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Arnold and Katrine Townships

By
W. A. HOGG

Geological Report No. 29

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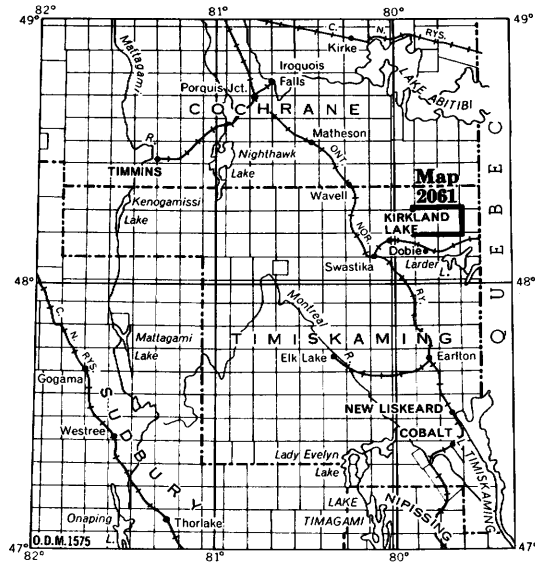
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**GEOLOGICAL MAP
(back pocket)**

Map No. 2061 (coloured)—Arnold and Katrine townships,
District of Timiskaming. Scale, 1 inch to $\frac{1}{2}$ mile.



Abstract



Key-map showing the location of the Arnold-Katrine area.
Scale, 1 inch to 50 miles.

This report describes the general, structural, and economic geology of Arnold and Katrine townships in the Kirkland Lake area.

The rocks of this map-area are all igneous and consist largely of intermediate volcanics and intrusive rocks. The volcanic rocks are mapped as basalt, andesite, dacite, and rhyolite. The intrusive rocks are diorite, gabbro, syenite, porphyry, and diabase.

Prospecting and exploration in the townships of Arnold and Katrine have been for the purpose of finding gold and copper. Several properties have been investigated by trenching, diamond-drilling, and exploration shafts.

Arnold and Katrine Townships

By

W. A. Hogg¹

Introduction

Arnold and Katrine townships, District of Timiskaming, are located 15 miles northeast of Kirkland Lake and 11 miles west of the Ontario-Quebec interprovincial border. The centre of the two townships is at Lat. 48°13'N. and Long. 79°46'W. Each of the two townships is 6 miles square.

The road to the Esker Lakes Provincial Park runs close by, and parallel to, the west border of Arnold township. It has a branch road going eastward to Howard Lake. The park road extends north from a point on highway No. 66 about 8 miles east of Kirkland Lake. Howard Lake belongs to the water system running continuously through Misema and Beaverhouse lakes to the east and south.

This watercourse provides access to the entire central area of Arnold township and to the southwest part of Katrine township. Beaverhouse Lake can be reached from the south by highway No. 66 through the town of Dobie and then by a bush road leading to the old Argonaut mine.

The northeastern and eastern parts of Katrine can be reached by aircraft through Mist Lake and Mulven Lake along the east border of Katrine township.

A good-grade private road, built to supply timber for Kerr-Addison Gold Mines Limited, extends northwest from Virginiatown and Cheminis. This road crosses the south boundary adjacent to the southeast corner of Katrine and passes over Kinabik Creek where it ends at a point about a mile west of the Ossian-Katrine boundary.

Many old logging-haulage roads still exist in Arnold and Katrine townships. These provide access to many parts of the map-area. The ones found in Arnold are underlain by sand plains and are normally passable by motor vehicle; those in Katrine and the eastern part of Arnold provide access only by tractor or by foot.

A short portage of 100 feet is required to pass from Howard Lake to Kennedy Lake and Car Lake in the northeast part of Arnold township.

¹Geologist, Noranda Exploration Co. Ltd.

Arnold and Katrine Townships

The townships of Arnold and Katrine are inhabited only by a group of Ojibway Indians, who live along the shores of Misema Lake, and occasionally by fishermen and prospectors who have cabins on the shore of the lake. Game observed during the summer included waterfowl, partridge, moose, and black bear.

Arnold and Katrine townships lie in an area of volcanic rocks that, to the east, has produced gold, copper, silver, and zinc. The presence of scattered gold and copper occurrences in Arnold and Katrine townships has drawn the attention of prospectors and exploration companies over the last 30 to 40 years.

Acknowledgments

Assistance in the field was given by J. C. McBean, W. G. McLennan, P. Friedman, D. Beggs, and R. W. Slater. Mr. McBean, as senior assistant, was responsible for much of the geological mapping in the western two-thirds of Katrine township.

The author extends thanks to Dave Lowe, a prospector from Larder Lake, for the use of his cabin on Misema Lake and for many courtesies during the field season. Alex Mathias assisted the party during the field season and was particularly helpful in finding old prospects and access trails. Residents of the Kirkland Lake-Larder Lake area were most co-operative and contributed by providing information useful for the completion of this survey.

Sources of Information for Geological Map

For much information in producing geological map No. 2061, the author wishes to acknowledge his indebtedness to several persons and companies:

Geological Survey of Canada: Geological mapping by J. B. Currie, 1947-49, eastern part of Katrine township.

S. A. Pain: Sketch showing location of diamond-drillholes on the property of Misema Lake Mining Corporation Limited.

J. C. Houston: Geological plan showing location of trenches and veins on the property of Norwood Kirkland Gold Mines Limited.

Erie Canadian Mines Limited: Sketch showing assays and vein location, and sketch showing location of diamond-drillholes, on the Callighan property.

