82ESE63

001210

ORO DENORO

TAPE NO. 1 REF. NO. 81 PRECON _____ INITIALS _____

Special Instructions _____

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1  rm360,sUN-11B,SOUTHEAST..BRITISH..COLUBMIA
2
3
4  lGEOLOGY..IN..VICINITY.,OF..THE..ORO..DENORO..MINE.....,(82E/2E)s10B +4,
5  rm420,By B..N. Church
6
7  lm420,INTRODUCTION:sM,,,.Detailed mapping was initiated following renewed exploration
8  and mining in the vicinity of the old Oro Denoro workings, 9.7 kilometres northeast
9  of Greenwood. Early in 1975 Granby Mining Corporation began a test operation to prove
10 an orebody estimated by previous work to contain about one million tonnes grading
11 slightly less than 1 per cent copper. When the property was visited in June 1975,
12 excavation had advanced to the third bench in the open pit, and approximately 135,000
13 tonnes of bedrock has been removed. Subsequently mining ceased pending the results of
14 a percussion drilling program. In 1976 stockpiled ore at the pit site was transported
15 to the Phoenix mill.s+4pts,
16 lThe history of Oro Denoro can be traced to the original discovery of copper in the
17 so-called 'Summit Camp' in 1891. Beginning in 1903 the property became an important
18 local mine producing 136,447 tones of ore grading 1.37 per cent copper, 0.027 ounce
19 per ton gold, and 0.225 ounce per ton silver. By 1910 accessible ore had been extracted
20 from five open stopes and 1,800 feet of underground drifts. After many years of
21 inactivity, prospecting was revived in response to increases in the price of copper.
22 Between 1951 and 1953, Attwood Copper Mines Ltd. carried out a number of geological,
23 geophysical, and geochemical surveys. Later the property was drilled by Noranda
24 Mines, Limited (1955 to 1957) and again by West Coast Resources Ltd. (1965 to 1970).
25 Testing by Granby Mining Corporation in the area continued through 1976.s10B,
26 -,
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1 ¡PHYSIOGRAPHY:sM,,,.The topography in the vicinity of the Oro Denoro mine is
2 relatively subdued, the hills in this region having been smoothed by southeasterly
3 moving Pleistocene glaciers. The mine site, at 3,500 feet elevation, occupies a low
4 point on the ridge dividing the Boundary Creek and Granby River drainage systems.
5 Slopes rise to the southwest in the direction of the Phoenix mine, attaining a
6 maximum elevation of 4,500 feet m.s.l. on Deadman Hill. Low points in the area near
7 Eholt Creek on the north, Lion Creek on the west, and Wilgress Lake on the northeast
8 are characteristically well vegetated and drift covered, bedrock being exposed mostly
9 in road cuts.s+4pts,
10 'Access is from a number of old railway grades, now converted to logging roads, and
11 Highway 3 which bounds the map-area on the north and east.s10B,
12
13 'GENERAL, GEOLOGY:sM,...The Oro Denoro region is underlain mostly by Mesozoic beds
14 east of the drainage divide and an older basement complex of resistant metamorphic
15 rocks to the west. (Fig. 1) These units are intruded by an assortment of plutonic rocks
16 ranging from granodiorite to gabbro, serpentine, and smaller dykes and sills of mostly
17 diorite and pulaskite composition.s+4pts,
18 'The relative age of formations is judged from metamorphism and the cutting relationship
19 of intrusions. Fossil evidence and a few radiometric determinations provide some
20 specific control.s10I,
21
22 'METAMORPHIC BASEMENT COMPLEX:sM,...The basement rocks, comprising an assemblage
23 of amphibolites, quartzites, marble bands, gneiss, and schist are collectively
24 referred to as the 'Knob Hill Group.' The age range of the constituent formations
25 is unknown although they ~~appear to be archaic and are~~ are certainly pre-Mesozoic.s+4pts,
26 'Amphibolites predominate in the southwest part of the map-area. These are dark-coloured
27 and generally massive, medium to fine-grained rocks of probable basic volcanic
28 derivation. In thin section there is little evidence of primary textures or mineralogy,
29 these features having been largely obliterated by cataclasis and regional
30 metamorphism. Fresh samples consist of fine-grained aggregates of pleochroic green
31 and yellow amphibole accompanied by thin discontinuous bands and lenses enriched in
32 magnetite dust or plagioclase. Retrograde effects have commonly reduced the rocks
33 to a ~~mash~~ mixture of chlorite, carbonates, and clay minerals. Chemical analysis is the
34 main ~~vestigial~~ evidence proving the basaltic nature of the rocks (sI,seesM,
analysis No. 1 in ~~the accompanying table~~ Table 1).s+4pts,

x

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jThe most prominent outcrops of metaquartzite are near the southwest corner of the map-area on the crest of the ridge leading to Deadman Hill. Characteristically the rock is competent and ranges from dark grey to light cream coloured. In thin section, samples are commonly very fine-grained and cherty except for numerous veinlets of coarser quartz.s+4pts,

jThe amphibolites and metaquartzite are accompanied by an older complex of gneiss and schist. This basal assemblage is exposed on the hillside northeast of Lion Creek. Generally the rocks are well foliated having thin alternating bands of felsic and mafic minerals. In thin section a sample displays a mixture of small grains, averaging about 0.1 millimetre in diameter, of quartz, 25 per cent and biotite, 40 per cent, interspersed with composite granules of muscovite and quartz, 35 per cent, and accessory magnetite,s+4pts,

jThe ~~fabric~~ structural fabric of the basement complex is often difficult to identify owing the massive habit of the major units, such as the amphibolites, contortion of the gneiss and schist formations, and paucity of marker beds.s10B,

jBEDDED,,ROCKS:sM,,,,Mesozoic and Tertiary strata lie ~~crest~~ unconformably on the basement complex. The Triassic Brooklyn Formation, lowermost in the cover assemblage, consists mostly of limestone and clastic sedimentary rocks and is overlain by the slightly younger, Eholt Formation, a predominantly volcanic ~~unit~~. The Tertiary beds, consisting of ~~two formations~~, the Marron volcanic rocks and Kettle River sedimentary rocks, are of minor importance, occurring only as small outliers.s10I,

jBROOKLYN,,FORMATION:sM,,,,Two members constitute the Brooklyn Formation,- at the base, a widely distributed 'sharpstone conglomerate' and, uppermost, a thick limestone deposit. +4pts,

