O.F. 212.

See also
O.F. 486 (for sale on 6th floor)

Bert,
This is my only copy so
can you bring it up to the field
with you.
Best regards.
Dirk

Reconnaissance Geology of Quiet Lake (105F), Finlayson Lake (105G), Sheldon Lake (105J) and Tay River (105K) map-areas, Yukon Territory

Compiled by D.J. Tempelman-Kluit
from field notes and maps of J.O. Wheeler, L.H. Green and J.A. Roddick

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INTRODUCTION

The geology of Quiet Lake, Finalyson Lake, Sheldon Lake and Tay River map-areas (N61° to 63°, W130° to 134°) was investigated in the course of the Geological Survey's Operation Pelly during 1956, 1958, 1959 and 1960. J.O. Wheeler began field work in Quiet Lake map-area in 1956. In 1958 Wheeler was joined by J.A. Roddick; during 1959 and 1960 Roddick continued the work with L.H. Green, and Wheeler spent a month at the start of the 1959 season in the region. Wheeler, Roddick and Green returned to the project area for a brief examination of critical localities during 1964. The writer spent the season of 1967 and part of 1968 examining the geology of the Faro-Vangorda zinc-lead district. In the course of this work he was able to study geological relations of rock units in a part of Tay River map-area. No additional field work was done in any of the three other map-areas of Operation Pelly, however, and consequently this report is based almost entirely on observations made by Wheeler, Roddick and Green. For this reason it cannot be considered an authoritative and comprehensive account of the geology of this vast region; rather it is a brief description of some of its more prominent features. Maps accompanying this report differ only locally in the distribution of rock units from the prelminary maps of the project area (Wheeler, Green and Roddick 1960, 1960a and Roddick and Green 1961, 1961a). However, they do embody important revisions in the stratigraphy of some rock units brought to light in the course of recent work. Because numerous fascinating stratigraphic and structural problems remain unexplained further work is planned in parts of the project area.

Able assistance in the field was given in 1956 by D. Gednetz, Kieller and Anderson; in 1958 by T.G. Allan, F. Cicierski, R.K. Germundson, J.C. Lamont, J.H. Montgomery, G.D. Pollock and M.G. Williams; in 1959 by Bateman, S.L. Blusson, D.B. Craig, W.J.P. Crawford, G.L. Goruk and W.W. Nassichuk; and in 1960 by G.F. Finlaison, A.T. Jenik, A.P.D. Lorraine, G.R. Turnquist, H.N. Wilkinson and R.W. Yole. In 1956 R. Mann and A. Porterfield were the packers and N. Scherf was cook while Alfred Martin (deceased) cooked for the party in 1958 and 1959.

The project area is served by roads to Ross River and Faro from Watson Lake, Johnson's Crossing (Canol road) and Carmacks. In recent years the Canol road has also been made passable to four-wheel drive vehicles between Ross River and Sheldon Lake. Travel in the map-area is relatively east. Numerous lakes allow efficient use of fixed-wing aircraft for prospecting and mineral exploration.

PREVIOUS WORK AND ACKNOWLEDGMENTS

The earliest recorded work by the Geological Survey in the region is that of G.M. Dawson, who in 1887 descended the Pelly River to its mouth having portaged to the Pelly drainage from the headwaters of Frances River. Dawson followed the route explored by Robert Campbell of the Hudson's Bay Company in 1843. In 1935, J.R. Johnston, in a reconnaissance of the region along Pelly River produced the first geological map of the area. E.D. Kindle carried out a geological reconnaissance along the part of the Canol Road that traverses the region examined by Operation Pelly.

The geology of areas adjoining that covered by Operation Pelly is included in published reports and maps by Mulligan (1963) on Teslin map-area (105C), Bostock and Lees (1938) on Laberge map-area (105E), Campbell (1967) on Glenlyon map-area (105L), Blusson (1966) and (1967) on Frances Lake (105H) and Nahanni (105I) map-areas, and by Poole and others (1960) on Wolf Lake map-area (105B).

This compilation has benefited from information on mineral occurrences supplied in 1956 and 1958 by A.E. Aho for Quiet Lake map-area. Similar information given more recently by Atlas Exploration Company for the entire project area has also been incorporated in this report.

The assistance of J.C. Wilkinson, E. Wilkinson and J. Wilkinson in the course of field work in 1956 is gratefully acknowledged. This compilation has benefited from discussions with R.B. Campbell, H. Gabrielse and other geologists familiar with this region.

PHYSICAL FEATURES

The project area is divided into northeast and southwest halves by Tintina

Trench a major northwest trending valley. The area southwest of this valley is occupied by the St. Cyr and Big Salmon Ranges (Fig. 1), parts of the Pelly Mountains (Bostock, 1948). Northeast of the trench are the MacMillan and Pelly Plateaux. Campbell Range, a part of the Pelly Mountains, forms a wedge between Pelly plateau and Tintina Trench in the southeast part of the area. In its south-central part the project area includes the northern extremity of Nisutlin Plateau. The Hess Mountains rise above the MacMillan and Pelly Plateau near the northern margin of the project area and the Itsi Range lies in the extreme northeast.

St. Cyr Range, underlain largely by Palaeozoic sedimentary strata, is perhaps the most rugged part of the region with a local relief of about 4,000 feet. Its highest peak, Fox Mountain, is 7,886 feet above sea level and many other peaks are nearly 7,000 feet in elevation (Fig. 2). In contrast to St. Cyr Range the Big Salmon Range is underlain by metamorphic and granitic rocks. Its highest peak in the project area is 7,134 feet in elevation.

Tintina Valley, occupied within the project area by the Pelly and Black Rivers provides a base level of about 2,000 feet in the western part of the region. The valley is the locus of an important zone of en echelon faults.

MacMillan and Pelly Plateaux, underlain largely by Proterozoic metamorphic and Paleozoic sedimentary rocks, are rolling uplands with a general elevation of 4,000 or 5,000 feet above which separate mountains rise to 6,500 feet or more.

Hess Mountains are underlain largely by Paleozoic sedimentary strata and rise to nearly 7,000 feet in the map-area. Itsi Range is a rugged mountain group of granitic rocks (frontispiece) that exceeds 8,500 feet in elevation and whose upper parts are covered by small icefields.

GLACIATION

Depositional and erosional features related to the last continental glaciation (McConnell advance) are widespread and well developed throughout the project area particularly north of Tintina Trench in Pelly and MacMillan Plateaux. Evidence for possible earlier glaciations has been obliterated by this latest advance. Glacial features that define ice flow patterns and deglaciation drainage systems in the project area have been studied and mapped by Wheeler *in* Hughes et al (1969). The general flow of ice was northwestward and most of the region was covered by the Selwyn lobe (*See* Campbell in Hughes et al, 1969).

GENERAL GEOLOGY

Tintina Trench, the locus of a zone of regional transcurrent faulting, divides the project area diagnonally into roughly equal northeast and southwest parts. The geology in these two divisions is distinctive and although the succession of rock units is basically the same on both sides of the Trench, important differences occur and some rock units are better developed, absent or of different facies on one or other side of the valley. In general the succession southwest of Tintina Trench is like that found farther to the southeast in McDame map-area (Gabrielse, 1963), whereas that northeast of it is typical of Selwyn basin (Gabrielse, 1967).

The oldest rocks, those of the Hadrynian "Grit Unit" are well represented northeast of the Trench, but are not exposed southwest of it in the project area. Lower Cambrian carbonate rocks and sandstone are extensive only in the southwest. Phyllitic and slaty rocks of Cambrian, Ordovician and Silurian age occur on both sides of, and near Tintina Trench. Siluro-Devonian carbonate rocks and sandstone are thick and well developed in the southwest, but are thin or absent in the northeast. A thick Devono-Mississippian succession of chert, slate and clastic rocks is widespread northeast and southwest of the Trench as are Pennsylvanian and Permian volcanic and associated rocks. Triassic rocks are known only in the northern part of the project area and in Tintina Trench. Cretaceous volcanic rocks are widespread northeast of Tintina Trench, but are not known south of it. Bodies of granitic rocks, most of presumed Cretaceous age, are widespread. Metamorphosed rocks of unknown stratigraphic affiliation are found on both sides of Tintina Trench but occur mainly southwest of the Trench in Quiet Lake map-area.

Because of the prelminary character of the study no new stratigraphic names are introduced in this report.

STRATIFIED ROCKS

Hadrynian

"Grit Unit" (Map-unit 1)*

In the project area rocks of the informally named "Grit Unit" (Fig. 3) outcrop only northeast of Tintina Trench and occupy a belt that extends south-eastward from the vicinity of Mount Selous, in the northeast corner of Tay River map-area to the southeast part of Sheldon Lake map-area. Rocks included in the unit also occur in the vicinity of Twopete Mountain in Tay River area. A narrow belt of rocks assigned to the "Grit Unit" occurs on the north side of Pelly River valley in central Tay River area. Rocks mapped as map-units A and C in Finlayson Lake area probably belong to the "Grit Unit" in part (Blusson, 1967a). The best estimate of the thickness of the "Grit Unit" is that given by Blusson (1968) who found the unit at least 12,000 feet thick in the southwest part of Nahanni map-area.

The "Grit Unit" consists mainly of quartzose and argillaceous rocks in about equal proportions. Owing, however, to their greater resistance to erosion, the quartose rocks form more than half of the outcrop. Limestone beds make up from 5 to 10 percent of the formation.

The main rock types in the formation in decreasing order of abundance are black and dark green shale and slate, quartzite (commonly gritty), calcarenite, quartz-pebble conglomerate, sandstone, brightly coloured (red, green, buff) shale and slate, and limestone. Phyllite, chert and greenstone are present in minor amounts.

Two rock types are distinctive and though not the most abundant, they make the formation easily recognizable in most places. Red and green shales are the most prominent, being commonly recognizable from the air. Also distinctive are the feldspar-quartz-pebble conglomerate and gritty quartzite that contains distinctive

*Unit numbers refer to those used in the maps accompanying this report and bear no relationship to numbers used in the preliminary maps of this region.

bluish quartz grains. The presence of red and green shale near overlying formations in the Ogilvie Mountains and east of Frances Lake map-area combined with the lack of red and green shale fragments in the conglomeratic part of the unit suggests that the conglomerate occurs predominantly in the lower part of the formation whereas the red and green shales form the upper part.

Dark shale and slate form beds ranging from 3 to 20 feet thick that are intercalated with quartzose and limy rocks. Between Pelly River and Pelly Lakes in Sheldon Lake map-area and in some other places the shale is markedly calcareous. Rarely it is cherty. In thin section the red shale is nearly opaque with ferruginous material. Small grains of quartz form an evenly scattered impurity in most of this rock. In the green shale 10 to 15 percent chlorite accounts for most of the colour of the rock. The remainder consists largely of argillaceous and sericitic material.

The quartzose rocks are quartzite with subordinate calcarenite, quartz-pebble conglomerate, and sandstone. They are of variable grain size, and form massive, brownish grey beds. In many places these rocks contain intergranular limonite.

Quartzite of the "Grit Unit" consists mainly of rounded to subrounded quartz grains most of which are about 1 mm across. In addition, most of the quartzite contains scattered grains 3 to 5 mm across that give the rock a gritty appearance. Rounding is better in these larger grains than in smaller grains. Perthite, microcline, and sodic plagioclase may form up to 25 percent of the rock. In most places, however, the total feldspar content is less than 15 percent. Rare fragments of black slate and recrystallized chert were observed. The matrix consists chiefly of fine-grained siliceous material with mica and clay minerals. Locally the larger grains have scalloped edges owing to corrosion by matrix. Rarely the larger grains have partly recrystallized to form mosaics of interlocking granules. Interstitial chlorite makes some of the quartzite greenish. Most of the feldspar is clouded with clay minerals and the quartz commonly contains fine dust-like opaque particles.

Quartz-pebble conglomerate forms massive beds commonly 50 to 100 feet thick that break into large blocks. These blocks are normally covered by a black lichen. Quartz pebbles rarely exceed 5 mm in diameter and most are about half that size. Except for the greater abundance of large quartz fragments the conglomerate does not differ significantly in thin section from the quartzite described above. Nearly all pebbles consist of quartz and most are well-rounded. Some of the pebbles are composites made up of interlocking quartz grains that have been derived from an older metamorphosed quartzite, gneiss, or plutonic rock. Feldspar forms 5 to 10 percent of the pebbles in most of the conglomerate, rarely more than 15 percent. As in the quartzite, feldspar includes microcline, perthite, and sodic plagioclase in varied proportions.

Limestone beds ranging from 1 to 50 feet thick appear throughout the formation but are apparently more abundant in the upper part where they are commonly associated with the red and green slate. Most of the limestone is medium to dark grey and fine grained. It is commonly brecciated, and the fragments are cemented by a coarser-grained white carbonate. Most of the thinner beds contain abundant argillacoues or sandy impurities. Two 50-foot limestone beds are particularly prominent south of Macmillan River where they form belts of outcrop extending from Mount Selous to the ridge west of Mount Riddell.

The lower contact of the "Grit Unit" has not been observed in the project area, nor elsewhere in the Yukon. The "Grit Unit" is unconformably overlain by the Road River Formation (Lower Ordovician to Silurian).

Rocks of the "Grit Unit" are weakly metamorphosed. In most of the project area chlorite and sericite are developed and quartz has been recrystallized.

The age of the "Grit Unit" is uncertain as no fossils have been found in it, but is limited to pre-Early Ordovician by the overlying fossiliferous rocks of the Road River Formation. In Nahanni map-area, where rocks of the "Grit Unit" occur close to known Cambrian strata the absence of "Grit Unit" lithologies in the Cambrian rocks implies a pre-Cambrian age for the unit. Rocks of the "Grit Unit" are lithologically like those of the Windermere series in the Purcell Mountains of British Columbia and the Windermere and "Grit Unit" show similar stratigraphic relations to Lower Cambrian strata.

Lower Cambrian

Atan Group (Map-unit 2)

Lower Cambrian sandstone, slate, shale and fossiliferous limestone correlated with the Atan Group of McDame map-area (Gabrielse, 1963) is well developed southwest of Tintina Trench in Quiet Lake and Finlayson Lake map-areas. Extensive exposures of the Atan Group are found on the north and south sides of White Creek and west of Lapie Lakes in Quiet Lake map-area. Strata of the Atan Group also occur near Liard River in south central Finlayson Lake map-area.

In general the Atan group is divisible into a lower part, about 1,000 feet thick consisting of orthoquartzite, a middle part about 300 feet thick of slate and phyllite and an upper part, several hundred feet thick, consisting of limestone and lesser dolomite.

Orthoquartzite of the lower part of the Atan Group is generally pinkish brown and grey and generally exhibits a closely spaced cleavage or foliation. It is a mature sandstone made up of rounded quartz grains with minor muscovite, biotite zircon and apatite. The quartz generally shows undulose extinction.

Slate and phyllite of the middle division of the Atan Group are commonly grey, but green, highly chloritic, varieties are found locally. These slaty rocks generally contain more fine detrital quartz than do those of the overlying Kechika Group. Thin beds of limestone are interbedded with the slaty rocks in places, but it is not known whether these are structurally introduced in the slate sequence or whether they are an integral part of the member.

The upper member of the Atan Group contains grey- or orange-weathering, massive, fine grained limestone and lesser dolomite. Oncolites up to 2 mm in diameter and ellipsoidal pellets are locally important. Archeocyathids in various orientations are generally associated with the pelletel oncolitic beds.

Structures displayed by rocks of the Atan Group are complex and varied. In the vicinity of White Creek the rocks are brought up on a broad irregular dome or culmination, which is superposed on earlier structures such as tight folds developed in these strata. Atan Group rocks west of Lapie Lakes are apparently brought up relative to crystalline rocks by a northwest trending fault.

The base of the Atan Group is not seen in the project area and the stratigraphic relations of the Group to rocks of the "Grit Unit" are not known. In McDame map-area to the southeast basal strata of the Atan Group generally lie a short distance above red and green shales thought correlative with similar strata of the "Grit Unit" (Gabrielse, 1968). In Selwyn Basin where shaly Lower Cambrian strata overlie phyllitic rocks of the "Grit Unit" separation of the two units is difficult. Strata of the Kechika Group overlie those of the Atan in many places in the project area, but the nature of the contact is obscure because of the marked difference in structural response between the competent Atan carbonate and the incompetent Kechika slate.

Archeocyathids and other fossils collected from carbonate rocks of the Atan Group (Appendix 1A) indicate a Lower Cambrian age for the upper part of the Atan Group. No fossils were collected from the lower division of the Atan Group and its age is not known. In other parts of the Cordillera homotaxial equivalents of this division are considered Lower Cambrian.