Sylvanite Gold Mines Limited: Plans showing diamond-drillholes, assays, and vertical sections of the Callighan property.

H. L. Garvie: Sketch map showing the location of diamond-drillholes for Fockler-Little-Lowe-Garvie claims.

Mid-North Engineering Company: Sketch showing location of diamond-drillholes on property of Wadge Mines Limited.

Field Methods

Geological mapping was conducted by the author for the Ontario Department of Mines during the summer of 1962. The cronaflex prints of the manuscript maps were supplied by the Cartographic Unit of the Geological Branch and were compiled from vertical air photographs flown in 1961.¹ Additional topographic

¹Air photographs are obtainable from the Silviculture Section, Timber Branch, Ontario Department of Lands and Forests, Toronto.

detail has been included from information collected during the field mapping program. The field mapping was effected at a scale of 1 inch to $\frac{1}{4}$ mile.

In 1962 the boundary between Arnold and Katrine townships was reopened and blazed again by D. M. Armstrong, O.L.S., Mining Lands Branch, Ontario Department of Mines. Mileposts were chained off and planted for geological control only. East-west lines were turned off at each milepost and outcrops were tied into these positions where possible.

Vertical air photographs at a scale of 1 inch to $\frac{1}{4}$ mile were used in the field and the shapes and positions of outcrops were marked on them. The outcrops, as shown on the map accompanying this report, are in as great detail as the scale of publication permits. For additional detail the reader is referred to the preliminary geological maps, P.178 and P.179, published in 1963 by the Ontario Department of Mines on the scale of 1 inch to $\frac{1}{4}$ mile.

A 2-mile strip along the east border of Katrine was mapped geologically in 1947-49 by J. B. Currie for the Geological Survey of Canada while in the process of mapping Ossian township. Copies of Dr. Currie's manuscript, prints, and photographs were made available to the present author by the Survey. Much of this information, along with a certain amount of checking and revision, has been used here for the eastern part of Katrine.

The southeast cornerpost of Katrine township was easily found; with care the east boundary can be traced. The north and south borders of Arnold and Katrine have not been recut and in many places could not be found. The west border of Arnold was found with difficulty.

Previous Geological Work

The first geological map showing Arnold and Katrine townships is map No. 29e made by C. W. Knight in 1920 and published by the Ontario Department of Mines; the map was considered as reconnaissance in nature and was at that time published at a scale of 1 inch to 1 mile. In 1927 it was reprinted by the Department of Mines, again as map No. 29e, but at a scale of 1 inch to $1\frac{1}{2}$ miles. On both editions of the map are marginal notes on general geology, economic geology, and canoe routes.

Map No. 37g by T. L. Gledhill is a revision of No. 29e, but covers a slightly larger area, particularly to the north in Harker, Holloway, and Marriott townships. This map has marginal notes on access, general geology, rock types, mineralization, and suggestions to prospectors; it accompanies a report in O.D.M. Vol. XXXVII, 1928, part 3. Map No. 37g is also of a reconnaissance nature but the accompanying report by T. L. Gledhill describes the deposits discovered after 1920.

Geological and Geophysical Reports and Maps

The Geological Survey of Canada, Department of Mines and Technical Surveys, Geophysics Division, published in 1951 aeromagnetic maps at a scale of 1 inch to 1 mile that include Arnold and Katrine townships; they are No. 46G—Magusi River, and No. 47G—Larder Lake.

Arnold and Katrine Townships

Information submitted as assessment work to the Ontario Department of Mines includes some diamond-drill logs, assays, and other geological data. The information is listed as follows: according to township, to kind of information, and to the holder of the property or claims.

INFORMATION SUBMITTED AS ASSESSMENT WORK TO THE ONTARIO DEPARTMENT OF MINES

Township	Kind of Information	Property or Claim Holder
Arnold	Geological reports, assays, diamond-drill logs, maps.	Lowe group
Arnold and Katrine	Diamond-drill logs.	Fockler-Little-Lowe-Garvie claims
Arnold	Diamond-drill logs.	Linton claims
Katrine	Diamond-drill logs, assays, report and maps.	Misema Lake Mining Corporation Ltd.
Katrine	Geological report, diamond-drill assays, maps.	Callighan property
Katrine	Geological reports, diamond-drill logs, assays, maps.	Wadge Mines Ltd., former Baghdad Gold Mines Ltd., former Walsh-Katrine Gold Mines Ltd.
Katrine and Arnold	Report, maps.	Norwood Kirkland Gold Mines Ltd.

Topography and Drainage

The western part of Arnold township is underlain by glacial deposits of fine eolian sand covering many rock outcrops and consequently hampering prospecting and exploration. Exceptionally few of the outcrops are exposed in this area. The sand-dune deposits are well drained; swampy ground lies between dune ridges and the sand plains. Much of the terrain is covered by a thick growth of jackpine.

The topography in Katrine and the eastern part of Arnold township is controlled by the underlying rock structure and by the rock ridges and outcrops of the east-trending volcanic belt lying north of the Kirkland Lake area.

Basic dikes, though small in extent and dimensions, occupy the depressions; steeper cliff faces are frequently encountered in the sharply folded volcanic rock along Misema Lake.

A large part of Arnold and Katrine townships has elevations of 1,000–1,100 feet above sea-level.¹ The relief is rarely greater than 100 feet except where prominent ridges rise 200–500 feet above the general level of the region. The Workman Hills in the north-central part of Katrine township reach elevations of about 1,450 feet above sea-level.

