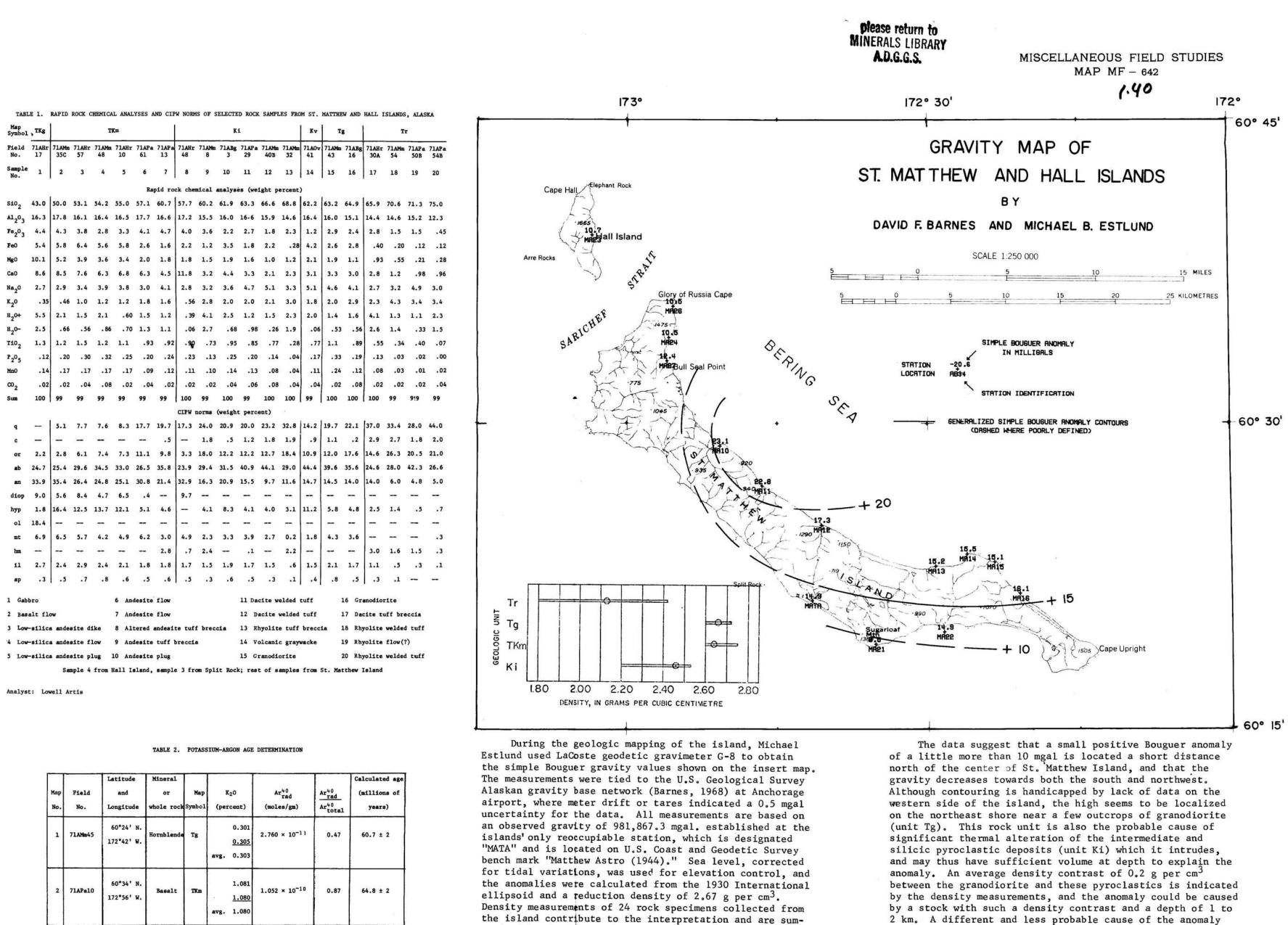
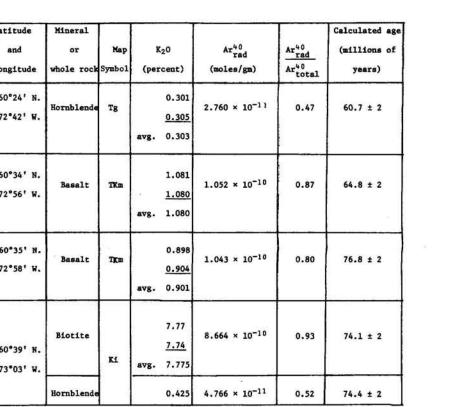
Arre Rocks



marized in the ber graph, on which the length of the bar

indicate the range of measured densities and the circles

indicate the means for each rock unit.