The Atan Group is correlated with similar Lower Cambrian strata in Wolf Lake, Watson Lake and McDame map-areas. Metamorphosed equivalents occur in Glenlyon map-area where Campbell (1967) assigned these rocks to the lower part of the Harvey Group.

Rocks of unknown age that may be, in part, equivalents of the Atan Group (mapped as Unit B) are found in Quiet Lake and Finlayson Lake map-areas northeast and southwest of Tintina Trench.

Unfossiliferous thin beds of marble and associated schist in Anvil Range, mapped as map-unit 2 ?, are pre-Ordovician and may be correlatives of the Atan Group. Although they are lithologically unlike rocks of the Atan Group they are apparently overlain by Kechika Group equivalents.

Cambrian, Ordovician and Silurian

Phyllitic and slaty rocks that range in age from Middle or Upper Cambrian to Upper Silurian are widespread throughout the project area on both sides of Tintina Trench. Those southwest of the Trench are correlative with the Kechika Group of McDame map-area (Gabrielse, 1963). Those northeast of it are for the most part like the Road River Formation as defined by Jackson and Lenz (1962). In this report the boundary between Road River and Kechika strata is arbitrarily taken as the Tintina Trench.

Cambrian and Ordovician

Kechika Group, lower part (Map-unit 3)

An assemblage of well foliated phyllitic rocks and associated greenstone, herein correlated with the Kechika Group, occurs extensively southwest of Tintina Trench in Quiet Lake and Finlayson Lake map-areas. Kechika Group rocks underlie the first range of mountains on the southern side of Tintina valley and form a belt of outcrop up to 10 miles wide along it. Kechika Group strata also occur in an irregular area between Barite Mountain and Mount Hogg in Quiet Lake map-area. Particularly good exposures are found near the sharp bend in Lapie River. In general, areas underlain by these rocks are characterized by a rather more subdued topography than that of areas underlain by other rocks.

The thickness of the Kechika Group in the project area is not known because the unit is internally repeated and because marker beds have not been recognized. It is estimated that between 2000 and 4000 feet of strata may be present.

In the project area the Kechika Group characteristically includes grey lustrous phyllite. This rock is silvery grey or greenish grey on fresh and weathered surfaces and generally shows excellent development of foliation at the expense of a well defined, thin lamination that marks bedding. The lamination reflects segregation of quartz and muscovite in discrete layers. Some laminae are apparently tuffaceous material. The phyllite comprises quartz and muscovite in roughly equal proportions but locally the quartz content is as much as 75 percent by volume. In places the rock is calcareous phyllite. Graphite-bearing phyllite occurs locally.

Thin bedded argillaceous limestone is common in rocks of the Kechika Group and makes up possibly a quarter of the volume of these rocks (Fig. 4 and 5). Near granitic bodies the phyllitic and associated rocks are recrystallized hornfels. Pyrite and pyrrhotite in this hornfels lend these hornfelses their distinctive rusty weathering colour.:

The Kechika Group commonly includes greenstone lenses up to 1000 feet long elongated in the plane of foliation of the enclosing phyllite. Greenstone lenses probably account for less than 5 percent of the unit, but because they are more resistant to weathering than enclosing rocks they form a disproportionate number of outcrops. Some greenstone bodies are apparently of extrusive origin, but relict textures in others suggest an intrusive relationship to the phyllitic rocks. The greenstone is thought to be roughly coeval with the enclosing phyllitic rocks.

Evidence bearing on the age of map-unit 3 in the project area is as follows. The map-unit overlies rocks of the Lower Cambrian Atan Group and is itself overlain at various localities by map-unit 4, the upper part of the Kechika Group which is of Early Ordovician and younger age. As no fossils were found in rocks of map-unit 3 in the project area its age cannot be limited closely. In McDame map-area (Gabrielse, 1963) Upper Cambrian fossils were found in strata thought to be correlative with map-unit 3.

Map-unit 4

Rocks of probable Cambro-Ordovician age, mapped as map-unit 4, are found northeast of Tintina Trench in central Tay River and northeastern Finlayson Lake map-areas. Occurrences in Tay River map-area are described in some detail elsewhere (Tempelman-Kluit, in press) and only a summary is given here.

The internal stratigraphy of map-unit 4 is unknown because of poor outcrop and structural complication. In central Tay River map-area the unit is divisible into two mappable parts. The lower part, about 2000 feet thick, is made up of biotite quartz schist with associated laminated argillaceous calc-silicate rocks and inter-foliated amphibolite and marble. The upper part of map-unit 4 is about 4000 feet thick and includes well foliated, silvery grey quartz mica phyllite and biotite schist with interlayered fine-grained amphibolite lenses. Locally the phyllite is metamorphosed and garnet, staurolite, cordierite and andalusite are developed. Occurrences of map-unit 4 in northeastern Finlayson Lake map-area also comprise phyllitic rocks.

No fossils have been found in map-unit 4 and its age and correlation are therefore in doubt. Lithologically these rocks resemble strata of the Kechika Group (map-unit 3), but this correlation is uncertain because Tintina Trench separates the occurrences. Map-unit 4 is probably pre-mid-Ordovician because fossiliferous rocks of map-unit 6 apparently overlie it. However contact relations between map-units 4 and 6 were nowhere seen. Map-unit 4 contains none of the diagnostic lithologies found in the "Grit Unit" and is therefore thought to be younger than it. Map-unit 4 may be late Proterozoic or Cambro-Ordovician in age.

Ordovician and Silurian

Kechika Group, upper part (Map-unit 5)

Map-unit 5 constitutes the lithologically distinctive, thin mappable and fossiliferous upper division of the Kechika Group (Gabrielse, 1963). In the project area map-unit 5 is found at scattered localities southwest of Tintina Trench. Lithologically similar rocks of the same age occur northeast of the Trench, but were not mapped as an entity, and there included in the Road River Formation. In the project area map-unit 5 occurs near the northern margin of Quiet Lake map-area, notably between Barite Mountain and Magundy River and east of Rose Mountain. An occurrence of these rocks is also known 12 miles northeast of McNeil Lake in Finlayson Lake map-area.

Fissile black pyritic slate and shale overlain by greyish and brown siltstone, silty shale and argillite and discontinuous bodies of volcanic breccia make up much of map-unit 5, which is estimated at less than 700 feet thick. The black slate and shale produce a sooty fine talus and weather recessively making these rocks readily distinguishable from a distance.

The age of map-unit 5 is fairly well defined by graptolites collected from it at various localities (see Appendix 1B). The collections suggest that the lower part ranges in age from Early to Middle or Late Ordovician and that its upper part contains two Silurian faunal zones, one of upper Llandovery or lower Wenlockian age (Early Silurian) and one of Lower Ludlow (Late Silurian) age. The upper part is of the same age as part of the lower member of map-unit 7 and the contact between map-units 5 and 7 therefore marks a diachronous facies boundary. Map-unit 5 is correlated with lithologically similar rocks occurring southeast of the project area in McDame map-area. There Silurian siltstone has been separated from Lower and Middle Ordovician black shales included in the Kechika Group (Gabrielse, 1963).

Ordovician and Silurian

Road River Formation (Map-unit 6)

Rocks that are similar in age and lithology to the Road River Formation (Jackson and Lenz, 1962) occur extensively in northern Sheldon Lake and Tay River map-areas. However, these strata are difficult to distinguish lithologically from the younger Devono-Mississippian rocks of map-unit 8 (Earn Group) and only where fossils are abundant can a separation be made with confidence. For this reason map-unit 6 is not generally differentiated from map-unit 8 on the accompanying maps, but is included with it in map-unit 8a. Map-unit 6 is differentiated in two small areas; one about 10 miles north of Mt. Mye in Tay River map-area and the other some miles downstream from Wolf Canyon on Pelly River.

Map-unit 6 includes black carbonaceous graptolitic slate and associated dark grey to black silty shale and argillite. Black, dense chert, in beds 1 to 4 inches thick with thin carbonaceous partings, occurs sparingly.

At the locality north of Mt. Mye map-unit 6 is about 400 feet thick, and is overlain, by fossiliferous Middle Devonian (Eifelian) carbonate rocks. Relations at the contact are obscure. Strata beneath map-unit 6 are not seen at this locality, but it is inferred from differences in the metamorphic grade and minor structures between map-unit 6 and nearby occurrences of map-unit 4 that an unconformity separates them.

Graptolites collected from map-unit 6 and from map-unit 8a (Appendix 1C), range in age through the Ordovician and part of the Silurian. Map-unit 6 is lithologically like map-unit 5 and is approximately the same age. Graptolites collected from Road River strata north of Mt. Mye are listed in a report on the geology of Anvil Range (Tempelman-Kluit, in press).

Silurian and Devonian

Map-unit 7

Rocks mapped as map-unit 7 are found on both sides of Tintina Trench, but they are a better developed and areally more extensive southwest of the valley. The main occurrences southwest of the Trench are found in a belt running northwest from the Nisutlin Plateau into Pelly Mountains through Finlayson Lake, Quiet Lake and Tay River map-areas. The map-unit is best known from occurrences in northern Quiet Lake map-area. Northeast of Tintina Trench occurrences of map-unit 7 are restricted to the vicinity of McEvoy Lake in northeastern Finlayson Lake map-area and to an area in Anvil Range, Tay River map-area. Map-unit 7 includes thick bedded orthoquartzite and carbonate rocks that are generally resistant to weathering and form excellent exposures particularly in Quiet Lake and Finlayson Lake map-areas (Fig. 2).

Southwest of Tintina Trench map-unit 7 can be subdivided into three members that have a total thickness ranging from 1000 feet near the headwaters of McConnell River to a maximum of about 5000 feet near Fox Mountain. Near McConnell Peak in Quiet Lake map-area and in the southwestern part of Finlayson Lake map-area map-unit 7 is about 3500 feet thick.

The basal member of map-unit 7 is about 2000 feet thick in much of Quiet Lake map-area, but is only 25 feet thick near the head of McConnell River and is missing in the area north of Pass Peak. In Finlayson Lake map-area, south of Indigo Lake, west of McNeil Lake, and northwest of peak 6747 map-unit 7 is about 1000 feet thick. In the project area the basal member of map-unit 7 consists of sandy and silty dolomite. Near Mount Hogg in Quiet Lake map-area the lower member contains lenses of massive grey dolomite and in parts of Finlayson Lake area it includes minor red slate which grades upward into thick-bedded dolomite with chert lenses.

The middle member of map-unit 7 includes dolomitic sandstone and orthoquartizte which commonly shows a spectacular development of current bedding and ripplemarks. The orthoquartzite is a mature sandstone composed wholly of well rounded, monocrystalline quartz grains of high sphericity that range from medium to coarse sand sizes. The middle member is about 1000 feet thick except near the head of McConnell River and west of Seagull Creek in Quiet Lake map-area where it is 300 feet thick.

Dark grey to black dolomite comprises the upper member. Near Fox Mountain (Quiet Lake map-area) this member is more than 1500 feet thick, but elsewhere in the map-area its thickness is less than 1000 feet.

At the occurrences near McEvoy Lake map-unit 7 is much thinner than it is southwest of Tintina Trench, but a three fold division is valid there also. The rocks are chiefly sandy and silty dolomite and orthoquartzite. South of McEvoy Lake on the eastern edge of Finlayson Lake map-area the orthoquartzite is overlain by fossiliferous buff and light grey dolomite.

In Anvil Range, orthoquartzite and massive light grey dolomite occur separately. The total thickness of strata there is about 100 feet. Several small occurrences of medium grey, thin-bedded, fossiliferous, fetid limestone grouped with map-unit 7 are also found in Anvil Range.

Map-unit 7 overlies graptolitic slate of map-unit 5 conformably near Fox Mountain and Barite Mountain in Quiet Lake map-area and southeast of the peak, elevation 6747 feet, in Finlayson Lake map-area. Elsewhere relations at the lower contact of map-unit 7 are obscure. The map-unit is overlain unconformably by strata of the Earn Group of Late Devonian and younger age at numerous localities on both sides of Tintina Trench.

Parts of map-unit 7 are highly fossiliferous (Appendix 1D) and the age of the unit is consequently well defined as ranging from late Early Silurian to Late Devonian. Fossils found in Quiet Lake and Finlayson Lake map-areas indicate a Silurian age for the lower member. Judging from the fossil data part of the lower member of map-unit 7 is equivalent in age to the upper part of the Kechika Group and the contact between map-unit 7 and Kechika Group strata must therefore be diachronous. Fossils from the upper member of map-unit 7 are of Middle Devonian age and at least two collections of probably Early Devonian fossils have been identified. In addition, two collections from dark grey dolomite of the upper member in Finlayson Lake map-area contains faunas of definite Late Devonian (Famennian) age.

Map-unit 7 is correlative with parts of the Sandpile and McDame Groups defined by Gabrielse (1963) in McDame map-area. However Ordovician beds, locally present in the Sandpile Group, are not known from map-unit 7. Strata equivalent to map-unit 7 have been mapped in adjacent areas. Campbell (1967) referred rocks that show strong lithologic affinities to map-unit 7 to the informally named Askin ? Group in Glenlyon map-area. Map-unit 7 is also correlative with map-units 5 and 6 of (Gabrielse, 1967a) in Watson Lake map-area and with map-units 10 and 12 of Blusson (1966) in Frances Lake map-area.

Devonian and Mississippian

Earn Group (Map-unit 8)

Strata broadly correlative with the Earn Group of Campbell (1967) occur extensively northeast of Tintina Trench throughout the project area. In this report these rocks are included in the Earn Group and mapped together as map-unit 8. No attempt is made to distinguish or map the various Formations that constitute the group as defined by Campbell (1967) in Glenlyon map-area, but gross lithologic subdivisions are indicated on the accompanying maps.

Rocks of the Earn Group are most widespread in the area between Tay River and Anvil Range in Tay River map-area. Strata that belong largely to the Earn Group, but which include undifferentiated Ordovician, Silurian and Devonian ? rocks, are mapped as map-unit 8a and occur over a large area in northern Sheldon Lake map-area. Scattered outcrops of the Earn Group are also found in the north-east part of Finlayson Lake map-area.

The thickness of the Earn Group is unknown, but is thought to be in excess of 6000 feet and is estimated to be in the order of 10,000 feet. The group is made up of chert, quartz-chert sandstone, shale, argillite, chert-pebble conglomerate and limestone but its internal stratigraphy is not known. Even the succession of the major lithologic units outlined below is uncertain. Probably the lowest beds of the Earn Group in Tay River map-area are found in the vicinity of Stokes Lake and consist of medium grey and dark grey, medium- to thin-bedded impure quartz-chert sandstone. Chert pebble conglomerate occurs locally. Greenish and grey shale and black chert are interbedded with the quartz-chert sandstone.

Dark grey to black, thin-bedded chert and argillaceous chert (Fig. 6), at least 1500 feet thick, apparently overlies the sandstone sequence and is best exposed in the area west of the headwaters of Tay River. This member also contains minor interbedded chert-pebble conglomerate. Throughout the Earn Group such conglom-erate interbeds are commonly no more than 100 or 200 feet thick and are lensoid in shape. They can generally not be traced along strike for more than a mile or two. The stratigraphic relations of the thick chert unit are not clear, but it is thought to be overlain by a sequence of dark grey to black siltstone, slate and argillite which is commonly calcareous. Beds of light grey to whitish sandstone are locally prominent in this part of the Earn Group.

A massive, mappable unit of light grey to dark grey chert pebble conglomerate overlies other rocks of the Earn Group and extends in two poorly defined belts from the western edge of Tay River map-area through Sheldon Lake map-area. This unit, named the Crystal Peak Formation by Campbell (1967), consists chiefly of dark grey to black subrounded chert and siliceous argillite fragments in a matrix of smaller, angular to rounded, sand-sized, chert, quartz and other lithic grains. Pebbles are as much as 15 cm across, though they are generally about 3 or 4 mm in diameter. Where pebbles are rare the rock grades into sandstone and the member shows bedding. The proportion of pebbles to matrix is generally about 1 to 1. The conglomerate has an apparent thickness of about 4500 feet on Stokes Mountain in northwest Tay River map-area. Campbell (1967) cited evidence indicating that the thick chert pebble conglomerate is entirely Osagean (Early Mississippian) in Glenlyon map-area.

The youngest subdivision of the Earn Group is a limestone named the Kalzas Formation by Campbell (1967). It is exposed in several isolated localities in northwestern Tay River map-area, and is not as extensive and continuous in the project area as in Glenlyon map-area (Campbell, 1967). In Glenlyon map-area the Kalzas Formation is grey and buff weathering, dark grey, fetid, fossiliferous limestone, about 1000 ft. thick, that overlies chert pebble conglomerate of the Crystal Peak Formation. The limestone in Tay River map-area also overlies chert pebble conglomerate and locally (Fig. 6, 7, Appendix 1E) contains fossils like those reported from the Kalzas Formation by Campbell (1967) indicating that its age is Osagean (Lower Mississippian).

