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The Cinola Gold Property

Queen Charlotte Islands, British Columbia

by

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Abstract

Consolidated Cinola Mines Ltd. obtained the Babe-Ric property in 1977 and a drill program totalling 20,000 metres continued to the middle of 1980. Ore in situ is now estimated at 45 million short tons of 0.056 oz. gold/ton with a cut-off grade of 0.025 oz./ton. Mineralization is found within a hill of silicified pebble conglomerate with interbedded sandstone and siltstone of Miocene age unconformably overlying a Cretaceous shale sequence. Poor sorting, coarse clastic nature, high carbon content and abrupt lithologic change all suggest an alternating near-shore marine and alluvial plain-braided river environment. Intrusion of a rhyolite dyke along the shale-conglomerate unconformity provided the heat source for a geothermal system which moved gold, silver, mercury and arsenic into the area. A halo effect shows a high-grade core containing gold and silver, a low grade surrounding zone and an argillically altered perimeter. The sediments and dyke were cut by a fault which may have offset part of the ore to the northwest. Features similar to those of deposits in Utah and Nevada suggest that the Cinola property may be a Carlin-type deposit. Development involves the erection of a 50-ton per day pilot mill and 500-metre adit to "fine-tune" the process and to confirm the ore grade, as well as some fill-in surface drilling.

Introduction

With the rapid increase in the price of gold over the last several years, there has been a dramatic change in the mining industry. Old workings that were not profitable, or even marginal at $35 an ounce found themselves under close scrutiny to see if they could be re-opened. Not only played-out mines, but numerous showings that as little as 10 years ago were not worth developing have in recent times caught the interest of the industry. Like many of these areas, the Consolidated Cinola property represents a potential open pit gold mine of relatively large dimensions but fairly low grade. This paper summarizes the work done from initial discovery up to the present, and notes future development plans. The information will assist in the production of a model of ore genesis to be employed in further exploration for mines of this nature.

Previous Work

First indications of an ore body were made in 1970 by Efrem Specogna and Johnny Trico, two loggers from Port Clements who were prospecting along the inferred Sandspit Fault System. Sampling of wallrock and veins on a cliff-face 17.6 kilometres south of Port Clements produced some gold values, and Specogna did some mining of the surface high-grade showing. The property was optioned in 1971 to Kennco Exploration who did extensive silt and soil sampling,

as well as mapping. A major mercury anomaly as well as weak gold and arsenic anomalies were revealed and two holes were drilled. In 1972 it was optioned to Cominco who did 500 metres of drilling in 9 holes and conducted a large trenching program, but the option was dropped. From then through to 1975 the property was examined by Umex, Silver Standard and Quintana who all did some sampling but who were apparently unsatisfied with the results. (A.F. Roberts, 1977).

Consolidated Cinola Mines Ltd.

In early 1977 the property was optioned to Consolidated Cinola Mines Ltd. who drilled a total of 677 metres the same year in the west-central part of the mineralized zone to give a grade of 1.3 million tons of 0.0860 or 1.4 million tons of 0.0796 oz. gold per ton. The following year 1254 metres were drilled and a high-grade area was partly delineated, raising the value to 6 million tons of 0.070 oz./ton with the possibility of some underground mining of the richer material. (Consolidated Cinola Mines Ltd., 1978). From January until August 1979 an expanded program proceeded to further investigate the high-grade zone and to help outline the entire mineralized area, with 15 holes being drilled for a total of 3217 metres. In August 1979 an agreement was made with Energy Reserves Canada Ltd. for continued funding of the project in which the new partner would invest $100,000 for each 1 percent ownership of the property up to a maximum of 50 percent, with Consolidated Cinola

retaining operator status. For the year of 1979 a total of 53 holes were drilled for a total of 8400 metres. At that point the southern half of the ore zone had been drilled in detail, giving reserves of approximately 28 million tons of 0.064 oz. gold/ton and roughly the same for silver. Preliminary feasibility studies and metallurgical testing were initiated. (Consolidated Cinola Mines Ltd., 1979). In 1980 drilling totalling about 9700 metres in 59 holes continued to the end of May. The ore zone from this final work shows a wedge dipping east to a depth of 300 metres, a maximum width of 300 metres and a total length of 900 metres with an average grade of 0.056 oz. gold/ton for an estimated 45 million tons. Present work involves consolidation of geological information, engineering and environmental studies and the erection of a pilot mill for testing the extraction process. Associated with the mill is an adit for bulk sampling, confirming ore values and for further geological investigation.

