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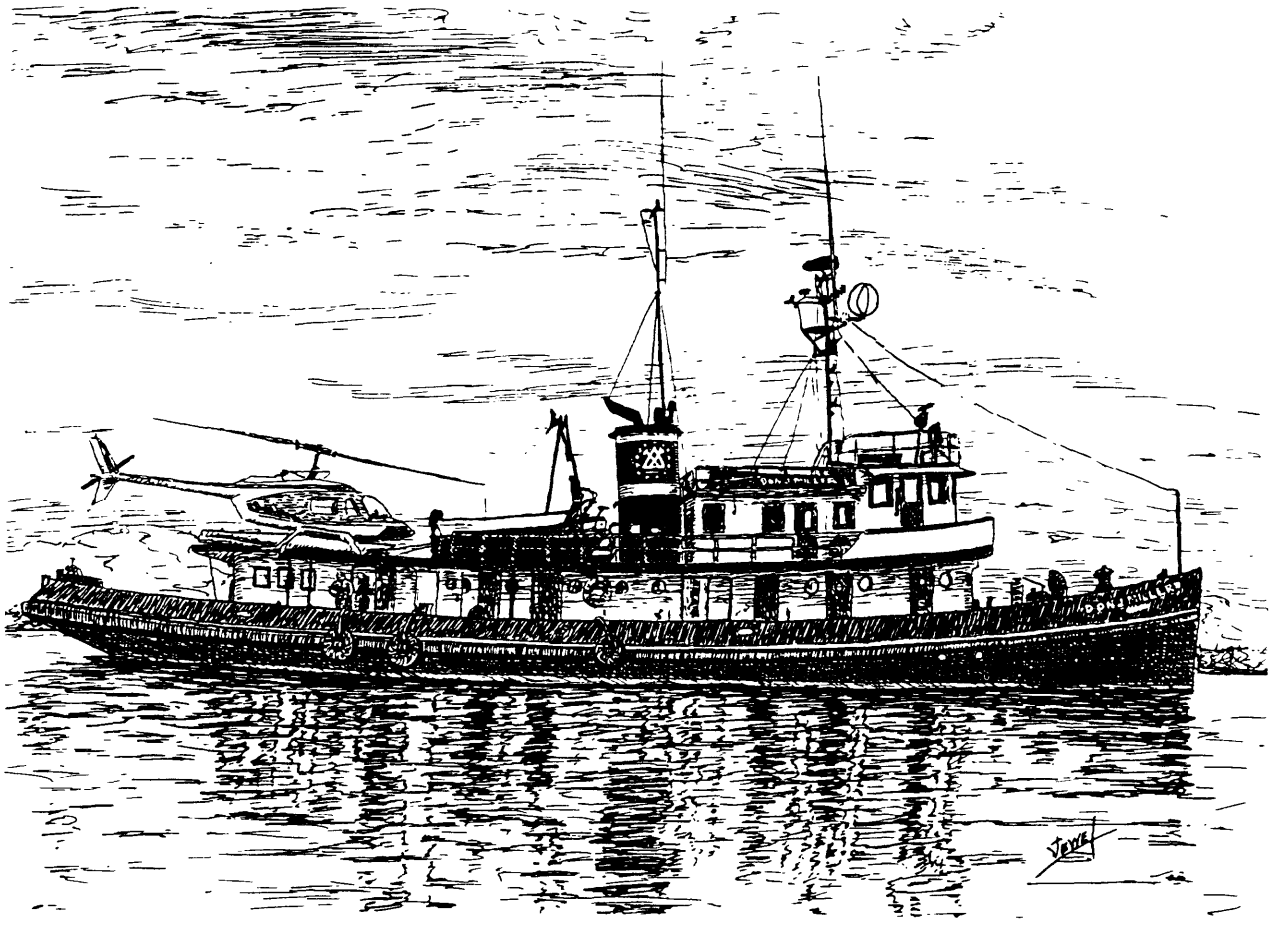

[U.S.G.S. R/V Don J. Miller II]

RECONNAISSANCE GEOLOGIC MAP OF THE PETERSBURG D-5 QUADRANGLE, SOUTHEASTERN ALASKA

Open-File Report 97-156-M

By David A. Brew

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Reconnaissance Geologic Map of the Petersburg D-5 Quadrangle, Southeastern Alaska

By

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INTRODUCTION

This map and its accompanying information were prepared by the U.S. Geological Survey specifically as part of the State of Alaska Division of Geological and Geophysical Surveys and the U.S. Department of Interior Bureau of Land Management Alaska Minerals Section (Juneau, Alaska) mineral-resource studies of part of the Petersburg, Alaska 1:250,000-scale quadrangle. These studies are a direct follow-up to the U.S. Geological Survey studies in the area in the 1980's, which are cited below.