Earn Group strata generally represent a rapid accumulation of material in a large relatively shallow basin, under marine conditions. The uniformity of composition and immaturity of the chert pebble conglomerate lenses found through the entire section indicates a lithologically uniform source area, from which material was derived and quickly deposited. Source rocks for clastic parts of the Earn Group may be the chert sections of Ordovician and Silurian age included in the Road River Formation. However, chert within the Earn Group probably also supplied part of the material for the coarse chert pebble conglomerates, which may be regarded as intraformational conglomerates lying unconformably on earlier deposited parts of the unit.

Rocks of the Earn Group lie unconformably on map-units 1 ("Grit Unit"), 4, 6 (Road River Formation) and 7, and the youngest rocks definitely not belonging to the Earn Group contain Eifelian (lower Middle Devonian) fossils (Tempelman-Kluit, in press). Earn Group rocks are overlain unconformably by strata of the Anvil Range Group in which the oldest fossils are fusulinids of latest Pennsylvanian or earliest Permian age. Fossils identified from the Earn Group (Appendix 1E) range in age from middle Frasnian (mid early Late Devonian) to Osagean (Early Mississippian). The Earn Group, as used in this report, therefore ranges in age from early Late Devonian to Early Mississippian.

Sylvester Group, lower part (Map-unit 9)

Rocks similar to those of the Earn Group, but which occur southwest of Tintina Trench are included as map-unit 9 and are correlated with the lower part of the Sylvester Group of McDame map-area (Gabrielse, 1963). In the project area map-unit 9 occupies a narrow belt that parallels the Trench roughly through Tay River, Quiet Lake and Finlayson Lake map-areas. Other scattered occurrences are found in Quiet Lake map-area near Big Salmon Lake.

Nothing is known of the internal stratigraphy and thickness of the Lower part of the Sylvester Group in the project area. Rocks contained in it are lithologically like those described from the Earn Group and include clastic sedimentary rocks, of which quartz-chert sandstone or greywacke is commonest. Chert and associated siliceous slate are also common. Map-unit 9 usually weathers a dark colour and only its coarser clastic, chert pebble conglomerate weathers resistantly.

Map-unit 9 overlies rocks of map-units 3 (Kechika Group) and 7 unconformably as illustrated by map relationships. The youngest fossils obtained from underlying rocks definitely not part of map-unit 9 are Famennian (late Late Devonian) (see F36, Appendix 1D). Map-unit 9 is locally overlain (conformably?) by a limestone (map-unit 10) in parts of Quiet Lake and Finlayson Lake map-areas near Tintina Trench. This limestone, possibly equivalent to the Kalzas (Campbell, 1967) or Nizi (Gabrielse, 1963) Formations, is probably Mississippian. Few fossils have been found in map-unit 9 and none are diagnostic and definitely dated so that its age is limited by underlying and overlying strata and ranges, in the project area, from latest Devonian through part of the Mississippian.

Map-unit 9 is correlated with lower, non-volcanic, part of the Sylvester Group of McDame map-area on lithologic and stratigraphic grounds. In McDame map-area the Sylvester Group ranges from Late Devonian to Middle Mississippian, indicating it may include somewhat older strata in the type area than in the report area. The lithologic and stratigraphic similarities between map-unit 9 and the Earn Group suggest possible correlation of these units, but evidence to-date indicates that the Earn Group suggest possible correlation of these units, but evidence to date indicates that the Earn Group is in part older than map-unit 9 in the project area and correlation of the two would require major time transgression of the lower unconformable contacts of the two map-units across Tintina Trench.

Map-unit 10

Rocks included in map-unit 10 occupy a narrow belt a few miles southwest of, and parallel with, Tintina Trench in Quiet Lake and Finlayson Lake map-areas. Map-unit 10 consists of medium- to thick-bedded, fine-grained sandy limestone with thin, argilleous interbeds. The limestone is dark grey in colour and weathers buff; it commonly shows cross-bedding and ripplemarks.

Map-unit 10 apparently overlies strata of map-unit 9 that are correlated with the Sylvester Group. Relations at the lower contact are not clear, but the contact may be conformable. The age of map-unit 10 is not limited by younger overlying rocks in the project area, fossils collected from it at a locality (F94) in Finlayson Lake map-area (see Appendix 1F) are probably Mississippian.

Map-unit 10 may be correlative with the Kalzas Formation of Campbell (1967), a carbonate unit which is Osagean (Early Mississippian). Alternately map-unit 10 may be correlated with the lithologically similar Nizi Formation, which is assigned to the Upper Mississippian (Chesteran) (Mamet and Gabrielse, 1969). The meagre fossil evidence presently available and the stratigraphic relations allow either correlation.

Sylvester Group, upper part (Map-unit 11)

Rocks mapped as map-unit 11 and found southwest of Tintina Trench in the project area are tentatively correlated with the upper, volcanic, part of the Sylvester Group (Gabrielse, 1963). They occur in Quiet Lake and Finlayson Lake map-areas and are particularly common near the boundary of these two areas.

The internal stratigraphy and thickness of the map-unit are not known, but it includes a wide variety of volcanic rocks of andesitic to basaltic composition. Massive, medium to dark green altered greenstone and fine-grained diorite constitute much of the non fragmental part. Amphibolite is locally common. Volcanic breccias and lithic tuffs, generally maroon and green, with minor interbedded flow rocks, slate, chert and greywacke make up the volcaniclastic part. Volcaniclastic rocks are interbedded with the massive extrusive rocks and the lithologic distinction, between the two, shown on the maps, has no known stratigraphic significance. Map-unit 11 also includes various felsic breccias and tuffs that are separated from other parts of the map-unit on the accompanying maps.

No fossils have been found in rocks of map-unit 11. It overlies strata of map-units 9, 7 and 3 unconformably and is thus considered to be Mississippian or younger. No limits are available on a minimum age but regional correlation suggests two possibilities. If map-unit 11 is equivalent to the volcanic part of the Sylvester Group, which is pre-Late Mississippian, it must be Lower Mississippian. If, on the other hand, the map-unit is correlated with the Anvil Range Group (map-unit 12) northwest of Tintina Trench, its age is Late Pennsylvanian and Early Permian. Because the stratigraphic relations of map-units 11 and 10 are not known neither of these possible correlations can be discarded. Because Permian volcanic rocks, lithologically indistinguishable from the Sylvester volcanics, are also found with Sylvester Group rocks in McDame map-area (Wolfe, 1965) it may be that map-unit 11 in the project area includes strata equivalent to both the Sylvester and the Anvil

Range Groups.

Pennsylvanian and Permian

Anvil Range Group (Map-unit 13)

A thick assemblage of volcanic and allied rocks, found northwest of Tintina Trench throughout the project area, and here mapped as map-unit 13, is correlated with the Anvil Range Group. Rocks of the Anvil Range Group, are found in Anvil Range where particularly good exposures are seen in the vicinity of Rose Mountain, the type locality. Outcrops extend southeast from here in an irregular belt on the northern side of Tintina Trench through the northeast corner of Quiet Lake map-area to the eastern edge of Finlayson Lake map-area.

The name Anvil Range Group was originally applied by Campbell (1967) to an assemblage of volcanic and associated rocks in Glenlyon map-area. Campbell's Anvil Range Group included with the volcanic rocks, strata that are now considered of Cambrian or Ordovician age (i.e. equivalents of map-unit 4). The Anvil Range Group has therefore been redefined (Tempelman-Kluit, in press) to include only the volcanic and allied sedimentary rocks of late Paleozoic age. In Anvil Range near the type locality, the Group is divisible into three formations; the lower is a sequence of light coloured chert and tuffaceous chert up to 2000 feet thick, the middle a basalt unit, about 1500 feet thick, and the upper a limestone unit of unknown thickness. A similar threefold subdivision in rocks now considered equivalent to the Anvil Range Group can be made in Watson Lake map-area (Gabrielse, pers. comm.) southeast of the project area. On the accompanying maps these formations are separated in a part of Tay River map-area, but elsewhere in the project area the Anvil Range Group is sub-divided only on lithologic grounds.

The lower chert and tuff formation of the Anvil Range Group includes pale green, greenish brown, grey and locally red massive to thin-bedded more or less argillaceous and tuffaceous chert. The chert weathers white and contains a considerable proportion of fine chlorite. "Radiolarian" (?) spherulites are locally common.

Alkali basalt makes up much of the volcanic part of the Anvil Range Group (map-unit 13b) in central Tay River map-area (<u>see</u> analyses given by Tempelman-Kluit, in press). The basalt includes tuffs, massive amygdaloidal flow rocks and pillowed basalt of which massive and pyroclastic types are the commonest. Commonly these rocks are medium to dark green and massive. They lack primary layering and generally have no foliation. Magnetite dusted through the rocks is common and epidote-quartz filled veinlets are seen everywhere. The rocks are made up of a mat of tiny, saussuritized plagioclase laths generally about 0.2 mm long through which equant, subhedral fresh augite grains are scattered. Chlorite constitutes about a third of the volume of the rocks and occurs interstitially to feldspar. Amygdules in the basalt are commonly filled with calcite, but celadonite and chlorite are not uncommon.

The upper formation of the Anvil Range Group (map-unit 13c), found only in isolated fault blocks in Tintina Trench, includes massive, dense, buff and light grey, buff weathering limestone.

On Rose Mountain the relations between the basal, cherty and middle, volcanic formations are clearly gradational and interfingering and the contact is a facies boundary. The thickness of chert ranges from 1500 feet, just north of Pelly River to a few feet in northern Anvil Range, and in much of northern Anvil Range the map-unit is absent. The volcanic part of the Anvil Range Group is probably not more than 2000 feet thick anywhere in central Tay River map-area and is considerably thinner at some localities, possibly as a result of erosion.

Rocks of map-unit 13 elsewhere in the project are similar to those described above. Limestone mapped at isolated localities near Finlayson Lake may be correlative with the upper formation.

The age of Anvil Range Group strata is defined by two fossil collections from central Tay River map-area (Tempelman-Kluit, in press). These collections indicate that map-unit 10 ranges from Late Pennsylvanian to Middle Permian and demonstrates that volcanism was restricted to the Early Permian. Rocks of the Anvil Range Group are correlated with lithologically similar, areally extensive volcanic strata found in adjacent regions. Specifically these include Units 8 and 9 of Watson Lake map-area (Gabrielse, 1967a), and part of Unit 13 in Frances Lake map-area (Blusson, 1966). Anvil Range Group strata may be correlative with part of Unit 11.

Triassic

Map-unit 15

Rocks of Triassic age included in map-unit 15 outcrop at several localities in Tay River map-area, but were not found elsewhere. Two out-crop areas are known in Tay River valley and a third is found on the north side of Pelly River on the south flank of Rose Mountain.

At the two northern localities the rocks include thin-bedded impure, micaceous sandstone with lesser interbedded dark shale. The proportion of shale to sandstone varies from place to place. Cross-bedding is common in the sandy beds. Thin beds of fine grained grey limestone occur locally. The rocks weather greyish brown and are fairly recessive. Locally thin beds of conglomeratic, micaceous sandstone are seen with pebbles several inches across. The thickness of strata exposed at the northern localities is unknown, but must be in the order of 1000 or 2000 feet. In most exposures the rocks are tightly folded.

The locality along Pelly River includes elongate bodies of massive, resistant cobble conglomerate. The conglomerate contains rounded fragments of low sphericity that range from 6 inches or more across to sand sizes, but which are generally 1/2 inch in diameter. The dominant clast types are metaquartzite (50 percent), chert (20 percent), basalt (20 percent) and limestone (10 percent) and these make up three quarters of the rock's volume. All clasts in the conglomerate are demonstrably of local derivation. The matrix includes muscovite flakes and a large proportion of angular, unstrained quartz grains as well as small grains of the rock types mentioned above. The conglomerate is well indurated being cemented by calcite and siliceous material and tends to break across, rather than around pebbles. Thin-bedded, platty, medium-grey silty and calcareous slate, locally with inter-bedded grey fine grained argillaceous and sandy limestone occurs at several places and is apparently a lower member of the conglomerate unit. At least 2000 feet of strata assigned to map-unit 15 are found at the Pelly River locality, but because the conglomerate lacks bedding accurate measurement of thickness is not possible.

Rocks of map-unit 15 overlie older rocks with pronounced unconformity and are found at different localities lying on strata of map-units 1 (Grit Unit) and 8 (Earn

Group).

Fossils from map-unit 15 include pelecypods (Appendix 1G) and conodonts (Tempelman-Kluit, in press) which indicate a Middle and/or Late Triassic age. Map-unit 15 is tentatively correlated with lithologically similar strata found in Glenlyon map-area (i.e. map-unit 19b of Campbell, 1967). No strata equivalent to map-unit 15 are presently known in a large area to the east of the localities described herein.

Cretaceous

Map-unit 18

Map-unit 18 includes volcanic rocks of late Mesozoic age which outcrop over a vast area in northern parts of Tay River map-area and in east central Sheldon Lake map-area, where they form the South Fork Range. The map-unit is resistant weathering and good exposures are found locally. Large outcrop areas are covered by felsenmeer of frost-heaved boulders. Particularly good exposures occur on the mountain 10 miles south of Laforce Lake. Rocks of map-unit 18 are generally easily distinguished in the field from volcanic rocks of the Anvil Range Group. In contrast to rocks of map-unit 18, Anvil Range Group strata contain no biotite, and quartz phenocrysts and plagioclast phenocrysts are rare. Nevertheless some areas mapped as map-unit 16 may include strata belonging to the Anvil Range Group (map-unit 13b).

For the most part map-unit 18 comprises massive flow rocks that approximate dacite and rhyodacite in composition. At least 5,000 feet of rocks are present locally. Pyroclastic varieties are uncommon and sedimentary beds are absent. Individual flows are rarely well defined, but range in thickness from 10 feet to 300 feet with most about 50 feet thick. Phenocrysts are plagioclase, quartz and biotite in a fine-grained feldspathic groundmass. Plagioclase (An_{40}-An_{60}) phenocrysts make up about 25 percent of the rocks and are subhedral and generally less than 5 mm across; they show oscillatory zoning and are commonly partly altered. Quartz phenocrysts make up 20 percent of the rocks and are subhedral to rounded and slightly resorbed; they are equant and 3 or 4 mm across. Biotite, pleochroic in brown, forms ragged, partly corroded and chloritized small phenocrysts, about 3 mm in longest dimension. Plagioclase (25 percent), K-feldspar (10 percent) and quartz (7 percent) make up much of the groundmass occurring as anhedral tiny grains about 0.2 mm across.

Rocks of map-unit 18 overlie older strata unconformably. Present relief on the unconformity is about 2000 feet. At a locality 5 miles north of Margori Lake near the east margin of Tay River map-area the rocks appear to grade into plutonic rocks of map-unit 17, but the relationship between the plutonic and volcanic rocks is not clear. Map-unit 18 may represent the extrusive equivalent of the plutonic rocks of map-unit 17.

The age of map-unit 18 is inferred from radiometric evidence because no stratigraphic data are available. Potassium-argon determinations on biotite yielded ages of 100, 117 and 86 m.y. These ages imply a Cretaceous time of extrusion but the wide range suggests caution should be used concerning the implication of these ages until more work is done.

Tertiary

Map-unit 19

An assemblage of immature, poorly indurated coarse clastic rocks and inter-bedded shale (map-unit 19) is found at isolated localities in Tintina Trench and along McMillan River valley. Good exposures are seen in the valley of Grew Creek and Lapie River and along the road near Ross River Post.

The map-unit includes buff to white weathering conglomerate and coarse pebbly sandstone with angular to rounded pebbles and cobbles of chert, slate, schist, quartzite and quartz. The rocks are poorly sorted and their constituent fragments at any locality reflect the lithology of underlying rocks in the immediate vicinity. They are thick bedded and layering is marked largely by grain size variation. Fragments are well cemented by hematite and quartz, but the rock generally breaks around the pebbles. The coarse clastic rocks grade laterally into, and are interbedded with, brown siltstone and silty shale that contains abundant imprints of plant remains. Thin beds of impure coal are found locally.

Exposures of map-unit 19 are less than 100 feet thick, but outcrops just south of Ross River Post have an aggregate thickness of 500 feet or more. The lower contact was not seen, but it is inferred from the immaturity of these deposits that the rocks overlie older strata unconformably.

The age of map-unit 19 is not closely defined, but plant macrofossils found in shaly interbeds (see Appendix 1H) have been assigned a Paleocene age.

