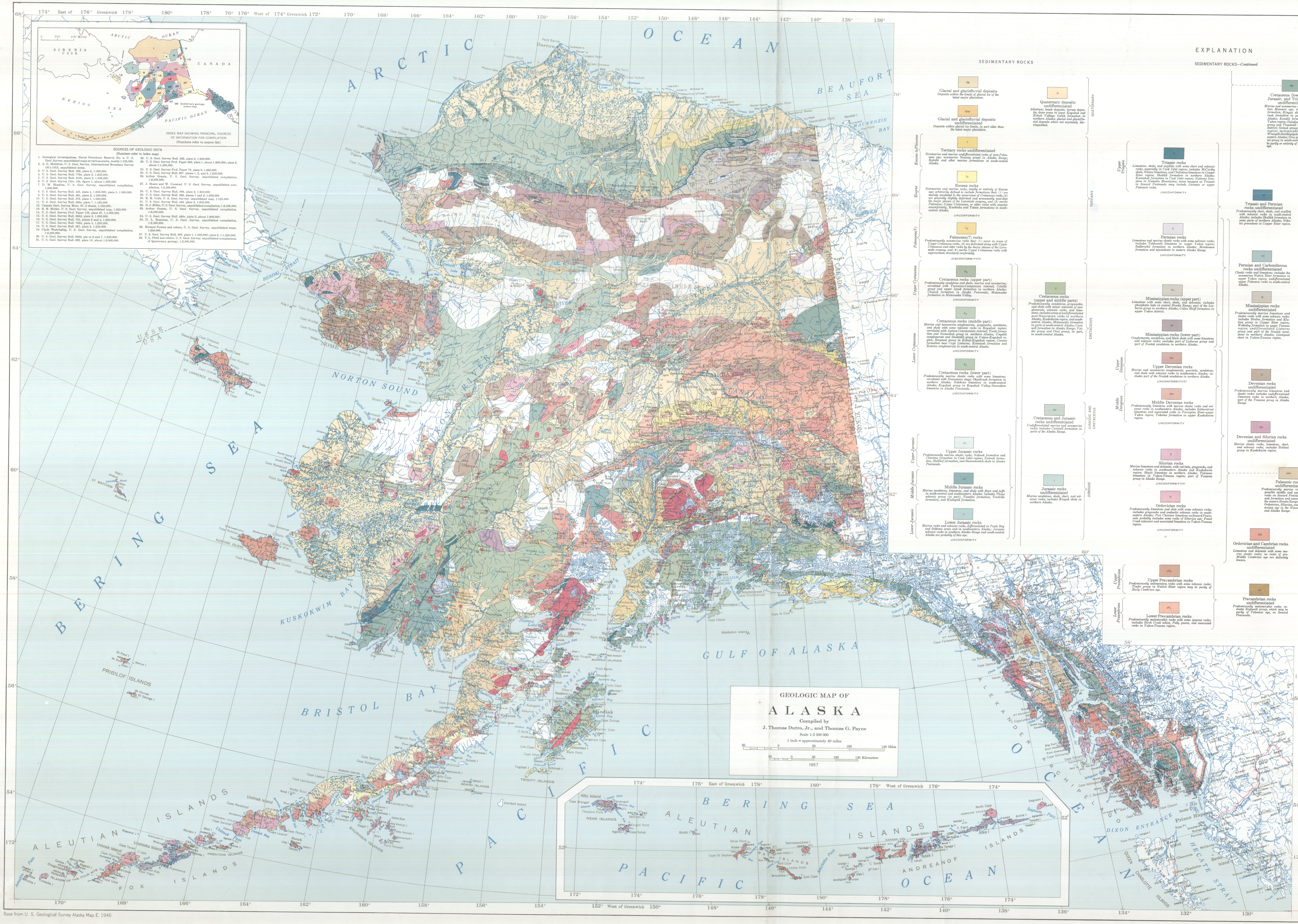

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GEOLOGIC MAP OF
ALASKA

Compiled by
J. Thomas Dutro, Jr., and Thomas G. Payne

Scale 1:2 500 000
1 inch = approximately 40 miles
50 0 50 100 150 Miles
50 0 50 100 150 Kilometers
1957

EXPLANATION

SEDIMENTARY ROCKS

QUATERNARY

Qg
Glacial and glaciofluvial deposits
Deposits within the limits of glacial ice of the latest major glaciation.