Geology

The general region around the Cinola deposit contains three major rock units and a major fault system. In the west and south-west is the Haida Formation, divided into a lower sandstone member and an upper shale member of Cretaceous age. To the north-west is the Massett Formation, in this area consisting of porphyritic andesite of Paleocene age, less than 65 million years old. East of the fault is a unit of pebble conglomerate with minor sandstone

and siltstone lenses, called the Skonun Formation of late Miocene or Pliocene age (Sutherland-Brown and Schroeter, 1975).

Haida Formation

In the type section, the upper shale member of the Haida Formation is 320 metres thick, and on the Cinola property it has been penetrated to approximately 35 metres. It is composed of dark grey to black, poorly consolidated, thin-bedded calcareous shale. In the fault it is a soft mud, but with increasing proximity to the rhyolite it becomes a silicified argillite or argillite breccia. South of the property it appears to dip to the northeast at 10^{o} to 30^{o}.

Masset Formation

The Masset Formation is composed of a mixture of columnar basalts and sodic rhyolite ash flows with a total thickness of 5500 metres, but in proximity to the ore-body the rocks appear to be pale to medium green porphyritic andesites and minor dark grey porphyritic basalts. They are located on a prominent hill west of the mineralized zone, and are separated from it by a shallow valley of Haida shales. The rhyolite dyke associated with the deposit is not part of the Masset Formation.

Skonun Formation

The Skonun Formation was mapped as overlying the Masset volcanics. Because of the small amount of outcrop, mainly to the east of the property, it was thought to be composed of poorly lithified sandstones and siltstones with only minor shale, conglomerate and lignite. However, the clastic sequence in the Cinola area east of the fault consists mainly of medium grey to pale brown polymictic subround to subangular pebbles and cobbles in a 30 % matrix of poorly sorted coarse sandstone. The clasts are 60 % felsic volcanic rock, 20 % mafic volcanic rock, 10 % granite, 5 % argillite and 5 % mixed conglomerate-sandstone-siltstone. Felsic volcanic clasts are massive and banded rhyolite, rhyolite porphyry and rare pyroclastics with chert. Mafic pebbles are dark green porphyritic andesite with feldspar and hornblende phenocrysts.

Minor sandstone members striking north-south and dipping gently east are medium grey to dark brown, medium to coarse-grained and show cross-bedding and graded bedding. Five to ten percent wood fragments are present, as well as rare shells. Also present are medium to pale grey interbedded sandstone-siltstone sections with graded bedding, cross-bedding and soft sediment slumping. It is now thought that the conglomerates on the property and the sandstones farther east are simply different facies of the same formation. (Sutherland-Brown, A., 1968).

Rhyolite Porphyry

The rhyolite dyke is found along the fault contact across the mineralized zone and also as smaller dykes on either side of the fault. In some drill holes it is found intruding the conglomerate or surrounding xenoliths of clastic material. A series of argillite "slivers" or wedges are found along with the rhyolite in most drill holes. The subvolcanic material is pale grey with rare quartz eyes and up to 10 % feldspar phenocrysts. Sections showing aphanitic felsic fragments in a white vitreous matrix may represent an extrusive phase of the system, but it is not extensive. Both the rhyolite and the argillite are extensively brecciated and are contained in a dark grey siliceous matrix along the fault, but this fracturing decreases as one proceeds away from it.

Structure

The most noticeable feature on the property is a fault striking N25^{o}W which dips at about 45^{o} to the northeast. The fault is recognized in drill holes by a change from siliceous argillite or rhyolite to a soft dark grey mud, originally shale. On surface it can be seen as a scarp near the southwest edge of the deposit. Drainage patterns, geochemical anomalies and topography are all displaced in such a way as to suggest that the hanging wall east block moved down and to the south in relation to the west footwall

block. Because it parallels the Sandspit Fault System and movement is similar, they are thought to be related. However, since the rhyolite is brecciated, latest movement was after the intrusion at 13 million years. (Champigny, N., and Sinclair, A.J., 1980).