Tertiary to Recent

Map-unit 20

Basalt, assigned to map-unit 20, is found in Tintina Trench near the western margin of Tay River map-area and near Grew Creek as well as at one or two localities on and near Hoole River in Finlayson Lake map-area. The basalt is a deep, chocolate brown weathering rock that is strongly fractured; it is dark green on fresh surfaces. The rock is fine-grained and porphyritic; its groundmass is made up of a mat of tiny plagioclase (An_{65}-An_{76}) laths with scattered epidote and brown alteration minerals. It contains sparse phenocrysts of greenish olivine to 5 mm across as well as a few larger grains of clear sanidine. Augite forms subhedral, equant microphenocrysts throughout.

Basalt exposures are nowhere more than 50 feet thick, but at the locality near Grew Creek an aggregate of 100 or 200 feet of strata may occur. Layering is absent and the basalts at any one locality appear to be part of a single flow. Columnar jointing is prominent at some localities.

PLUTONIC ROCKS

Four groups of lithologically distinct plutonic rocks occur in the project area. Areally the most important are medium- to coarse-grained, locally porphyritic biotite granodiorite and allied types of probable Late Cretaceous age (map-unit 16). Quartz feldspar porphyry of granodioritic composition (map-unit 17) and probably also Late Cretaceous is next in areal extent. Serpentinite, originally peridotite to pyroxenite, of Late Permian or Early Triassic age occurs locally along Tintina Trench and in a belt parallel to, and southwest of, the Trench. Syenite of presumed

Mississippian age forms small intrusive plugs in Quite Lake map-area where it is associated with volcanic rocks of the Sylvester Group.

Map-unit 12

Map-unit 12 includes small plugs and sills of syenite that intrude volcanic rocks of the Sylvester Group and older rocks. The syenite is restricted to the north-eastern part of Quiet Lake map-area where it forms reddish and brownish weathering exposures.

The syenite is an equigranular, medium-grained rock made up essentially of subhedral orthoclase and interstitial anhedral hornblende. At most localities the rock is strongly fractured. Near contacts the syenite commonly contains inclusions of the surrounding strata.

In the absence of stratigraphic and isotopic data the age of map-unit 12 is inferred from its close spatial association with rocks of map-unit 11 which are thought to be Mississippian.

Map-unit 14

Ultrabasic rocks are found at widely scattered localities in the project area. Southwest of Tintina Trench these rocks occur in an irregular southeast trending belt that extends from Dunite Mountain to near Nisutlin Lake. The largest bodies occur in Quiet Lake map-area near Dunite Mountain and Tower Peak. A number of long, wide dykes of ultrabasic rocks occur along the northern side of Tintina Trench through Tay River and Finlayson Lake map-areas and several equidimensional masses are also found northeast of, and not far from, the Trench in Finlayson Lake map-area. Although these rocks may not all be of the same age they are mapped collectively as map-unit 14.

Dunite is the chief primary rock at the occurrences in Quiet Lake map-area, but the rocks are strongly serpentinized. Minor amounts of pyroxenite were noted near the margins of the Dunite Mountain body. At Dunite Mountain the metamorphic rocks dip gently beneath the ultrabasic rocks suggesting that the ultramafic mass is lopolithic in shape.

The dominant rock at the localities along the northern side of Tintina Trench is a dark green to black serpentinite, made up largely of serpentine that is pseudomorphous after original olivine and orthopyroxene. Where the rock is weakly serpentinized it is clear that the parent was a harzburgite containing about 75 percent medium- to coarse-grained olivine and 25 percent enstatite, partly altered to bastite with magnetite and perovskite as accessory minerals. Along the margins of the bodies the rocks are altered to buff weathering pale greenish talc-carbonate rocks with minor amounts of fuchsite.

Ultrabasic bodies along the northern margin of Tintina Trench are fault bounded and have rocks of the Anvil Range Group on one side and rocks of the "Grit Unit" on the other. The position and continuity of the ultrabasic dykes is well brought out by aeromagnetic patterns, which by their asymmetry, indicate that these bodies dip steeply southwestward. The bodies are typical alpine intrusives and as such were probably emplaced tectonically as crystalline masses.

The ultrabasic rocks along Tintina Trench were apparently emplaced prior to deposition of map-unit 15 (which contains pebbles of serpentine) in Middle or Late Triassic time and their transgressive relations to Anvil Range Group volcanic rocks indicate that map-unit 14 is younger than Middle Permian. Map-unit 14 along Tintina Trench is therefore considered to be of Late Permian and/or Early Triassic age. Certain bodies in Quiet Lake map-area may be somewhat older, because conglomerates in the Sylvester Group (Mississippian) locally contain pebbles of serpentine presumably derived from map-unit 14.

Map-unit 16

Granitic rocks underlie a large part of the project area and particularly the southwest half of Quiet Lake map-area, central and eastern Tay River map-area and central Finlayson Lake map-area. Generally the rocks are resistant and well exposed (frontispiece), but the topography developed on the granitic rocks is distinguished, especially in areas northeast of Tintina Trench, by its smooth upland slopes and is not rugged, as in many other areas where granitic rocks occur (Fig. 7). The topography of the Itsi Range in northeastern Sheldon map-area, which is underlain by granitic rocks, is rugged. In general the rocks weather medium grey, but heavy lichen cover gives outcrops a dark colour. Because the rocks are lithologically similar and because there is no evidence to indicate that these rocks are not all of the same age they are mapped together as map-unit 16.

Granitic rocks occur in bodies of widely different size and shape and although their contacts are locally concordant the plutons are generally strongly discordant. Nevertheless the larger bodies are elongate in a direction that is roughly parallel with the structural grain of the region. Table 1 gives a breakdown of the different plutons and shows their areal extent and average specific gravity as determined from available hand specimens. The table shows that five major batholiths account for about 75 percent of the nearly 2000 square miles that are underlain by granite in the project area. The average of 450 specific gravity determinations on rocks of map-unit 16 is 2.64, and the mode is 2.625. More than one third of the specimens fall in the specific gravity range 2.62 to 2.65.

Detailed petrographic information is not available for most of the granitic rocks in the project area and the following description is therefore brief. Granitic rocks examined from the northeast side of Tintina Trench range from biotite quartz monzonite to biotite quartz diorite, but most are granodiorite (Fig. 8) and the average modal ratio quartz:plagioclase:potash feldspar is 36:48:16. No systematic compositional variation has been noted in any of the granitic bodies, but few have been studied in sufficient detail to rule out the existence of such variation. The rocks are generally medium grey and medium grained with equigranular texture, but porphyritic varieties are common and foliated types are seen at several places as, for example, on the southern slope of Mt. Mye. No attempt has been made to map the different textural phases throughout the project area; only where this information is available is it incorporated in the map.

Except where foliated granitic rocks show the characteristic hypidiomorphic granular texture of plutonic intermediate rocks. Plagioclase forms euhedral to subhedral, twinned tabular crystals to 5 mm long and commonly contains small inclusions of potash feldspar and muscovite. The mineral is generally weakly zoned and its composition ranges widely from albite to labradorite, but most is restricted to the range An_{20} to An_{20}. Plagioclase is generally partly saussuritized and particularly the cores of zoned grains are so altered; grain boundaries with potash feldspar are commonly albitized. Potash feldspar, generally microperthitic orthoclase, occurs as anhedral to subhedral, poikilitic grains, which commonly enclose small crystals of plagioclase, quartz and biotite. Where the rocks are porphyritic phenocrysts are euhedral perthitic orthoclase showing Carlsbad twinning. Quartz forms anhedral, equant grains to 3 mm across and locally enclose biotite or muscovite; it occurs interstitially to the feldsparts. Quartz also forms myrmekitic intergrowths with potash feldspar. Biotite is the main mafic mineral and locally makes up a quarter of the rock's volume. The mineral is pleochroic in browns and is found as subhedral corroded grains that are commonly partly chloritized. Muscovite, present in small proportions in most specimens is generally intergrown with biotite. Hornblende is rarely found and is everywhere subordinate to biotite. Zircon is the commonest accessory mineral; sphene and allanite are rare.

The foliated granitic rocks are mineralogically identical to the hypidiomorphic types, but their texture is markedly different. Feldspars, particularly orthoclase, are commonly round or ovoid. Plagioclase and micas are bent and quartz is form-oriented and strained. Segregation of minerals is generally weak and the rock lacks well developed compositional layering.

Little stratigraphic evidence is available within the project area to limit the age of intrusive rocks of map-unit 16. The youngest rocks cut by the granitic rocks in the project area are Early Permian (Anvil Range Group) and the oldest rocks definitely younger are Paleocene. Potassium-argon ages determined on micas from rocks of map-unit 16 (Table 1) must therefore be considered the best approximation to the time of consolidation of these plutonic rocks. Eight determinations to date fall in the range 74 to 90 m.y. and overlap, within their limits of error, in the range 80 to 95 m.y. Closely similar ages have been determined on lithologically allied plutonic rocks that occur in other parts of Yukon outside the project area (Gabrielse, 1967). In addition four potassium-argon ages determined on regionally and (?) thermally metamorphosed rocks in the project area (19 ± 5, 83 ± 26, 93 ± 4 and 99 ± 5) are in accord with those determined on the granitic rocks and probably reflect the time of intrusion of these rocks. Because the granitic rocks are generally much alike and evidently all of one suite, and because there is fair accord between the isotopic ages it seems valid to say that rocks of map-unit 16 were emplaced in Late Cretaceous time. A 66 m.y. age determined on biotite of a sample from the batholith at the head of Black River falls outside the range of other determined dates. If may represent an isolated, younger pluton.

Map-unit 17

Map-unit 17 includes quartz feldspar porphyries and granodiorite that are considered to be the plutonic equivalents of the volcanic rocks mapped as map-unit 18. These rocks are found in southeastern parts of Tay River map area and in adjoining parts of Sheldon Lake map area; they are generally resistant and resemble rocks of map-unit 16.

The porphyries have a fine-grained greenish quartzo-feldspathic matrix that is generally weakly saussuritized and which makes up as much as half the volume of the rock. Plagioclase (about An_{50}), commonly saussuritized, forms euhedral and broken phenocrysts generally 3 or 4 mm long. The mineral shows oscillatory zoning and complex twinning and constitutes about 25 percent of the rock's volume. Quartz (15 percent) forms subhedral, equant grains about 3 mm across; its grain boundaries are commonly resorbed. Biotite (10 percent) forms euhedral small phenocrysts that are partly chloritized. The rocks contain minor amounts of potash feldspar and hornblende as anhedral phenocrysts. Locally the rocks grade into fine-grained equigranular biotite granodiorite.

Rocks of map-unit 17 seem to grade into those of the South Fork Volcanics (map-unit 18) and similar porphyries occur within the volcanic rocks. This association suggests that the rocks may be coeval and that map-unit 17 is the subvolcanic equivalent of the South Fork Volcanics.

METAMORPHIC ROCKS

Metamorphosed rocks of unknown and probable varied stratigraphic affilation are widespread in Quiet Lake and Finlayson Lake map-areas where they are separated lithologically into three map-units. The age of these rocks is unknown, but they probably include strata of different ages and may be, in part, equivalent to other rock units in the project area. The metamorphic rocks in Quiet Lake map-area (Units A, B, and C) are continuous with metamorphosed rocks of the Yukon Group in

Teslin, Laberge and Glenlyon map-areas (Mulligan, 1963; Bostock and Lees, 1938; Campbell, 1967). The Yukon Group was originally thought to be Precambrian, but it is now clear that this group of metamorphic rocks includes at least some metamorphosed Paleozoic strata (Mulligan, 1963; Campbell, 1967).

Map-unit A

Rocks assigned to map-unit A are found in the southwest half of Quiet Lake map-area, where they are invariably associated with rocks of map-unit C and with the large granodiorite bodies found there. Lithologically similar rocks in Finlayson Lake map-area, northeast of Tintina Trench occur in a broad structural culmination where they are also associated with bodies of granitic rocks.

Map-unit A includes a remarkably uniform assemblage of various pelitic schists with lesser phyllite and limestone. For the most part the schistose rocks are brownish weathering and moderately resistant. The rocks are quartz-biotite-muscovite schists with varied proportions of mica and quartz; chlorite and graphite are locally important and garnet is seen in places. Locally the rocks grade into micaceous metaquartzites. The schists are generally well foliated and display a coarse schistosity. Limestone and marble form thin "beds" interfoliated with schistose rocks. Phyllite included in map-unit A is apparently gradational with the schists.

Rocks of map-unit A are lithologically similar to those of the Big Salmon Complex (Mulligan, 1963), rocks of map-unit 6 in Glenlyon map-area (Campbell, 1967) and rocks of map-unit 1 in Laberge map-area (Bostock and Lees, 1938). Part of map-unit A may be as old as Proterozoic, but it probably includes a considerable proportion of Paleozoic rocks as do similar metamorphosed rocks in adjacent regions. Blusson (1967a) has suggested that parts of Unit A in Finlayson Lake map-area are correlative with the "Grit Unit" (map-unit 1).

Map-unit B

Rocks mapped as map-unit B are associated with those of map-units A and C and are found in the southwestern part of Quiet Lake map-area. Map-unit B includes recrystallized limestone and dolomite and minor schist. Much of the marble is grey and greyish weathering, thick-bedded to massive, and made up of sparry calcite.

The marbles are of unknown correlation and may represent equivalents of map-units 2 and 7 as well as older carbonate units.

Map-unit C

Map-unit C includes metamorphosed pelitic rocks, migmatitic rocks, migmatitic gneiss and gneissose granitic rocks (Fig. 9). It is found mainly in the southwest half of Quiet Lake map-area and in central Finlayson Lake map-area where it is invariably closely associated with granitic rocks of map-unit 16 and with less highly metamorphosed pelitic rocks of map-unit A.

Age of Metamorphism

Evidence for the timing of metamorphism of map-units A, B and C is meagre as no stratigraphic data limits the age of metamorphism in most of the project area. Two potassium-argon determinations have been made on metamorphic rocks in Quiet Lake map-area. One on biotite from a biotite hornblende schist gave 91 $\pm$ 4 m.y. The other on actinolite from a gneiss in map-unit C returned 83 $\pm$ 26 m.y.

In Anvil Range stratigraphic evidence (Tempelman-Kluit, in press) suggests that map-unit 4 was regionally metamorphosed in Cambro-Ordovician time. However potassium-argon radiometric ages determined on these thermally metamorphosed rocks give 93 and 99 m.y. ages which clearly reflect a much younger thermal event probably related to the intrusion of granitic rocks (map-unit 16). Therefore the 91 and 83 m.y. ages determined on regionally metamorphosed rocks in Quiet Lake map-area may also reflect only the young thermal event related to granitic intrusion rather than the time of regional metamorphism. Mulligan (1963) reported potassium-argon ages of 214 and 222 m.y. determined on micas from metamorphosed rocks that are continuous with map-units A, B and C and on this basis the regional metamorphism of these strata is considered to be Permo-Triassic. It is not known whether the Cambro-Ordovician regional metamorphic event which affected rocks in Anvil Range extended to rocks of map-units A, B and C southwest of Tintina Trench. Conversely there is no evidence of regional metamorphism of Permo-Triassic age on the northeast side of Tintina Trench.

STRUCTURAL GEOLOGY

Details of the structure in the project area are imperfectly known and even some of the larger features are poorly understood. For this reason only a broad outline of the structural geology can be given here.

Tintina Trench separates the project area into two distinct structural provinces which can each be conveniently subdivided further into smaller, less distinct, structural units (See Fig. 10). From northeast to southwest these are as follows:

1. A large broadly antiformal region that is part of Selwyn basin and which occupies Sheldon Lake map-area and the northern part of Tay River map-area with rocks of the "Grit Unit" in its core and younger Devono-Mississippian strata on its flanks. Rocks of the "Grit Unit" are internally deformed by slip on a pervasive crenulation foliation, which generally dips steeply and trends northwestward. Small scale relatively open folds deform bedding and are seen in most outcrops (See Fig. 3). Large folds have not been recognized in these rocks and the relationship of the small scale folds to possible larger structures is unknown. The Devono-Mississippian and undifferentiated Ordovician-Silurian strata are thrown into large open symmetric northwest trending folds. These folds are not mapped and their shape and distribution is unknown. The folds are broken locally by steeply dipping normal (?) faults. The Devono-Missippian and older rocks in this area are overlain unconformably by flat-lying flows of the South Fork volcanics in two large areas.

Two parallel, northwest trending linear troughs, the MacMillan River and Tay River Troughs occupy parts of this region. MacMillan River trough extends from north-central Tay River map-area along Macmillan and Riddell Rivers into Sheldon Lake map-area and is occupied, in places, by a thick sequence of Paleocene(?) conglomerate, sandstone and shale (map-unit 19). Fault control of part of this feature suggests that Macmillan trough may represent a graben activated during the Tertiary and may bear a relationship to the latest movement along Tintina Trench. The Tay River trough along a part of Tay River is occupied locally by immature sandstone and shale of Triassic age (map-unit 15). There is no evidence for fault control but

Tay River Trough may also be a graben that was perhaps formed during early stages of movement along Tintina Trench.

