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DEPARTMENT OF NATIONAL DEVELOPMENT.  
BUREAU OF MINERAL RESOURCES  
GEOLOGY AND GEOPHYSICS.

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RECORDS.

Records No. 1953/81

GEOLOGICAL REPORT ON GOLD MINING LEASE  
1075 - "BAROLA REEFS" KAINANTU SUB-  
DISTRICT. EASTERN HIGHLANDS. NEW GUINEA.

by

N. J. MacKAY.

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PLATE 1. - Geological Plan of Workings and Sections,  
Gold Mining Lease 1075 - "Barola Reefs".  
Scale : 1 inch = 20 feet.

GEOLOGICAL REPORT ON GOLD MINING LEASE 1075 - "BAROLA REEFS"

KAINANTU SUB-DISTRICT, EASTERN HIGHLANDS, NEW GUINEA

(a) Location, History and Development.

Gold Mining Lease 1075 is situated at the head of Rowlands Creek, a tributary of Barola Creek. The workings are on the hillside just south of the head of Rowlands Creek and approximately five (5) miles west-south-west from Kainantu Sub-District Office and Airstrip in the Eastern Highlands of New Guinea. The elevation of the workings is approximately 6,200 feet above sea-level. The area was examined by the writer in April, 1953.

The presence of gold was first discovered by Mr. E.W. Rowlands early in 1933 when prospecting Rowlands Creek. He is reported to have won about 800 ounces of bullion from the creek wash. This led to his pegging G. M. L. 905 and carrying out a certain amount of exploratory work. An adit, 64 feet in length, was driven into the hillside on No. 1 level (see Plate 1) and a rise opened up to the surface from the end of the adit for ventilation purposes. This rise has since collapsed. An adit on No. 2 level was also put in for a very short distance. The lease was forfeited in 1937. No further work was done until Messrs. G.P. Buchanan and W.J. Bloomfield pegged Reef Claim 101 in 1951. The adit on No. 2 level was opened up and driven on the mineralisation for 97 feet (see Plate 1). No. 1 winze was sunk from No. 1 level and followed the main lode down to No. 2 level. A cross-cut to the west from No. 1 level intersected a second lode underlying the main lode and No. 2 winze followed this lode down dip towards No. 1 level. The holders of the Reef Claim applied for Gold Mining Lease 1075 - "Barola Reefs" - of 18 hectares in area covering the workings and immediate vicinity in March, 1953. Approximately 150 tons of selected ore is at grass at the present time.

(b) Transport, Water and Timber.

Present cost of air freight from the coast at Lae to Kainantu is 7d. per lb. A good jeep road runs from Kainantu Airstrip to within  $\frac{1}{2}$  mile of the workings and a road can easily be constructed over this section in order to bring in any equipment for treating the ore.

The workings are situated near the head of Rowlands Creek and any treatment plant would have to be erected further down the creek in order to make use of the water in the creek.

The lease and adjacent country is thickly covered by timber but little is known of the relative durability of these bush timbers for mining purposes.

(c) General Geology.

The country rock of the lease and its immediate vicinity consists of sandstone and shale. Both are fine-grained and strongly iron-stained in places. In nearby Rowlands Creek a body of diorite porphyry intruding the sedimentary rocks is exposed. This rock is grey in colour and consists of phenocrysts of plagioclase, hornblende and biotite in a fine-grained ground mass. Small stringers containing quartz, magnetite and pyrite are present in the diorite porphyry. Upstream from the intrusive body several quartz-magnetite-pyrite veins and tongues of diorite porphyry, up to 6 feet in width, cut across the creek bed. Dollying of specimens did not reveal any traces of gold.

Apart from in the bed of Rowlands Creek very few rock exposures can be observed due to the thick soil and scree cover of the area. There are numerous magnetite boulders in the creek wash and these appear to have been washed down the creek from the point where the creek has eroded the northern extension of the ore-body. A grab sample from these magnetite boulders yielded only a trace of gold on assay. The attitude of the sedimentary beds could not be determined except at one place in Rowlands Creek where they strike 350° with a dip of 70° to the west. 53

(d) Ore Geology

The main lode has been exposed on two levels (see Plate 1). The upper adit on No. 1 level followed the lode for a distance of 50 feet and No. 1 winze (see Section A-A<sup>1</sup> of Plate 1) followed this lode down to the lower level. This lower level, No. 2 level, is 13 feet below No. 1 level and has followed the main lode, attaining a length of 97 feet.

Another lode, parallel to and underlying the main lode, has been intersected by a cross-cut to the west from No. 1 level and followed down dip by a winze known as No. 2 Winze. A third lode, known as No. 3 lode, is exposed on the surface 40 feet west of the portal of No. 1 level.

