ownership of which was being disputed. In 1920, J. Griffin and J. Heath both worked land in the area. In 1921 the Scotsdale Copper Mining and Smelting Company was formed to work all the properties at Fairy Meadow and Mulloon, including the old Mulloon and Mount Fisher mines. Considerable work was done in 1922 and 1923 but no ore was raised and the company went into liquidation in 1923. In 1921, some work was done on a property called "The Briars", about 9 miles south of Bungendore. This area was also taken up by the Scotsdale Copper Company and investigated in conjunction with the Mulloon property.

Paddys River - A magnetite deposit containing small quantities of lead, silver, zinc, copper and gold occurs on the western side of Paddys River, Australian Capital Territory, about $\frac{1}{2}$ mile upstream from its confluence with the Cotter River. The locality is described under Iron with only brief reference to the other metals, which occur mainly as sulphides within the magnetite body. The sulphides include chalcopyrite, arsenopyrite, galena, sphalerite and pyrite, which appear in small quantities in the spoil dumps near the adits.

The deposit was first prospected in 1895, when Thomas Coyle raised 60 tons of ore containing £150 worth of copper and £105 worth of silver. A company was formed in 1897 to develop the area but nothing further was reported until 1907 when another company was stated to be prospecting there. In 1908 it "proved the existence of a large low-grade ore deposit, but too complex to permit of cheap treatment".

In 1946 Broken Hill South applied for a mining lease of the area; the deposit was mapped by the Bureau of Mineral Resources and the upper adit was sampled. Samples were assayed by Broken Hill South Ltd., with the following results:-

No.	<u>SAMPLE</u>	<u>ASSAY</u>					dwts Au.
	Footage	%Pb.	ozAg.	%Zn	%Cu		
1	0 - 5	0.4	0.2	1.0	0.2	nil	
2	5 -10	1.3	1.7	3.0	0.3	<0.2	
3	10 -16	1.0	1.9	2.2	0.2	<0.2	
4	16 -22	1.6	2.4	2.6	0.4	<0.2	
5	22 -24	0.2	0.6	0.8	nil	<0.2	
6	24 -30	0.3	0.7	1.0	0.1	<0.2	
7	30 -35	0.4	0.8	0.9	nil	<0.2	
8	35 -40	1.3	0.9	1.4	nil	<0.2	
9	40 -45	1.0	1.1	1.7	nil	<0.2	
10	45 -50	0.5	1.2	1.3	0.1	nil	
11	50 -55	0.9	2.2	1.3	0.2	nil	
12	55 -60	0.4	1.1	1.0	nil	<0.2	
13	60 -62	1.1	1.0	1.1	0.1	<0.2	
14	62 -67	3.6	10.4	7.7	0.2	0.4	
15	67 -72	0.2	1.1	5.0	0.1	<0.2	
16	72 -77	0.1	0.7	1.0	0.9	<0.2	
17	77 - 82	nil	0.8	0.7	0.3	<0.2	
18	82 -87	1.3	4.2	3.4	0.8	0.3	
19	87 -92	0.7	3.6	5.0	nil	<0.2	
20	92 -97	0.2	1.3	2.4	0.8	<0.2	
21	97 -102	0.9	2.8	6.2	0.7	<0.2	
22	102 -107	0.2	1.3	2.4	0.1	<0.2	
23	107 -112	1.8	7.3	6.8	0.9	0.4	
24	112 -117	1.6	4.8	5.4	0.8	0.3	
25	117 -122	nil	0.4	0.8	nil	nil	
26	122 -127	nil	0.1	0.7	nil	nil	

Sample 1 begins from the edge of the mineralized area nearest the mouth of the adit and samples were taken along the left-hand side of the adit. Samples 4, 5 and 6 were taken in a small cuddy off the adit and represent only 5 feet advance along the adit.

It is understood that the deposit was subsequently examined by officers of the Joint Coal Board as a possible source of magnetite for coal-washing plant but it is not known what work was done or what results were obtained.