2. A northwest trending structural culmination or arch centered on Anvil Batholith with granitic rocks in its core and relatively old rocks on its flanks (i.e. rocks of map-unit 4), is herein referred to as Anvil Arch. This structural culmination is truncated along its southwest flank by Vangorda fault, one of a system of faults, along Tintina Trench. Anvil Arch is a relatively young feature, probably related in time to intrusion of Anvil Batholith, and is superimposed on all older structures.

Rocks that make up Anvil Arch are internally deformed by a strong crenulation foliation that transposes an earlier foliation mimetic after bedding. The internal deformation is tentatively dated as Cambro-Ordovician (Tempelman-Kluit, in press).

3. A major culmination or structurally elevated zone which is referred to herein as the Finlayson metamorphic complex occupies much of central Finlayson Lake map-area and is underlain by metamorphic rocks of uncertain age. Rocks of the Finlayson metamorphic complex are deformed internally by a penetrative foliation along which recrystallization has taken place. This foliation dips gently in most places. Small scale folds are common but their general disposition and their relationship to major structures is unknown. Study in this area has been hindered by the general absence of marker horizons which makes it difficult to outline major structures.

4. A narrow structurally low area on the northern side of the Finlayson metamorphic complex, the Anvil Depression, underlain by volcanic and allied rocks of the Anvil Range Group, which trends northwestward through Finlayson Lake and Tay River map-areas. The rocks of this belt are not deformed internally, but major structures have not been outlined because of the general paucity of exposures.

5. The Tintina fault system, at least 600 miles long, is a zone of major transcurrent faulting on which about 250 miles of right lateral displacement has been postulated (Roddick, 1967). Although the evidence for the amount and even the sense of movement is debatable, transcurrent displacement seems necessary to explain local marked differences of geologic terrains on opposite sides of the Tintina Trench. Faults in Tintina Trench form an extensive, branching, northwest trending network,

about eight miles wide, that crosses the project area diagonally. The faults dip steeply; the northern ones apparently dip to the southwest judging from the asymmetry of aeromagnetic patterns across them. Other faults are probably vertical or northeast dipping.

Rocks of widely different ages outcrop between faults and all major units are apparently involved in the faulting. Mesozoic and Tertiary coarse clastic rocks are extensive in some of the fault blocks. Stratigraphic omission of between 1,000 and 5,000 feet can be demonstrated across each of the faults and implies dip-slip movement of at least that magnitude. The sense of the apparent dip-slip movement differs from one fault to another and displays no regular pattern. However the net result of this movement has been to bring rocks south of the fault zone upward relative to those north of it by 5,000 feet or more. Strike-slip movement cannot be demonstrated on any of the faults, but the length and continuity of the fault system and the ambiguous dip-slip relations on some faults like the Vangorda (Tempelman-Kluit, in press) imply that important strike-slip displacement has probably taken place. Several pairs of faults bounding the individual long, narrow blocks had dip-slip movement that should have led to steep tilting of those blocks. That such tilting has not occurred can also be taken as evidence of major strike-slip movement on the faults. Finally the relatively small amount of dip-slip movement across the fault system seems incompatible with a structure of its extent. This also suggests that strike-slip movement may have been considerable.

The depth to which the faults extend is not known, but the abundance of serpentinite and the local occurrence of eclogite along the northern faults suggests that these structures may extend well down into the crust, perhaps to the mantle. The southern faults, which do not contain serpentinite, may not be such deep structures.

Displacement on the faults occurred during three distinct intervals. The southwest dipping faults associated with serpentinite moved about early Triassic time, after deposition of Upper Permian carbonate rocks (map-unit 13c) and before deposition of mid-Triassic conglomerate (map-unit 15). Movement at this time was dominantly vertical and was accompanied by emplacement of alpine ultramafic bodies. The more southerly faults along the Tintina Trench and granitic rocks of probable late Early

Cretaceous age are overlain by Paleocene? conglomerate (map-unit 19); movement occurred during mid-Cretaceous or late Cretaceous time and was largely of a trans-current nature. Finally, relatively minor vertical faulting with perhaps limited strike-slip movement took place during the Tertiary.

Fault bounded blocks behaved essentially as rigid masses and are not sheared internally. Shearing is confined to local narrow zones. Subsidiary faults parallel to the larger structures having the same sense of movement as the bounding Grew Creek and Buttle Creek faults are common between the faults and in the block between the Danger Creek and Lapie River faults.

The pattern of major and minor subparallel, branching faults occupying a broad zone in the present area is compatible with the overall scheme of faulting postulated along Tintina Trench. Although evidence from the map-area sheds no light on the nature and amount of transcurrent faulting, it does confirm the timing of movement as in part Late Cretaceous and Tertiary. However there is no evidence of faulting during the early Paleozoic as Roddick (1967) has suggested; all displacement seems to have occurred in Early Triassic and later time.

6. Paleozoic rocks of the Pelly Mountains fold belt can be divided into two structural zones separated by the Porcupine thrust. Northeast of this bounding fault structures dip steeply and folds are upright and tight. Steeply dipping, northwest trending faults, along which vertical movement has taken place, occur between the Porcupine thrust and Tintina Trench. The St. Cyr fault, the most prominent of the steep dipping faults, has had movement which brought up the northeast side relative to the southwest. Deformation of the competent rocks has been by large scale folding, but internal slippage and minor recrystallization has led to the development of a steeply dipping northwest trending cleavage in the less competent rocks (i.e. map-unit 3).

Rocks southwest of the Porcupine thrust occur in large open folds and north-eastward directed, locally folded, thrust sheets. Competent Siluro-Devonian strata have generally slid on thrust faults over Cambro-Ordovician phyllitic and slaty rocks. The folded and thrust-faulted rocks are cut by steep north-northwesterly trending normal faults such as the Seagull Fault.

Figure 2 shows two representative schematic cross-sections to illustrate structures within the Pelly Mountains fold belt.

7. The Pelly Mountains crystalline belt comprises metamorphic and igneous rocks that are locally superimposed on unmetamorphosed sedimentary and volcanic strata of the Pelly Mountains fold belt by a northeasterly directed thrust fault. The metamorphic rocks are recrystallized siliceous rocks of various ages. Bedding is generally obscured by recrystallization and only small scale folds have been recognized. Foliation generally dips gently. Granitic rocks of the crystalline belt are unfoliated and evidently postdate recrystallization of the enclosing metamorphic rocks.

The area of Mississippian and older volcanic and sedimentary rocks (Big Salmon Block) within the Pelly Mountains crystalline belt (Fig. 10) near Quiet Lake and Big Salmon Lake may occupy a downfaulted block within the crystalline rocks. Alpine ultramafic bodies within volcanic and sedimentary rocks trend generally northwestward.

ECONOMIC GEOLOGY

The project area includes, in Anvil Range, the largest zinc-lead deposits discovered in Yukon, and a number of other mineral occurrences. The history of exploration is a short one that did not begin in earnest until completion of the Canol Road, diagonally across the project area, in 1944. Prior to this only some prospecting for placer gold had been carried out along the main streams. The first important discovery in the region came in 1953, when A. Kulan and associates located and staked the Vangorda Creek deposit. An extensive diamond drilling program by Prospector's Airways (later absorbed by Kerr Addison Mines) subsequently outlined the deposit. The nearby Swim Lake zinc-lead body was discovered by Kerr-Addison in 1963 and the Faro ore body was located in 1965 by Dynasty Explorations bringing the total zinc-lead ore discovered in the Anvil Range district to nearly 100 million tons. In 1970 the Faro ore body was brought into large-scale production; so far it is the only producing mine in the region.

Some of the more important mineral properties are listed below and their locations are indicated on the accompanying maps. The properties are identified in the text and on the maps by numbers. Names of the properties are taken from published descriptions - some properties are named after exploration companies that discovered them, others are known by the mineral claim names, still others are named after nearby topographic features. No attempt is made to describe the mineral properties in detail as the writer has examined only a few of them. Instead a brief note on the character of the occurrences is included with references to more complete descriptions in the Yukon mineral industry reports and other publications.

A survey of the lode mining potential of the Yukon by Green (1968) includes some suggestions for exploration that apply to the project area. Because massive sulphide deposits in the region are restricted to rocks of map-unit 4 (Cambrian or Hadrynian) and because numerous lead-zinc-silver occurrences are known in rocks of map-unit 2 (Lower Cambrian), strata of this general age (i.e. Hadrynian to Cambrian) are thought most favourable to further prospecting. Units A and C probably include a considerable proportion of rocks of this general age and may therefore also be fruitful ground for future exploration. The numerous serpentine bodies in the Yukon offer some potential as host rocks for asbestos.

LIST OF MINERAL PROPERTIES

1. Faro
N62° 21'30", W133° 02'

References

Aho, 1966, pp. 127-149
Findlay, 1967, pp. 35-39; 1969, pp. 43-45; 1969a, pp. 29-30
Green, 1965, pp. 36-37; 1966, pp. 47-50
Green and Godwin, 1964, pp. 31-32
Tempelman-Kluit, 1968, 1969, in press

This is a 60 million ton stratabound, conformable pyritic zinc-lead ore body grading about 10 percent combined lead and zinc. It was brought into production in 1970. The deposit is in rocks of map-unit 4.

2. Vangorda
N62° 15', W133° 12'

References

Chisholm, 1957, pp. 269-277
Green, 1965, p. 36
Green and Godwin, 1964, pp. 31-32
Tempelman-Kluit, 1968, 1969, in press

This is a 10 million ton stratabound, conformable pyritic zinc-lead occurrence grading about 10 percent combined lead and zinc. The deposit is in rocks of map-unit 4.

3. Swim
N62° 12'30", W133° 02'

References

Findlay, 1967, p. 40; 1969, p. 47
Green, 1966, p. 50; 1965, p. 36
Tempelman-Kluit, 1968, 1969, in press

A deposit of about 10 million tons of 10% combined zinc-lead ore. The occurrence is of the conformable, pyritic type and is in rocks of map-unit 4.

4. Sea Group
N62° 11', W132° 54'

Reference
Green, 1965, p. 37

Disseminated pyritic lead-zinc mineralization in rocks of map-unit 4.

5. Dragon Lake
N62° 37', W131° 32'30"

Reference
Skinner, 1961, p. 43

Disseminated pyrrhotite, chalcopyrite and scheelite in skarn developed in limestone of map-unit 1 near its contact with a granodiorite plug.

6. Norken - Canadian Yukon Mining Co. Ltd.
N62° 15', W.130° 42'

References
Green and Godwin, 1963, pp. 30-31
Skinner, 1962, p. 41

Disseminated pyrrhotite and chalcopyrite in rocks of map-unit 8a.

7. Pike Group
N62° 11', W130° 39'

References
Chisholm and Brock, 1967
Findlay, 1967, pp. 60-61; 1969, p. 80

Erratic low grade disseminated copper-silver mineralization in rocks of map-unit 8a near the contact with a small acid granitic plug.

8. Pay Group
N61° 59', W130° 27'

Reference
Findlay, 1969, pp. 81-83; 1969a, p. 49

Sparse zinc-lead mineralization in rocks of map-units 4 and 7.

9. North Lakes Copper Showings
N61° 20' to N61° 32', W130° 50' to W131° 37'

References

Findlay, 1967, p. 59
Skinner, 1962, pp. 40-41

Minor sulphides occur in metamorphic rocks of map-unit A.

10. Fyre Lake-Fire Lake
N61° 13'30", W130° 31'

References

Chisholm and Brock, 1967
Findlay, 1967, pp. 59-60; 1969, pp. 78-79
Skinner, 1961, p. 42; 1952, pp. 39-40

A geochemically anomalous copper prospect.

11. Barite Mountain
N61° 50', W133° 00'

References

Green and Godwin 1964, p. 41
Kindle 1946, pp. 23-26

Barite-bearing veins in brecciated Middle Devonian carbonate rocks of map-unit 7.

12. Canol Mines Ltd. - Seagull Lakes Showing
N61° 39', W132° 48'

References

Cathro 1969, p. 34
Findlay 1969, pp. 77-78; 1969a, pp. 46-47

Two narrow quartz-siderite-galena veins in carbonate rocks of Devonian age (map-unit 7) with low silver-lead ratio.

13. Stormy Mountain-Upper Sheep Creek - Canol Metal Mines Ltd.
N61° 29'30", W132° 48'

Reference

Skinner, 1961, pp. 41-42

Molybdenite is disseminated along the contact between granodiorite and limestone (map-unit 3) both in the granodiorite and in skarn developed at its contact. The occurrence is similar to that at the Molly Group (15).

14. Cone - Pelly Minerals Syndicate
N61° 36', W132° 37'

Reference

Green and Godwin, 1964, pp. 41-42

A small pyrrhotite, pyrite, galena lens with low silver-lead ratio in volcanic rocks of map-unit 11.

15. Molly Group - Conwest Exploration Company Ltd.
N61° 10', W132° 26'

References

Green and Godwin, 1963, pp. 30; 1964, pp. 45-46
Skinner, 1961, pp. 41-42

Molybdenite is disseminated in diopside-garnet skarn and in wollastonite-garnet skarns that are possibly thermally metamorphosed equivalents of map-unit 3. At a second occurrence molybdenite and powellite are developed near the contact between granodiorite and skarn.

16. Key Group Showing
Ketza Key Silver Mines Ltd.
Silver Key Mines Ltd.
Stump Mines Ltd.
N61° 33', W132° 10'

References

Findlay 1967, pp. 56-58; 1969, pp. 75-76; 1969a, pp. 44-46
Green 1966, pp. 64-68
Skinner, 1961, pp. 39-40; 1962, pp. 36

A number of promising occurrences of silver-lead mineralization as quartz-siderite-galena veins cutting rocks of map-units 3 and 7. The silver-lead ratio is better than 1:1. A considerable amount of work including surface stripping and underground drifting has been done.

17. Oxo Group - Oxso Silver Mining and Smelting Company Ltd.
N61° 31', W132° 12'

Reference
Green, 1965, pp. 42-43

A small showing in which pyrrhotite, pyrite, galena and sphalenite are disseminated in an apparently restricted lens of limestone of map-unit 2. The silver-lead ratio is less than 1:1.

18. Boswell River Showing
N61° 03', W133° 48'

References
Bostock 1935, p. 12
Green, 1966, pp. 60-62
Lees, 1936, pp. 23-24

Several small occurrences of galena as veins and lenses in quartz feldspar biotite gneiss with interfoliated dolomite. Silver-lead ratio is 1:1 or better.

19. Bruce Lake
N61° 48'30", W132° 02'

Reference
Green and Godwin, 1964, pp. 42-43

Aeromagnetic anomaly over ultrabasic rocks in Tintina Trench. Explored for possible nickel content, but results were discouraging.

20. Newmont Mining Corp. Canada Ltd. - Hoole River
N61° 43', W131° 45'

Reference
Green, 1965, pp. 43-44

Asbestos bearing serpentine float coincident with an aeromagnetic anomaly occur over a serpentine body which was drilled, with no economic success.

21. Tintina Silver Mines Ltd. - Eagle Showings
N61° 09', W131° 09'

References
Green and Godwin, 1963, pp. 26-29
Skinner, 1962, pp. 37-39

A number of lenses and veins of silver-lead mineralization in carbonate rocks of map-unit 2, with better than 2:1 silver lead ratios. One of the more promising showings in the district but the tonnage is small.

22. Mont Group
N61° 01', W130° 40'

Reference
Green, 1966, pp. 82-84

A series of en echelon chalcopyrite bearing quartz lenses in phyllitic rocks of map-unit 3 near their contact with a small granodiorite pluton occur over a large area.

APPENDIX 1A

Fossils Identified from Upper Part of Atan Group (Map-unit 2)

Collections identified by A.W. Norris, Geological Survey of Canada

G.S.C. Loc. No.

28551 F89

Locality and Fauna

Quiet Lake map-area N61° 40'15", W132° 37'30"
7 miles west-southwest of Mount Green;
elevation 6,200 feet

indeterminate archaeocyathids

G.S.C. Loc. No.

28552 F90

Locality and Fauna

Quiet Lake map-area N61° 25', W132° 22'30"
7 1/2 miles northwest of Mount Hogg;
elevation 6,100 feet

Archaeocyathus Sp.
Ajacicyathus Sp.

G.S.C. Loc. No.

28560 F91

Locality and Fauna

Quiet Lake map-area N61° 26', W132° 22'
8 miles northwest of Mount Hogg;
elevation 5,000 feet

?*Ajacicyathus* Sp.
?*Pycnoidocyathus* Sp.

G.S.C. Loc. No.