Mineralization

Soil and stream sediment sampling have produced major anomalies of mercury, arsenic and gold over the Skonun sediments. Extensive drilling has shown a fairly consistent picture of a high-grade narrow centre approximately 50 metres wide running from the northwest to the southeast end of the property parallel to the fault. On the average it grades better than 0.070 oz. gold/ton and dips steeply southwest from the surface to the fault at about 150 metres depth. Surrounding this core the values decrease outward for 80 metres on the west, averaging 0.035 oz. gold/ton, until they hit the fault and the Haida Formation which contains nothing above background gold values. East of the core, gold values decrease outward for 60 to 80 metres, again averaging 0.035 oz./ton. In the northwest, there is a second mineralized zone on the footwall side of the fault where rhyolite porphyry has been noted and gold values at this point average greater than 0.070 oz./ton. Further investigation is required in this area.

Over the mineralized zone there is moderate to intense silicification. Some narrow high-grade intervals may be associated

directly with quartz veining but most of the gold is scattered erratically throughout the sediments, showing no definite relation to lithologies or to the rhyolite intrusion. On the east boundary, mineralization ends abruptly when it encounters an alteration zone striking and dipping parallel to the high-grade core. The alteration shows moderate to intense kaolinization, especially of feldspars, and minor chloritization. At the southeast and northwest ends of the property it swings around to close off mineralization. It is also visible topographically, where it is found in the lowlands surrounding the silicified hill which contains the gold.

Since mineralization is found after emplacement of the Skonun sediments, as is the rhyolite, it is assumed that the intrusion provided the heat source for a hydrothermal system which concentrated gold, silver, mercury and arsenic in the area. Source rocks have not been identified, but metallurgical tests suggest that some of the pebbles show fractures and quartz veins predating emplacement as clastic material, i.e. as part of the Masset volcanics. A halo effect may be present with a high-grade core, a lower grade outer zone and kaolinized perimeter. Since no alteration zone is noted on the west side against the fault, it is suggested that it may have been displaced to the northwest by the fault and may contain some low grade mineralization.

Many of the aspects of the Cinola gold deposit can be compared to disseminated gold deposits of the Nevada-Utah area. (Hansen and

Kerr). Small particle size, usually less than 5 microns, Tertiary age of mineralization and anomalous mercury and arsenic values over the entire mineralized zone are all noted in both regions. Also, high porosity, permeability and carbon or carbonate content are similar features. Porphyritic dykes and related hydrothermal alteration are common. However, the presence of argillic alteration cannot be relied upon as a criterion for comparison, since in some mines silica content increases within the ore zone, whereas in others clay content seems more pervasive. Faulting, although present in most orebodies, does not appear to be genetically related to the system. Keeping these limitations in mind, the Cinola property could be classified as a Carlin-type disseminated gold deposit.

Geological History

In middle to late Cretaceous time, organic-rich sediments were deposited in a low-energy marine basin in moderate proximity to land to the west. Between the late Cretaceous and the Paleocene, the basin was uplifted subaerially, possibly in association with the Sandspit Fault System, and was eroded to produce a moderate slope to the east. Between the Paleocene and Pliocene ages, Masset Formation porphyritic andesites and sodic rhyolites were extruded onto the Haida shales west of the present Cinola property. By Pliocene time, these volcanics were partially eroded and rapidly accumulated in a tectonically active depression

of Haida shales to the east, relatively close to sea level, in an alluvial plain-braided river system discharging and possibly alternating with a shallow marine environment which extended farther east. Possibly associated with continuous minor faulting, a porphyritic rhyolite dyke was intruded at 14 million years along the shale-conglomerate unconformity, with roots originating through the Haida Formation and concentrating gold, and silver in the center of the property and leaving an outer zone of kaolinized and chloritized material. The halo was then faulted, putting the hanging wall in its present position and suggesting that the remaining section lies to the northwest. Between then and the present an average of three metres of glacial till has been added.