¹Elevations are from sheets No. 32D/4 and 32D/5, National Topographic Series.

A gabbro ridge rises with a nearly vertical face on the east side of Gem Lake and has talus slopes where it crosses the Katrine-McVittie boundary.

The area is mostly covered by a growth of mixed bush consisting, in the sandy areas, of poplar, birch, spruce, and jackpine. The drainage, such as that through Kennedy, Howard, and Misema lakes, is directed along faulted zones.

General Geology

Arnold and Katrine townships are underlain by Precambrian volcanic rocks. These belong to a large belt of volcanic rocks occupying the northern part of the Kirkland Lake area extending from east of the Noranda area in Quebec to west of the Timmins area in Ontario. Large bodies of basic, intermediate, and acidic rocks intrude the lavas. A few north-trending diabase dikes were found to intrude the other rock types. The volcanic group, although also separable into basic, intermediate, and acidic rocks, has a predominating abundance of the intermediate rock type. The very basic and very acidic rock units are commonly too narrow and too limited in extent to be shown on the present map scale.

TABLE OF FORMATIONS

CENOZOIC	
RECENT AND PLEISTOCENE	Sand, gravel, clay.
	<i>Unconformity</i>
PRECAMBRIAN: PROTEROZOIC	
KEWEENAWAN	Diabase.
	<i>Intrusive Contact</i>
ARCHEAN	
INTRUSIVE ROCKS	
Acid Intrusive Rocks	Syenite, syenite porphyry.
Basic Intrusive Rocks	Diorite, quartz diorite, gabbro, metagabbro.
	<i>Intrusive Contact</i>
VOLCANIC GROUP	
Basic to Intermediate Volcanic Rocks	Dacite, andesite, basalt; massive lava, porphyritic lava, amygdaloidal lava; agglomerate.
Acid Volcanic Rocks	Rhyolite, rhyolite agglomerate.

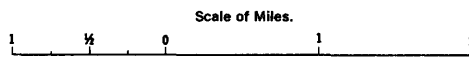
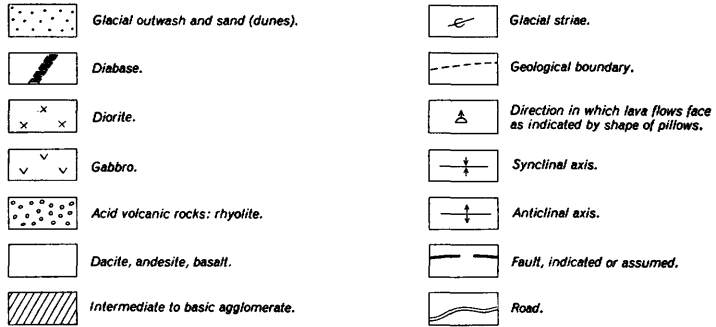
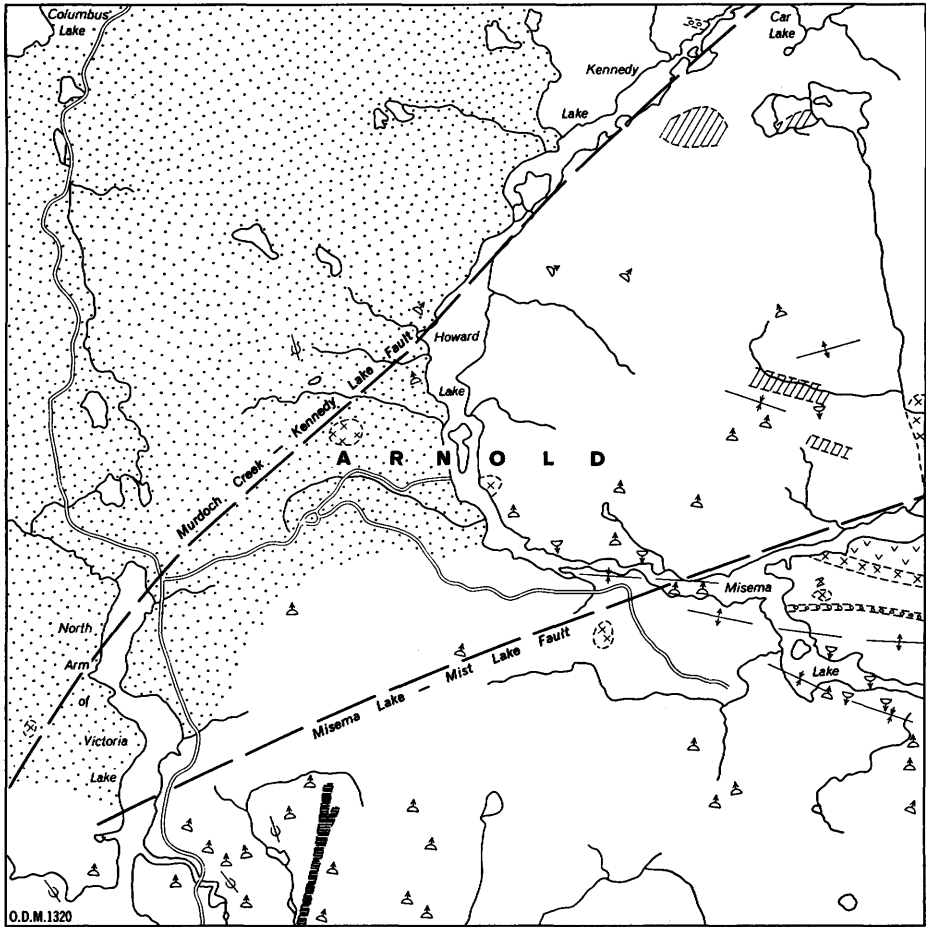
Rock outcrops are abundant in Katrine township, particularly in the eastern part. They are also abundant toward the southern and eastern parts of Arnold, but few outcrops occur in the area west and northwest of Kennedy and Howard lakes.