Qug
Glacial and glaciofluvial deposits undifferentiated
Deposits within glacial ice limits, in part older than the latest major glaciation.

Q
Quaternary deposits undifferentiated
Alluvium; beach deposits; terrace deposits; dune areas in lower Koyukuk and Kobuk Valleys; Gubik formation in northern Alaska; glacial and glaciofluvial deposits where not separately distinguished.

TERTIARY

Eocene to Pliocene

T
Tertiary rocks undifferentiated
Nonmarine and marine undifferentiated rocks of post-Paleocene age; nonmarine Nenana gravel in Alaska Range; Katalla and other marine formations in south-central Alaska.

Eocene

Te
Eocene rocks
Nonmarine and marine rocks, mostly or entirely of Eocene age; arbitrarily defined to include formations that: (1) are mainly unrelated to the occurrence of Cretaceous rocks, (2) are generally slightly deformed and presumably post-date the major phases of the Laramide orogeny, and (3) overlie Paleocene, Upper Cretaceous, or older rocks with angular unconformity. Kushtaka and Tokun formations in south-central Alaska.

UNCONFORMITY

Paleocene(?)

Tp
Paleocene(?) rocks
Predominantly nonmarine rocks that: (1) occur in areas of Upper Cretaceous rocks, (2) are deformed along with Upper Cretaceous and older rocks by the major phases of the Laramide orogeny, and (3) overlie Upper Cretaceous rocks with approximate structural conformity.

DISCONFORMITY(?)

CRETACEOUS

Upper Cretaceous

K_3
Cretaceous rocks (upper part)
Predominantly sandstone and shale, marine and nonmarine; correlated with Turonian-Campanian interval; Colville group and upper Ignek formation in northern Alaska; Chignik formation in Alaska Peninsula; Matanuska formation in Matanuska Valley.

UNCONFORMITY

Lower Cretaceous

K_2
Cretaceous rocks (middle part)
Marine and nonmarine conglomerate, graywacke, sandstone, and shale with some volcanic rocks in Koyukuk region; correlated with Aptian-Cenomanian interval; Torok formation and Nanushuk group in northern Alaska; Ungalik conglomerate and Shaktolik group in Yukon-Koyukuk region; Bergman group in Kobuk-Koyukuk region; Corwin formation near Cape Lisburne; Kennicott formation and Kotsina conglomerate in south-central Alaska.

UNCONFORMITY

K_1
Cretaceous rocks (lower part)
Predominantly marine clastic rocks with some limestone; correlated with Neocomian stage; Okpikruak formation in northern Alaska; Nelchina limestone in south-central Alaska; Koyukuk group in Koyukuk Valley; Herendeen limestone in Alaska Peninsula.

UNCONFORMITY

K
Cretaceous rocks (upper and middle parts)
Predominantly sandstone, graywacke, and shale with minor amounts of conglomerate, volcanic rocks, and limestone; includes areas of undifferentiated post-Neocomian rocks in northern Alaska, Kuskokwim region, and south-central Alaska; Matanuska formation in parts of south-central Alaska; Cantwell formation in Alaska Range; Valdez group and Orca group, in part, in south-central Alaska.

JURASSIC AND CRETACEOUS

KJ
Cretaceous and Jurassic rocks undifferentiated
Undifferentiated marine and nonmarine rocks; includes Cantwell formation in parts of the Alaska Range.

JURASSIC

Upper Jurassic

Ju
Upper Jurassic rocks
Predominantly marine clastic rocks; Naknek formation and Chinitna formation in Cook Inlet region; Naknek formation, Shelikof formation, and Staniukovitch shale in Alaska Peninsula.