Development and Metallurgy

At the present time the Company is in the final stages of erecting a 50-ton/day pilot mill on a plateau about 1.6 kilometres from the proposed pit. It will be used to test and adjust all phases of the mill process before a final production decision is made in early 1981. Current studies show that because micron-size free gold can be found not only with silica but associated with pyrite and lignite as well, a two-stage flotation process followed by calcining of the lignite float and cyanidation of the combined lignite ash-sulphide float will give an overall gold-silver recovery of 92 %. (Lichty, 1980). Once the mill is erected, an adit will begin to supply muck from a site at the base of the

hill at the south end of the deposit. It is expected to follow the high-grade zone north-west for at least 500 metres, with a cross-cut to extend east and west to the edge of the mineralization and a possible raise on one of the known drill-holes. This will not only supply material for the mill, but will also give a more exact grade of the mineralization.

Several fill-in drill holes will be required for final ore reserve estimates in the main ore zone. Some new geochemical studies have been conducted on a second hill just east of the known mineralization, and a significant gold-mercury-arsenic anomaly has been found, requiring further studies. Also, small rhyolite bodies found in the footwall west of the main zone also contain significant gold values and should be examined more closely.

Summary

In summary, Consolidated Cinola Mines Ltd. has put together the picture of a low-grade large tonnage gold deposit discovered on the Queen Charlotte Islands. It is essentially a silicified zone within a pile of young coarse clastic rocks cut by a rhyolite intrusion and a fault zone, and is surrounded by a barren argillic alteration zone. Present work suggests a grade of 0.056 oz. gold/ton in approximately 45 million tons of ore. Recovery by proposed extraction methods is 92 % and the company is in fact in the process of erecting a pilot mill to confirm that process. Certain features suggest a Carlin-type deposit, common in the southwestern United States, and further exploration for similar situations holds the potential for new discoveries on the Queen Charlotte Islands.

References

Champigny, N., and Sinclair, A.J., "Cinola (Specogna) Gold Deposit, Queen Charlotte Islands, British Columbia - A Canadian Carlin-Type Deposit," in Gold Symposium and Field Excursion, CIM Bulletin, vol. 73, no. 820, pg. 62