The general strike of the main lode is meridional and the average dip is 30° - 35° to the east. Half way along No. 2 level adit the lode swings to a strike of 160° and at a distance of 60 feet from the portal the dip flattens out to 8° to the east. Just before the end of the adit the dip steepens again to 32°. This flattening of the dip is not exposed in the upper adit as this adit passes out of the lode towards its termination. As shown in Section C-C<sup>1</sup> of Plate 1 the main lode passes under the upper level due to the flattening of the dip of the lode. The width of the main lode ranges from 3 to 6 feet and averages 5 feet. The maximum length of lode exposed at present is 90 feet.

No. 2 lode is 5 feet wide in the cross-cut from No. 1 level but it lenses out in No. 2 winze. (See Section B-B<sup>1</sup> of Plate 1). An outcrop of a third lode to the west has been named No. 3 lode but this lode has not been exposed elsewhere up to date.

The main and No. 2 lodes are parallel to each other and 2 - 4 feet apart. They have been intersected by a fault that strikes 170° and dips 75° to the west. The fault consists of a well-defined zone of brecciation ranging in width from 3 inches to 18 inches. No displacement of the lodes was observed.

The lodes are well-defined although the hanging wall of each lode is rather irregular in character. Some horizons of sandstone are included in the main lode near the hanging wall. The lode material consists of magnetite, hematite, limonite, brown garnet, quartz and small amounts of pyrite. Within each lode there are up to three bands of rather massive magnetite which are generally 6 inches wide but range up to a maximum width of 2 feet.

(e) Occurrence of the Gold

The origin of the lodes is probably closely related to the intrusive diorite porphyry but no igneous rocks have been exposed in the workings up to date. The gold is crystalline, very fine in character and appears to be occurring free. The grade of the gold is 850 - 930 fine.

The results of assay samples taken from the lodes are tabulated below. Locations of the samples are shown on Plate 1.

Sample Number	Sample Width	Lode Width	Gold Ozs. per ton	Silver
Magnetite Bands -				
1	1 ft. (from HW)	5 ft.	6.06	0.25
2	1 ft.	6 ft.	0.80	
3	6 ins. (from HW)	4 ft. 6 ins.	1.16	0.09
Main Lode -				
4	5 ft.	5 ft.	0.16	
5	4 ft. 6 ins.	4 ft. 6 ins.	0.26	
6	5 ft.	5 ft.	0.15	
7	5 ft. (from HW)	6 ft.	1.35	
8	2 ft. 6 ins. (from FW)	5 ft.	0.43	0.07
9	2 ft. 6 ins. (from HW)	5 ft.	0.74	
10	3 ft. (from FW)	5 ft.	0.48	
11	3 ft. (from FW)	6 ft.	0.99	0.19
12	6 ft.	6 ft.	0.46	
No. 2 Lode -				
13	3 ft.	3 ft.	0.33	0.07
14	5 ft.	5 ft.	0.61	
15	2 ft. (from HW)	5 ft.	0.67	0.09
16	5 ft.	5 ft.	0.42	
17	3 ft. 6 ins.	3 ft. 6 ins.	0.31	
No. 3 Lode -				
18	3 ft.	3 ft.	0.15	

With regard to the main lode it carries very little gold on No. 1 level but the gold content increases considerably on No. 2 level. On this level the gold content is shown by the assays to be approximately 0.75 ounces per ton over an average width of 5 feet and for a length of 65 feet along the adit. The gold is mainly concentrated in the massive magnetite bands and the average grade of the ore would be increased by selective treatment of these magnetite bands.

No. 2 lode averages 0.42 ounces gold per ton over a width of 4 feet for a distance of 30 feet down the dip of the lode from No. 1 level but the lode lenses out below this level. Only the magnetite ore in this lode is worthy of treatment. The sample taken from No. 3 lode at its surface outcrop returned only 0.15 ounces gold per ton.

#### (f) Prospects.

The exposure of the main lode on No. 2 level, averaging 5 feet in width, for a length of 90 feet gives definite promise that it should extend for some considerable distance below the level and show a high gold content. As the greatest width of this lode is in the face of the adit the lode probably extends for some distance to the south along this level. The most logical places for further exploration are along No. 2 level to the south and below this level by winzing on the lode. If the adit is continued much further to the south a ventilation rise to the surface will be necessary. A cross-cut to the east from No. 2 level may also reveal the presence of additional lodes parallel to the main lode.