The volcanic rock types that have been recognized are primarily dacitic in composition with a lesser distribution of basalt, andesite, and rare rhyolite interbands. Pillow structures, so common in the basic and intermediate rock types, are most abundant in the southern parts of the map-area.

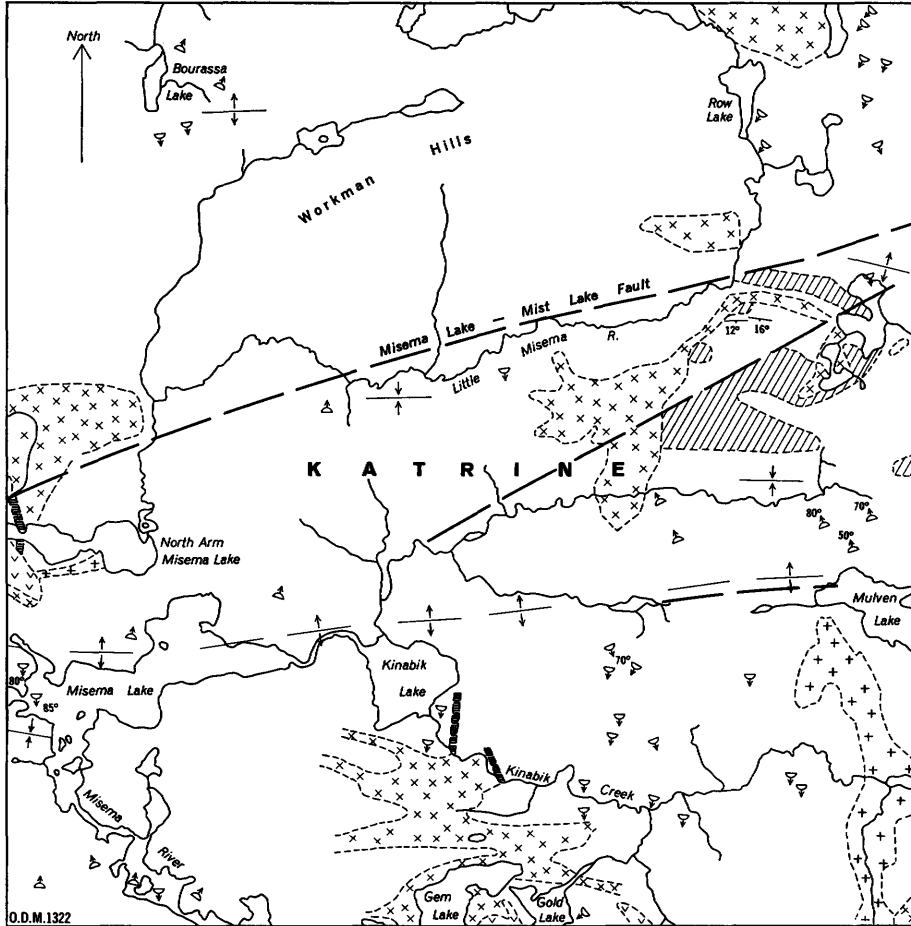
The volcanic sequence has been intruded by bodies of gabbro, diorite, syenite, syenite porphyry, and younger diabase dikes. A number of faults have been recognized; several of these are evidently southwestward and northeastward extensions of known faults. These extensions are characterized by strong linear features. The volcanic rocks in the southern part of the two townships have plunging close folds. Northwards, though, the folds are more open.

The geological succession is summarized in the Table of Formations.

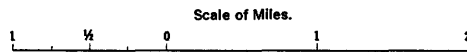
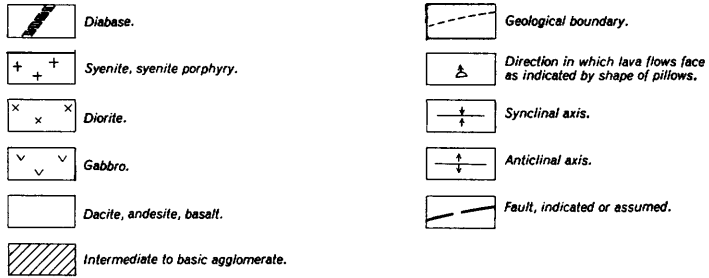
INTERPRETED GEOLOGY OF ARNOLD TOWNSHIP



INTERPRETED GEOLOGY OF KATRINE TOWNSHIP



O.D.M. 1322



Arnold and Katrine Townships

Archean

Volcanic Group

ACID VOLCANIC ROCKS

In Arnold township a narrow band of rhyolite less than 100 feet wide extends for more than 5,000 feet in an east-west direction along the middle of the peninsula lying between the North Arm and the southern part of Misema Lake. A similar narrow band is found north of Side Lake on the Misema River.

The rhyolite is a resistant rock and is exposed as ridges having a whitened weathered surface. It is a hard fine-grained massive rock whose clean surface is light grey. In places it is agglomeratic and contains fragments of squeezed rhyolitic material.

BASIC TO INTERMEDIATE VOLCANIC ROCKS

This group of volcanic rocks is composed of dacite, andesite, and basalt; the dacite occupies by far the largest area. These rocks are usually in the form of massive lava flows making up a thick series containing many examples of pillow lava. This form has been produced in consequence of the lavas having flowed into the waters of lakes formed earlier during periods of volcanic quiescence.