Consolidated Cinola Mines Ltd., Annual Report, 1978

Consolidated Cinola Mines Ltd., Annual Report, 1979

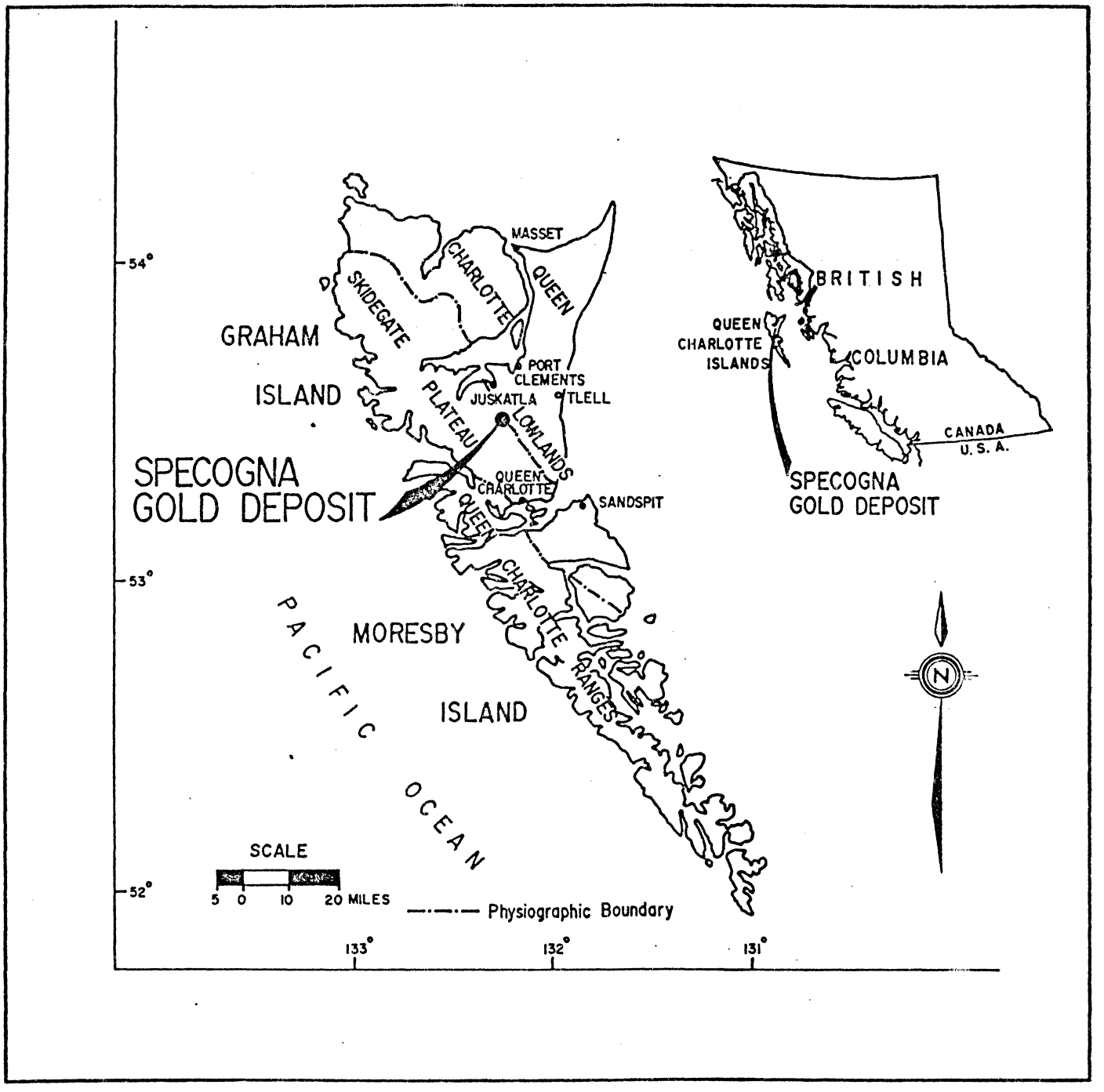
Hansen, Donald M., and Kerr, Paul F., "Fine Gold Occurrence at Carlin, Nevada", in Ore Deposits of the United States, 1933-1967

Lichty, L., "Report No. 2, Metallurgical Test Work on Gold Ore from the Cinola Property on Queen Charlotte Islands, Canada", June 15, 1980

Roberts, A.F., "Report on the Specogna Gold Prospect, Queen Charlotte Islands, B.C., Skeena Mining Division, October 17, 1977

Sutherland-Brown, A., "Geology of the Queen Charlotte Islands, British Columbia", B.C. Ministry of Energy, Mines and Petroleum Resources, Bulletin 54

Sutherland-Brown, A., and Schroeter, T.G., "Babe Gold Prospect, Queen Charlotte Islands", Dept. of Mines and Petroleum Resources, Geological Fieldwork, 1975