No. 2 lode lenses out below No. 1 level but this lode may be further explored by a drive to the south from where the lode is exposed in the cross-cut. This cross-cut can also be driven to the west in order to intersect No. 3 lode below its surface outcrop. However, the higher gold content of the main lode on No. 2 level

suggests that exploration should be concentrated there in the first instance.

The massive magnetite ore, which is the richest ore, necessitates the installation of a crushing plant. The lease-holders are endeavouring to purchase a stamp battery from Australia that will be suitable for efficient crushing of this hard ore. Because of the fine grain size of the gold, cyanidation of the ore after crushing will probably be required to ensure a good gold recovery.

A representative sample of the lode material has been sent by the writer to C.S.I.R.O., Melbourne for tests by this organisation in order to find out the best means of recovering the gold, especially with respect to the remote locality of the ore-body in New Guinea and the necessity of air freighting all the required equipment from the seaport of Lae to Kainantu Airstrip.

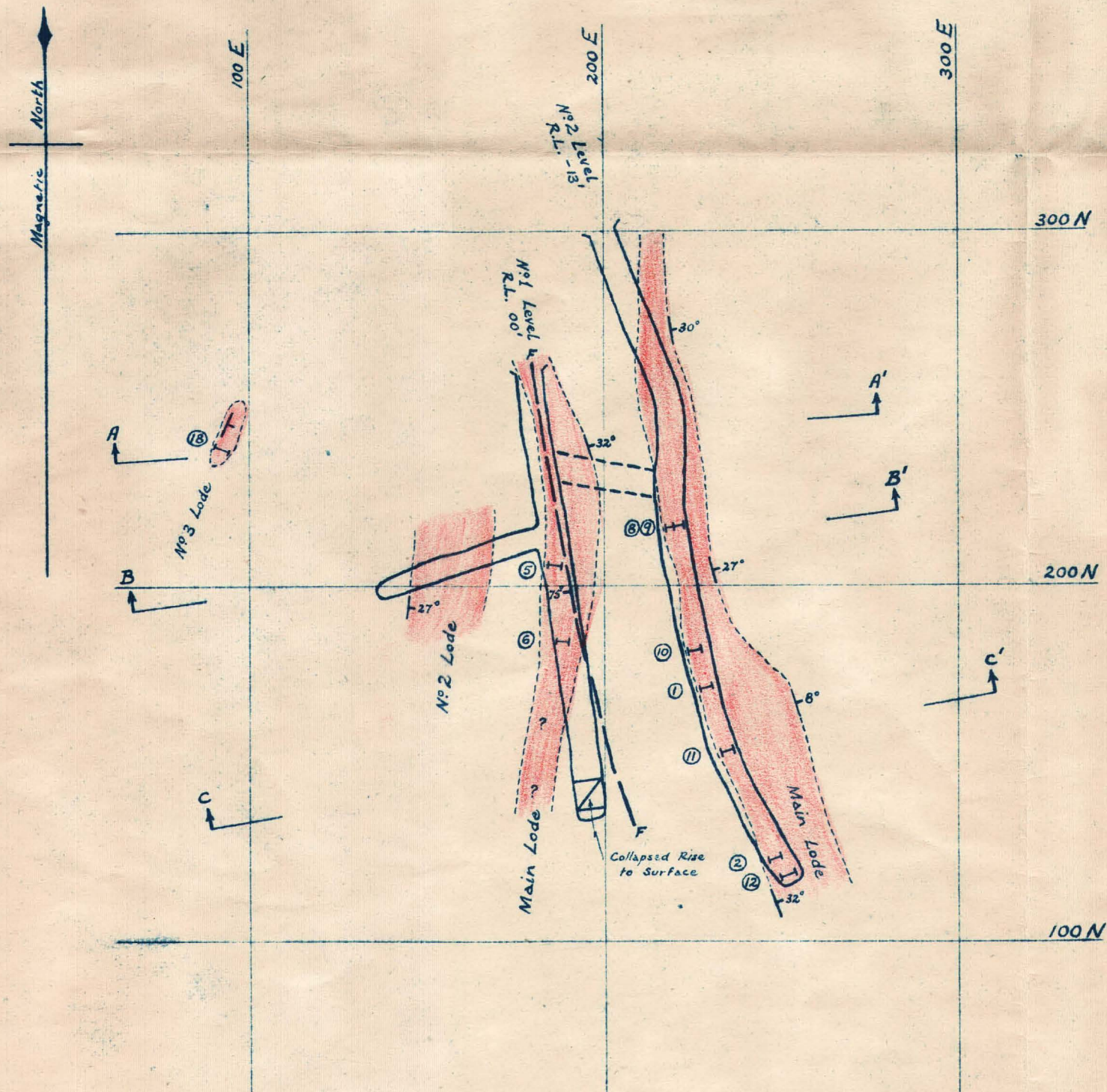
When a diamond drill becomes available to the Mines Department the ore-body developed on Gold Mining Lease 1075 will be very worthy of attention. A systematic drilling programme could reveal the presence of a large orebody in a very short period of time compared with the slow rate of underground development.

