Figure 62.—Areas in southeastern Alaska discussed in this circular. Outlines define the areas described by the indicated authors.

SOUTHEASTERN ALASKA

(Figure 62 shows study areas described.)

RE-INTERPRETATION OF THE AGE OF THE KUIU-ETOLIN BELT VOLCANIC ROCKS, KUPREANOF ISLAND, SOUTHEASTERN ALASKA

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The Kuiu-Etolin volcanic-plutonic belt (Brew and others, 1979) consists of a variety of volcanic and plutonic rocks in a belt extending northwest-southeast across the Petersburg map area (fig. 62). Its geologic features are mapped and described by Brew and others (1984). The part of the belt discussed here corresponds to the south end of the Tertiary Admiralty trough of Miller and others (1959). The purpose of this note is to re-interpret the age of the volcanic rocks of the belt. These rocks are not formally named.

Buddington and Chapin (1929) provided the first thorough description of the volcanic rocks in the belt, based on Buddington's observations in the southern Kupreanof and east-central Kuiu Islands area. Buddington recognized that some of the rocks, especially those on southeastern Kupreanof Island, appeared to be appreciably younger than others. Nevertheless, he concluded that they were all of Tertiary age, based on the fact that they overlie plant-bearing sediments of early Tertiary age. Miller and others (1959) used Buddington and Chapin's information in their analysis of the Tertiary Admiralty trough. Loney (1964) and Lathram and others (1965) contributed additional age information on the apparently time-equivalent volcanic and sedimentary rocks on Admiralty Island; these rocks are named the Admiralty Island Volcanics and Kootznahoo Formation (Lathram and others, 1965). The Kootznahoo Formation on Admiralty Island is now considered to be of Eocene to Miocene age, on the basis of plant fossils in sandstone beds (Wolfe, 1966; Wolfe, written commun., 1979; 1983). The Admiralty Island Volcanics generally overlie the Kootznahoo Formation, but intertongue near their base. In 1971, three whole-rock samples collected by H.C. Berg from basalt flows on Level Island, close to southeastern Kupreanof Island, were dated by M.A. Lanphere using the K-Ar method. The results suggested that the rocks sampled were no more than a few hundred thousand years old (M.A. Lanphere, U.S. Geological Survey, written commun., 1972).

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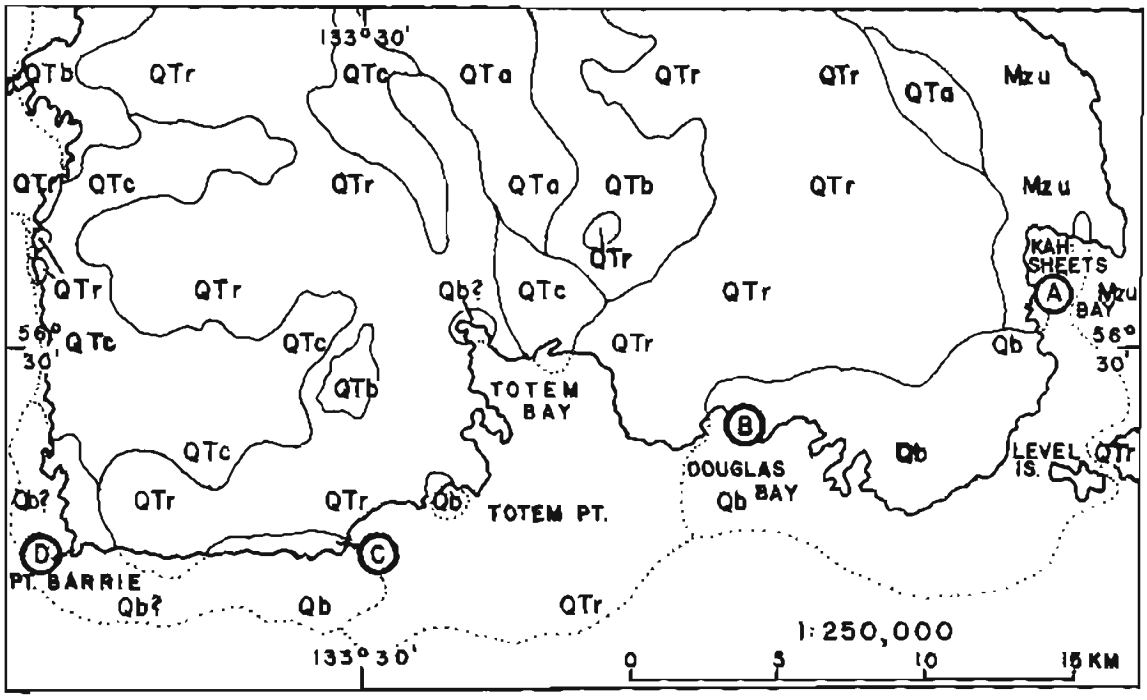

Figure 63.—Geologic map of southern Kupreanof Island (from Brew and others, 1984) showing localities A through D referred to in the text and map units as follows : Qb, Quaternary extrusive basaltic rocks and underlying sediments; QTr, Quaternary(?) and Tertiary rhyolite, rhyodacite, and related siliceous extrusive and intrusive rocks; QTc, Quaternary(?) and Tertiary volcaniclastic deposits; QTa, Quaternary(?) and Tertiary andesite and other intermediate extrusive rocks; QTb, Quaternary(?) and Tertiary basalt and other mafic extrusive rocks; and Mzu, Mesozoic rocks underlying the volcanic rock units.