Middle Jurassic

Jm
Middle Jurassic rocks
Marine sandstone, limestone, and shale with flows and tuffs in south-central and southwestern Alaska; includes Thane volcanic group (in part), Tuxedni formation, Tordrillo formation, and Kialagvik formation.

Lower Jurassic

Jl
Lower Jurassic rocks
Marine rocks and volcanic rocks, differentiated in Puale Bay and Seldovia areas and in southwestern Alaska; Jurassic volcanic rocks in southern Alaska Range and south-central Alaska are probably of this age.

UNCONFORMITY

J
Jurassic rocks undifferentiated
Marine sandstone, shale, chert, and volcanic rocks; includes Kingak shale in northern Alaska.

SEDIMENTARY ROCKS—*Continued*

TRIASSIC

Upper Triassic

℞
Triassic rocks
Limestone, shale, and argillite with some chert and volcanic rocks, especially in Cook Inlet region; includes McCarthy shale, Nizina limestone, and Chitistone limestone in Copper River region; Shublik formation in northern Alaska; Kamishak formation in Cook Inlet region; Nabesna limestone in Nutzotin Mountains; areas mapped as Triassic in Seward Peninsula may include Jurassic or upper Paleozoic rocks.

UNCONFORMITY

Mz
Cretaceous (lower part), Jurassic, and Triassic rocks undifferentiated
Marine and nonmarine rocks of pre-Aptian Mesozoic age; includes Shublik formation, Kingak shale, and Okpikruak formation in parts of northern Alaska; Kandik formation in upper Yukon region; Douglas Island volcanic group and Treadwell slate in Juneau district; Gemuk group in Kuskokwim region; metamorphic rocks of the Wrangell-Revillagigedo belt in southeastern Alaska; Orca group and Yakutat group in south-central Alaska may be partly or entirely of Late Cretaceous age.

℞P
Triassic and Permian rocks undifferentiated
Predominantly chert, shale, and argillite with volcanic rocks in south-central Alaska; includes Shublik formation in some parts of northern Alaska; Nikolai greenstone in Copper River region.

PERMIAN

P
Permian rocks
Limestone and marine clastic rocks with some volcanic rocks; includes Tahkandit limestone in upper Yukon region; Sadlerochit formation in northern Alaska; Mankomen formation and equivalents in eastern Alaska Range.

UNCONFORMITY

PC
Permian and Carboniferous rocks undifferentiated
Clastic rocks and limestone; includes the nonmarine Nation River formation in upper Yukon region; undifferentiated upper Paleozoic rocks in south-central Alaska.

CARBONIFEROUS

MISSISSIPPIAN

Mu
Mississippian rocks (upper part)
Limestone with some chert, shale, and dolomite; includes phosphatic beds in central Brooks Range; part of the Lisburne group in northern Alaska; Calico Bluff formation in upper Yukon district.

Ml
Mississippian rocks (lower part)
Conglomerate, sandstone, and black shale with some limestone and volcanic rocks; includes part of Lisburne group and part of Noatak sandstone in northern Alaska.

M
Mississippian rocks undifferentiated
Predominantly marine limestone and clastic rocks with some volcanic rocks; includes Strelna formation and Klutina group in Copper River region; Wellesley formation in upper Tanana region; undifferentiated Lisburne group and part of the Noatak sandstone in northern Alaska; Livengood chert in Yukon-Tanana region.

DEVONIAN

Upper Devonian

Du
Upper Devonian rocks
Marine and nonmarine conglomerate, quartzite, sandstone, and shale with volcanic rocks in southeastern Alaska; includes part of the Noatak sandstone in northern Alaska.

UNCONFORMITY(?)

Middle Devonian

Dm
Middle Devonian rocks
Predominantly limestone with marine clastic rocks and volcanic rocks in southeastern Alaska; includes Salmontrout limestone and associated rocks in Porcupine River-upper Yukon region; Takotna formation in upper Kuskokwim region.