The marked general uniformity of rock types and the absence of a main volcanic centre or cone indicate that these rocks are the result of eruptions of the fissure-flood-lava type.

Rhyolites are rare in this group and only two narrow bands have been recognized. In this type of eruption, the feeding fissures are difficult to recognize, but several small feeders have been noted along the Misema River in Arnold township.

Intrusive Rocks

The volcanic group of rocks has been invaded by dikes and irregularly shaped masses of syenite, syenite porphyry, diorite, gabbro, and diabase. The diorite occurs mainly in Katrine township and occupies a larger area than any of the other rocks. A dike-like body of syenite and syenite porphyry breaks through into the southeast corner of Katrine. Quartz veins and stockworks may represent an acid phase of this syenite mass.

BASIC INTRUSIVE ROCKS

Diorite and Gabbro

Diorite is the largest and most widespread intrusive rock in the map-area and is exposed along the central boundary between Arnold and Katrine and toward the eastern part of Katrine.

The outline of the diorite bodies, especially in the eastern part of Katrine, is irregular. This suggests that the diorite is flat-lying with a low dip toward the south. The diorite bodies have a tendency to follow the strike of the lava flows, but in most instances they transgress these flows.

Variations occur in texture, grain size, and mineral composition. Normally, though, the rock is uniform in texture and composition. The colour of the fresh

rock is generally dark-grey but locally assumes a green coloration wherever alteration to chlorite and epidote has been unusually great. The weathered surface is rough and irregular; its colour is dark-green to rusty brown.

A lens of gabbro 4,000 feet in length straddles the boundary between Arnold and Katrine along the peninsula adjacent to the North Arm of Misema Lake. Two other gabbro intrusions extend through from McVittie into Katrine and terminate east of Gem and Gold lakes.

The rock is coarse-grained and uniformly black or dark-green in colour. The weathered surface of the gabbro is generally reddish brown to olive green.

ACID INTRUSIVE ROCKS
Syenite and Syenite Porphyry

The acid intrusive rocks are syenite and syenite porphyry. They are found in the form of dikes and irregularly shaped masses. A dark-brown and pink variety of syenite and syenite porphyry is found in the southeast corner of Katrine; and in places these porphyries are difficult to distinguish from the adjacent lavas.

Macroscopically the rock is medium- to coarse-grained.

Proterozoic

Keweenawan

DIABASE

The diabase dikes of the map-area have predominately north trends. Their maximum width is 400 feet. The rock is brown to reddish brown on the weathered surface; the freshly broken surface shows a fine- to medium-grained dark-grey rock. Chilled zones are found near the outer margins of the intrusion; the rock also has a coarser texture here but grades to a finer texture near the centre of the intrusion.

Parallel vertical joints, normal to the trend of the dike, are a characteristic feature of these diabase dikes. The dikes are considered to be emplaced in fissures or tension fractures opened up normal to the axis of the regional folding. They represent the youngest intrusive rocks in the map-area.

Cenozoic

Pleistocene and Recent

The area was covered by Pleistocene ice-sheets whose movements left erratic boulders on the sides and tops of the highest hills. Many rock outcrops have been abraded by the ice movement that produced glacial striae and grooves. The rock outcrops have typical *roches moutonnées* forms with gently sloping stoss sides and the steeper lee sides. The elongation of the *roches moutonnées* and the glacial striae on the highest hills indicate that the direction of the ice movement was approximately S.10°E.–S.20°E.

Throughout the greater part of the area a thin mantle of glacial deposit—gravel, clays, and sand—rests in the depression between outcrops.

The west half of Arnold township is underlain by a strip of glacial outwash

Arnold and Katrine Townships

about 5 miles wide and extending over a distance of greater than 30 miles to beyond Garrison in the north and Gauthier in the south. The deposits in Arnold township have been reworked by postglacial desert-like winds. Great dune ridges have been developed in consequence of these processes. These fine eolian sand deposits are dry along the higher elevations, with swampy muskeg areas located between the dune ridges and sand plains. The dune ridges are now stabilized and support a fairly even growth of jackpine. The small chain lakes and isolated lakes were formed on the original glacial-outwash plain.

Structural Geology

The main folds and faults of Arnold and Katrine townships form part of an east-trending belt of deformation extending from the Kirkland Lake area in Ontario eastward to beyond the Noranda area in Quebec.

The structural interpretation of the map-area is based on the use of the elongation (or strike) and top determination of pillow structures in the lavas. Dips in the attitude of the pillows have also been utilized.

The reverse-S shape of the Howard-Misema-lakes drainage system, thought to be related to a folded structure, is considered as being formed by the intersection of the Murdoch Creek-Kennedy Lake fault with a fault along the east-west part of Misema Lake. The southwest part of this structure in Arnold township is covered with glacial eolian sand.

Folds

The volcanic rocks have been folded about east-west-trending axes. A number of folds are recognizable but few are traceable for any appreciable length.

A fairly continuous anticlinal structure extends westward through Mulven Lake on the eastern boundary of Katrine township to Misema Lake in Arnold.

In most instances the axes of the folds are sheared with a well-formed rock cleavage, probably representing a cleavage mode of folding.

Faults

A dominant linear continuation of the Murdoch Creek-Kennedy Lake fault trends N.40°E. in Arnold township and passes through Kennedy Lake. The volcanic rocks are sheared and fractured where this fault is exposed. No direct evidence of displacement has been recognized.