Dacite and andesite tuff breccia. Dacite welded Very coarse dacite breccia (lahar?) with blocks up to 6 m in diameter.

Reference

Barnes, D. F., 1968, Alaskan gravity base station network:

U.S. Geol. Survey open-file rept., 8 p. and 31 tables.

Basalt and andesite flows. Minor andesitic tuff breccia. Varicolored dacite TK and rhyolite tuff breccia. Ash-fall tuff with Cretaceous pollen. ndesitic volcanic

might be the gabbroic rocks, whose single field exposure

suggests a much smaller volume of intrusive rock.

DIAGRAMMATIC SKETCHES OF VOLCANIC SEQUENCES EXPOSED AT SELECTED LOCALITES (A-D) ON ST. MATTHEW ISLAND

Base from U.S. Geological Survey 1:250,000, 1951 SCALE 1:125 000 10 KILOMETRES

Pinnacle Island

EXPLANATION OF SYMBOLS

Inferred fault. Dotted where concealed

Pleistocene cirque

Rocks thermally altered by granodiorite

Location of potassium-argon age sample. Number

refers to map number listed in table 2

Fossil wood and pollen sample locality

Location of volcanic sequence shown in diagrammatic sketches

Glory of Russia Cape

RECONNAISSANCE GEOLOGIC MAP OF ST. MATTHEW ISLAND, BERING SEA, ALASKA Ву

Submarine ridge

-60° 15'

W. W. Patton Jr., T. P. Miller, H. C. Berg, George Gryc, J. M. Hoare, and A. T. Ovenshine

1975

For sale by U. S. Geological Survey, price \$.50 NU.S. GOVERNMENT PRINTING OFFICE: 1975-0-690-036/59

TABLE 1. RAPID ROCK CHEMICAL ANALYSES AND CIPW NORMS OF SELECTED ROCK SAMPLES FROM ST. MATTHEW AND HALL ISLANDS, ALASKA Sample 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 or 2.2 2.8 6.1 7.4 7.3 11.1 9.8 3.3 18.0 12.2 12.2 12.7 18.4 10.9 12.0 17.6 14.6 26.3 20.5 21.0 ab 24.7 25.4 29.6 34.5 33.0 26.5 35.8 23.9 29.4 31.5 40.9 44.1 29.0 44.4 39.6 35.6 24.6 28.0 42.3 26.6 11 2.7 2.4 2.9 2.4 2.1 1.8 1.8 1.7 1.5 1.9 1.7 1.5 .6 1.5 2.1 1.7 1.1 .5 .3 .1 60°35' N. 71APa15 60°39' N. Potassium measurements: Lois Schlocker Argon measurements and age calculations: A. Atkinson, J. Von Essen [K<sup>40</sup> decay constants:  $\lambda_{\epsilon} = 0.585 \times 10^{-10} \text{ year}^{-1}$ ;  $\lambda_{\beta} = 4.72 \times 10^{-10} \text{ year}^{-1}$ . Abundance ratio:  $K^{40}/K = 1.19 \times 10^{-4}$  atom percent] Index map showing location of St. Mathew Island

CORRELATION OF MAP UNITS

DESCRIPTION OF MAP UNITS

trusive and hypabyssal cogenetic equivalent of granodiorite (Tg)

and volcaniclastic deposits (TKm)

facies of marine turbidite

sumably of Cretaceous age

low-silica andesite dike (table 1, sample no. 3)

SURFICIAL DFPOSITS -- Undifferentiated beach, bar, alluvial, and colluvial deposits. Mostly gravel

RHYOLITE AND DACITE TUFF AND HYPABYSSAL ROCKS -- On northwestern part of St. Matthew Island, chiefly rhyolite and dacite welded tuff and tuff breccia and dark rhyolite vitrophyre. Minor intercalated flows and crosscutting dikes of andesite and basalt. Exposed mainly as frost-riven rubble. Forms conspicuous barren light-colored ridges. On southwestern part of St. Matthew Island, chiefly light-colored rhyolite and dacite hypabyssal rocks

Unit appears to overlie mafic flows and volcaniclastic deposits (TKm) and may represent ex-

GRANODIORITE -- Fine-grained hornblende granodiorite. Exposed in seacliffs along northeast coast o