The sharpstone member forms a narrow belt trending subparallel to the crest of the northeast ridge of Deadman Hill. It is a thickness of about 1,500 feet of well indurated and often massive pebble conglomerate. Detailed examination of the constituent fragments indicates a diverse provenance. Chert and greenstone are most

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abundant, comprising about 80 per cent of the clasts with carbonate, schists, and gneiss fragments being accessory. Modal analysis of the sandy matrix shows an average of chert and quartz grains, 40 per cent; amphibolite and porphyritic clasts, 25 per cent; schist and chlorite matrix, 15 per cent; carbonates, 15 per cent; and minor feldspar and iron oxides. Calculations based on chemical analysis of a sample of carbonate-poor sharpstone conglomerate (analysis No. 2) gives 47 per cent normative quartz. +4pts,

Table 1

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¡Contact relations of the sharpstone member are displayed on the slopes of Deadman Hill. At the lower contact the conglomerate directly overlies Knob Hill quartzites, and at one point, a thin wedge of felsic tuff breccia. The upper contact, exposed further east on the main ridge, passes transitionally into the limestone member through several hundred feet of intercalated sandstone, conglomerate, and carbonate beds.s+4pts,

'The limestone member, estimated to be about 2,000 feet thick, is exposed extensively in the eastern section of the map-area. This is a light blue-grey rock of variable structure consisting of massive, relatively pure calcium carbonate phases and thinly bedded zones enriched in clay and chert impurities. Above the sharpstone contact in the area southwest of Wilgress Lake and the Oro Denoro mine, the member is commonly massive, in places ~~having the aspect of~~ resembles a coarse breccia. To the east, the upper half of the limestone section is generally well bedded with frequent shaly partings. Cherty sand ~~'sesame seed' impurities~~ appear at several horizons in calcarenite zones. A thin section of this peculiar sedimentary rock ~~contains~~ shows mostly rounded carbonate clasts and fine-grained carbonate mud matrix, 55 per cent; subangular to well-rounded chert grains, 35 per cent; and accessory quartz, feldspar, porphyritic rock fragments, and amphibolite.s+4pts,

'The age has been determined as Middle Triassic by the discovery ofsI, DaonellasM, sp. in the limestone near the Phoenix mine (H.,W. Little, personal communication).s10I,

¡EHOLT..FORMATION:sM,...The Eholt Formation, described by Carswell (1957), is little known in the map-area. The only exposures are near the Phoenix road turnoff and rock cuts along Highway 3. The formation consists of intercalated limestone and dark green and purple lavas and breccia. A peculiar breccia facies of mixed chert, greenstone, and limestone blocks (similar to the Brooklyn sharpstone conglomerate) has been included in ~~the definition of~~ the formation. Chemical analysis of a sample of Eholt lava gives a basaltic composition (analysis No. 3).s+4pts,

¡The Eholt rocks are believed to unconformably overlie Brooklyn Formation. The age has been detemind as probable Late Triassic fom an assemblage of fossil corals, which includessI, ThecosmiliasM, sp. (H.,W. Little, personal communication), obtained from an outcrop of Eholt limestone north of the Phoenix road.s10I,

s,

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¹KETTLE..RIVER..FORMATION:sM,...The basal Tertiary assemblage represented by the Kettle River Formation is found only in a small area north of Wilgress Lake. This is a channel deposit of light-coloured sandstone and pebble conglomerate. A thin section of the sandstone shows the following modal composition: quartz, 15 per cent; chert, 5 per cent; feldspar, 40 per cent; volcanic rock, 10 per cent; mica and opaque minerals, accessory; matrix, 30 per cent. It is estimated that more than 75 per cent of the clasts were derived from a fresh felsic volcanic source rocks, the remainder having a metamorphic provenance.s10I,

¹MARRON..FORMATION:sM,,,,The Marron volcanic rocks are found in two places, a small area of exposure on Deadman Hill and north of Wilgress Lake. At the latter locality Marron rocks directly overlie the Kettle River beds.s+4pts,

¹The volcanic rocks are medium to dark grey lavas and breccia characterized by scattered tabular or rhomb-shaped anorthoclase and anhedral pyroxene phenocrysts. In thin section the matrix is commonly charged with randomly arranged feldspar microlites, rounded analcite crytals, and interstitial pyroxene, magnetite, abundant apatite, and glass. Chemical analysis of the rock ~~demonstrates~~ suggests a mafic phonolite composition (sI,seesM, analysis No. 5).s10B,

Table 1

¹IGNEOUS,,INTRUSIONS:sM,,,,The Lion Creek granodiorite, the main intrusion in the area, is accompanied by smaller satellitic bodies, the Emma porphyry and related dykes, and the Cyclops gabbro. Other intrusions include a small serpentine body and some young Coryell-related monzonite sills and pulaskite dykes, ~~complete the spectrum of igneous intrusions~~.s10I,

¹ULTRAMAFIC,,ROCKS:sM,,,,A small lens of serpentinized peridotite occurring in basement gneisses north of Lion Creek constitutes the only ultramafic body and probable oldest intrusion in the map-area. These rocks are generally brittle and mottled light grey - dark greenish grey on fresh surfaces and rust brown where weathered. In thin section, a typical sample is comprised of a cataclastic aggregation of serpentine, talc, and minor carbonates interspersed with ragged pyroxene remnants and associated ~~with~~ magnetite.s10I,

Add after Cyclops Gabbro on page 8.