The geologic information presented here has been released previously in generalized form (Brew and others, 1984); the information is based on reconnaissance field mapping and thus does not have the density of field-station control, samples, or field observations that are expected in published U.S. Geological Survey 1:63,360-scale geologic maps. This map is one of a series that share the same format and general information (Brew, 1997a-m; Brew and Koch, 1997). There are both a combined description and a combined correlation of the map units for this whole series of maps (Brew and Grybeck, 1997).

The available information on known mineral deposits in the whole Petersburg-Wrangell area was released previously (Grybeck and others, 1984) and Brew and others (1989, 1991). Bedrock, stream-sediment, and other geochemical data were released and interpreted by Karl and others (1985), Karl and Koch (1990), Cathrall and others (1983a-w), and Tripp and Cathrall (1984). Aeromagnetic and aeroradioactivity surveys information was released by the U.S. Geological Survey (1978, 1979) and Bouguer gravity information by Barnes and others (1989). Remotely-sensed features were described by LeCompte (1981). Burrell and others (1982) released a preliminary bibliography of Petersburg and Port Alexander quadrangles-related items.

Assessments of the undiscovered mineral resources for the whole Petersburg/Wrangell area are also available (Brew and others, 1989, 1991; Brew and Drinkwater, 1991). Some of the mineral-resource-assessment tract information in neighboring areas was revised by Brew and others (1996). Brew (1993) presented a generalized view of metallogenic belts that includes this area.

Detailed information on the Late Cretaceous plutonic rocks in the Petersburg 1:250,000-scale quadrangle is found in Burrell (1984abc); major-element chemical and other data for the area were reported by Douglass and others (1989), and relatively young volcanic features were described by Brew and others (1984) and by Brew (1990). McClelland and Gehrels (1990) reinterpreted some of the geology in and around the Duncan Canal area, which lies to the northwest of this quadrangle.

The index map on the over-size sheet shows the major geological elements of the Petersburg/Wrangell area. They are, from west to east, (1) the Alexander belt, consisting of generally unmetamorphosed Lower Paleozoic through Upper Triassic rocks intruded by scattered mid-Cretaceous plutons, (2) the Gravina belt, consisting of unmetamorphosed to highly metamorphosed, variably deformed Upper Jurassic(?) through mid-Cretaceous flysch and volcanic rocks intruded by both mid- and Upper Cretaceous plutons, and (3) the Mainland belt, consisting of metamorphic rocks intruded by Upper Cretaceous, lower Tertiary, and mid-Tertiary plutons. Younger than almost all parts of all of these belts, and extending from the Alexander belt across the Gravina and onto the mainland belt, is the lower to middle Tertiary Kuiu-Etolin belt that consists largely of varied volcanic rocks, associated plutons, and minor sedimentary rocks. The Alexander belt corresponds more or less to the Alexander terrane of Berg and others (1978), the Gravina belt is a refined interpretation of their Gravina belt. This quadrangle includes rocks of the (1) Alexander belt, (2) Duncan Canal-Zarembo Island-Screen Islands sub-belt of the Gravina belt, (3) Gravina belt itself, and (4) Kuiu-Etolin belt (see Correlation of Map Units diagram on the oversize sheet).

DESCRIPTION OF MAP UNITS

[Note: All formational and descriptive map-unit names in the text of the following descriptions are set off with quotation marks to make them easier to identify.]

Qs SURFICIAL DEPOSITS (Holocene and(or) Pleistocene)--Includes alluvium, colluvium, tidal mudflat deposits, and some glaciofluvial deposits. The distribution of most large areas of surficial deposits was mapped in the field, but the deposits have not been studied in detail; many small areas are not shown.