UNCONFORMITY

D
Devonian rocks undifferentiated
Predominantly marine limestone and clastic rocks; includes undifferentiated Devonian rocks in northern Alaska; part of the Tonzona group in Alaska Range.

DS
Devonian and Silurian rocks undifferentiated
Marine clastic rocks, limestone, chert, and volcanic rocks; includes Holitna group in Kuskokwim region.

SILURIAN

S
Silurian rocks
Marine limestone and dolomite, with red beds, graywacke, and volcanic rocks in southeastern Alaska and Kuskokwim region; Skajit limestone in northern Alaska; Tolovana limestone in Yukon-Tanana region; part of Tonzona group in Alaska Range.

UNCONFORMITY(?)

pals
Paleozoic rocks undifferentiated
Predominantly marine rocks; includes possible middle and upper Paleozoic rocks on Seward Peninsula; Neruokpuk formation and associated rocks in the eastern Brooks Range; limestones of Ordovician, Silurian, and possibly Devonian age in the Nixon Fork region and Alaska Range.

ORDOVICIAN

O
Ordovician rocks
Predominantly limestone and slate with some volcanic rocks; includes graywacke and andesitic volcanic rocks in southeastern Alaska; Port Clarence limestone on Seward Peninsula probably includes some rocks of Silurian age; Fossil Creek volcanics and associated limestone in Yukon-Tanana region.

UNCONFORMITY

CAMBRIAN

OꞒ
Ordovician and Cambrian rocks undifferentiated
Limestone and dolomite with some marine clastic rocks; no rocks of pre-Middle Cambrian age are definitely known.

PRECAMBRIAN

Upper Precambrian

p$Ꞓ_2$
Upper Precambrian rocks
Predominantly sedimentary rocks with some volcanic rocks; Tindir group in Nation River region may be partly of Early Cambrian age.

Lower Precambrian

p$Ꞓ_1$
Lower Precambrian rocks
Predominantly metamorphic rocks with some igneous rocks; includes Birch Creek schist, Pelly gneiss, and associated rocks in Yukon-Tanana region.

pꞒ
Precambrian rocks undifferentiated
Predominantly metamorphic rocks; includes Kigluaik group, which may be partly of Paleozoic age, on Seward Peninsula.

METAMORPHIC ROCKS

PALEOZOIC

palm
Paleozoic metamorphic rocks undifferentiated
Predominantly pre-Devonian in age; may include some Precambrian or Mesozoic rocks; Totatlanika schist in Alaska Range; some areas mapped as Birch Creek schist in Yukon-Koyukuk region; schists of pre-Skajit age in northern Alaska; Nome group and associated metamorphic rocks on Seward Peninsula; schists of Cosna-Ruby region and Kaiyuh Hills may be partly or entirely of pre-Paleozoic age; Wales group in southeastern Alaska.

IGNEOUS ROCKS

QUATERNARY

Qv
Quaternary volcanic rocks
Extrusive rocks with associated pyroclastic rocks; includes unmodified volcanic cones in Aleutian Islands.

QTv
Quaternary and Tertiary volcanic rocks
Extrusive rocks with associated pyroclastic rocks—some fossiliferous; includes Eocene rocks in southeastern Alaska and southeastern Talkeetna Mountains; Tertiary to Recent rocks in Wrangell Mountains, south-central Alaska, Alaska Peninsula, Aleutian Islands, and Seward Peninsula; Pliocene rocks of Pribilof Islands; volcanic rocks of Aleutian Islands have been modified by glaciation.

TERTIARY

Ti
Tertiary intrusive rocks
Predominantly granitic intrusive rocks, with associated extrusive rocks.

Tmi
Tertiary mafic intrusive rocks
Predominantly mafic intrusive rocks with associated extrusive rocks.

TMzv
Tertiary and Mesozoic volcanic rocks undifferentiated
Extrusive rocks with associated pyroclastic rocks; mapped only in Aleutian Islands.