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'LION, CREEK .GRANODIORITE:-M,, .The Lion Creek granodiorite is thought to be an appendage of the Wallace Creek batholith. The intrusion ~~enters the map area from the west~~ penetrating the Triassic beds and basement complex and extending eastward to the Oro Denoro workings. This is a light grey massive granoblastic rock having the following approximate modal composition: feldspar, about 65 per cent (mostly plagioclase); quartz, 25 per cent; and accessory amphibole, biotite, and magnetite. The plagioclase occurs as rectangular oscillatory zoned plates, intermixed with subhedral quartz, 1 to 4 millimetres across, with slightly smaller interstitial quartz and feldspar and magnetite grains associated with patches of pale yellow-green amphibole and scattered biotite books. Some garnet, sphene, and diopside are reported near the contaminated borders of the intrusion.s+4pts,

iThe Emma intrusion is an elongated northerly trending offshoot of the Lion Creek body. It is well exposed in a small area west of the Oro Denoro pit and on the slopes to the north in the vicinity of the Emma mine. This is a distinctive porphyritic phase consisting of about 8 per cent subhedral plagioclase ~~individual and clusters~~, and 1 per cent partly resorbed amphibole phenocrysts, ½ to 4 millimetres in length, suspended in a fine-grained quartzofeldspathic matrix. According to normative calculations the rock contains a total of 20 per cent quartz and about 70 per cent feldspar (Ansdown,30sup,), the chemical composition of the Emma phase being very similar to the Lion Creek intrusion (sI,seesM, analyses Nos. 6 and 7).s+4pts,

x Table 1

TAPE NO. _____ REF. NO. 16 PRECON _____ INITIALS _____

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iThe age of the Lion Creek intrusion has been determined as Cretaceous, 140±math,bsM,5 Ma, based on K/Ar analysis of biotite obtained from a sample of granodiorite taken near the Emma mine.sI,

iCYCLOPS,.GABBRO:±M,,,.The Cyclops gabbro occurs in the area south and southeast of the Cyclops prospect as a large partly concordant body and a number of small dyke-like offshoots in the vicinity of the Oro Denoro and Emma workings. The rock is commonly dark greenish grey and rather uniform, fine grained, consisting of subhedral plagioclase plates, about 55 per cent, interspersed with equant pyroxene grains, 20 per cent (measuring to 1.5 millimetres in diameter) set in a matrix of chlorite and disseminated magnetite. Conversion of some of the pyroxene to blue-green amphibole locally is viewed as a retrograde metamorphic effect.s+4pts,

iThe age of the gabbro certainly post-dates the Middle Triassic Brooklyn Formation which it intrudes, however, its relation to other igneous rocks in the area is uncertain.s10I,

iCORYELL,,INTRUSIONS:sM,,,.The Coryell intrusions are exposed mostly in the northern part of the map-area. These include an assemblage of syenite, monzonite, and shonkinitic bodies, and their finer grained equivalents,- a variety of pulaskite and lamprophyre dykes. The most common rock in this suite is a mottled pink and grey feldspar porphyry consisting of glomerophenocrystic plagioclase-sanidine clots, up to ~~measuring to~~ 6 millimetres in diameter, and smaller solitary feldspar crystals suspended in a finer grained matrix of interlocking feldspars and biotite, and a small amount of interstitial quartz, disseminated magnetite, and apatite. Clinopyroxene is also present as an additional mineral in the more basic phases.s+4pts,

jA sample of pyroxene monzodiorite obtained northwest of the Emma mine shows the following normative mineralogy: quartz, 6.5 per cent; potassium feldspar, 27.2 per cent; plagioclase (An±down,33~up), 41.1 per cent; clinopyroxene, 22.8 per cent; magnetite, 2.4 per cent. The chemical analysis of this rock is similar to the composition of a post-mineralization pulaskite dyke exposed in the No. 1 quarry at the Oro Denoro mine (±I,see~M, analyses Nos. 8 and 9).±+4pts,

Table 1

TAPE NO. _____ REF. NO. _____ PRECON _____ INITIALS _____

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'The age of Coryell batholith, recently established by ~~James A.~~ (1973) Fyles in the Rossland area, is Middle Eocene.¤10B,

'STRUCTURE:~M,,..The general pattern of folding, faulting, and intrusion seems to have a north-south and east-west control. In detail, the structures are intricate and often difficult to unravel because of the scarcity of markers/horizons and imperfect exosure.¤+4pts,

TAPE NO. 1 REF. NO. 07 PRECON _____ INITIALS _____

Special Instructions _____

'The trend of the Brooklyn and Eholt Formations is mostly northerly, bedding strikes averaging 005 degrees. The Mesozoic section is tilted easterly about 50 degrees forming a monocline. Local reversals and deflections of beds give evidence of the presence of northeasterly plunging minor folds (Fig. 2).s+4pts,

iThe structure of the basement complex is more difficult to determine because of the massive character of the rocks, particularly the amphibolite formation which covers a wide area. An exception is a band of marble, traced for about 2 kilometres striking from the west boundary of the map-area to the north slope of Deadman Hill, and following near the base of the amphibolite formation. Metaquartzite with an average bedding attitude ofschange to degree ball, 060!/50!schange 10M, northwest overlies the amphibolite near the crest of Deadman Hill.s+4pts,

iThe main fractures trend easterly coincident with major draws and valleys, and northerly subparallel to the principal strike direction of the Mesozoic beds (Fig. 1). Specific measurements of numerous minor fractures illustrates this bimodal distribution showing a development of strong joint sets at approximatelysdegree ball, 110!/85! southwest and 005!/82!schange ball, east (Fig. 3). That the fracture system pre-dates the major igneous intrusions and was probably advantageous to the emplacement of these rocks is suggested by the east-west elongation of the Lion Creek pluton and the north-south orientation of the Emma and Cyclops bodies.s10B,

jMINERALIZATION:sM,,,,The Oro Denoro mine is centrally located either a 2.4-kilometre-long ~~meridianal~~ alignment of skarn deposits which includes the Emma and Jumbo on the north and the Cyclops and Lancashire Lass on the south. The host rock for all of these, and many other deposits in the Greenwood area, is the Brooklyn limestone member (Fig. 1).s+4pts,

jThe geology of the Oro Denoro is relatively straightforward. Mineralization consists of pockets of pyrite, chalcopyrite, and magnetite in a garnetite skarn. This is mostly a replacement of limestone intruded by an apophysis of the Lion Creek granodiorite stock (Fig. 4).s+4pts,

'The mine workings cover an area of about 10 acres in the central part of the Oro

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Denoro Crown-granted claim. In the early period of mining between 1903 and 1910 ore was drawn from five quarries and a number of open stopes which were serviced by ~~from~~ two underground levels. This mine and the Phoenix operation several miles to the southwest were among the earliest attempts at open-pit mining in the Province. +4pts,