MASSET
CHARLOTTE
QUEEN
SKIDEGATE
GRAHAM
ISLAND
PORT
CLEMENTS
JUSKATLA
TLELL
PLATEAU
LOWLANDS
SPECOGNA
GOLD DEPOSIT
QUEEN
CHARLOTTE
SANDSPIT
QUEEN
CHARLOTTE
RANGES
MORESBY
ISLAND
PACIFIC
OCEAN
54°
53°
52°
133°
132°
131°
SCALE
5 0 10 20 MILES
Physiographic Boundary
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COLUMBIA
QUEEN
CHARLOTTE
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GOLD DEPOSIT
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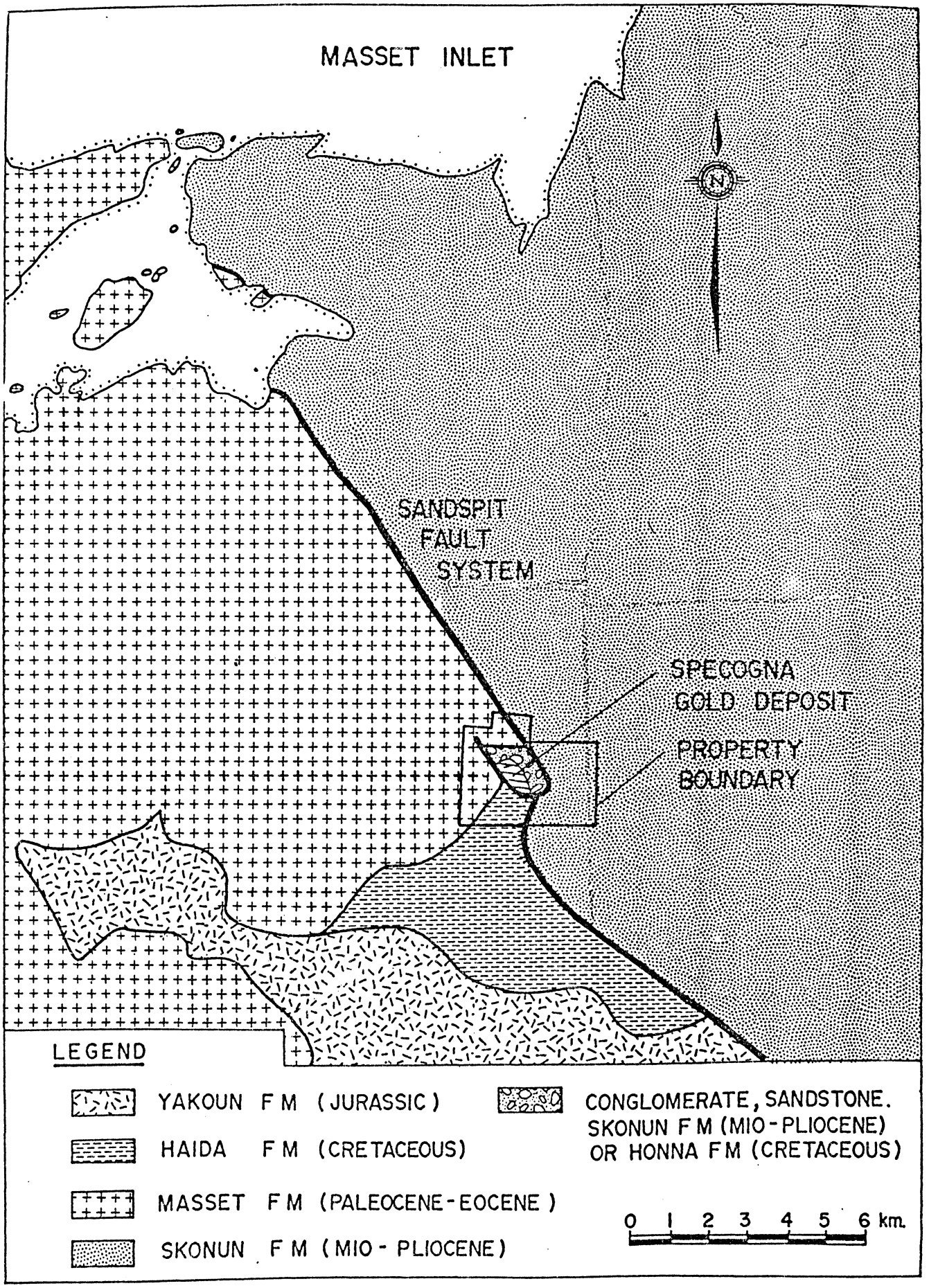
MASSET INLET
N
SANDSPIT
FAULT
SYSTEM
SPECOGNA
GOLD DEPOSIT
PROPERTY
BOUNDARY
LEGEND
YAKOUN F M (JURASSIC)
HAIDA F M (CRETACEOUS)
MASSET F M (PALEOCENE-EOCENE)
SKONUN F M (MIO-PLIOCENE)
CONGLOMERATE, SANDSTONE.
SKONUN F M (MIO-PLIOCENE)
OR HONNA F M (CRETACEOUS)
0 1 2 3 4 5 6 km.