Other assumed faults include the Misema Lake-Mist Lake fault trending N.70°E. and the Mulven Lake fault (Katrine township) trending N.85°E.; it is possible that the gold occurrences adjacent to these two faults are related to them.

Economic Geology

Recommendations for Future Mineral Exploration

The search for minerals in Arnold and Katrine townships in past years was encouraged by the presence of gold- and copper-bearing minerals in several localities.

The district is still worthy of prospecting efforts and promising areas are to be found near or adjacent to syenite and syenite porphyry intrusions, also in zones of strong shearing, and within faulted zones. Such areas are frequently situated on low ground and often occupied by swamps; but some of the low outcrops merit careful investigation.

Some of the areas of the Misema Lake peninsula represent the zones of contact between the diorite and gabbro intrusions and the surrounding volcanic rocks. A search for copper minerals in these areas appears to offer favourable prospects.

Gold and Copper

The gold and copper mineralization occurs as: (1) quartz veins bearing gold indications in a host rock of volcanic-intermediate type or in syenite bodies, (2) quartz veins bearing chalcopyrite and gold in intermediate volcanic rocks, and (3) quartz veins in andesite rock containing impressive but erratic amounts of chalcopyrite.

No gold or copper production has occurred in Arnold or Katrine townships. At several properties, however, shafts have been sunk and underground levels established.

Gravel Deposits

An extensive deposit of sand, along with localized gravel beds, exists in the west half of Arnold township. So far the sand and gravel have been utilized almost exclusively for road construction in the surrounding area.

Description of Properties

LOWE GROUP

The Lowe group comprises 11 claims in east-central Arnold township. The showing is in the east-west-striking lavas in the east-centre of the township. A trench 40 feet long and 12 feet deep has been opened in an exposure 150 feet long and 50 feet wide. Pillow lavas are found to the north and south of the exposure. The rocks in the trench consist of a grey carbonatized lava containing disseminated pyrite. The predominating blue-to-white quartz veins contain scattered pods of chalcopyrite, and channel samples gave erratic assays although several yielded high gold values.

LOWE CLAIMS (VITRO CHEMICALS CORPORATION OPTION)

In 1962 a group of 27 contiguous unpatented claims on the east border of Arnold township between Mileposts 3 and 4 were optioned from Dave Lowe by the Vitro Chemicals Corporation. In the spring of 1962, six diamond-drillholes were collared to cut beneath a faulted zone where surface trenches had yielded gold assays.

A. E. LINTON CLAIMS

During 1949, three diamond-drillholes totalling about 313 feet were put down on an area of ground near the branch of the North Arm of Misema Lake. The drillholes intersected volcanic rocks and feldspar porphyries. No gold values were reported.

Arnold and Katrine Townships

FOCKLER-LITTLE-LOWE-GARVIE CLAIMS

The Fockler-Little-Lowe-Garvie group of claims was located astride the Arnold and Katrine township border, north of the North Arm of Misema Lake.

Work on the group consisted of test pits and four diamond-drillholes totalling 1,068 feet. The holes were drilled in September and October of 1947 at 1,500 feet north of the North Arm of Misema Lake and 1,000 feet west of the Arnold-Katrine boundary.

The holes encountered andesite, dacite, tuff, and tuff breccias. Traces of gold were reported from assays.

NORWOOD KIRKLAND GOLD MINES LIMITED (CHARTER CANCELLED IN 1953)

The Norwood Kirkland Gold Mines Limited property was formerly held by Enterprise Gold Mines Limited. It comprised an area of approximately 1,145 acres north of Misema Lake in Katrine township.

Although the property is now largely overgrown, prior to 1936 a number of test pits and trenches exposed several quartz veins. In 1938, 14 diamond-drillholes were put down on the property. Two of these holes intersected gold values beneath surface showings.

The underlying rocks are dacitic lavas intruded by syenite porphyry dikes. The quartz veins are reported to have yielded low gold values.

MISEMA LAKE MINING CORPORATION LIMITED

The Misema Lake Mining Corporation Limited was incorporated in 1959 and acquired a group of 23 claims consisting of 800 acres in the southwest corner of Katrine township. The claims were formerly named the T. Anderson Claims and were held in 1943 by the Forwood Mining Syndicate.

Stripping, trenching, and test pitting left behind by previous operators eventually slumped in and became overgrown.

On claim L.58862, test pits and trenches were cut for a length of 600 feet into quartz veins and stockworks that are mineralized with pods of chalcopyrite.

The property contains two other chalcopyrite-mineralized showings. One is located on claim L.59313 and is exposed in the narrow channel near the centre of the claim. The other is located in a zone of quartz lava breccia on claim L.61900.

In 1954, during June and July, five holes representing 2,002 feet of diamond-drilling were put down on claim L.58862. The drilling on this claim showed the immediate area to be underlain by fractured pillowed andesite lavas containing quartz and quartz-carbonate stringers.

In February and March of 1960 the Misema Lake Mining Corporation Limited carried out 2,017 feet of diamond-drilling on the property under the direction of S.A. Pain, mining engineer of Swastika, Ontario.

Two holes on claim L.59313 intersected, in andesite lavas, copper mineralization associated with a quartz vein. Two drillholes put down on claim L.58862 encountered minor copper mineralization. Three other holes were put down on claim L.56878; two of these were discontinued in overburden and a third encountered a zone of fracture containing quartz and minor chalcopyrite.