TAPE NO. _____ REF. NO. 23 PRECON _____ INITIALS _____

Special Instructions _____

'In the old workings of Oro Denoro the southernmost quarries, Nos. 1 and 2, were the principal source of copper ore. These are interconnected and have a general east-west elongation. The trend of the excavations appears to follow the course of a number of large steeply dipping calcite lenses in the skarn and along the granodiorite contact which is near the north wall. Quarry No. 3, centred about 200 feet north of Nos. 1 and 2, is the second largest pit. Here the mineralization was concentrated in a tongue of skarn rock projecting deep into the granodiorite mass. Quarries Nos. 4 and 5, centred about 150 feet northwest of No. 3, are relatively small. The magnetite-rich ore was situated between a small remnant of limestone in the skarn rocks and the granodiorite ~~contact~~. Control of the mineralization appears to be east-west crossfractures cutting approximately perpendicular to bedding in the limestone.s+4pts,

¡The new excavation which is located immediately west and south of the old quarries is a large benched open pit about 500 feet long and 150 feet wide ~~curved mostly from~~ on mainly based on garnetite skarn, ~~forming~~ the core and summit of Oro Denoro's 'mine hill.' The target of this development was a mineralized zone near the south end of the pit.s+4pts

¡The mine area is traversed by a numer of faults of ore control significance. The most important is a pronounced shear zone striking about 120 degrees from the north end of the main pit through No. 1 quarry. Profound movement on this zone has resulted in the emplacement of exotic formations in the skarn such as a wedge of carbonaceous schist in the main pit and epidotized volcanic breccia along the south wall of No. 1 quarry. Of less importance are two minor faults 045/75 southeast and 015/80 east causing local displacements in the skarn-granodiorite contact in No. 3 quarry and a weaker fracture 150/45 southwest observed in No. 5 quarry.s+4pts,

¡Mineralization and the development of a skarn at Oro Denoro is evidently the result of intrusion of the Lion Creek granodiorite stock. An exchange of chemical components between the granodiorite and Brooklyn limestone is apparent. A determination of the mineralogy of the skarn is provided by Carswell (1957): garnet (grossularitesmath down,10sM up, andraditesmath down,90sM up), 35 per cent; and 5 per cent for each of clinozoisite, diopside, and quartz (in weight per cent). In terms of estimated chemical composition this mineralogy reduces to:

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SiO=math down,2~M up,. 39.6 per cent; Al~math down,2 M up,O~math down,3~M up,, 3.9 per cent; Fe~math down,2~M up,O~math down,3~M up,, 24.7 per cent; MgO, 0.9 per cent; CaO, 30.9 per cent on an anhydrous base,- a calculation which compares closely with the actual chemistry of a sample of skarn rock (analysis No. 4). The gain of large amounts of iron oxide and silica by the limestone is matched by an equally large loss of lime to the granodiorite. Source of the iron oxide and silica appears to result from calcification of iron-bearing silicates and plagioclase feldspar in the granodiorite.=+4,

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1 im420,sUN-10M,Mineral paragenesis begins with the skarn silicates which are
2 partly overlapped by magnetite and succeeded by sulphides. Magnetite commonly occurs
3 interbanded with the skarn silicates, the banding generally having the same trend
4 as bedding in the nearby limestone (Plate II). In contrast, the sulphides are
5 present as disseminated grains, individual large crystals or masses associated with
6 calcite in seams and pods (Plate III). Also, mixtures of sulphides, mostly pyrite
7 and chalcopyrite, with garnet and calcite may display a crude planar fabric or banding
8 of coarse and fine grains betraying a suggestion of relict bedding (Plate IV). The
9 final generation of sulphides is reposed in interstices and cracks crossing the
10 skarn silicates, magnetite, and older sulphides (Plate V).s+4pts,
11 iFormation of the skarn and emplacement of the sulphide and magnetite ores ~~refers~~ involved
12 ~~to~~ high temperature interaction between the limestone and granodiorite,- high
13 temperatures being implied by the extensive development of garnetite. Marked
14 irregularity and variation in the width of the skarn zone from a few metres to many
15 tens of metres ~~derives the conclusion~~ suggests that the reactions occurred only at places
16 where ascending solutions were active. These solutions, enriched in carbon dioxide,
17 silica, and iron, rose along the fissure system. At first the interaction of
18 invading solutions on the host rocks was intensified along fissures ~~converting~~
19 ~~walls~~ forming metasomatic veins, ~~and thence~~ infiltrating with water out of the limestone mass, ~~soaking~~
20 ~~rock pores and ultimately achieving wholesale replacement.~~«10B,
21
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23
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s,

ORO DENORO C.G. CLAIM

EMMA C.G. CLAIM

ABANDONED RAILROAD GRADE

SCALE
0 100 200 300 FEET

40 S

3600'

3550'

3400'

N°4 QUARRY

N° 5 QUARRY

N°3 QUARRY

PIT

LEVEL No.2

LEVEL No.3

QUARRY

LEVEL No.1

N°2 QUARRY

45 S

3600'

60 W BASE LINE

50 S

49°07.5'

PIT

PIT

CYCLOPS C.G. CLAIM

ABANDONED RAILROAD GRADE

3500'

3550'

3450'

118°33'

LEGEND

BEDDED ROCKS

BROOKLN FORMATION

Metavolcanics / Skarn

Limestone, marble / Skarn

Carbonaceous Schist.