KUIU-ETOLIN BELT

Belt informally named by Brew and others (1979), redefined by Brew and Morrell (1983), and the age revised by Brew and others (1985).

EXTRUSIVE AND INTRUSIVE VOLCANIC ROCKS OF KUIU-ETOLIN VOLCANIC-PLUTONIC BELT (Quaternary and Tertiary)--Diverse volcanic rocks exposed in a broad area extending from northeastern Kuiu southeastward through Kupreanof and Zarembo Islands. Divided into:

Extrusive and Intrusive Volcanics and Volcaniclastic Rocks (Quaternary(?) and Tertiary)--

Complicated intrusive and extrusive volcanic pile best exposed on southwestern Kupreanof Island and on Zarembo Island, may include rocks that should be assigned to "Extrusive Basaltic Rocks and Underlying Sediments" (Qb) but which cannot be distinguished in the field from older basalts. Originally considered to be the southeastern, and more varied extension of "Admiralty Island Volcanics" unit named by Loney (1964) and assigned a late Eocene to Oligocene age on Admiralty Island; that age revised to Eocene to Miocene(?) by Lathram and others (1965). K-Ar dating (G. Plafker, U.S. Geological Survey, oral commun., 1982) of volcanic rocks there indicates a Miocene age. The "Admiralty Island Volcanics" are now considered to be a different but possibly time-equivalent unit. Time- and litho-stratigraphic relations are uncertain, but dominant rhyolites and basalts appear to have erupted at undetermined times and in no obvious or simple sequence from Paleocene (as indicated by the age of the locally underlying "Kootznahoo Formation") to Holocene (as inferred from the possible inclusion of Quaternary volcanic rocks in the unit). The unit may include rocks erupted throughout the Tertiary and Quaternary, but it is believed likely to have a significant Oligocene break. Stratigraphically complicated, with major lithologic types occurring repeatedly throughout the section. Some suggestion that "Altered Dellenite, etc." (QTf), and "Gabbro and Microgabbro" (Tmgb) exposed elsewhere in the Petersburg-Wrangell area occur only low in the section. "Siliceous Volcaniclastic Rocks" (QTc) occurs in and around "Rhyolite, Rhyodacite, etc." (QTr); see also Muffler (1967). Divided into:

QTr Rhyolite, Rhyodacite, and Related Siliceous Extrusive and Intrusive Rocks--

In general, aphanitic to finely crystalline, generally quartz and feldspar porphyritic; C.I. less than 1. Locally layered, spherulitic, and(or) miarolitic. Light gray on fresh surfaces; buff, white, green lavendar, maroon, or pink where altered; generally rusty weathering. Pyrite and zeolites common. Many exposures are complicated mixtures of discontinuous mm-scale flow-layered, brecciated, spherulitic, and phenocrystic rocks. Stratigraphic sections include lava flows, obsidian flows, lahars, welded and nonwelded ash, tuff, and lapilli, all cut locally by porphyritic rhyolite and rhyodacite dikes. Extreme alteration, brecciation, attitudes of layering, and dikes indicate vents and domes ; massive structureless isolated rhyolite bodies suggest plugs; columnar-jointed cliff exposures in excess of 100-m thick are interpreted as cooling units. Exposed in southern part of quadrangle on Kupreanof Island.

QTa Andesite and Other Intermediate Extrusive Rocks--

Dark gray on fresh surfaces, green to maroon where altered. Blocky weathering, pyroxene and feldspar porphyritic, massive to vesicular and amygdaloidal flows 10-50 cm thick. Apparently intercalated with basalts in southern Rocky Pass area between Kuiu and Kupreanof Islands; occurs in the southernmost part of this quadrangle.

QTb Basalt and Other Mafic Extrusive Rocks--

Dark gray on fresh surfaces, rusty weathering. Platy, blocky, or columnar-jointed flows 50-cm to several meters thick. Commonly vesicular and amygdaloidal; amygdule fillings include calcite, epidote, chalcedony, chlorite, and zeolites, in order of decreasing abundance. Platy flows are pyroxene microporphyritic; massive flows may contain magnetite, pyroxene, and olivine. Intercalated mafic tuff and flow breccia of uneven thickness, generally less than 1-m thick. Section of gently east-dipping flows greater than 500-m thick extends from Port Camden on Kuiu Island, across Rocky Pass to western Kupreanof Island; unit is exposed at the southwesternmost edge of this quadrangle. Most extensive volcanic unit in the Kuiu-Etolin belt; may also underlie much of exposed extrusive volcanic section on Kuiu, Kupreanof and Zarembo Islands. Mafic dikes and small localized flows occur higher in the section.