Queanbeyan - Assays of copper with lead and silver were reported from the Queanbeyan area in 1889 and 1895; a general report for the area in 1898 stated: "There certainly occur various silver and copper deposits well worth a thorough prospecting". The report mentioned "a promising little vein about 10 inches in thickness of green and blue carbonates occurring near the south-east corner of the town boundary". It also referred to "the old Primrose Valley, which more than thirty years ago produced some rich assays" but did not say whether the material assayed was rich in silver or copper or both. London Bridge, Diggers' Hill and deposits on J. Macnamara's property were also mentioned. Nothing more appears to have been recorded in the Queanbeyan district until 1906 when it was reported that prospecting operations in the parish of Carwoola had produced 10 tons of ore, valued at £90. In 1912, "applications were made for a lease of Crown lands and for an authority to enter on adjoining private lands, close to the town of Queanbeyan, but no work of any moment was done". In 1914, "a lease of 20 acres in the Parish of Urayarra was acquired" for silver and copper, but no work appears to have been done on it.

In 1908, it was stated that "in the Queanbeyan District there is a number of large gossan outcrops, all carrying bunches of copper or silver ores, but up to the present none of these have proved payable". This remark appears to be still true. It was reported in 1959 that machinery and plant were being acquired for the Silver Kookaburra Mines.

IRON

Michelago - A quantity of iron oxide was raised here for use as a pigment (umber). Prospecting work was done in 1919; 53 tons, valued at £175, were raised in 1920, and 44 tons, valued at £88 in 1922. The deposit was said to be near the railway station.

Paddys River - Deposits of magnetite occur at the margin of granite in the valley of Paddys River, Australian Capital Territory, at two localities, $\frac{1}{2}$ mile and 2 miles upstream from the confluence with the Cotter River. For convenience they will be termed the Half-Mile and the Two-Mile Deposits.

Half-Mile Deposit. At the Half-Mile Deposit iron ore occurs in five irregularly shaped outcrops on a steep spur on the western side of Paddys River. The northernmost outcrop, near the foot of the spur, is small in dimension, having a surface area of 3000 square feet. It contains a considerable proportion of siliceous material and of decomposed amphibolite. The other outcrops, considerably larger than the northern one, consist of magnetite oxidized in part to limonite, and weathered, partially-replaced host-rock.

A 40 lb sample obtained in November, 1960, by collecting chip samples from the more prominent outcrops, gave the following analysis (Bureau of Mineral Resources, Canberra):-

Fe	SiO ₂	gain on Ignition
69.2%	4.63%	0.75%

The gain on ignition is due to the oxidation of ferrous iron more than off-setting moisture loss.

Many years ago, two adits, an upper and a lower, were driven from localities immediately above the northern outcrop in a south-westerly direction towards the main outcrop, which is

about half way up the slope, south-south-west of the northerly outcrop. The spoil dumps contain small amounts of chalcopyrite, arsenopyrite, galena, sphalerite and pyrite. Clearly, the magnetite at depth contains appreciable proportions of sulphide minerals. These are discussed more fully under Copper, where figures are given of analyses of samples taken from the upper adit, over a length of more than 100 feet.

The superficial dimensions of the main outcrops that were chip-sampled at the surface, i.e. exclusive of the low-grade northern outcrop, total 42,000 square feet. Reserves based on this superficial sampling amount to about 5,000 tons per vertical foot. At the surface, this consists of high grade iron ore. Below the zone of surface oxidation and leaching, the magnetite contains sulphides, which are exposed in the adits. On the information available it is not possible to indicate the depth at which the sulphides occur; some sulphide minerals may be quite close to the surface.

Two-Mile Deposit. A body of magnetite occurs on a spur on the eastern side of Paddys River about 2 miles upstream from its confluence with the Cotter River. It has an outcrop length of about 500 feet and outcrop width ranging from a little over 20 feet at the rivers edge to about 150 feet at a distance of 300 feet from the river. It is about 50 feet thick where exposed in a cliff face a short distance farther up-slope from the river. As is the case with the Half-Mile Deposit, it appears to be a contact deposit replacing limestone.

Four samples chipped from the outcrop in the cliff face gave the following analyses (Bureau of Mineral Resources, Canberra):-

Sample No.	SiO ₂ %	S %	Fe %	Fe ₃ O ₄ %	Moisture at 110° %
1	5.0	nil	64.4	89.1	0.21
2	7.7	nil	63.5	87.5	0.16
3	2.8	nil	69.8	96.5	0.10
4	4.2	nil	64.3	88.8	0.28

Descriptions of Samples.