INTRUSIVE ROCKS

Pulaskite dikes

Basic intrusions

EMMA ~~Granodiorite~~ porphyry

LION CREEK Granodiorite

SYMBOLS

Bedding

Fracture attitude

Outcrop

Fault

Broken rock, talus

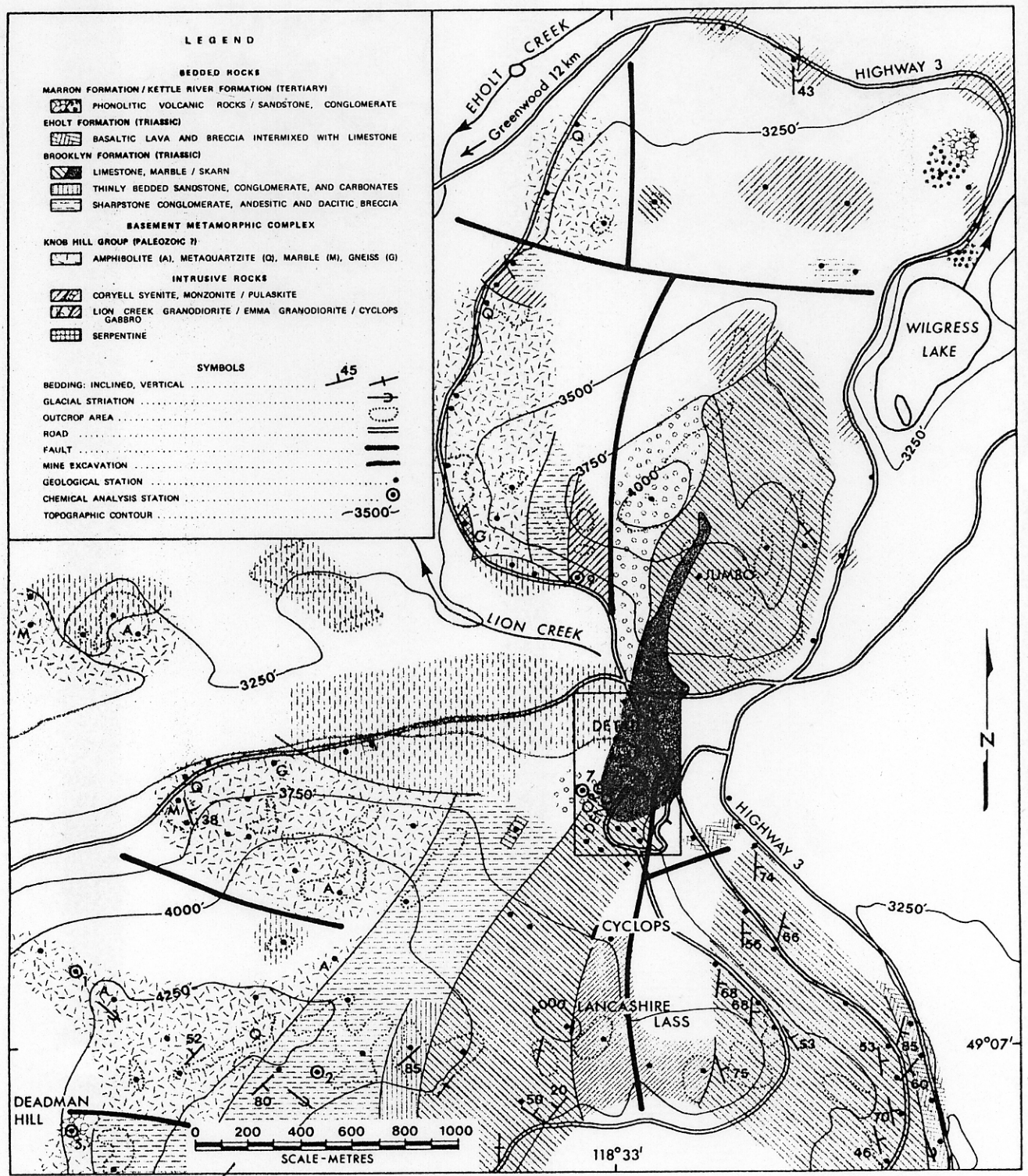
Topographic contour

Stream

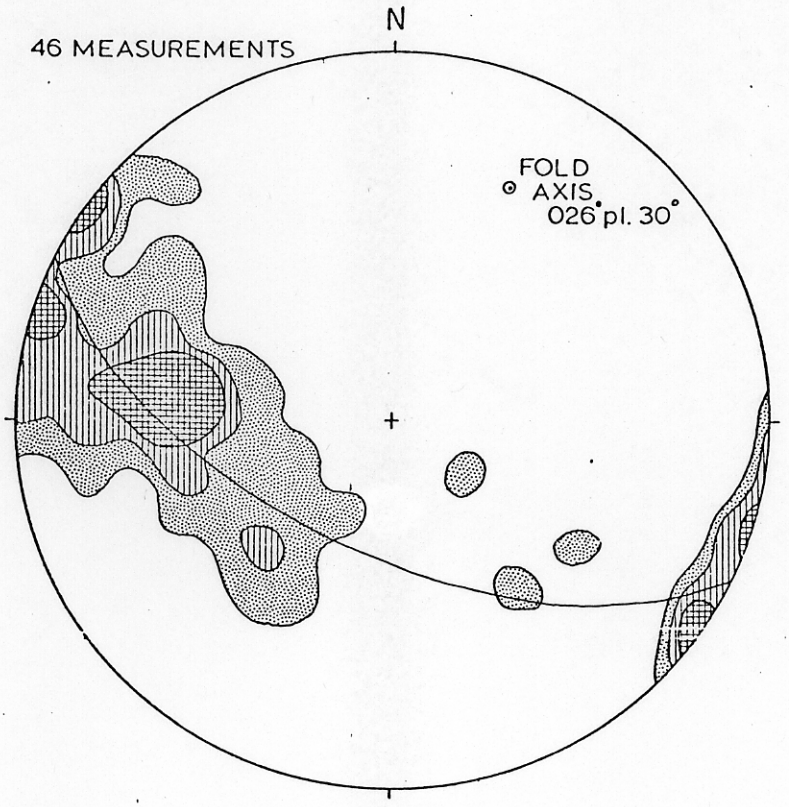
Road

Underground workings

FIG. CHURCH - 4 DETAILED GEOLOGY IN VICINITY OF THE ORO DENO



* Replace scale with Feet - Metre scale
(topography is in feet)