INTRUSIVE GRANITIC AND OTHER ROCKS OF KUIU-ETOLIN VOLCANIC PLUTONIC BELT (Miocene and(or) Oligocene--K-Ar determinations of about 20-22 Ma obtained on rocks from the "Granite of Central and Northern Etolin Island" (Tmge) (M. A. Lanphere, U.S. Geological Survey, written communs., 1981, 1982) apply to this unit also. Descriptions of the rocks of this belt given by Hunt (1984). Two units mapped in this quadrangle:

Tmdk Heterogeneous Dioritic Rocks of Northern Kuiu Island--

Biotite-hornblende-pyroxene diorite, quartz diorite, quartz monzodiorite, and gabbro. Massive, nonfoliated; allotriomorphic to hypidiomorphic; seriate; medium- to coarse-medium-grained; C.I. 17 to 50. Extensively diked and locally migmatitic with granitic to dioritic neosomes invading dioritic paleosomes. Mineralogy includes zoned plagioclase with local potassic alteration, locally abundant "clots" of interstitial potassium-feldspar, rare micrographic intergrowths, and abundant subophitic mafics; mafic minerals are generally intergrown and consist of pale clinopyroxene, some orthopyroxene, green-brown hornblende (associated with a pale-green, fibrous secondary amphibole), minor brown biotite, and rare olivine. Accessory minerals include sphene, apatite, magnetite, and rare allanite. Unit exposed in a small pluton at the southern edge of this quadrangle and elsewhere as the outer portion of the pluton at Washington Bay on northwestern Kuiu Island; also as a small plug at the head of Threemile Arm on northeastern Kuiu Island. Resembles the more dioritic phases of the "Migmatitic Granitic Rocks of Central and Northern Etolin Island" (Tmme) that is exposed elsewhere in the Petersburg-Wrangell area.

Tmgb Gabbro and microgabbro--

Medium-grained, dark gray on fresh and weathered surfaces, olivine- and clinopyroxene-bearing, locally deuterically altered. Forms now-gently-dipping sills up to about 500-m thick. Cuts "Kootznahoo Formation" and older rocks; well exposed on Hamilton Island, on Kuiu Island north of Kadak Bay and at Saginaw Bay in the Keku Islets, and at Big John Bay on Kupreanof Island. Inferred by Muffler (1967) to be genetically related to the "Basalt and Other Mafic Extrusive Rocks" (QTb) to the south. Occurs as a small stock in the west-central part of this quadrangle.

Tk KOOTZNAHOO FORMATION(?) (Paleogene)--Nonmarine arkosic sandstone, sandstone, shale, and conglomerate

Medium- to very thick-bedded; locally cross-bedded. Dominant rock type is medium- to very coarse-grained lithic feldspathic quartz arenite; conglomerate contains clasts up to 10 cm of granitic rock, slate, schist, chert, felsic volcanics. Minor shale is locally carbonaceous and contains plant fossils; rare thin coal beds; greater than 300 m thick near Dakaneek Bay on Kupreanof Island (K. A. Dickinson, U.S. Geological Survey, oral commun., 1980). Available fossil evidence suggests that all of this unit in the northern part of the Petersburg-Wrangell map area near Keku Strait is Paleocene in age and that in the southern part on Zarembo Island is early Eocene, whereas the type "Kootznahoo Formation" on Admiralty Island (Lathram and others, 1965) is now considered latest Eocene through early Miocene age (Wolfe, 1966; J.A. Wolfe, U.S. Geological Survey, written communs., 1979, 1983). The similarities in depositional environment, stratigraphic position, and lithology suggest that the name "Kootznahoo Formation" is appropriate although the depositional basins may not have been connected. Unit is inferred to underlie most, if not all, of the "Extrusive and Intrusive Volcanic Rocks of Kuiu-Etolin Volcanic-Plutonic Belt" in the Petersburg-Wrangell map area and locally intertongues with at least the lower part of that unit. The largest outcrop of the unit is south and southeast of Hamilton Bay on Kupreanof Island, another large area is on the southwest side of Zarembo Island and Bushy Island, small outcrops are in this quadrangle at California Bay on Prince of Wales Island and east of Point Nesbitt on Zarembo Island; other outcrop areas in the general Petersburg-Wrangell area are in the divide between Port Camden and Threemile Arm on Kuiu Island, at Kadake Bay on Kuiu Island, and, in this quadrangle, in the upper drainage of Hamilton Creek on Kupreanof Island. Buddington and Chapin (1929) report an occurrence at Kah Sheets Bay on Kupreanof Island which Brew and others (1984) did not find. See Muffler (1967), Dickinson (1979), Dickinson and Campbell (1982), Wright and Wright (1908), and Loney (1964) for further information.