28512 F92

Locality and Fauna

Quiet Lake map-area N61° 32'45", W132° 17"
5 3/4 miles southwest of Peak 6762;
elevation 6,500 feet

Ajacicyathus Sp.
Coscinocyathus Sp.

G.S.C. Loc. No.

28507 F 93

Locality and Fauna

Quiet Lake map-area N61° 31'30", W132° 18'
6 miles east northeast of Peak 6541;
elevation 5,500 feet

?Dendrocyathus Sp.

All the lots contain definite archeocyathids. Further work would allow specific determination of some of the archaeocyathids in all the lots with possible exception of No. 28551. In North America and Australia the presence of archeocyathids dates the enclosing beds as Lower Cambrian.

Collections identified by V.J. Okulitch, University of British Columbia

O - rare
X) - increased order of abundance
XX)
XXX)

G.S.C. Loc. No.

40506

Locality and Fauna

Quiet Lake map-area

Archaeocyathus of loculiformis	0
Archaeocyathus atlanticus	0
Pycnoidocyathus of occidentalis	X
Pycnoidocyathus of amourenois	X

	Pycnoidocyathus dissepimentalis	XX
	Pycnoidocyathus sp.	X
	Metethmophyllum sp. (new species)	XXX
ck	*Coscinocyathus* dentocanis	XXX
	Coscinocyathus of dentocanis	X
	Coscinocyathus sp.	

This fauna suggests a fairly high horizon in the Lower Cambrian - possibly similar to the Donald formation.

G.S.C. Loc. No.

40500

Locality and Fauna

Quiet Lake map-area
4 miles south southeast of Peak 7001

	?*Rhizocyathus*	0
	?*Protopharetra*	
	Archaeocyathus of loculiformia	XX
	Archaeocyathus sp.	X
	?*Pycnoidocyathus*	
	Ajacicyathus nevaclensis	XX
	Ajacicyathus purcellensis	XX
	Ajacicyathus of purcellensis	XXX
	Ajacicyathus sp.	X
ck	*Ajacicyathus* of yukonesis	0
	Coscinocyathus dentocanis	0
	Coscinocyathus sp.	0

Lot 40506 resembles in content the Donald fauna from the Dogtooth Mountains, as well as faunas collected by W.H. Poole from Wolf Lake map-area. This fauna is almost certainly high Lower Cambrian. Lot 40500 is probably from a somewhat lower horizon than Lot 40506. It is higher though than the fauna from Colville, Washington.

APPENDIX 1B

Fossils Identified from map-unit 5 Kechika Group (Upper Part)

Collections identified by B.S. Norford, Geological Survey of Canada

G.S.C. Loc. No.

36696 F82

Locality and Fauna

Quiet Lake map-area N61° 56', W133° 17'30"
2.4 mi. ENE of Fox Mountain

Monograptus sp. cf. *M. priodon* (Bronn)

Age - See F83

G.S.C. Loc. No.

36694 F83

Locality and Fauna

Quiet Lake map-area N61° 55'30", W133° 17'30"
Fox Mountain

Monograptus cf. *M. priodon* (Bronn)

Age

Monograptids of the priodon species group range from late Llandoverian to late Wenlockian in age (i.e. Lower to Middle Silurian). However, the great lengths attained by many of the specimens in the above collections as well as the apparent paucity of other graptolites suggest a Wenlockian rather than Llandoverian age.

G.S.C. Loc. No.

36685 F84

Locality and Fauna

Quiet Lake map-area N61° 55'30", W133° 16'30"
Fox Mountain

Tetragraptus cf. *T. fructicosus* (Hall)
Tetragraptus cf. *T. quadribrachiatus* (Hall)

Isograptus sp. indet.
diplograptid, gen. and sp. indet.

Age

This fauna is Arenigian in age and the T. cf. T. fructicosus suggest a correlation with the zone of Didymograptus extensus.

G.S.C. Loc. No.

28529 F86

Locality and Fauna

Quiet Lake map-area N61° 56'15", W133° 09'

Monograptus sp. cf. M. priodon (Bronn)
Monograptus sp. cf. M. vomerinus Nicholson

Age

Upper Llandoverian or Wenlockian (i.e. Lower of Middle Silurian)

G.S.C. Loc. No.

28521 F87

Locality and Fauna

Quiet Lake map-area N61° 55'30", W133° 06'

Monograptus sp. ex. gr. Monogratus spiralis (Geinitz)
Monograptus sp. cf. M. priodon (Bronn)
Monograptus sp. cf. M. vomerinus Nicholson

Age

Upper Llandoverian (Lower Silurian)

G.S.C. Loc. No.

28528 F33

Locality and Fauna

Quiet Lake map-area N61° 51'40", W133° 08'

Monograptus sp. ex. gr. M. dubius Suess

Age

Silurian (Wenlockian or Ludlovian)

G.S.C. Loc. No.

40508 F39

Locality and Fauna

Quiet Lake map-area N61° 45'40", W132° 45'30"

Monograptus sp. indet.
Diplograptus s.l. sp. indet.

Age

Llandoverian (Lower Silurian)

G.S.C. Loc. No.

40505 F88

Locality and Fauna

Quiet Lake map-area N61° 45'45", W132° 49'30"

Monograptus sp. indet.
Diplograptus s.l. sp. indet.

Age

Llandoverian (Lower Silurian

APPENDIX 1C

Fossils Identified from Road River Formation (Map-unit 6)

Collections identified by B.S. Norford, Geological Survey of Canada

G.S.C. Loc. No.

42864 F2

Locality and Fauna

Tay River map-area N62° 58', W133° 57'
creek north of South Macmillan River

?*Phyllograptus* sp.
?*Didymograptus* sp.
Didymograptus aff. *D. extensus* (Hall)
Dichograptus cf. *D. octobrachiatus* (Hall)
Tetragraptus cf. *T. fruticosus* (Hall)
Tetragraptus aff. *T. phyllograptoides* Linnarsson
Tetragraptus cf. T. *quadribrachiatus* (Hall)

Age

Early Ordovician, Arengian -?- *T. fruticosus* fauna

G.S.C. Loc. No.

42954 F3

Locality and Fauna

Tay River map-area N62° 56', W132° 58'
tributary of South Macmillan River

diplograptids

Age

Ordovician

G.S.C. Loc. No.

42953 F4

Locality and Fauna

Tay River map-area N62° 52 1/2', W133° 04'
tributary of South Macmillan River

Monograptus sp.

Age

Silurian

G.S.C. Loc. No.

42872 F8

Locality and Fauna

Tay River map-area N62° 42', W132° 05'
Laforce Creek

diplograptids

Age

Ordovician

G.S.C. Loc. No.

42865 F8

Locality and Fauna

Tay River map-area N62° 42', W132° 05'
Laforce Creek

diplograptids

Age

Ordovician

G.S.C. Loc. No.

42874 F12

Locality and Fauna

Sheldon Lake map-area N62° 58', W130° 58'
13 miles NNW of Mount Sheldon

diplograptids

Age

Ordovician

G.S.C. Loc. No.

42957 F13

Locality and Fauna

Sheldon Lake map-area N62° 43', W131° 20'
2 miles west of Mount Riddell

biserial graptolites

Age

Ordovician

G.S.C. Loc. No.

42956 F14

Locality and Fauna

Sheldon Lake map-area N62° 30', W130° 43'
west of Otter Lake

biserial graptolites
?*Dicelograptus*

Age

Ordovician, probably Late

G.S.C. Loc. No.

42955 F15

Locality and Fauna

Sheldon Lake map-area N62° 32 1/2', W130° 42 1/2'
west of Otter Lake

biserial graptolites
?Dicelograptus

Age

Ordovician, probably Late

G.S.C. Loc. No.

42868 F16

Locality and Fauna

Sheldon Lake map-area N62° 28', W130° 01'

diplograptids
Dicellograptus sp.

Age

Late Ordovician

Unnumbered G.S.C. Collection
by Joseph Keele, 1910, p. 38

Locality and Fauna

Sheldon Lake map-area
about 7 miles below John Lake on Ross River

Orthograptus quadrimucronatus, Hall
Leptograptus flaccidus, Hall
Orthograptus or glossograptus, sp.

Age

Late Ordovician

G.S.C. Loc. No.

42878 F17

Locality and Fauna

Sheldon Lake map-area N62° 15', W130° 31'
9 miles southwest of Wolf Canyon (Pelly River)

diplograptids

Age

Ordovician

G.S.C. Loc. No.

42881 F18

Locality and Fauna

Sheldon Lake map-area N62° 14', W130° 40'

diplograptids

Age

Ordovician

APPENDIX 1D

Fossils Identified from Map-unit 7

Collection identified by B.S. Norford, Geological Survey of Canada

G.S.C. Loc. No.

42929 F19

Locality and Fauna

Tay River map-area N62° 12'30", W133° 52'
between Magundy and Pelly Rivers

Coenites 2 spp.
rugose corals 2 spp.
Syringopora sp.
stromatoporids
Thamnopora sp.
orthid and (?) pentamerid brachiopods
Ptychopleurella sp.

Age

Silurian

Collection identified by A.W. Norris, Geological Survey of Canada

G.S.C. Loc. No.

42921 F20

Locality and Fauna

Tay River map-area N62° 11'11", W133° 45'30"
north side of Magundy River

?*Cladopora* sp. - poorly preserved
Crinoid ossicles

Age

Probably M. Devonian

Collection identified by D. McLaren, Geological Survey of Canada

G.S.C. Loc. No.

36690 F21

Locality and Fauna

Tay River map-area N62° 3'25", W133° 26'

small Trachypora-like tabulate coral

poss. Sil ?

G.S.C. Loc. No.

40564 F22

Locality and Fauna

Quiet Lake map-area N61° 58', W133° 25'30"
NW of Fox Mountain

Amphipora sp.

Age

Middle Devonian

G.S.C. Loc. No.

40540 F24

Locality and Fauna

Quiet Lake map-area N61° 58'25", W133° 25'30"
NW of Fox Mountain

Coenites sp.

Age

Late Middle Devonian Givetian

G.S.C. Loc. No.

40568 F23

Locality and Fauna

Quiet Lake map-area N61° 58'10", W133° 26'30"
NW of Fox Mountain

Thamnopora sp.
Coenites
Schizophoria sp.
crinoid ossicles

Age

Middle Devonian

Collections identified by B.S. Norford, Geological Survey of Canada

G.S.C. Loc. No.

36665 F25

Locality and Fauna

Quiet Lake map-area N61° 56'30", W133° 20'
1.8 miles NE of Fox Mountain

echinoderm fragments
solitary corals
?Coenites sp.
tabulate coral
indeterminable brachiopods 4 spp.
fish fragments

Age

Probably Early Devonian. Primitive fish plates also found at this locality were examined by D.L. Dimly of the University of Ottawa. He identified the plates as Pteraspide and commented "Known in Lower Devonian formations of Utah. I know of no Middle or Upper Devonian fishes possessing just this kind of ornamentation.......". He concluded that the remains are probably Lower Devonian.

G.S.C. Loc. No.

40510 F26

Locality and Fauna

Quiet Lake map-area N61° 56'45", W133° 18'40"
2.2 m. NE of Fox Mountain

echinoderm columnals
triaxon sponge spicules
Coenites sp.
cf. Aulopora sp.
Dicaelosia sp.
cf. Atrypa sp.
cf. Alaskospira sp.
cf. Fardenia sp.
atrypellid and pentamerid brachiopods
indeterminable brachiopods, 3 spp.

Age

Silurian, Middle or Late

G.S.C. Loc. No.

40490 F27

Locality and Fauna

Quiet Lake map-area N61° 56'16", W133° 19'30"
1.8 m. NE of Fox Mountain

?Coenites sp.
Conchidium cf. C. alaskense Kirk and Amsden
solitary coral (from different rock than other fossils)

Age

Late Silurian

Collections identified by D. McLaren, Geological Survey of Canada

G.S.C. Loc. No.

36663 F28

Locality and Fauna

Quiet Lake map-area N61° 55'30", W133° 15'
3.9 mi. ENE of Fox Mountain;
west of Askin Lake

Amphipora sp. (to index coll.)
stromatoporoid
Alveolites sp. B. (to index coll.)
Coenites sp. C. (to index coll.)
Favosites sp. C. (to index coll.)
Romingeria sp. (to index coll.)
Hexagonaria sp. F. (to index coll.)
Stringocephalus sp. (to index coll.)

Age

This is a valuable collection in that the presence of undoubted Stringocephalus allows several of the associated forms which occur elsewhere to be dated. Alveolites sp. B, Coenites sp. C, and Favosites sp. C are all known from the Nahanni and Ramparts Formations in the Mackenzie region. The Romingeria and Hexagonaria species are new. The beds containing this fauna are probably equivalent in age to the Upper Ramparts, possibly the lower half, and are of late Middle Devonian (Givetian) age.

G.S.C. Loc. No.

36679 F28

Locality and Fauna

Quiet Lake map-area N61° 55'30", W133° 15'
4 mi. ENE of Fox Mountain

stromatoporoids
Alveolites sp.
Coenites sp. C.

Age

Upper Ramparts/Nahanni; M. Devonian

G.S.C. Loc. No.

28522 F29

Locality and Fauna

Quiet Lake map-area N61° 54'15", W133%17'40"
2 1/2 mi. SE of Fox Mountain at El. 5500'

Columnariid coral A (close to a Ramparts form)

Age

M. Devonian

G.S.C. Loc. No.

28531 F30

Locality and Fauna

Quiet Lake map-area N61° 55', W133° 20'30"
1 m. SE of Mount Fox, El. 6900'

Amphipora sp.
coral fragments

Age

Probably Devonian

G.S.C. Loc. No.

28566 F31

Locality and Fauna

Quiet Lake map-area N61° 56'15", W133° 08'30"
2 miles E of Askin Lake

Alveolites ex gr. suborbicularis Lemarck
(to index collection)
Favosites
Thamnopora sp.

Age

M. Devonian

G.S.C. Loc. No.

28536 F32

Locality and Fauna

Quiet Lake map-area N61° 53'30", W133° 04'
El. 4900' from talus 4 mi. NW of Barite Mountain
near collection 19020

Emanuella on Ambothyris (to index collection)

Age

Probably M. Devonian

G.S.C. Loc. No.

28530 F32

Locality and Fauna

Quiet Lake map-area N61° 53'30", W133° 04'
El. 4900', 4 mi. NW of Barite Mountain
near collection 19

stromatoporoids
Thamnopora sp.
"Nardophyllum"?? (to index collection)

Age

M Devonian - Givetian

Collections identified by T.E. Bolton, Geological Survey of Canada

G.S.C. Loc. No.

28567 F33

Locality and Fauna

Quiet Lake map-area N61° 51'40", W133° 08"
3 mi. NW of Barite Mountain
El. 6000' in 500' sequence of red and brown
siltstone and argillite containing collection
F33 G.S.C. Loc. No. 28528 (Wenlock or
Ludlovian graptolites)

G.S.C. Loc. No.

28536 F32

Locality and Fauna

Quiet Lake map-area N61° 53'30", W133° 04'
El. 4900' from talus 4 mi. NW of Barite Mountain
near collection 19020

Emanuella on Ambothyris (to index collection)

Age

Probably M. Devonian

G.S.C. Loc. No.

28530 F32

Locality and Fauna

Quiet Lake map-area N61° 53'30", W133° 04'
El. 4900', 4 mi. of NW of Barite Mountain
near collection 19

stromatoporoids
Thamnopora sp.
"Nardophyllum"?? (to index collection)

Age

M. Devonian - Givetian

Collections identified by T.E. Bolton, Geological Survey of Canada

G.S.C. Loc. No.

28567 F33

Locality and Fauna

Quiet Lake map-area N61° 51'40", W133° 08"
3 mi. NW of Barite Mountain
El. 6000' in 500' sequence of red and brown
siltstone and argillite containing collection
F33 G.S.C. Loc. No. 28528 (Wenlock or
Ludlovian graptolites)

Rugose coral indet.
Halysites sp. indet.
Favosites ? sp. indet.

Age

Probably Silurian

G.S.C. Loc. No.

28525 F34

Locality and Fauna

Quiet Lake map-area N61° 52'15", W133° 6'80"
4 mi. NW of Barite Mountain near collection #21

Coenites? sp. indet.
Syringopora sp.
Pentamerid indet.
Hormotoma ? sp.

Age

Probably Silurian

Collections identified by D. McLaren, Geological Survey of Canada

G.S.C. Loc. No.

28534 F35

Locality and Fauna

Quiet Lake map-area N61° 50'50", W133° 06'
1 1/2 mi. NNW of Barite Mountain
El. 6700'

Clathrodictyon ? sp.
Alveolites (digitate sp.)
Thamnopora sp.
Atrypa sp. ? (etched fragments)

Age

M. Devonian - Ramparts Formation equivalent

G.S.C. Loc. No.