CALLIGHAN PROPERTY

The Callighan property is around Mulven Lake adjacent to the east border of Katrine township. Prior to 1935 the exploration work carried out on this property was limited to opening up a quartz vein and stockwork by trenching and pit sinking. All the work was confined to claims L.23551 and L.23631 including, and adjacent to, the west part of Mulven Lake. The quartz is mineralized with pyrite and chalcopyrite and assay values in gold were obtained. The main vein strikes N.72°E. and is adjacent to a syenite-porphyry body. A length of 900 feet and a width of 2-6 feet is indicated from trenching and development pits (S. A. Pain 1933).

In July 1936, Erie Canadian Mines Limited diamond-drilled 1,056 feet in five holes on claim L.23551. The cores revealed the presence of basic lavas intruded by syenite porphyry dikes and quartz mineralized with erratic gold values.

Shortly afterward, Sylvanite Gold Mines Limited put down 19 diamond-drillholes in the quartz veins on claim L.23551 and sampled the surface exposure of the vein for a length of 195 feet. Assays indicated erratic gold values.

WADGE MINES LIMITED

This property is located on claims L.72714 and L.72715 in southeast Katrine township; and on claims L.72716 and L.72622 in the adjacent township of Ossian.

Andesite, basalt, and related fragmental rocks underlie the property and have been intruded by a syenite and syenite porphyry mass.

Quartz veins and breccia zones occupy near-vertical fractures striking north-west. The veins are narrow and extend from a few inches to over 3 feet in width. Four main veins are indicated on the surface. These have been reported to contain pyrite, chalcopyrite, minor galena, and some gold values. Two veins have been investigated underground and appreciable amounts of ore-grade material were indicated to be present in them.

The entire record of the development work is incomplete but considerable surface trenching was undertaken and a 515-foot-deep two-compartment vertical shaft was sunk in 1925-26. A total of 2,000 feet of lateral work was completed on four levels.

Records indicate that 13,000 feet of diamond-drilling was undertaken on the property but information on this earlier work has not been found.

Wadge Mines Limited, in May 1962, collared two 100-foot drillholes on the southern projection of the veins on claim L.72714 for assessment purposes. The two holes intersected syenite, and a narrow quartz-carbonate section gave an assay in gold.

Arnold and Katrine Townships

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





























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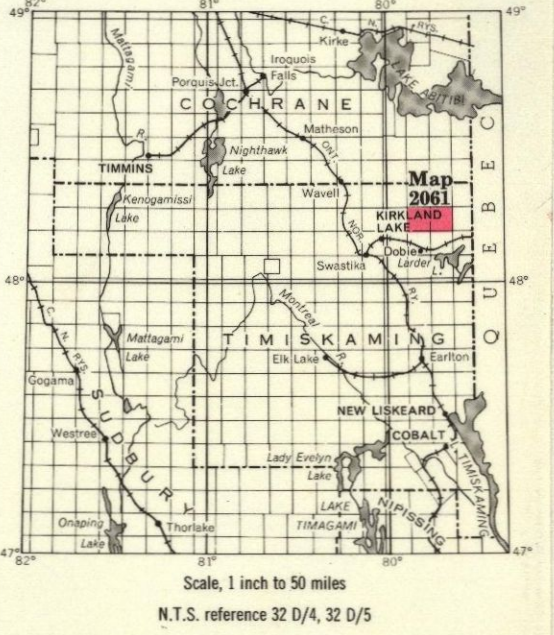
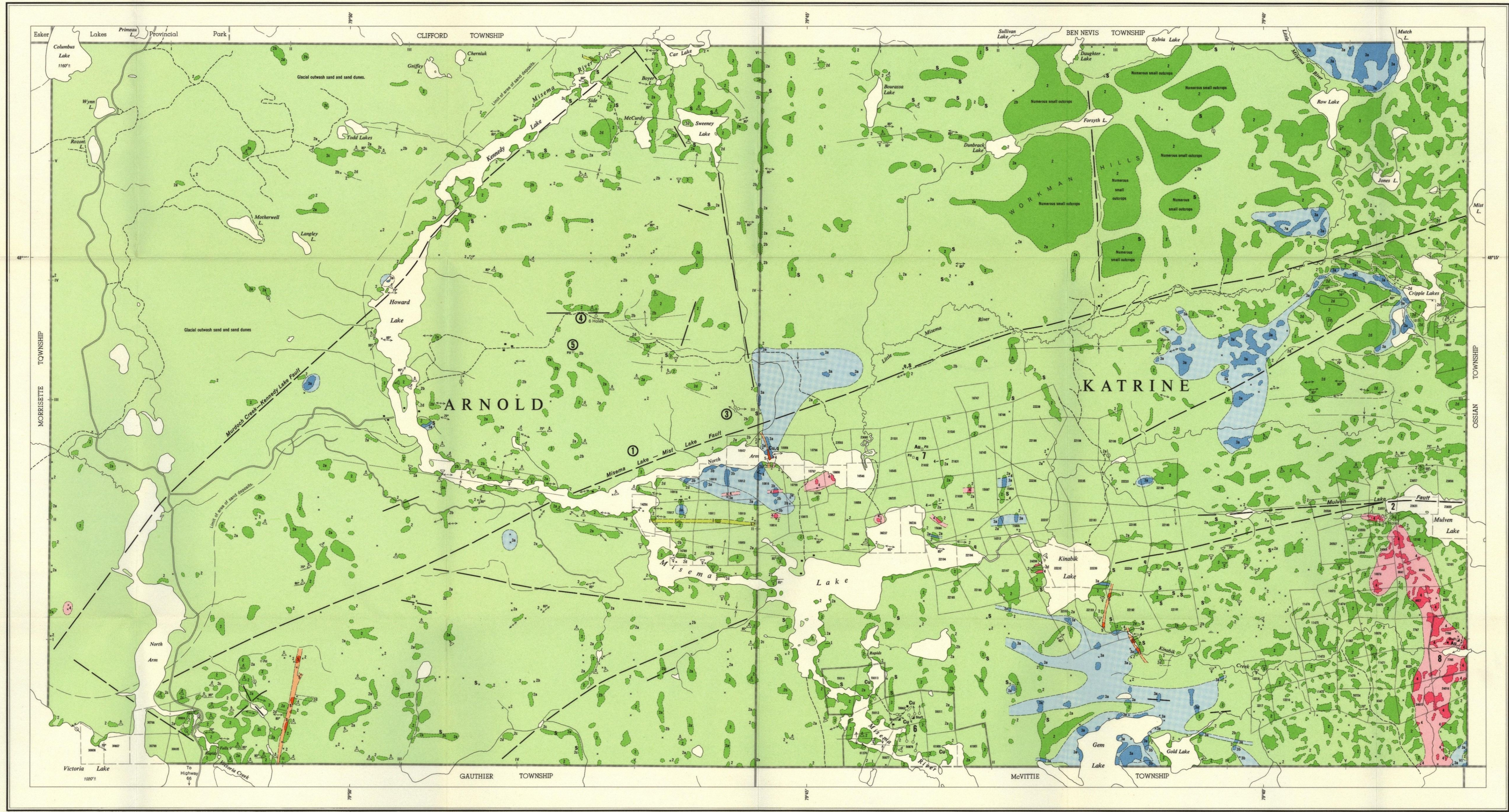
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