During fieldwork in 1983, Tobey recognized a glacial till unit interbedded with volcanic flows in a quarry on a small peninsula in Kah Sheets Bay on southeastern Kupreanof Island (A, fig. 63) and informed the other authors. Additional fieldwork did not identify any other till occurrences, but it did lead to: (1) recognition of extensive Quaternary flows and associated locally underlying sandstones and conglomerates; (2) inference of a Tertiary and Quaternary(?) age for the remainder of the volcanic rocks on southwestern Kupreanof Island; and (3), reconsideration of the plutonic and volcanic history of the Kuiu–Etolin belt.

The youngest unit in the volcanic pile (represented by the symbol Qb, fig. 63), which is interpreted to be Holocene and(or) Pleistocene, consists of several tens of meters of extrusive basaltic rocks and associated underlying sediments that locally overlie the till in places. The till has been recognized at only one locality, and no striated pavements have been seen. No glacial deposits have been recognized overlying these flows.

In this unit, fresh, locally polygonally jointed, dark greenish-gray, dense, very fine-grained to aphanitic, magnetite-bearing olivine basalt and minor pyroxene basalt are the most common rock types. Most flows are less than 1 m thick, but some individual flows are up to 10 m thick; all are typically columnar jointed. Well developed pahoehoe flows with tumuli are common. The flows are underlain locally by dark gray aa flows and mafic volcanic breccia in layers up to 0.5 m thick and by locally derived, poorly sorted, well-bedded brown- to gray-weathering polymictic, volcanic-clast-rich conglomerate, pebbly sandstone, sandstone, and minor siltstone, deposited in fluvial or beach environments. The locality in Kah Sheets Bay exposes well-indurated, matrix-supported polymictic glacial till in a 1-m-thick and 3-m-long lens underlying dense aphanitic basalt. The till is medium to light gray and consists of very poorly sorted, rounded to angular, fine to coarse gravel-size clasts of schist, graywacke, greenstone, and carbonate "floating" in a dense, microscopically layered matrix of calcite and clay. The K-Ar-dated samples mentioned previously are from the dense aphanitic basalt unit.

The flows of the youngest unit (Qb of fig. 63) and the underlying sediments of unit Qb are best exposed along the south shore of Kupreanof Island from Kah Sheets Bay (A, fig. 63) to Douglas Bay (B, fig. 63), just west of Totem Bay, and at Indian Point and on High Castle Island in Duncan Canal. From

beyond locality C to north of Point Barrie (D, fig. 63), we cannot conclusively identify map unit, but the complicated intrusive and extrusive volcanic pile in this area may include rocks belonging to it.

Time-stratigraphic and lithostratigraphic relations are uncertain in the rocks inferred to underlie the youngest volcanic unit. Rhyolites and basalts appear to have erupted at as-yet undetermined times and in no obvious or simple sequence after the Paleocene (as indicated by the age of the Kootznahoo Formation here where it locally underlies the volcanic pile). The four main units in this pile are as follows (fig. 63):

(1) Rhyolite, rhyodacite, and related siliceous extrusive and intrusive rocks (represented by the symbol QTr in fig. 63), which may be several hundreds of meters thick, consist of aphanitic to finely crystalline, generally quartz- and feldspar-porphyritic rocks that are locally layered, spherulitic, and(or) miarolitic. Heterogeneous stratigraphy includes lava flows, obsidian flows, lahars, welded and nonwelded ash, tuff, and lapilli, all cut locally by porphyritic rhyolite and rhyodacite dikes. Extreme alteration, brecciation, and diking identify vents and domes. Massive, structureless, isolated rhyolite bodies suggest plugs. Columnar-jointed flows exposed in cliffs greater than 100 m high are interpreted as cooling units.

(2) Andesite and other intermediate extrusive rocks (represented by the symbol QTa in fig. 63) consist of at least several tens of meters of fresh dark gray or altered green to maroon, blocky weathering, pyroxene and feldspar porphyritic, massive to vesicular and amygdaloidal flows which are 10-50 cm thick.

(3) Basalt and other mafic extrusive rocks (QTb) consist of at least several tens of meters of dark-gray, rusty weathering, platy, blocky, or columnar jointed flows from 50 cm to several m thick. The flows are 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.

(4) Volcaniclastic deposits (represented by the symbol QTc in fig. 63) consist of an unknown thickness of unsorted to sorted pyroclastic deposits, including felsic to mafic tuff, lapilli tuff, tuff breccia, felsic to mafic lahars, and oligomictic conglomerate. These rocks tend to occur in and around outcrops of, and are locally intercalated with, the rhyolite, rhyodacite, and related extrusive and intrusive rock unit.

According to this re-interpretation, at least a small part of the volcanic sequence in the Kuiu-Etolin volcanic-plutonic belt definitely post-dates the youngest recognized glacial activity; it is possible that a much larger part of the sequence is Holocene and(or) Pleistocene. The young flows both conceal and probably have less mineral resource potential than the underlying Tertiary volcanic rocks. Further definition of their relation to the older volcanic rock units may be important in future mineral resource exploration in this part of the Kuiu-Etolin belt.

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