40551 F36

Locality and Fauna

Quiet Lake map-area N61° 51', W133° 30'
Barite Mountain E.

Gypidula sp.
undet. ? brachiopod fragments

Age

No diagnostic elements

G.S.C. Loc. No.

40544 F36

Locality and Fauna

Quiet Lake map-area N61° 51'00', W133° 02' 30"
Barite Mountain W.

Cyrtiopsis sp.

Age

Late Upper Devonian (Famennian). *Cyrtiopsis* unquestionably indicates a late Upper Devonian age. The genus first appears within the Imperial Formation in the Mackenzie River basin.

G.S.C. Loc. No.

40574 F37

Locality and Fauna

Quiet Lake map-area N61° 50'30", W133° 02'30"
Barite Mountain W.

Trachypora sp.
Emanuella sp. - to index collection
undet. crushed brachiopods
corals indet.

Age

An *Emanuella* similar to this form occurs high in the Middle Devonian that is, the Slave Point formation of the Great Slave Lake area.

G.S.C. Loc. No.

36676 F38

Locality and Fauna

Quiet Lake map-area N61° 45', W132° 45'30"
E. of Porcupine Creek, 8.8 mi. WNW of Mount Green

?*Amphipora*

Age

Devonian?

G.S.C. Loc. No.

36693 F39

Locality and Fauna

Quiet Lake map-area N61° 45'40", W132° 45'30"
8 mi. ESE of 7000; E. of Porcupine Creek

stromatoporoid
?*Coenites*
?*Thamnopora*

Age

Possibly Late Silurian or Devonian

Collections identified by B.S. Norford, Geological Survey of Canada

G.S.C. Loc. No.

36695 F40

Locality and Fauna

Quiet Lake map-area N61° 45'15", W132° 42'
8 mi. SW of Mount Ross;
400 yds. SE of F88

echinoderm fragments
gastropod
solitary corals
?*Alveolites*
?*Coenites*
?*Favosites*
spiriferid brachiopods 2 spp.

Age

Silurian

Collection identified by D. McLaren, Geological Survey of Canada

G.S.C. Loc. No.

28561 F42

Locality and Fauna

Quiet Lake map-area N61° 44'30", W132° 37'45"
6 1/2 mi. W of Mount Green

stromatoporoids
Alveolites sp.
Thamnopora sp.
digonophyllid coral (to index collection)
"*Nardophyllum*" sp. A

Age

Probably M. Devonian

Collections identified by B.S. Norford, Geological Survey of Canada

G.S.C. Loc. No.

40507 ~~F43~~ F41

Locality and Fauna

Quiet Lake map-area N61° 43'30", W132° 40'
7.8 mi. W of Mount Green

Favosites sp.

Age

Silurian or Devonian

G.S.C. Loc. No.

40494 F43

Locality and Fauna

Quiet Lake map-area N61° 43'30", W132° 40'
7.6 mi. W of Mount Green

bryozoa
echinoderm columnals
indeterminable rugose corals
ramose favositids 2 spp.
indeterminable stauriid coral
Coenites sp.
Favosites sp.
Heliolites cf. H. megastoma (M'Coy)
Heliolites aff. H. distans Foerste

Age

Silurian

Collections identified by D. McLaren, Geological Survey of Canada

G.S.C. Loc. No.

28555 F44

Locality and Fauna

Quiet Lake map-area N61° 41'40", W132° 29'
2 1/4 mi. SSW of Mount Green;
Elevation 6200'

Amphipora large sp.
Alveolites (digitate sp.)
Emanuella or Ambothyris (same as 19A) (to index collection)
silicified fauna - etched from dolomite

Age

Probably M. Devonian

G.S.C. Loc. No.

36672 F38

Locality and Fauna

Quiet Lake map-area N61° 45', W132° 45'30'
E. of Porcupine Creek, 8.6 mi. ESE of 7000

Amphipora
stromatoporoids
Syringopora sp.
ghosts of corals in white dolomite

Age

Probably Devonian

G.S.C. Loc. No.

28537 F45

Locality and Fauna

Quiet Lake map-area N61° 40'30", W132° 49'
1 mi. W of N end of S Central Seagull Lake;
Elevation 6050'

sandy dolomite and dolomitic sandstone,
silicified fauna; some fragments etched
out in acid

Thamnopora ? sp.
coral & crinoid fragments
large poorly preserved Atrypa sp.

Age

Probably M. Devonian

G.S.C. Loc. No.

36666 F46

Locality and Fauna

Quiet Lake map-area N61° 39'40", W132° 54'
4.7 mi. SE of 6400, W of N end of Seagull Lake

Amphipora sp.
stromatoporoid
?Coenites

Age

Probably Devonian

G.S.C. Loc. No.

36664 F47

Locality and Fauna

Quiet Lake map-area N61° 38'30", W132° 36'
5.5 mi. WNW of 7001; SW of head of McConnell River

Receptaculites sp. (to index coll.)
Cystiphylloides sp.
Devonoproductus sp. (to index coll.)
Emanuella cf. E. meristoides (Meek) (to index coll.)
proetid tail

Age

M. Devonian "Harrogate" facies

G.S.C. Loc. No.

40580 F48

Locality and Fauna

Quiet Lake map-area N61° 38', W132° 35'

Favosites sp.
Alveolites sp.
Spongophyllum sp. E to index coll.
Disphyllum cf. D. goldfussi (Geinitz) to index coll.
Hemicystiphyllum sp. A. to index coll.
cup corals
Gypidula sp.
crinoid ossicles

Age

This fauna is reasonably well-preserved and diagnostic. Its age is unquestionably Late Middle Devonian (Givetian). Spongophyllum sp. E has been collected from the McDame Group in Lower Turnagain River map-area by Norford, and from the McDame area by Gabrielse, as well as the "Ramparts" and Nahanni Formations. The Disphyllum species is also widespread at this horizon. The presence of Hemicystiphyllum, reported for the first time in Canada, confirms the age assignment as Givetian.

Collection identified by T.E. Bolton, Geological Survey of Canada

G.S.C. Loc. No.

36688 F49

Locality and Fauna

Quiet Lake map-area N61° 28', W132° 39'
1.2 mi. NE of 6570

Columnals - large size
Brachiopod slightly squashed
Brooksina sp. (not B. Alaskensis the only known species of this genus)

Age

Silurian. B. Alaskensis occurs in the Upper Silurian of Alaska

G.S.C. Loc. No.

40503 F50

Locality and Fauna

Quiet Lake map-area N61° 32', W132° 28'

Rock almost completely altered but traces of:
Coenites sp. C ??
Favosites sp.
Syringopora sp.
Thamnopora sp.

Age

M. Devonian

Collection identified by D. McLaren, Geological Survey of Canada

G.S.C. Loc. No.

40567 F48

Locality and Fauna

Quiet Lake map-area N61° 38', W132° 35'

Coenites
Conocardium
undet. gastropods
undet. brachiopod shell fragments

Age

Middle Devonian?

G.S.C. Loc. No.

40577 F48

Locality and Fauna

Quiet Lake map-area N61° 38', W132° 35'

Spinatrypa sp. cf. S. andersonensis (Warren)
Coenites sp.
crinoid stems
cup corals

Age

The presence of Spinatrypa sp. cf. S. andersonesis (Warren) suggests a Middle Devonian, possibly Eifelian age

G.S.C. Loc. No.

40572 F51

Locality and Fauna

Quiet Lake map-area N61° 38'30", W132° 37'30"

Emanuella sp.
Atrypa sp. cf. A. perfimbriata Crickmay
cup corals indet.

Age

Atrypa sp. cf. A. perfimbriata associated with ?Emanuella sp. suggests a Middle Devonian (probably Givetian) age

G.S.C. Loc. No.

40581 F51

Locality and Fauna

Quiet Lake map-area N61° 38'30", W132° 37'30"

Atrypa sp.
?Schuchertella sp.
undet. straight hinged coarsely costate brachiopod

Age

Middle or Upper Devonian?

G.S.C. Loc. No.

36662 F52

Locality and Fauna

Quiet Lake map-area N61° 39', W132° 42'40"

Amphipora sp.
Alveolites sp.
Coenites sp.
Favosites sp.

Age

Probably Devonian

G.S.C. Loc. No.

36674 F53

Locality and Fauna

Quiet Lake map-area N61° 39', W132° 38'
from talus - 7 m. WNW of 7001; SW of headwaters of McConnell River

stropheodontids
large Atrypa cf. A. independensis Webster
Emanuella ?? sp.
pelecypod indet.

Age

Middle Devonian. This fauna bears a close resemblance to the fauna of the Harrogate formation in Southeastern B.C. It is of equivalent age to the Ramparts/Nahanni formations. By analogy with the Mackenzie region it may possibly represent a Middle Ramparts horizon (i.e. 'Hare Indian River Shale')

G.S.C. Loc. No.

36701 F53

Locality and Fauna

Quiet Lake map-area N61° 39', W132° 38'
6.2 mi. WNW of 7001 above F92W;
W head of McConnell River

Alveolites sp.
Cystiphylloides sp. (to index coll.)
Disphyllum ? sp.
Atrypa ? sp.

Age

("Harrogate") facies. M. Devonian

G.S.C. Loc. No.

28549 F54

Locality and Fauna

Quiet Lake map-area N61° 36'30", W132° 40'
6 1/2 mi. ENE of Pass Peak

large Favosites corallum
collumnariid coral indet. (to index collection)

Age

Probably M. Devonian

G.S.C. Loc. No.

28562 F55

Locality and Fauna

Quiet Lake map-area N61° 27'15", W132° 15'
9 mi. N of Mount Hogg;
Elevation 6300'

Favosites sp.
other corals indet.

Age

Possibly Devonian

G.S.C. Loc. No.

28564 F55

Locality and Fauna

Quiet Lake map-area N61° 27'15", W132° 15'
9 mi. N of Mount Hogg;
Elevation 6100'

Alveolites ? sp.
Favosites sp.
Barrandeophyllum ?? sp.

Age

Possibly Devonian

Collections identified by B.S. Norford, Geological Survey of Canada

G.S.C. Loc. No.

28498 F56

Locality and Fauna

Quiet Lake map-area N61° 34'45", W132° 15'30"
3 1/2 mi. WSW of 6762 ft. peak;
Elevation 6050'

echinoderm fragments
solitary corals
ramose favositid coral

halysitid corals 3 spp.
Syringopora cf. *S. verticillata* Goldfuss
Coenites cf. *C. laminatus* (Hall)

Age

Silurian, Clinton (late Llandovery to early Wenlock)

G.S.C. Loc. No.

40518 F57

Locality and Fauna

Quiet Lake map-area N61° 32'45", W132° 02'
6 mi. SE of 6762 ft. peak

Favosites sp.
Heliolites aff. *H. interstinctus* (Linnaeus)

Age

Silurian

G.S.C. Loc. No.

40520 F58

Locality and Fauna

Quiet Lake map-area N61° 34'15", W132° 14'30"
7.2 mi. SE of 7001 ft. peak

halysitid corals, 2 spp.
favositid coral
Thamnopora sp.
indeterminable solitary coral
indeterminable brachiopod
echinoderm columnals

Age

Silurian

G.S.C. Loc. No.

36691 F59

Locality and Fauna

Quiet Lake map-area N61° 20', W132° 17'30"
WSW of Mount Hogg

echinoderm fragments
solitary corals
ramose favositid coral
?*Coenites* spp.
Pentamerus sp.
Atrypa parva Hume

Age

Silurian, Clinton (Late Llandovery to early Wenlock)

Collection identified by D. McLaren, Geological Survey of Canada

G.S.C. Loc. No.

36675 F60

Locality and Fauna

Quiet Lake map-area N61° 19', W132° 17'30"
2.8 mi. SW of Mount Hogg

Favositid
same *Trachypora*-like tabulate as 61?
?pentamerid

Age

Possibly Silurian

Collection identified by B.S. Norford, Geological Survey of Canada

G.S.C. Loc. No.

40497 F61

Locality and Fauna

Quiet Lake map-area N61° 19', W132° 21'45"
2 mi. ENE of McConnell Peak

echinoderm columnals
? sponge or stromatoporoid
indeterminable colonial and solitary corals
cf. Pentamerus sp.

Age

Silurian, probably late Early or Middle

G.S.C. Loc. No.

40498 F61

Locality and Fauna

Quiet Lake map-area N61° 19', W132° 21'45"
2 mi. ENE of McConnell Peak

echinoderm columnals
indeterminable solitary corals
Coenites sp.
Favosites sp.
cf. Pentamerus sp.

Age

Silurian, probably late Early or Middle

G.S.C. Loc. No.

40499 F62

Locality and Fauna

Quiet Lake map-area N61° 19', W132° 13'
1.8 mi. SSE of Mount Hogg

cf. Coenites sp.
Favosites sp.

Age

Silurian or Devonian

G.S.C. Loc. No.

40521 F63

Locality and Fauna

Quiet Lake map-area N61° 18', W132° 23'30"
1 1/2 mi. SE McConnell Peak

Coenites sp.

Age

Silurian or Devonian, probably former

G.S.C. Loc. No.

40492 F64

Locality and Fauna

Finlayson Lake map-area N61° 29'30", W131° 44'
2.5 mi. NW of 6747 ft. peak

indeterminable solitary coral
ramose favositid
Coenites aff. *C. rectilineatus*
(Simpson)

Age

Probably Silurian

Collection identified by D. McLaren, Geological Survey of Canada

G.S.C. Loc. No.

36700 F65

Locality and Fauna

Finlayson Lake map-area N61° 28', W131° 41'30"
0.7 mi. W of 6747

Coenites sp.
Favosites cf. sp. C
Syringopora sp. D (to index coll.)
Productella sp.
Ontario sp.
abundant large gastropods indet.

Age

Typical Upper Ramparts fauna. The presence of *Productella* excludes an age earlier than Middle Devonian. Age M. Devonian.

G.S.C. Loc. No.

36686 F65

Locality and Fauna

Finlayson Lake map-area N61° 28', W131° 41'30"
0.7 mi. W of 6747, overlies G.S.C. Loc. 36700

Coenites sp. C
Syringopora sp. D (to index coll.)

Age

M. Devonian

Collections identified by B.S. Norford, Geological Survey of Canada

G.S.C. Loc. No.

40514 F66

Locality and Fauna

Finlayson Lake map-area N61° 25'30", W131° 55'30"
9.2 mi. WSW of 6747 ft. peak

poorly preserved halysitid coral

Age

Ordovician or Silurian, probably latter.

G.S.C. Loc. No.

36702 F67

Locality and Fauna

Finlayson Lake map-area N61° 24'40", W131° 53'
8 mi. WSW of 6747 ft. pt., N of McNeil River;
3 mi. at 335° from McNeil Swamp fly-camp,
elev. 5450 ft., S slope of small mountain NNW of
camp

echinoderm fragments
gastropods
Cystihalysites sp.
solitary corals
indeterminable brachiopod
dalmanellid brachiopod
?Homoeospira sp.
?Pentamerus sp.
straight cephalopod

Age

Silurian

Collection identified by D. McLaren, Geological Survey of Canada

G.S.C. Loc. No.

36703 F68

Locality and Fauna

Finlayson Lake map-area N61° 24'20", W131° 53'15"
7.8 mi. WSW of 6747; W of McNeil River

Favosites sp.

Age

Upper Silurian to M. Devonian

Collection identified by T.E. Bolton, Geological Survey of Canada

G.S.C. Loc. No.

36707 F69

Locality and Fauna

Finlayson Lake map-area N61° 24'30", W131° 51'30"
7.8 mi. WSW of 6747, West of McNeil River

Phaceloid coral slightly similar to form in F78W
- too poorly preserved for identification
Halysitid coral - Catenipora sp. rather than Halysites

Age

Silurian

Collection identified by B.S. Norford, Geological Survey of Canada

G.S.C. Loc. No. F70

40504

Locality and Fauna

Finlayson Lake map-area N61° 24'30", W131° 47'
5 1/2 mi. SW of 6747 ft. peak.

echinoderm columnals
indeterminable solitary and colonial rugose corals
cf. Halysites or Cystihalysites sp.
Favosites sp.
Favosites aff. F. Favosus (Goldfuss)

Age

Silurian

Collection identified by D. McLaren, Geological Survey of Canada

G.S.C. Loc. No.

36673 F71

Locality and Fauna

Finlayson Lake map-area N61° 20', W131° 54'15"
1 1/2 mi. NE of Lower end of Upper McNeil Lake

ramose and digitate stromatoporoids
Coenites sp.

Age

Upper Silurian or Devonian

G.S.C. Loc. No.