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- SYMBOLS**
-  Glacial striae.
 -  Small rock outcrop.
 -  Boundary of rock outcrop, or outcrop area.
 -  Geological boundary, defined.
 -  Geological boundary, approximate or assumed.
 -  Strike and dip, direction of top unknown.
 -  Direction in which lava flows face as indicated by shape of pillows.
 -  Synclinal axis.
 -  Anticlinal axis.
 -  Strike and dip of schistosity.
 -  Strike of vertical schistosity.
 -  Strike of schistosity, dip unknown.
 -  Fault indicated or assumed.
 -  Mineral occurrence.
 -  Altitude in feet above mean sea level.
 -  Muskeg or swamp.
 -  Motor road.
 -  Other road.
 -  Trail, portage, winter road.
 -  Building.
 -  Shaft.
 -  Pit.
 -  Trench.
 -  Drill hole, inclination unknown.
 -  Drill hole, inclined.
 -  Township boundary, approximate location only.
 -  Claim line, surveyed, approximate location only.
 -  Property boundary, approximate location only.
 -  Location of mining property, surveyed. See list of properties.
 -  Location of mining property, unsurveyed. See list of properties.

- LIST OF PROPERTIES**
1. A. E. Linton claims.
 2. Callaghan Property.
 3. Fockler-Little-Lowe-Garvie claims.
 4. Lowe claims, (Vibro Chemical Corp. option).
 5. Lowe Group.
 6. Misema Lake Mining Corp. Ltd.
 7. Norwood Kirkland Gold Mines Ltd.
 8. Wadge Mines Ltd.



- LEGEND**
- CENOZOIC***
- RECENT AND PLEISTOCENE
Sand, gravel, clay.
- UNCONFORMITY
- PRECAMBRIAN****
- PROTEROZOIC**
KEWENAWAN
-  5 Diabase.
- INTRUSIVE CONTACT
- ARCHEAN**
- INTRUSIVE ROCKS**
ACID INTRUSIVE ROCKS
-  4 Syenite, syenite porphyry.
- BASIC INTRUSIVE ROCKS**
-  3a Diorite, quartz diorite, 3b Gabbro, melagabbro.
- INTRUSIVE CONTACT
- VOLCANIC GROUP**
BASIC TO INTERMEDIATE
VOLCANIC ROCKS
-  2 Undifferentiated dacite, andesite, basalt, 2a Massive lava, 2b Porphyritic lava, 2c Arragatitoid lava, 2d Agglomerate.
- ACID VOLCANIC ROCKS**
-  1 Rhyolite, rhyolite agglomerate.
- Mineral Occurrences:**
-  Au Gold.
 -  Cu Copper.
 -  Q Quartz.
 -  S Sulphide mineralization (pyrite).

*Unconsolidated deposits. Cenozoic deposits are not differentiated on the map. For the most part they coincide with the lighter coloured and uncoloured parts of the map.

**Bedrock geology. Outcrops and inferred extensions of each rock unit are shown, respectively, in deep and light tones of the same colour. Where in places a formation is too narrow to show colour and must be represented in black, a short black bar appears in the appropriate block.

SOURCES OF INFORMATION

Geology by W. A. Hogg and assistants, Ontario Department of Mines, 1962.

Additional information by J. B. Currie, Geological Survey of Canada 1947-1949.

Maps and plans of mining companies.

Cartography by D. F. Juge and P. A. Ralph, Ontario Department of Mines, 1964.

Base map derived from Ontario Forest Resources Inventory maps, with additional information by W. A. Hogg.

Magnetic declination approximately 5°30' W., 1962.

The designating letter "L" has been omitted on this map from the numbers marking the mining claims recorded at the office of the Larder Lake Mining Division.

Map 2061
ARNOLD AND KATRINE TOWNSHIPS
 TIMISKAMING DISTRICT