#### Supplementary Note.

Since the completion of this report the lease-holders have reported that the main lode has been followed on No. 2 level for a further 20 feet to a distance of 117 feet from the portal. At 94 feet from the portal on this level a cross-cut to the east passed through a body of igneous rock, which appears by description to be diorite, and intersected a new lode, approximately 7 feet in width, at 14 feet from the start of the cross-cut. This lode dips  $35^{\circ}$  to the east and has been followed by a winze for 12 feet below the cross-cut. The gold content of this new lode is reported to be high and a considerable portion of the gold is rather coarse in character. A further visit will be paid to the mine by the writer in the near future in order to examine the new working.

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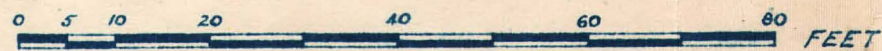


# Geological Plan of Workings & Sections, G.M.L.1075 — "Barola Reefs",

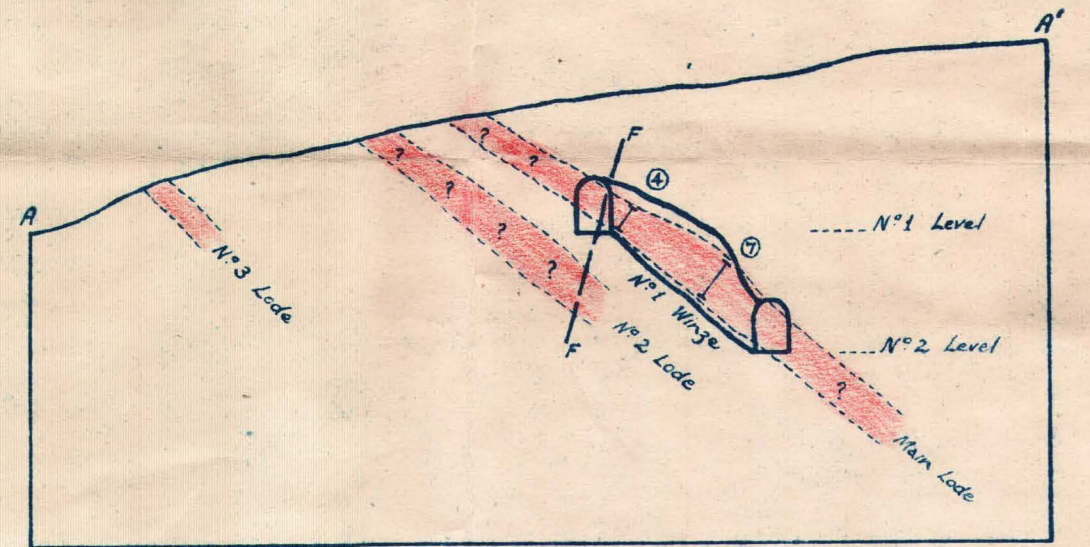
KAINANTU SUB-DISTRICT,  
EASTERN HIGHLANDS, NEW GUINEA.