36669 F71

Locality and Fauna

Finlayson Lake map-area N61° 20', W131° 54'15"
3 mi. W of N. end of Upper McNeil Lake

Digitate stromatoporoid
Gypidula sp.

Age

Silurian or Devonian

G.S.C. Loc. No.

36689 F71

Locality and Fauna

Finlayson Lake map-area N61°20', W131°54'15"
4 mi. W of N. end of Upper McNeil Lake

Favosites sp. G. (squamulate form) (to index coll.)

Age

Upper Silurian to Middle Devonian

G.S.C. Loc. No.

40491 F72

Locality and Fauna

Finlayson Lake map-area N61°27'20", W131°31'30"

Amphipora sp.
Coenites sp. C
Syringopore sp. D
large pelecypods indet.
gastropod traces

G.S.C. Loc. No.

40509 F73

Locality and Fauna

Finlayson Lake map-area N61°25'30", W131°33'

stromatoporoids
Alveolites sp.
Favosites sp. indet.
Syringopora sp.

G.S.C. Loc. No.

40522 F74

Locality and Fauna

Finlayson Lake map-area N61° 25'15", W131° 35'

digitate stromatoporoids
Coenites sp. C

G.S.C. Loc. No.

40515 F75

Locality and Fauna

Finlayson Lake map-area N61° 15', W131° 33'

Disphyllum cf. D. goldfussi (Geinitz)

G.S.C. Loc. No.

40495 F75

Locality and Fauna

Finlayson Lake map-area N61° 25', W131° 30'

Amphipora sp.
?Coenites sp.
Favosites sp. indet.

Age

Collections 40491, 40509, 40522, 40515 and 40495 seem to belong to a single fauna and probably correlate with a horizon in the upper part of the Middle Devonian, i.e. the species of Disphyllum, all of which occur with undoubted Givetian forms elsewhere. Age correlation might be suggested with the Nahanni Formation, the "Upper Ramparts", and the Harrogate.

G.S.C. Loc. No.

40533 F76

Locality and Fauna

Finlayson Lake map-area N61° 19'15", W131° 30'

undet. ? productellid
Camarotoechia sp.
Cyrtiopsis sp.
undet. ? cephalopod

Age

U. Devonian (Famennian). This fauna is present in the upper part of the Imperial Formation of the lower Mackenzie basin and in the Palliser Group of the front ranges of the Canadian Rocky Mountains.

G.S.C. Loc. No.

40529 F77

Locality and Fauna

Finlayson Lake map-area N61° 17'15", W131° 41'40"
3 mi. SW of peak 6656', about 9 mi. SE of McNeil Lake

digitate stromatoporoids
Amphipora sp.
Cladopora sp.
undet. cup coral
undet. gastropods
crinoid ossicles

Age

Devonian

G.S.C. Loc. No.

40535 F78

Locality and Fauna

Finlayson Lake map-area N61° 10'30", W131° 26'
17 mi. SE of McNeil Lake

?Aulopora sp.
large crinoid ossicles

Age

Probably Devonian

G.S.C. Loc. No.

36692 F79

Locality and Fauna

Finlayson Lake map-area N61° 10', W131° 46'
above thrust 2 mi. S of Indigo Lake

Amphipora ?? of fragments of other stromatoporoids
??Alveolites
??Coenites
?favositid
non-columellate phaceloid coral - disphyllid?
patelloid rugose coral indet.
costate brachiopod fragment

Age

Probably Devonian, possibly Middle Devonian

G.S.C. Loc. No.

40590 F80

Locality and Fauna

Finlayson Lake map-area N61° 12', W130° 57'

Thamnopora sp. F
undet. gastropods
large fragments of acanthophyllid corals

Age

Middle Devonian

G.S.C. Loc. No.

40530 F81

Locality and Fauna

Finlayson Lake map-area N61° 15', W131° 04'
13 mi. N of Ings-Liard rivers junction

digitate stromatoporoids
Alveolites sp.
Coenites sp.
Syringopora sp.
Thamnopora sp.

Age

M. Devonian

APPENDIX 1E

Fossils Identified from Map-unit 8
(Earn Group)

Collection identified by A.W. Norris, Geological Survey of Canada

G.S.C. Loc. No.

42842 F1

Locality and Fauna

Tay River map-area N62° 48', W133° 45'

Schizophoria sp.
?chonetid
Calvinaria aff. C. variabilis (Whiteaves)
Cyrtospirifer sp.
Eleutherokomma sp.

Frasnian

Age

8h

The juxtaposition of the genera Eleutherokomma and Crytospirifer indicates a mid-early Upper Devonian (middle Fasnian) age and represents a fairly restricted horizon in Western Canada. In terms of other areas this fauna is equivalent to forms found at about the Perdrix-Mount Hawk formations boundary in the Alberta Rockies and the Lower Escarpment Formation ("Upper Hay River shale") on Hay River. Equivalent beds to the east must occur in the grey shales at present referred to as lower "Imperial", below the horizon of common reef development, and below major sandstone development.

Collection identified by E.W. Bamber, Geological Survey of Canada

G.S.C. Loc. No.

42858 F6

Locality and Fauna

Tay River map-area N62° 42', W133° 28'
near Twopete Mountain

Spirifer cf. minnewankensis Shimer
?Cleiothyridina sp.
Orthotetinid brachiopod
?Phillipsia sp.

Gastropod indet.
?Homalophyllites sp.

Age

Mississippian, probably Osagean. This collection is probably the same age as that from G.S.C. Locality 42927 (i.e. F7).

Collection identified by D. McLaren, Geological Survey of Canada

G.S.C. Loc. No.

42927 F7

Locality and Fauna

Tay River map-area N62° 33', W133° 03'

undet. spiriferid
Camerotoechia - like brachiopod

Age

?Mississippian

~~F55~~
~~59~~
F94

APPENDIX 1F

Fossils Identified from Map-unit 10

Collection identified by P. Harker, Geological Survey of Canada

G.S.C. Loc. No.

40573

Locality and Fauna

Finlayson Lake map-area N61° 22'30", W131° 20'30"

Spirifer cf. *esplanadensis* Brown
Spirifer sp.
Ambocoelia sp.
Proetid trilobite

Age

Poorly preserved but almost certainly of Mississippian age.

Probably this is equivalent to some of the collections we made in '75
Should get Bamber to have a look at them

APPENDIX 1G

Fossils Identified from Map-unit 15

Collection identified by E.T. Tozer, Geological Survey of Canada

G.S.C. Loc. No.

42893 F5

Locality and Fauna

Tay River map-area N62° 43', W133° 22'

Monotis subcircularis Gabb

Age

Upper Triassic, Norian

APPENDIX 1H

Fossils Identified from Map-unit 18

Collections identified by D.C. McGregor, Geological Survey of Canada

G.S.C. Loc. No.

5686 F9

Locality and Fauna

Tay River map-area N62° 12', W133° 12'
Pelly River

Among the small fragments of rock in this collection were two with impressions of parts of conifer short shoots that could be *Sequoia*, *Metasequoia*, or *Taxodium*. Had there been more specimens a more accurate identification might have been possible.

Age

It is impossible to distinguish Cretaceous from Tertiary from these fragments, but they are probably Upper Cretaceous or younger. No spores were present.

G.S.C. Loc. No.

5684 F10

Locality and Fauna

Tay River map-area N62° 03', W132° 52'
Grew Creek, Yukon

Trochodendroides may be present, but this genus ranges throughout the Upper Cretaceous and Tertiary. Apex, margins, finer venation and in most cases the bases are missing from the specimens, and they are therefore not identifiable. There are no spores present.

Collection identified by W.L. Fry, Geological Survey of Canada

G.S.C. Loc. No.

4879 F11

Locality and Fauna

Quiet Lake map-area
4 mi. downstream on Lapie River from Lapie River bridge

Taxodium dubium (Sternberg)
Viburnum antiquum (Newberry)
Juglans sp.

Age

These same elements were identified in a collection made by E.D. Kindle from this locality and reported on in G.S.C. Paper 45-21 p. 21. The florule indicates a Paleocene age.

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TABLE 1

	K-Ar Age (G.S.C.) b - biotite m - muscovite	Area in Square Miles	Area as a % of Total Area Underlain by Granitic Rocks	Average Specific Gravity
Tay River map-area				
Anvil Batholith	b98±4 b94±5 b90±5 m94±5 b87±5 m79±6	257	13.3	2.62
South Anvil Batholith		204	10.6	2.64
Mt. Menzie Plug		4	0.2	2.68
Plug 10 miles East of Two Pete Mountain		1	--	2.66
Mt. Selous Batholith	b74±7 b83±7 b81±10	54	2.8	2.70
Pluton along McMillan River West of Mt. Selous		10	0.5	2.69
Pluton South of Riddell River		3	0.1	
Plug North of Fox Mountain		3	0.1	2.65
Southwest Corner Tay River map-area		65	3.4	2.60
Pluton near Battle Creek in Tintina Trench		24	1.4	2.69
Sheldon Lake map-area				
Western Plug North of South McMillan River		2		2.70
Eastern Plug North of South McMillan River		1		2.65
Mt. Sheldon Plug		2		2.64
Itsi Pluton		22	1.1	2.68
Traffic Mountain		1		2.64
South Traffic Mountain		5	0.3	2.67

TABLE 1 (cont'd)

	K-Ar Age (G.S.C.) b - biotite m - muscovite	Area in Square Miles	Area as a % of Total Area Underlain by Granitic Rocks	Average Specific Gravity
Finlayson Lake map-area				
Batholith at head of Black River	b66±	70	3.6	2.62
Plug near Peak 7393		4	0.2	
Plug in fork of North and Black Rivers		9	0.5	2.64
Plug North of North River		23	1.2	2.76
Plug North of North River		6	0.3	2.70
Plug North of North River		2		2.70
Plug at head of Mink Creek		17	0.9	
Plug at head of Mink Creek		10	0.5	2.72
Plug at head of Big Campbell Creek		11	0.5	
Plug along Big Campbell Creek		14	0.7	2.72
Pluton South of McEvoy Lake		28	1.5	2.65
Pluton North of McEvoy Lake		18	1.0	2.65
Pluton on North Side of Pelly River		14	0.7	
Quiet Lake map-area				
Big Salmon Range Batholith	b90±6	390	20.2	2.65
Plug in Big Salmon Range		26	1.3	
Batholith diagonally across Central Quiet Lake map-area	b90±6	320	16.6	2.64
North Big Salmon River Batholith		250	13.0	2.64
Fox Mountain Batholith		45	2.3	2.68
Barite Mountain Plug		3	0.1	2.64
Nigatlin River Plug		10	0.5	

HADRYNIAN

1	Light to dark grey massive muscovite quartz schist, micaceous quartzite and graphitic quartzite, locally containing quartz and feldspar clasts

METAMORPHIC ROCKS OF UNKNOWN AGE

A	Quartz-biotite and quartz-chlorite schist, micaceous quartzite, hornfels; minor phyllite and limestone
B	Marble and dolomite
C	Micaceous quartzose gneiss, granitoid gneiss; minor quartz-biotite schist

Geological boundary (defined, approximate or assumed).......

Limit of geological mapping, unmapped area...............

Bedding (horizontal, inclined, vertical, overturned)..........

Bedding (dip known, tops unknown)..............................

Bedding (estimated attitudes, includes foliation in metamorphic rocks; dip g, gentle, m, medium, s, steep).. g

Foliation (horizontal, inclined, vertical)...........................

Fault (defined, approximate or assumed).................

~~Thrust fault (defined, approximate or assumed)~~

Anticline (defined, approximate)...........................

Syncline (defined, approximate)...........................

Fossil locality..

Fossil locality referred to in Appendix............................ F 87

Mineral occurrence or prospect..................................

Mineral occurrence listed in text................................ 7

Rock altered to hornfels...

MINERAL SYMBOLS

Asbestos	asb	Lead	Pb
Barite	ba	Molybdenum	Mo
Copper	cu	Silver	Ag
Gold	Au	Tungsten	W

LEGEND

21 21a, modern unconsolidated alluvial deposits
21b, unconsolidated glacial and alluvial deposits

TERTIARY

20 Dark brown and black olivine basalt flows

PALEOCENE

19 Brownish silty sandstone and pebble conglomerate

CRETACEOUS
SOUTH FORK VOLCANICS

18 Grey and dark grey andesite, dacite and basalt, commonly massive and porphyritic; minor pyroclastic varieties

CRETACEOUS

17 Granodioritic quartz feldspar porphyry, possibly plutonic equivalent of 18

CRETACEOUS

16 Medium-to-coarse-grained biotite granodiorite to quartz monzonite; partly porphyritic (K-feldspar); minor granite, diorite and migmatite; 16a, porphyritic biotite granodiorite and quartz monzonite; 16b, equigranular granodiorite to quartz monzonite; 16c, foliated and gneissose equivalents.

TRIASSIC
MIDDLE (?) AND UPPER TRIASSIC

15 15a, conglomerate with pebbles and cobbles of basalt, chert, quartzite and limestone; 15b, sandstone, siltstone, dark shale and grey to black limestone.

UPPER PERMIAN AND/OR LOWER OR MIDDLE TRIASSIC

14 Serpentinite and partly serpentinized dunite and peridotite; minor gabbro and diorite

PENNSYLVANIAN (?) AND PERMIAN
UPPER PENNSYLVANIAN (?) AND LOWER AND MIDDLE (?) PERMIAN
ANVIL RANGE GROUP

13 Undifferentiated volcanic rocks and lesser chert and limestone; 13a, altered dark green basalt and lesser pyroclastic rocks; 13b, green and maroon volcanic breccia, tuff and flow rocks; 13c, buff, rusty and pale green felsic volcanic breccia and tuff, minor chert and brown crinoidal limestone; 13d, massive grey and cream coloured limestone; 13e, pale green, grey and maroon chert and tuffaceous chert with minor chert conglomerate; 13f, light grey massive crinoidal limestone.

12 Heterogeneous, shattered hornblende syenite, associated with rocks of Unit 11

MISSISSIPPIAN(?)

11 11a, partly altered green volcanic rocks, greenstone, meta-diorite; minor serpentinite and amphibolite; 11b, green and maroon breccias, tuffs and flows; 11c, buff, rusty and pale green felsic breccias and tuffs, minor chert and brown crinoidal limestone; 11d, massive gray and cream limestone

MISSISSIPPIAN(?)

10 Current-bedded, ripple-marked, dark grey limestone; minor dark grey and brown argillite and dolomite

DEVONIAN AND MISSISSIPPIAN
UPPER DEVONIAN AND MISSISSIPPIAN

SYLVESTER GROUP

9 Brown and black weathering, siliceous slate and shale; thin-bedded vari-coloured chert with shaly partings; speckled grey and brownish grey greywacke; minor chert pebble conglomerate

DEVONIAN AND MISSISSIPPIAN
UPPER DEVONIAN AND MISSISSIPPIAN

EARN GROUP

8 Undifferentiated chert, shale, slate, sandstone and conglomerate; 8a, includes undifferentiated rocks of Unit 6; 8b, chert pebble conglomerate; 8c, black and grey chert, shale, quartzite; minor conglomerate and limestone; 8d, black slate, black and brown siliceous shale sandstone, greywacke phyllite; minor conglomerate; 8e, limestone, minor argillite, limy argillite and chert

SILURIAN AND DEVONIAN

7 Grey and buff weathering, thick-bedded dolomite, with local lenses of chert; buff to reddish weathering, well-bedded dark grey dolomite and sandy and silty dolomite; buff, grey and white orthoquartzite

ORDOVICIAN AND SILURIAN
ROAD RIVER FORMATION

6 Grey and black thin bedded graptolitic slate, minor thinbedded black chert

ORDOVICIAN AND SILURIAN IN
KECHIKA GROUP (~~UPPER~~ PART)

5 Black slate, platy argillaceous limestone, grey and pink siltstone; 5a, volcanic breccia

CAMBRIAN (?) AND ORDOVICIAN (?)

4 Medium greenish grey lustrous chlorite muscovite quartz, phyllite, locally graphitic or calcareous, grades to and includes staurolite garnet biotite muscovite schist; 4a, thinly laminated biotite, garnet, diopside, quartz skarn and staurolite, garnet, biotite muscovite schist, light grey coarsely crystalline marble; 4b, fine-grained foliated amphibolite

CAMBRIAN
KECHIKA GROUP (LOWER PART)

3 Buff and grey weathering, grey, green and black phyllite and slate; silty limestone and siltstone

LOWER CAMBRIAN
ATAN GROUP

2 2a, light grey and white orthoquartzite, banded hornfels, grey quartzite, skarn; minor chert and crystalline limestone; 2b, crystalline limestone; 2c, green and maroon shale, slate, phyllite and quartzite; minor andesite; 2d, gritty, massive quartz pebble quartzite, medium-grained, grey quartzite and dark slate