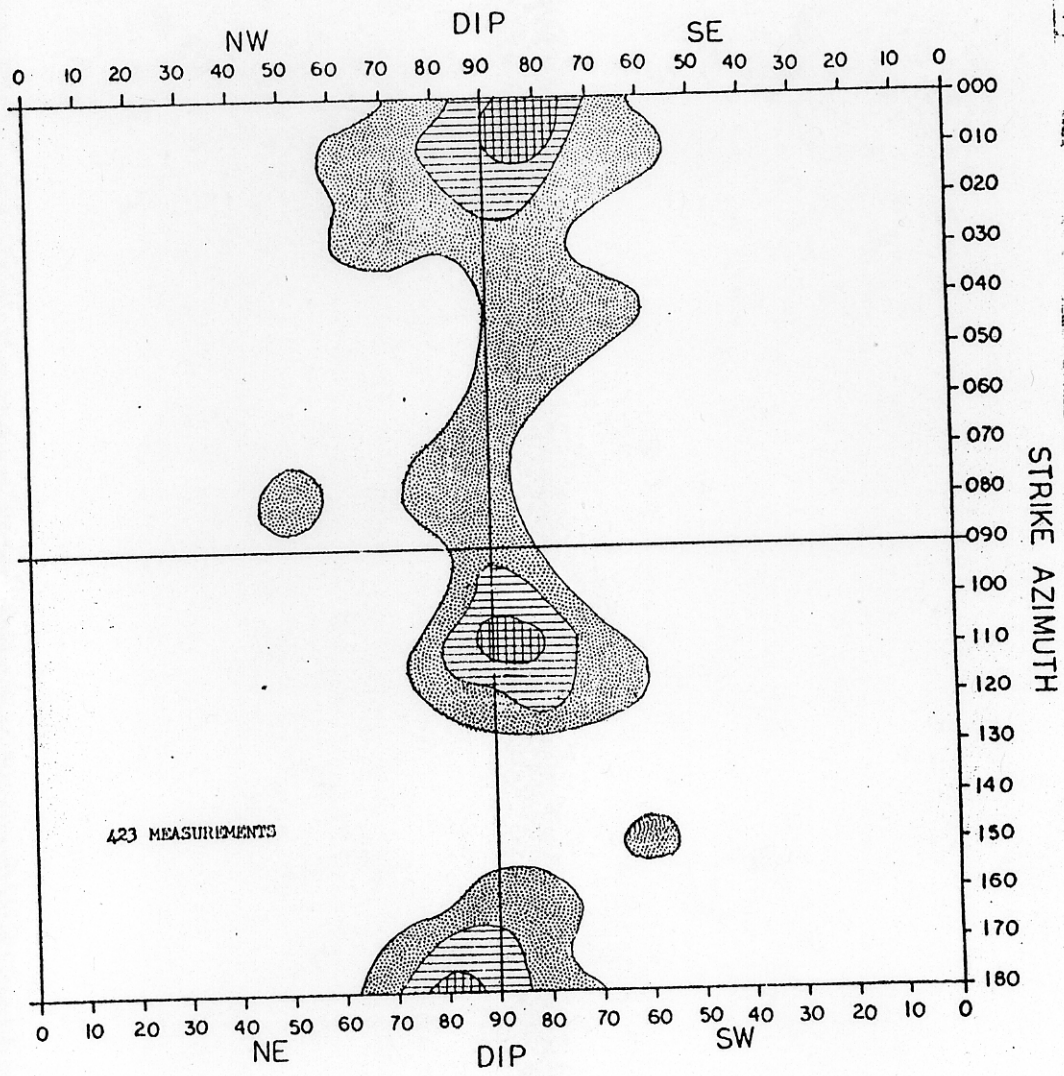
FREQUENCY OF POLES TO BEDS

VERY FREQUENT

LESS FREQUENT

INFREQUENT

FIG. CHURCH - 2 EQUAL AREA PLOT OF BEDDING FOR MESOZOIC ROCKS, ORO DENORO AREA



FRACTURE FREQUENCY

VERY FREQUENT

LESS FREQUENT

INFREQUENT

PLATES

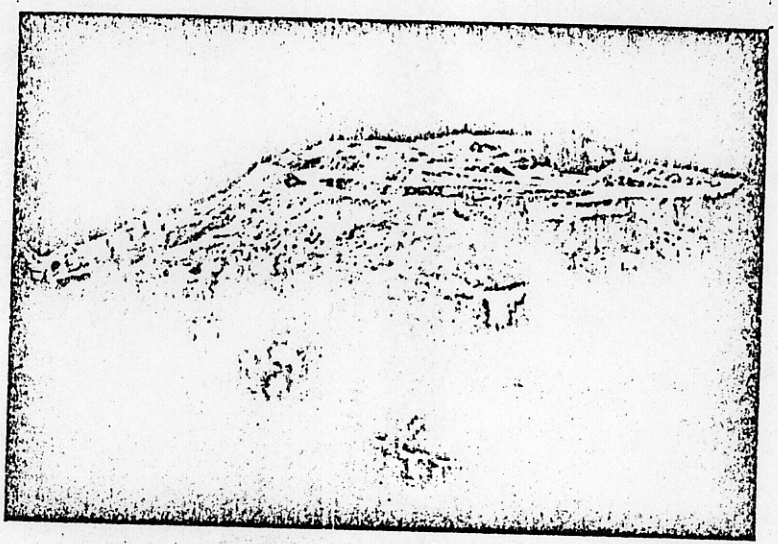
CHURCH 1 Oro Denoro - view of open pit area looking south

CHURCH 2 Oro Denoro - banded garnet magnetite, epidote skarn

CHURCH 3 Oro Denoro - garnetite with calcite and pyrite fillings

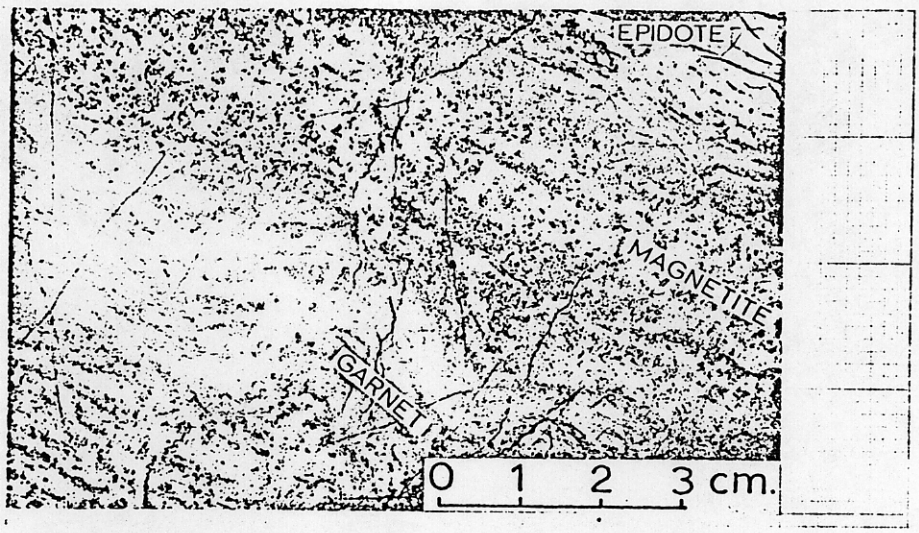
CHURCH 4 Oro Denoro - garnetite with relict carbonate - rich bands and disseminated pyrite and chalcopyrite

