UR1986_66

**1986/66. Mineralogy of gold-bearing concentrates from Synfields Lease (Tasmanian Alluvials). Lisle goldfield.**

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*Abstract*

Six concentrates were described mineralogically, with special reference to their gold content. The major minerals present are quartz, ilmenite, magnetite, hematite, zircon and gold. Electron microprobe analyses indicate up to 11.3 mass% silver, up to 1.3 mass% copper and up to 0.8 mass% zinc. The textures, associations and origin of the gold are discussed.

INTRODUCTION

A number of samples from this lease have been submitted for mineral identification and are listed below.

| *Reg. No.* | *Description* | *Sampler* |
|---|---|---|
| C100 014 | Pan Concentrate (Launceston Lab. No. 841092) | V. M. Threader |
| C100 015 | Black sand, highly magnetic, sprials underflow | D. McP. Duncan |
| C100 016 | Black sand, weakly magnetic, spirals underflow | D. McP. Duncan |
| C100 017 | Gold concentrate (superpanned by Launceston Labs) | V. M. Threader |
| C100 018 | Gold-bearing black sand, highly magnetic | V. M. Threader |
| C100 019 | Gold-bearing black sand, weakly magnetic | V. M. Threader |

The mineralogy of these samples was determined with a combination of transmitted and reflected-light microscopy, and is summarised in Table 1.

GOLD

The gold contents of the last three samples are estimated as about 80%, 1% and 2% respectively, by volume. Some of the gold resembles electrum (i.e. >20 mass% Ag) in colour, but probe analyses (fig. 1, table 2) have not confirmed this. Intragranular variations in gold composition seem to be quite high, and this is most commonly expressed as silver-depleted rims. Probe analyses have not confirmed this, probably because the rims are usually thin and porous, resulting in analyses with unacceptably low totals. Grain number nine shows an increase of about 0.6 mass% Ag from rim to core but in most grains the variation is within the detection limits. Much of the gold exhibits irregular skeletal shapes, some resembling crystal forms. Inclusions are not uncommon, and include quartz, mica, rutile and magnetite. One gold grain was found as an inclusion in limonite.

OTHER MINERALS

Zircon is bimodal; some is very fresh and euhedral (granitic?) and some is well rounded (from basalt or Mathinna beds?). Ilmenite and magnetite show variable (some complete) alteration to rutile/leucoxene and/or hematite.

A number of apparently artificial phases are distributed throughout these

samples, including tin metal (spheres), slag? (magnetite ± hematite ± unknowns, as spheres, usually hollow), copper metal and iron metal. The spheres often have dendritic textures, indicating rapid crystallisation from the liquid state. A number of other phases could be possible contaminants, including cassiterite, wolframite, chalcopyrite and bismuth, but this is difficult to prove.

## DISCUSSION

Silver-depleted rims on placer gold have been considered to represent either leaching of silver or chemical accretion of gold about detrital gold grains (Boyle, 1979). The inclusions in the gold indicate at least some of the gold is detrital, possibly eroded from quartz veins, although the association with magnetite is atypical and may have derived from a disseminated or other form of deposit. The shapes of gold grains are very suggestive of growth of gold *in situ* about detrital gold nucleii. The gold in limonite may represent gold originally in pyrite, or gold scavenged from solution by colloidal iron oxides. Some losses in recovery could be expected from fine gold in limonite, quartz and possibly other minerals.

## REFERENCE

BOYLE, R. W. 1979. The geochemistry of gold and its deposits (together with a chapter on geochemical prospecting for the element). *Bull. geol. Surv. Can.* 280.

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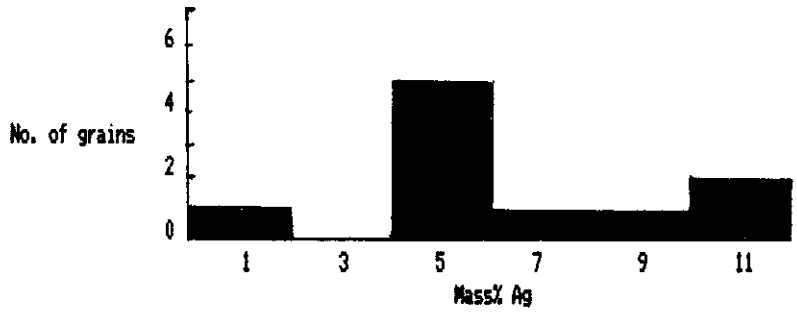


**Figure 1.** *Variation in silver content in Lisle gold grains.*



5 cm

*Table 1*
*MINERAL CONSTITUTIONS OF LISLE CONCENTRATES*

| Sample no. | Gold | Ilmenite | Magnetite | Zircon | Tourmaline | Quartz | Hematite | Others |
|---|---|---|---|---|---|---|---|---|
| C100 014 | - | d | tr | a | tr | sd | - | Tin metal, rutile, monazite, pyroxene |
| C100 015 | - | a | d | tr | tr | tr | tr | Slag?, monazite, pyroxene |
| C100 016 | - | d | - | a | a | sd | a | Chalcopyrite, coke, rutile, pyroxene (a) |
| C100 017 | d | tr | - | a | - | tr | tr | Sphene?, rutile, monazite, limonite |
| C100 018 | tr | tr | d | tr | - | - | tr | Slag? (a), cassiterite, wolframite, hornblende, various metals |
| C100 019 | tr | d | sd | tr | - | - | - | Slag? (a), cassiterite, wolframite, various metals |

d = dominant, sd = subdominant (>20%), a = accessory (5-20%), tr = trace (<5%), - = not detected.

*Table 2*
*SELECTED PROBE ANALYSES (MASS%) OF GOLD GRAINS IN SAMPLE No. C100 017, LISLE GOLDFIELD*

| Grain | Au | Ag | Cu | Zn | Total |
|---|---|---|---|---|---|
| 1r | 94.22 | 5.05 | 0.91 | 0.54 | 100.72 |
| 2c | 93.12 | 4.70 | 0.10 | 0.10 | 98.02 |
| 3r | 101.26 | 0.26 | 0.10 | 0.10 | 101.72 |
| 3c | 98.66 | 0.26 | 0.10 | 0.10 | 99.12 |
| 4c | 94.95 | 5.30 | 0.38 | 0.10 | 100.73 |
| 4r | 92.57 | 4.63 | 0.83 | 0.39 | 98.42 |
| 5c | 87.39 | 11.31 | 1.00 | 0.74 | 100.44 |
| 5r | 86.47 | 11.20 | 1.30 | 0.76 | 99.73 |
| 6r | 88.47 | 10.87 | 0.10 | 0.10 | 99.54 |
| 6c | 88.63 | 10.88 | 0.36 | 0.10 | 99.97 |
| 7c | 91.80 | 5.50 | 0.67 | 0.10 | 98.07 |
| 7r | 93.20 | 5.48 | 0.58 | 0.65 | 99.91 |
| 8c | 92.68 | 6.34 | 1.08 | 0.54 | 100.64 |
| 8r | 93.44 | 6.26 | 1.18 | 0.75 | 101.63 |
| 9r | 94.33 | 4.32 | 0.90 | 0.59 | 100.14 |
| 9c | 93.14 | 4.95 | 0.80 | 0.75 | 99.64 |
| 10c | 89.68 | 9.22 | 0.54 | 0.76 | 100.20 |
| 10r | 88.16 | 9.24 | 0.43 | 0.42 | 98.25 |
| AVERAGE | 92.34 | 6.43 | 0.63 | 0.42 | 99.83 |

r = rim, c = core