ALEXANDER BELT

Belt informally named here to denote those rocks ranging in age from Ordovician up to Cretaceous that form a coherent stratigraphic section, including the pre-Cenozoic granitic and other rocks intruded into them, in the western part of the Petersburg-Wrangell map area. It does not correspond exactly to the Alexander terrane of Berg and others (1978) because, outside of this quadrangle, it includes one stratigraphic unit of limited extent that is of Cretaceous age. Two units exposed in this quadrangle:

Pp PYBUS FORMATION (Lower Permian)--Limestone, dolomite, and chert

Conspicuous cliff-forming, medium-bedded to massive, non-bedded coarsely crystalline, dolomitic limestone. White to very light gray on fresh surfaces. Contains light gray replacement chert as thin beds, nodules, fragments, and crosscutting masses. Minor coarse-grained, light-gray limestone; also fetid medium-gray dolomite near top of unit. Unit is 80 to 160 m thick Abundant silicified brachiopod fauna has been studied extensively (Buddington and Chapin, 1929; R.E. Grant, U.S. Geological Survey, written commun., 1968; Grant, 1971); collections noted by Muffler (1967) indicate a Leonardian age as do four collections made during our study (J.T. Dutro, Jr., U.S. Geological Survey, written commun , 1983). Named by Loney (1964) and redefined by Muffler (1967). Crops out on Cornwallis Peninsula of Kuiu Island and extends south to head of Saginaw Bay, on Keku Islets, near Cape Bendel on Kupreanof Island, on the Middle Islands, and at the western edge of this quadrangle in the Hamilton Bay area and adjacent part of Kupreanof Island.

MDc CANNERY FORMATION (Mississippian and Devonian)--

Thin-bedded, gray tuffaceous volcanic argillite and fine-grained, gray tuffaceous volcanic graywacke. Both weather bluish-green or reddish-brown and are intensely fractured. Some very thin-bedded, dark gray chert, silicified argillite, pillow flows, and gray clastic limestone. At least 600 m, and possibly 1,200 to 1,500 m thick. Age considered Permian by Muffler (1967) based on two fossil localities, one of which is Permian in age but is from rocks now mapped as Pybus Formation, and another which is the basis for the original age assigned by Loney (1964). More recent studies (Jones and others, 1981) have shown that the Cannery Formation in the Petersburg-Wrangell area is Late Devonian to Early Mississippian in age. Four collections made during this study contain Late Devonian to Mississippian radiolarians (D. L. Jones, U.S. Geological Survey, written communs., 1981, 1982). One collection from rocks mapped as" Cannery Formation" on upper Hamilton Creek, Kupreanof Island, contains Upper Triassic conodonts (Brew and others, 1984; B. Wardlaw and A. G. Harris, U.S. Geological Survey, written commun., 1983). Those rocks could be mapped as the "Greenschist, Chert, Limestone, and Argillite" (Mzm) unit of the Gravina Belt; however, they lack the structural features that typify that unit. Named by Loney (1964) for exposures at Cannery Bay on Admiralty Island.