1. Finely granular to massive magnetite with some haematite(?) and silicates; from central part of deposit.
2. Fine-grained magnetite and haematite(?); slightly porous, possibly from weathering and leaching of gangue minerals.
3. Massive magnetite; from central part of deposit.
4. Granular magnetite and haematite(?); mainly from upper part of deposit.

Traces of oxidized copper minerals were observed at one locality on the outcrop, and it may be assumed that small proportions of sulphide minerals occur at some depth below the surface. However inspection of outcrops suggests that the Two-Mile Deposit contains much less sulphide than the Half-Mile Deposit. At the Two-Mile Deposit the outcrop is essentially magnetite whereas at the Half-Mile Deposit it contains much re-distributed iron oxide. The deposit was examined by Jaquet (1901), who states "A tunnel has been driven into the deposit for a

distance of 116 feet, near a spot where copper ore was found on the surface. No extensive deposits of copper ore have been found and the great bulk of the ore does not appear to contain appreciable amounts of the metal". Following is an analysis given by Jaquet presumably of a sample obtained from the tunnel:-

Moisture at 100°C	0.220
Combined water	0.470
Ferric oxide (Fe_2O_3)	63.800
Ferrous oxide (FeO)	26.000
Silica (SiO_2)	6.040
Alumina (Al_2O_3)	0.740
Lime (CaO)	0.700
Soda & Potash (Na_2O & K_2O)	0.270
Phosphoric Anhydride (P_2O_5)	0.025 (P=0.0109)
Sulphuric Anhydride (SO_3)	0.016
Titanic Acid (TiO_2)	trace
Manganous oxide (MnO)	0.440
Copper oxide (CuO)	0.012 (Cu=0.0995)
Magnesia (MgO)	1.400
	<hr/> 100.133
Metallic Iron	64.880

Jaquet estimated "at least 1,000,000 tons of excellent magnetite ore in sight. However, the tunnel is not now open, and on the information available at the surface reserves are estimated to be 150,000 cubic yards.

LEAD

Belconnen - A silver-lead lode was inspected by the geological surveyor in 1893 at a locality about 200 yards below the junction of the Molonglo and Murrumbidgee Rivers on the right bank of the river. The ore contained galena, chalcopryite and pyrite, and selected samples showed a range of 10% - 38% lead. Silver content was up to 1 oz 10 dwt per ton; the copper content was not reported. The geological surveyor wrote: "Having regard to the results of these assays, I am unable to speak favourably of the Belconnen lode, nor am I able to recommend its further exploitation at the present time".

Burra - In 1907, it was reported that "the Burra Silver and lead mine has been further prospected, and results of some promise are said to have been disclosed", but no production was subsequently reported.

Captains Flat. See under Gold.

London Bridge - A silver-lead deposit was reported here in 1896, and several other deposits in the same area were said to "have a very promising appearance". This area was investigated again in 1907-08, but no marketable ore was found.

Mount Blundell - See under Gold.

Paddys River. See under Copper.

Queanbeyan. See under Copper.

SILVER - See Lead.

TIN

Bungendore - In 1913 some prospecting was done on private land "at Lomolong, about 6 miles from Bungendore". Samples of ore were sent to Germany for assay. In 1914, in the Bungendore Division, "a little work was done on the authorities to enter held by F. Bernhardt, at Wattle Valley, but nothing of importance was disclosed. It is believed that there is not any tin ore in this locality".

ZINC

Captains Flat. See under Gold.

Mount Blundell. See under Gold.

Paddys River. See under Copper.

PROSPECTING AND MINING IN THE A.C.T. AND ENVIRONS



REFERENCE

- Minor mineral occurrence
- X Prospect; little or no production
- X Mine, not being worked
- X Alluvial workings
- (Fe) Unworked deposit
- (X) Major mine, not operating
- Au Gold
- Bi Bismuth
- Cu Copper
- Fe Iron
- Pb Lead
- Sn Tin
- Railway
- Road
- Vehicle track
- Δ Trig station, height in feet (Standard Datum Sydney)