GABBRO -- Medium- to coarse-grained pyroxene gabbro dike(?). Exposed in seacliff on northeast coast of St. Matthew Island. Relation with surrounding rocks obscure but probably intrudes mafic flows

MAFIC FLOWS AND VOLCANICLASTIC DEPOSITS -- Flat-lying to gently dipping flows of andesite and basalt, and volcaniclastic deposits of andesitic and basaltic tuff and conglomerate. On St. Matthew Island, unit composed chiefly of flows. Well exposed in seacliffs where flows cap intermediate and silicic pyroclastic deposits (Ki). Dikes and necks of andesite and basalt form resistant

points of land and sea stacks. Unit appears to be at least 250 m thick at north end of St.

Matthew Island. On Hall Island, flows are intercalated with fine crystal tuff, coarse tuff breccia, and volcanic conglomerate. Pinnacle Island not visited but offshore inspection suggests that it is composed of nearly vertical mafic dikes. Prominent submarine ridges (U.S. Coast and Geodetic Survey, 1955) extend north and northeast from Pinnacle Island and include Split Rock, a

Unit presumably of latest Cretaceous age but may include rocks as young as earliest Tertiary.

K-Ar ages of 76.8+2 m.y. and 64.8+2 m.y. obtained from whole-rock samples of basalt flows at north

composed of rounded clasts of dacite and andesitic flows in an andesite crystal tuff matrix, and

6) andesite and dacite porphyritic and vitrophyritic plugs, dikes, sills, and flows. Inter-calated andesite and basalt flows in upper part. Abundant carbonized and silicified logs in tuf-

locality 1). Unit thermally altered by granodiorite (Tg) intrusive body
Unit well exposed in nearly vertical seacliffs. Gently dipping to flat lying except steeply
dipping near faults. Exposures in interior parts of island confined to scattered patches of

frost-riven rubble. Unit at least 250 m thick along northeast coast of St. Matthew Island Assigned a Late Cretaceous age on the basis of K-Ar ages of 74.1+2 m.y. and 74.4+2 m.y. ob-

tained from biotite and hornblende mineral separates from rhyolite tuff breccia on Hall Island (table 2) and on age of pollen assemblages recovered from carbonaceous tuffs on St. Matthew Island (R. A. Scott, oral communication, 1973) fossil localities 1 and 2)

VOLCANIC GRAYWACKE AND ARGILLITE -- Thinly interbedded fine-grained graywacke and argillite thermally altered by granodiorite (Tg) intrusive body. Bedding sheared and crenulated. Graywacke composed of angular to subrounded grains of feldspar, volcanic rock, and quartz in dense, altered, argillaceous matrix. Argillite is siliceous and dense and breaks with a conchoidal

U.S. Coasst and Geodetic Survey, 1955, United States Coast Pilot 9, Alaska: Capa Spencer to Arctic Ocean, 6th

fracture. Small-scale crossbedding and convolute laminations. Appears to represent distal

Unit found only in small fault-bounded block west of large lagoon on northeast side of St. Matthew Island. Stratigraphic relations uncertain but greater deformation of this unit suggests that it is probably older than intermediate and silicic pyroclastic deposits (Ki). Pre-

Geology mapped in 1971

-60°.30° and tuff breccia along shore of Sarichef Strait at northwest end of St. Matthew Island (fossil

INTERMEDIATE AND SILICIC PYROCLASTIC DEPOSITS -- Includes: 1) dacite, andesite, and rhyolite nonwelded tuff breccia and crystal tuff, 2) dacite and rhyolite welded tuff, 3) massive dacite breccia (lahar?), 4) fine ash-fall tuff containing abundant plant debris, 5) volcanic conglomerate

St. Matthew Island. K-Ar age of  $60.7\frac{2}{10}$  m.y. obtained from hornblende mineral separate (table 2)

QUATERNARY

TERTIARY

TERTIARY

CRETACEOUS

TERTIARY(?)

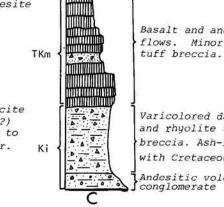
CRETACEOUS

CRETACEOUS

Cretaceous

Massive basalt and andesite flows. Intercalated ashfall tuffs. Thin, platy weathering Varicolored rhyolite and dacite tuff breccia with thin ash-fall tuffs. Sills of andesite vitrophyre. Forms

andslides along seacliffs. Plug of andesite vitrophyre.



Rhyolite and dacite tuff breccia. Basalt flow at top.