CHURCH 5 Oro Denoro - magnetite-rich garnetite with pyrite and chalcopyrite on cracks

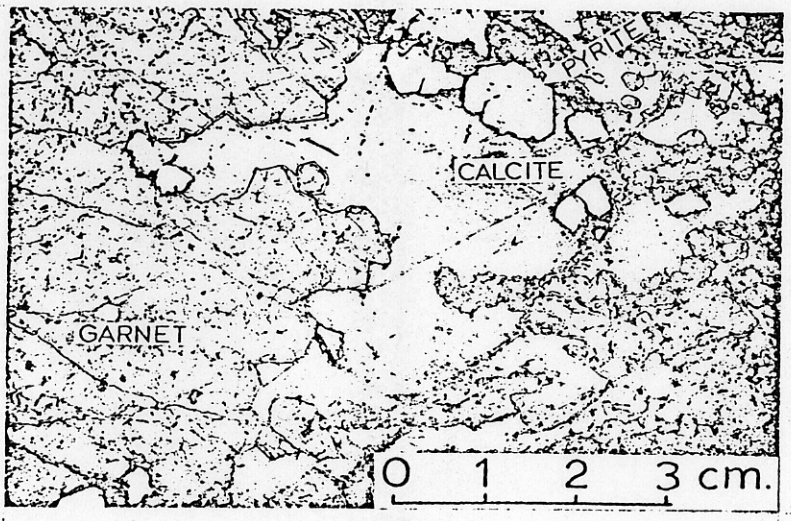


CHURCH 1 Oro Denoro - view of open pit area looking south

No. 1110

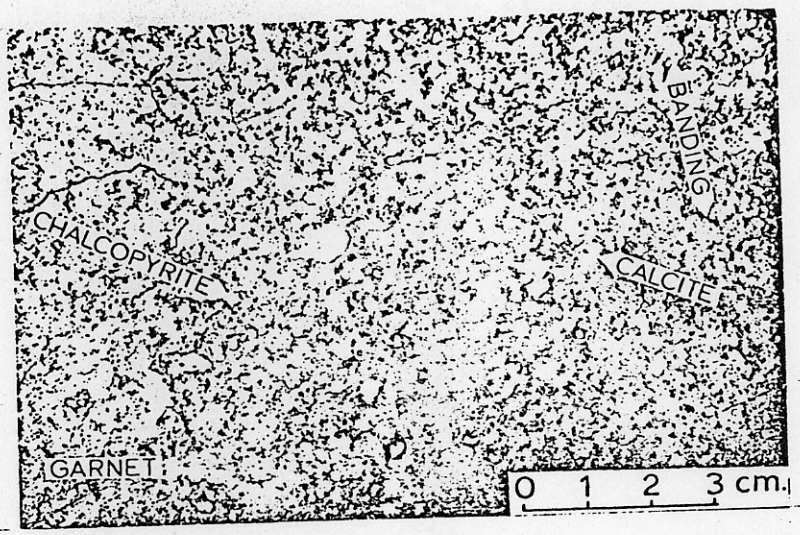


CHURCH 2 Oro Denoro - banded garnet magnetite, epidote skarn

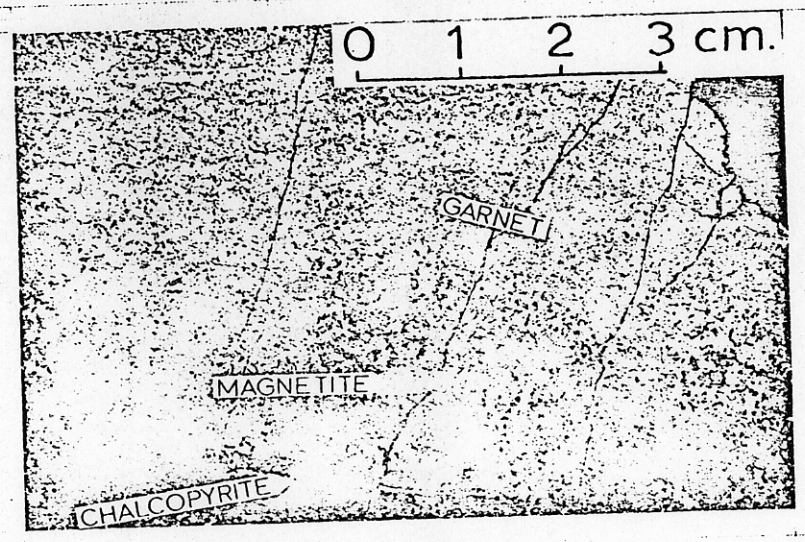


CHURCH 3 Oro Denoro - garnetite with calcite and pyrite fillings

Rite in the Rain
WEATHERPROOF
No. 1110



CHURCH 4 Oro Denoro - garnetite with relic carbonate - rich bands and disseminated pyrite and chalcopyrite



CHURCH 5 Oro Denoro - magnetite-rich garnetite with pyrite and chalcopyrite on cracks

No. 1110

Table 1

Key to Analyses

1 - Amphibolite, Knob Hill Group, Deadman Hill area.

2 - Sharpstone conglomerate, Brooklyn Formation, Deadman Hill area.

3 - Basalt lava, Ekolt Formation, near the junction of the Phoenix road and Highway 3 just beyond the southeast corner of the map-area.

4 - Skarn from No. 1 Quarry of the Oro Denoro mine.

