# POSSIBILITY OF DISCOVERY OF NEW LEAD-ZINC AND COPPER DEPOSITS

## MT. ISA DISTRICT, QUEENSLAND.


by

C.J. Sullivan

Records 1952/48.

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OBSERVATIONS

The writer spent the period May 31st to June 4th, 1952, with geological parties lead by K.A. Townley and J.F. Ivanac respectively in the Mt. Isa District, Queensland. At this time E.K. Carter had carried out one week's mapping to the south of Mt. Isa township, and had traced the Mt. Isa shale and dolomitic shale for about 12 miles south of the mine. He had shown that the Templeton granite was concordant and that it was younger in age than the Mt. Isa sediments.

The writer, after consideration of the work carried out by E.K. Carter and a study of the photographs of the region and of the geology of Mt. Isa Mines, came to the following conclusions:-

(1) The Templeton granite is very significant for the occurrence of ore at Mt. Isa. In a regional sense the Mt. Isa deposits and those recently found 12 miles north of Mt. Isa are details on the eastern edge of the Templeton granite. This point would seem to suggest itself to most geologists but, has apparently been overlooked at Mt. Isa, possibly owing to the influence of Roland Blanchard. Blanchard and Hall (1937) state: "The nearest strictly intrusive granite outcrops more than 8 miles distant (from the orebody) though pre-ore granite gneiss masses lie nearer. No intrusive rock has been encountered in the deepest developments to a depth of more than 900 feet, nor in the deepest diamond drill to a depth of 1400 feet". This statement implies that gneiss plays no part in the concentration of ore. Actually, the gneiss at Mt. Isa appears to be only a stage in the metamorphic sequence: sediment-schist-gneiss-granite. The gneiss-schist contact appears to be vitally related to ore distribution. The association is very similar to that at Southern Cross, Western Australia, where a series of gold deposits, now being exploited by Great Western Consolidated, are arranged around an anticline of granite gneiss.

In the area north and west of Mt. Isa, the Templeton granite-sedimentary contact forms a north-pitching anticlinal structure. Along this north-pitching structure, local reversals of pitch occur.

(2) The regional photography shows that Mt. Isa deposits are associated with a swing in the granite contact which is convex to the eastward, representing an anticlinal pitch change in the dominantly north-pitching fold mentioned above. This pitch change has been noted in the folding at Mt. Isa Mines. The axis of change of pitch dips to the south - a point apparently not recognized by Mt. Isa geologists and this corresponds to the pitch of the zone of Black Star Ore-bodies, as distinct from the pitch of individual shoots, which is to the north. The northern prospect is also associated with anticlinal pitch change which is again reflected by a swing in the granite contact.

(3) To the south of Mt. Isa, Carter has shown that granite occurs to the east as well as to the west of ore-bearing sediments. As the dominant pitch is to the north, the granite, when treated as a conformable unit - as it is where exposed - is seen to pitch beneath Mt. Isa, and the anticlinal pitch changes in the sediments correspond to the positions of buried cupolas in the granite gneiss.

(4) It has been well known for many years that the Mt. Isa shale is a favourable host rock for ore and both major groups of deposits occur in this formation.

(5) The lead-zinc deposits at Mt. Isa form extremely inconspicuous outcrops and the presence of lead is most difficult to detect by inspection. However, associated with lead-zinc mineralization both at Mt. Isa and at the northern prospect is extensive pyritic mineralization which forms prominent iron stained jasper outcrops. These outcrops are a most useful guide to prospecting.

RECOMMENDATIONS

1. A fold in the granite-sediment contact was noted on the aerial photographs about 12 miles south of Mt. Isa and the Mt. Isa shale east of this fold was briefly inspected. A ferruginous gossan of pyritic derivation was found within the Mt. Isa shale in a very brief period of time and it is considered that the country extending over about one mile in this vicinity shows sufficient promise to warrant extensive prospecting. The necessity for this can be realised only after the deposits now exposed at the northern prospect have been inspected; here it is seen that the finding of lead in the outcrop presents the utmost difficulty even after extensive bulldozing and costeaning has taken place. Lead-bearing outcrops have the appearance of weathered shale. This deposit was found by geologists only 2 years ago although it is only 200 yards from the bituminized highway to Tennant Creek.

2. The whole sediment-granite contact extending over about 50 miles north and 50 miles south of Mt. Isa is worthy of the most careful mapping followed by closer investigation of those parts characterised by -

1. Anticlinal pitch changes reflected in the concordant granite-sedimentary contact.

2. Signs that granite-gneiss is likely to pitch beneath the area.

3. Presence of the Mt. Isa shale, dolomite or similar rocks.

4. Presence of folding and contortion associated with anticlinal pitch changes and with thrusting.

5. Presence of extensive gossans derived from pyritic mineralization.

Note: For a fuller discussion of postulated relationship between ore occurrence, concordant granites, source rocks and anticlinal pitch changes, the reader is referred to Sullivan (1949A,B).

REFERENCES.

BLANCHARD, Roland, and HALL, Graham, 1937: Mt. Isa ore deposition Econ. Geol. 32, p.1044.

SULLIVAN, C.J., 1949A: Ore granitization. Econ. Geol. 43, pp.471-498

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