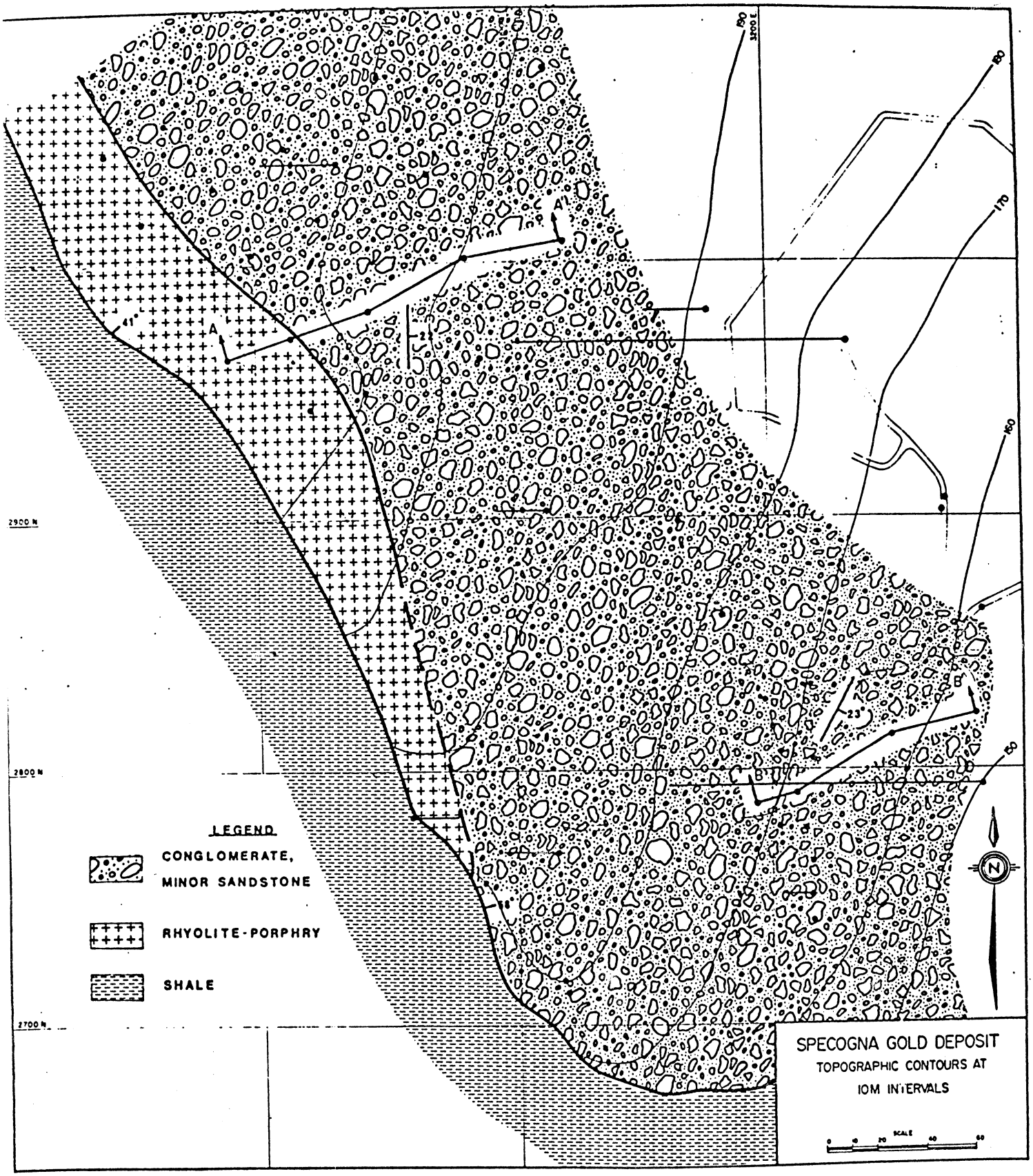
2900 N
2800 N
2700 N
A
A'
B
B'
C
C'
D
D'
41°
23°
180
170
160
150
LEGEND
CONGLOMERATE, MINOR SANDSTONE
RHYOLITE-PORPHRY
SHALE
N
SPECOGNA GOLD DEPOSIT
TOPOGRAPHIC CONTOURS AT
10M INTERVALS
SCALE

FIG. 3

CROSS - SECTION A A'