5 - Mafic phonolite, Marron Formation, Deadman Hill area.

6 - Lion Creek granodiorite, just south of the Emma mine.

7 - Emma porphyry, west of the Oro Denoro pit.

8 - Pulaskite dyke, No. 1 Quarry of the Oro Denoro mine.

9 - Coryell monzodiorite, northwest of the Emma mine.

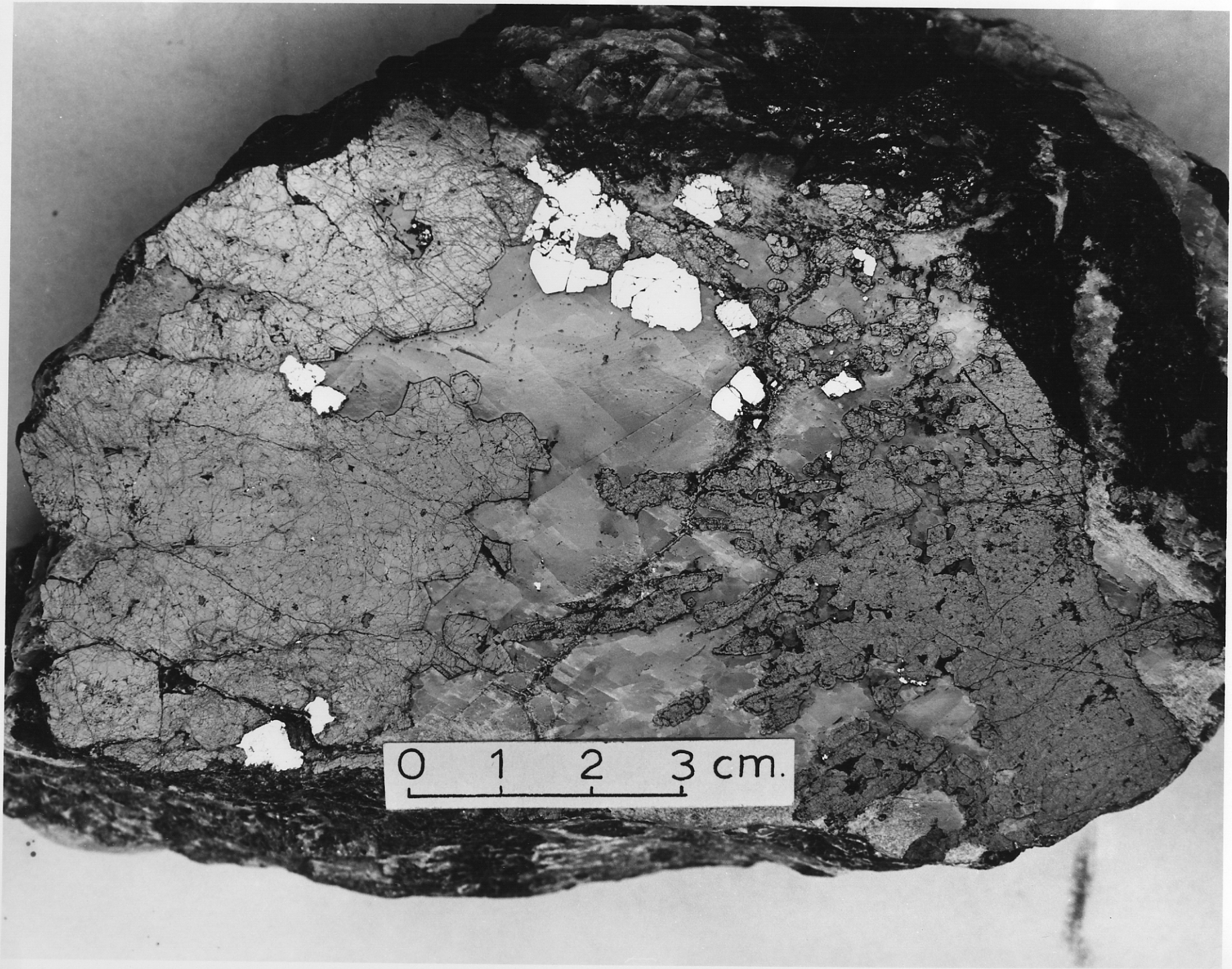
CHURCH - ORO DENIRO

Table 1

TABLE OF CHEMICAL ANALYSES

	1	2	3	4	5	6	7	8	9
Oxides Recalculated to 100 –									
SiO_2	49.66	75.60	52.28	36.71	56.21	66.44	65.71	60.07	57.95
TiO_2	1.05	0.52	0.96	0.11	0.97	0.42	0.47	0.90	1.13
Al_2O_3	17.21	9.98	17.83	5.69	17.41	16.22	16.12	15.84	19.84
Fe_2O_3	3.11	1.33	9.31	23.09	4.85	2.00	1.02	2.58	2.31
FeO	5.83	3.30	1.36	1.16	1.94	2.25	3.89	3.66	4.22
MnO	0.22	0.12	0.15	0.39	0.08	0.06	0.14	0.12	0.11
MgO	7.07	2.94	8.17	0.64	2.24	2.00	2.52	5.12	4.53
CaO	8.51	3.86	4.85	32.20	4.37	4.46	4.49	4.12	5.33
Na_2O	2.17	1.42	4.80	0.01	5.61	3.46	4.19	4.73	3.03
K_2O	2.17	0.93	0.29	—	4.32	2.69	1.44	2.67	4.55
	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Oxides as Determined –									
$+H_2O$	2.11	1.14	3.49	0.28	2.77	0.87	1.21	1.98	1.27
$-H_2O$	0.24	0.27	0.35	0.11	1.25	0.24	0.19	0.78	0.77
CO_2	0.60	0.15	0.89	1.67	1.35	0.45	1.19	0.91	1.21
P_2O_5	0.18	0.32	0.39	0.48	0.71	0.18	0.30	0.28	0.41
S	0.01	0.02	0.01	0.11	0.01	0.02	0.06	0.02	0.02
SrO	0.03	0.02	0.09	0.006	0.30	0.08	0.09	0.13	0.12
BaO	0.08	0.06	0.02	0.001	0.21	0.12	0.11	0.11	0.09


0 1 2 3 cm.


0 1 2 3 cm.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