CRETACEOUS

Ki
Cretaceous intrusive rocks
Predominantly granitic intrusive rocks with associated extrusive rocks and metamorphic rocks, mainly in southeastern Alaska.

Kmi
Cretaceous mafic intrusive rocks
Mafic intrusive rocks, mainly associated with the granitic intrusive rocks of southeastern Alaska.

Kv
Cretaceous volcanic rocks
Extrusive rocks with associated pyroclastic rocks, mainly in southern Kuskokwim region.

Mzv
Mesozoic volcanic rocks
Predominantly extrusive rocks with associated pyroclastic rocks; includes rocks of probable Jurassic and Triassic age in Anchorage area; rocks in southeastern Alaska predominantly Cretaceous and Jurassic in age; includes questionably Mesozoic volcanic rocks on St. Lawrence Island, Seward Peninsula, in Alaska Range, and in Aleutian Islands; probably includes some intrusive rocks in Aleutian Islands.

KJi
Cretaceous and Jurassic intrusive rocks undifferentiated
Predominantly granitic intrusive rocks with associated extrusive rocks and metamorphic rocks; includes Jurassic and Cretaceous intrusive rocks of Alaska Range, Yukon-Tanana region, Seward Peninsula, and northern Alaska; much of Coast Range complex of southeastern Alaska may be of Cretaceous age.

KJmi
Cretaceous and Jurassic mafic intrusive rocks undifferentiated
Mafic intrusive rocks with associated extrusive rocks.

JURASSIC

Ji
Jurassic intrusive rocks
Predominantly granitic intrusive rocks with associated extrusive rocks, mainly in south-central Alaska and the Alaska Peninsula.

Jv
Jurassic volcanic rocks
Extrusive rocks and associated pyroclastic rocks; includes Skwentna group of Early Jurassic age in southern Alaska Range; volcanic rocks of Cook Inlet area and the Talkeetna formation of south-central Alaska are also largely of Early Jurassic age.

Ui
Intrusive rocks of unknown age
Predominantly granitic intrusive rocks and associated extrusive rocks of unknown age; rocks in Yukon-Koyukuk region and northeastern Alaska may be partly of middle Paleozoic age; rocks in western Aleutian Islands are probably Cretaceous or Tertiary in age.

Umi
Mafic intrusive rocks of unknown age

PERMIAN AND TRIASSIC

℞Pv
Triassic and Permian volcanic rocks undifferentiated
Extrusive rocks with associated greenstones and siliceous rocks; includes Nikolai greenstone of south-central Alaska.

PERMIAN

Pv
Permian volcanic rocks
Extrusive rocks with associated greenstones and siliceous rocks; mainly in Wrangell Mountains and southwestern Alaska.

PCv
Permian and Carboniferous volcanic rocks undifferentiated
Extrusive rocks with associated greenstones and siliceous rocks; mainly in Kaiyuh Hills, Kuskokwim region, Seward Peninsula, and St. Lawrence Island.

MISSISSIPPIAN — CARBONIFEROUS

Mv
Mississippian volcanic rocks
Rampart group, Circle volcanics, and associated volcanic rocks, greenstones, and siliceous rocks of Yukon-Tanana region; includes part of area mapped as Kanuti group in Koyukuk region.

DEVONIAN

Dmi
Devonian mafic intrusive rocks
Predominantly mafic intrusive rocks with associated greenstones of Yukon-Tanana region.

Dv
Devonian volcanic rocks
Extrusive rocks and associated siliceous rocks; Woodchopper volcanics of Yukon-Tanana region.

Contact
Dashed where position is approximately located; uncolored areas are beyond limits of exploration.

U
D
Fault
Dashed where approximately located, dotted where concealed or hypothetical; U, upthrown side; D, downthrown side. Most of the faults shown in northern Alaska are either thrust faults or reverse faults with upthrown side on the south.

Base from U. S. Geological Survey Alaska Map E. 1946

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For sale by U. S. Geological Survey, price $
Compiled March 1954