## LEGEND

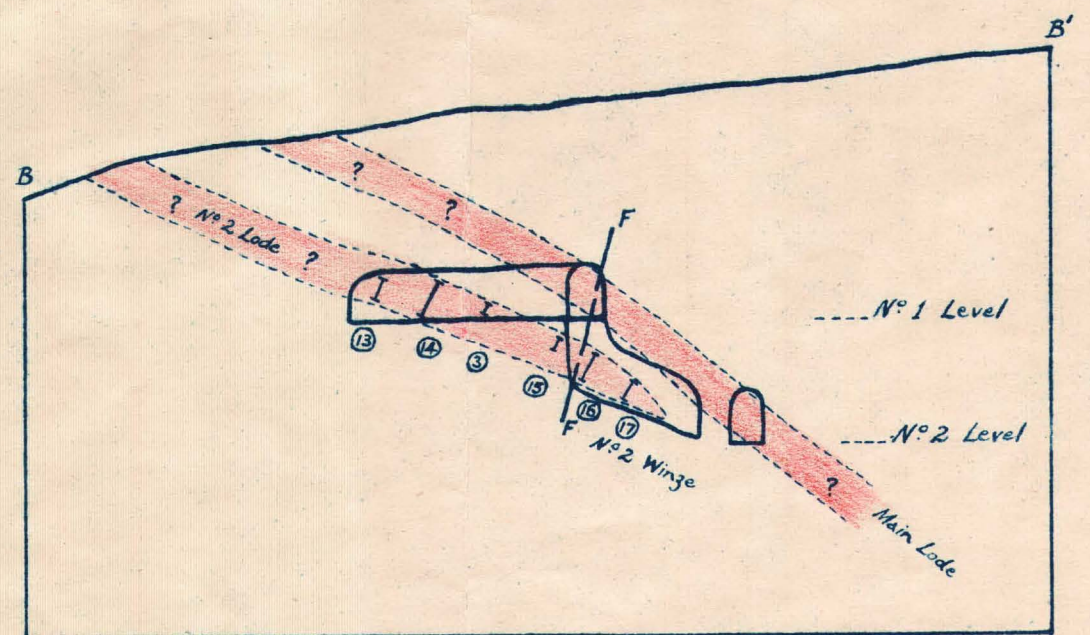
- Lode.
- Shale & Sandstone.
- Fault.
- Strike & Dip of Lode.
- Assay Sample.



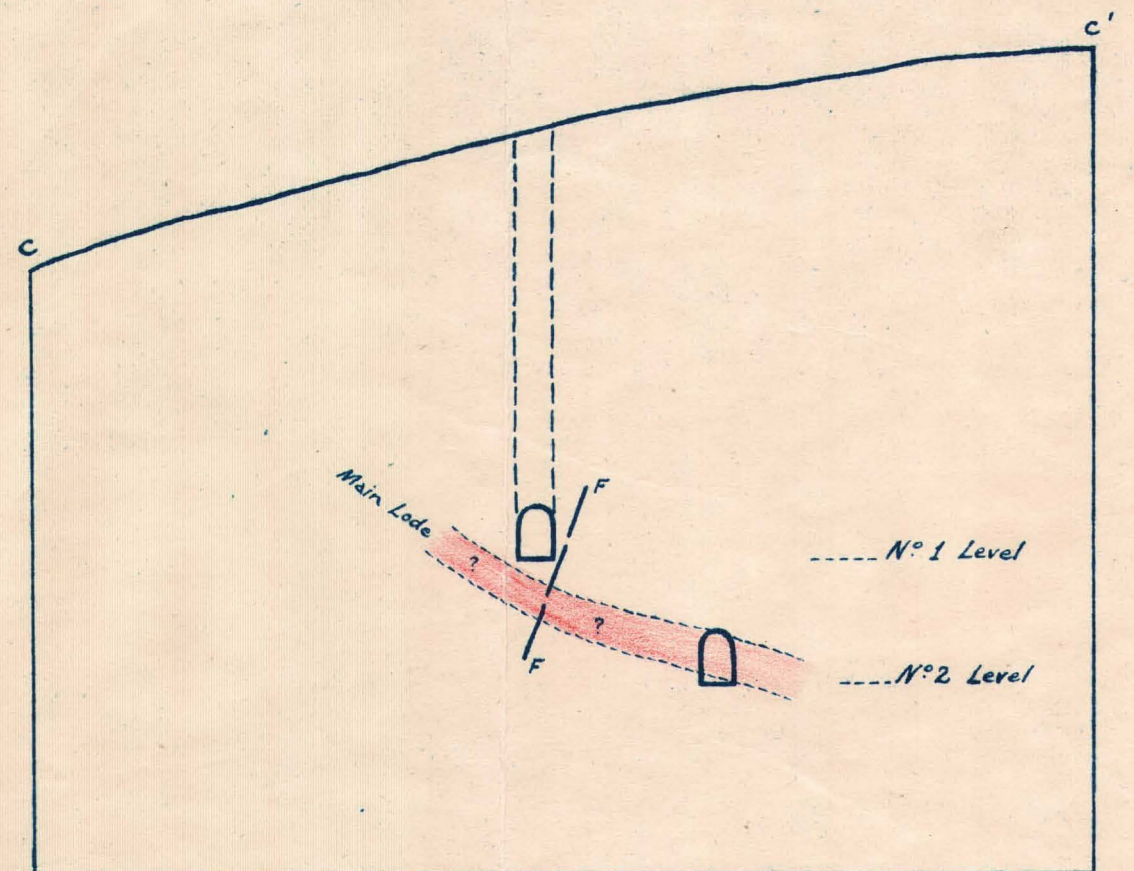
SCALE  
(Vertical & Horizontal)



Section A-A'



Section B-B'



Section C-C'