GRAVINA BELT

The term Gravina belt is used here to denote sedimentary and volcanic rocks of Late Jurassic and Early Cretaceous age, including the pre-Cenozoic granitic and other rocks intrusive into them, in the east-central part of the Petersburg-Wrangell map area. As used here, the term also includes rocks of indeterminate Mesozoic age in a broad zone to the west of and adjoining the Jurassic and Cretaceous rocks. This zone is called the Duncan Canal-Zarembo Island-Screen Island sub-belt and it has within it blocks of Paleozoic and Mesozoic rocks unlike any elsewhere in the Gravina belt, but similar to some in the Alexander belt. The Gravina belt as used here more or less corresponds to the Gravina belt as defined by Berg and others (1978), but the map distribution does not correspond because of newer information and differing interpretations.

INTRUSIVE ROCKS OF ADMIRALTY-REVILLAGIGEDO PLUTONIC BELT (Upper Cretaceous)--Belt informally named by Brew and Morrell (1983) and described by Burrell (1984abc). K-Ar determinations by M. A. Lanphere, U.S. Geological Survey, (written communs., 1981, 1982), interpreted to be applicable to the whole suite, including the rocks in this quadrangle, are as follows:

Map unit	General location	Biotite age	Hornblende age
Ktif unit	Wrangell Is.	83.2 Ma	91.6 Ma
" "	Mitkof Is.	-	89.1 Ma
Ktef unit	Zarembo Is.	90.4 Ma	93.0 Ma

Somewhat similarly dated rocks occur in lithically correlative units to the east in the Bradfield Canal quadrangle (R. L. Elliott and R. D. Koch, oral commun., 1982; Koch and Berg, 1996). In this quadrangle:

Kqo Pyroxene-Biotite-Hornblende-Quartz Monzodiorite, Quartz Diorite, Monzodiorite, and Diorite--

Locally foliated; equigranular; medium-grained, fine- to medium-grained near margins of bodies; C.I. 20 to 61. Black and white to medium gray on fresh surfaces, brownish-gray to orangish-gray on weathered surfaces. Mafic inclusions, quartz and pegmatite veins and diabase dikes present. Mineralogy includes anhedral, commonly poikilitic, hornblende with pyroxene, biotite, and plagioclase inclusions; and anhedral biotite and pyroxene. Plagioclase is twinned, zoned,and crystals are very closely packed. Plagioclase, K-feldspar, and quartz form the groundmass. Hornblende, when present, is usually the dominant mafic mineral. Unit is exposed both on northern Lindenberg Peninsula and on central Mitkof Island (Burrell, 1984a), and at the northeastern edge of this quadrangle.

STEPHENS PASSAGE GROUP (Upper Cretaceous/Cenomanian to Upper Jurassic(?))--Name proposed by Lathram and others (1965) for the "...sequence of slate, graywacke, conglomerate, and augite-bearing volcanic flow breccia, Late Jurassic and Early Cretaceous in age, which forms a well-defined northwest-trending belt of rocks exposed along the eastern slopes and shores of Admiralty Island...". This sequence also occurs south and east of Admiralty Island (Souther and others, 1979) and extends southward into the area described here. Information presented by Brew and others (1984) showed that the Group is as young as Albian or Cenomanian, i.e., late Early and early Late Cretaceous, in this general area. The "Brother's Volcanics"/"Douglas Island" unit probably intertongues with the "Seymour Canal Formation", probably near the top of the latter (Loney, 1964). Cohen and Lundberg (1993) reported on details of the "Seymour Canal Formation" north of this quadrangle. Not mapped in this quadrangle, however, in the:

DUNCAN CANAL-ZAREMBO ISLAND-SCREEN ISLAND SUB-BELT OF THE GRAVINA BELT

See "Gravina belt" heading (above) for background information.

METAMORPHOSED STEPHENS PASSAGE GROUP AND OTHER ROCKS (Upper(?) Mesozoic)--Currently interpreted to be mostly metamorphic equivalents of the "Stephens Passage Group", but some may be derived from "Cannery Formation" (Muffler, 1967; Brew and others, 1984), some from a different facies of the "Stephens Passage Group", and some from a previously unrecognized facies of Triassic rocks. In this quadrangle includes:

Mzm Greenschist, Chert, Limestone, and Argillite--

Greenstone, greenschist, pelitic and quartzofeldspathic phyllite, and marble. Locally very folded and internally faulted. Dominantly light- to medium-green on fresh surfaces, grayish-green to reddish-gray weathered. Probably several thousand meters thick. Depositional environment uncertain but may have been in part a chaotic slope facies sequence adjacent to a volcanic arc; now metamorphosed to albite-muscovite chlorite-subfacies of the greenschist facies according to Muffler (1967). Greenstone and greenschist probably derived from porphyritic basalt and basaltic tuff. Mapped as "Gambier Bay Formation" of Devonian age by Muffler (1967) on the basis of the fossiliferous limestone-marble lenses within the unit. Those lenses are mapped here as the "Fossiliferous Limestone" (Dls) and are interpreted to be exotic blocks within this unit. A collection of conodonts from thin marble layers in north-central Kupreanof Island indicates that the unit is at least in part Upper Triassic (B. R. Wardlaw and A. G. Harris, U.S. Geological Survey, written commun., 1983). The relation of the unit to the "Cannery Formation" to the west and south is obscure; in most places the two units have been differentiated by the contrasting degrees of metamorphism and folding. Similar criteria, together with lithologic contrast, have been used to separate this unit from the "Phyllite and Slate Metamorphosed From Mudstone and Minor Graywacke" (Mzp), exposed near Pinta Point on northwestern Kupreanof Island, south of the Bohemia Range, and on Hamilton Creek. See also Loney (1964) and Muffler (1967). Exposed in the Bohemian Range in the northeastern part of this quadrangle.

Mzs Semischist and phyllite metamorphosed From Graywacke and Siltstone--

Low grade (probably sub-greenschist facies) metamorphic rocks; locally highly folded. Generally, poorly foliated but finer-grained phases have good cleavage. Brownish-gray on fresh surfaces, gray to brown where weathered. Relict textures and sedimentary structures indicate derivation from a graywacke and siltstone or mudstone turbidite sequence. Unit in other quadrangles encloses several large lenses of "Fossiliferous Limestone" (Dls) of Devonian age, but there is no direct indication of the age. Proximity to outcrops of "Seymour Canal Formation" (KJss) rocks in other quadrangles and compatibility of the protoliths with that formation suggest that this unit is a metamorphic and deformed equivalent of that formation. Unit contrasts with the "Phyllite and Slate Metamorphosed From Mudstone and Minor Graywacke" (Mzp) unit in the proportion of originally coarse-grained sediments, and in the general absence of volcanic-protolith phyllite in this unit, but the two units probably intertongue much more complexly than is shown on the map. Exposed at the eastern edge of this quadrangle near Duncan Canal, and elsewhere on Woewodski, Zarembo, and Etolin Islands.

Mzv Greenschist And Greenstone Metamorphosed From Intermediate To Mafic Volcanic Rocks--

Greenschist, greenstone, phyllite, minor semischist. Weathers light to dark green, locally brownish. Includes pillow breccia, agglomerate flows, and possible tuffs. Appears less deformed and less metamorphosed than other nearby rock units. Probably several thousand meters thick. Locally abundant relict pyroxene phenocrysts suggest a close link to the "Douglas Island Volcanics" (KJsv) mapped elsewhere in the Petersburg-Wrangell area. Inferred upper Mesozoic age based on association with other units. Unit contrasts with the "Phyllite and Slate Metamorphosed From Mudstone and Minor Graywacke" (Mzp) mapped elsewhere in the Petersburg-Wrangell area in its apparent lesser metatuff and its higher proportion of rocks of volcanic origin. Exposed in the southern and eastern parts of this quadrangle near Duncan Canal and in the Bohemian Range and elsewhere on Woewodski and Zarembo Islands and on Key Reef in Clarence Strait.

Mzc Quartzite Metamorphosed From Chert--

Quartzite and minor phyllite; white or light gray on fresh and weathered surfaces. Fine-grained; "ribbon-like" appearance common, with relict beds 0.5 to 3.0 cm thick with very thin phyllitic partings. Individual outcrops are highly folded, but some lenses must have been at least several 10's of m thick originally. Others may have been only a few m thick. No direct evidence of age; no radiolaria recovered from several samples collected for that purpose. Crops out in the west-central part of this quadrangle in central Kupreanof Island.

Mzp Phyllite and Slate Metamorphosed From Tuff, Mudstone and Minor Graywacke--

Chlorite phyllite, slate and semischist, minor conglomerate, limestone and quartzite; fine- to very fine-grained; highly folded, especially in northern Kupreanof Island. Some phyllite is light green on fresh surfaces and medium green weathered and is inferred to have been derived from intermediate composition tuffaceous rocks, other phyllite is dark gray fresh and weathered and is inferred to have been derived from fine-grained clastic sediments, as are the dark gray fresh and weathered slates. Dark gray rocks are locally graphitic. Locally polymictic conglomerate layers less than 1-m thick occur on northwestern Kupreanof Island only; thickness unknown, but probably great. One collection of conodonts from the limestone layers in west-central Kupreanof Island indicates that the unit is at least in part Upper Triassic (B. R. Wardlaw and A. G. Harris, U.S. Geological Survey, written commun., 1983). Unit contrasts with the "Cannery Formation" (MDc) elsewhere in the Petersburg-Wrangell area because the unit contains less chert and is more deformed and contrasts with the "Greenschist, Chert, Limestone, and Argillite" (Mzm) because the unit is of lower metamorphic grade and contains no limestone. Unit probably grades into the "Phyllite" (Ksp) to the east. Muffler (1967) mapped the exposures of this unit on northwestern Kupreanof Island as "Seymour Canal Formation" (KJss in this series of maps) on the basis of lithologic correlation with that unit on Admiralty Island to the north. Those rocks have been assigned to this unit because of difficulty in mapping them southward as a separate unit. Unit is exposed very widely as the most common unit in the northern part of the Duncan Canal-Zarembo Island-Screen Island sub-belt, especially in the central part of this quadrangle.

HYD GROUP(?) (Upper Triassic)--One unit mapped in this quadrangle:

Thv Felsic and Intermediate Volcanic Flows and Breccia, Limestone, and Argillite--

Dominantly very-fine to fine-grained, chlorite-quartz-muscovite-feldspar phyllite. Light to dark green on fresh surfaces, rusty and green weathered. Locally chertlike; interpreted by Berg and Grybeck (1980) and Berg (1981) to be felsic metatuff. Also thinly layered to laminated quartz-feldspar phyllite or semischist interpreted by the same workers to be metarhyolite. Associated with dark gray thin-bedded carbonaceous mudstone, siltstone, and limestone. Thickness unknown, but probably several hundred meters at least. Age of Late Triassic-early Karnian for the unit is inferred from one collection of halobiid pelecypods from exposures on the west side of Duncan Canal (N.J. Silberling, U.S. Geological Survey, written commun., 1980). Host unit for massive sulfide deposits. Exposed in the eastern part of this quadrangle near Duncan Canal, and elsewhere on the Castle Islands and Woewodski Island. The exposures on Rookery Island in Duncan Canal and on the northeast side of East Island in the Kashevarof Islands in the quadrangle to the south are well-bedded silty limestone of different and more uniform aspect.

DIs FOSSILIFEROUS LIMESTONE (Lower and Middle Devonian)--

Medium-bedded to massive, fine- to medium-grained. Light to medium gray on fresh and weathered surfaces; locally fetid. Individual lenses up to several hundred m thick; contains brachiopods, corals, crinoids, and (locally) fusulinids. Northwesternmost exposures (mapped by Muffler, 1967, as part of the Gambier Bay Formation) contain corals or stromatoporoids of Middle Devonian or possibly Late Silurian age (Muffler, 1967). Abundant old and new collections from the several fossiliferous lenses at and near the head of Duncan Canal in the eastern part of this quadrangle contain Lower and Middle Devonian corals, brachiopods, and conodonts (Buddington and Chapin, 1929); A.G. Harris, U.S. Geological Survey, written communs., 1979, 1980, 1983; W.A. Oliver, Jr., U.S. Geological Survey, written commun., 1979; J.T. Dutro, Jr., U.S. Geological Survey, written communs., 1979, 1980) and the smaller lenses in Clarence Strait (Key Reef and Abraham Island) contain Lower(?) Devonian corals (W.A. Oliver, Jr., U.S. Geological Survey, written communs., 1978, 1983). Part of large exposure at Castle Islands in Duncan Canal was the host for a sulfide-barite deposit of significant size (Burchard, 1914); some workers interpret this limestone mass to be of Triassic age (D.J. Grybeck, U.S. Geological Survey, written comm., 1997.

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