STRATIFIED SEDIMENTARY AND VOLCANIC ROCKS. MAINLY MARINE. IN PART METAMORPHOSED

- Qh HOLOCENE DEPOSITS--Alluvial, glacial, lacustrine, swamp, landslide, and beach deposits
- QUATERNARY DEPOSITS--Alluvial fan, sand, and silt deposits and the marine Bootlegger Cove Clay OP PLEISTOCENE DEPOSITS--Alluvial, glacial, dune sand, loess, terrace and pediment gravel, and reworked sand
- UPPER TERTIARY ROCKS--Siltstone, sandstone, and conglomeratic sandy mudstone (marine tillite) of Miocene and Pliocene age. Consists mainly of Yakataga Formation in Gulf of Alaska area
- MIDDLE TERTIARY ROCKS--Siltstone, organic shale, sandstone, and locally abundant submarine volcanic rocks of late Eocene(?), Oligocene, and early Miocene age. Consists mainly of Poul Creek and Katalla Forma-
- LOWER TERTIARY ROCKS--Marine and continental clastic rocks of Paleocene and Eocene age. Includes Kulthieth and Kushtaka Formations, clastic rocks of the Orca Group, and related unnamed rocks in the Gulf of Alaska
- LOWER TERTIARY VOLCANIC ROCKS--Mafic pillow lavas and pyroclastic rocks with minor chert, limestone, and shale of Paleocene and Eocene age. Includes lower part of Orca Group in Gulf of Alaska area. Intensely
- K CRETACEOUS ROCKS--Shelf deposits of sandstone, siltstone, shale, limestone, claystone, conglomerate, mudstone, and porcellanite ranging in age from Early Cretaceous (Valanginian) to Late Cretaceous (Maestrichtian). Rocks of Aptian age apparently absent. Includes the Kennicott, Moonshine Creek, Schulze, Chititu, and MacColl Ridge Formations and related unnamed rocks in the southern Wrangell Mountains; the Matanuska Formation in the Matanuska Valley; and the Kaguyak Formation on the Alaska Peninsula
- CRETACEOUS AND JURASSIC ROCKS--Argillite, shale, graywacke, conglomerate, lava, tuff, and agglomerate; almost barren of fossils; probably includes rocks ranging in age from Early Jurassic to Late Cretaceous. In places moderately to highly (amphibolite facies) metamorphosed
- CRETACEOUS AND UPPER JURASSIC(?) ROCKS--Graywacke, slate, argillite, with minor conglomerate, volcanic detritus, and interbedded mafic volcanic rocks. Mainly of Late Cretaceous (Maestrichtian) age but includes some rocks of Early Cretaceous and possible Late Jurassic age; sparsely fossiliferous. Include: the Kodiak Formation on Afognak Island, Valdez Group of the Kenai and Chugach Mountains, and the Yakutat Group of the Chugach Mountains east of the Copper River. Mildly metamorphosed, locally to greenschist
- CRETACEOUS AND(OR) UPPER JURASSIC ROCKS--A deep-water clastic sequence of siltstone, graywacke, arkose, and conglomeratic sandstone chaotically juxtaposed with a sequence containing massive pillow basalts and associated radiolarian chert, argillite, and minor ultramafic rocks and marble. Mildly metamorphosed (prehnite-pumpellyite facies). In part a melange. Consists of the McHugh Complex
- LOWER CRETACEOUS AND UPPER JURASSIC ROCKS--Shallow- and deep-water clastic deposits of argillite and graywacke with interbedded massive lenses of extraformational conglomerate of Late Jurassic (Oxfordian) ... Early Cretaceous (Barremian) age. Includes a sequence of nonmarine clastic rocks at the top
- LOWER CRETACEOUS ROCKS--Interlayered submarine and subaerial andesitic fragmental volcanic rocks, volcanic flows, lapilli tuffs, and volcaniclastic rocks of Early Cretaceous age. Consists mainly of the Chisana
- UPPER JURASSIC ROCKS--Siltstone, sandstone, shale, and conglomerate of the Chinitna and Naknek Formations in the Cook Inlet area and along the southern flank of the Talkeetna Mountains, and the Root Glacier Formation along the southern Wrangell Mountains
- MIDDLE JURASSIC ROCKS--Siltstone, sandstone, and shale of the Tuxedni Group in the Cook Inlet area and southern Talkeetna Mountains, and Nizina Mountain Formation and Kotsina Conglomerate along the southern Wrangell Mountains. May locally include rocks of the Late Jurassic age
- LOWER JURASSIC ROCKS--Sandstone and argillite interbedded with volcanic flows and pyroclastic rocks of the Talkeetna Formation in the Cook Inlet area and southern Talkeetna Mountains LOWER JURASSIC AND UPPER TRIASSIC ROCKS--Shallow- to deep-water limestone with minor dolomite, shale, and
- chert ranging in age from Late Triassic (Karnian) to Early Jurassic (Sinemurian). Includes the Chitistone Limestone, Nizina Limestone, McCarthy Formation, and Lubbe Creek Formation along the southern Wrangell
- TRIASSIC ROCKS--Shale and schistose tuff with sandstone and beds of pillow basalt. Includes Uyak Formation on Afognak Island and Kamishak Formation in the Cook Inlet area UPPER TRIASSIC ROCKS--Limestone, chert, tuff, tuffaceous conglomerate and breccias. Includes unnamed rocks
- at southern tip of Kenai Peninsula TRIASSIC AND PERMIAN ROCKS--Mafic volcanic rocks, red beds, limestone, and calcareous argillite along the west-central Alaska Range. Argillite and limestone with siltstone and conglomerate and abundant gabbroic
- sills along east-central Alaska Range. Includes upper part of Mankomen Group of Middle Pennsylvanian to Early Permian age PP PERMIAN AND PENNSYLVANIAN ROCKS--Basaltic to andesitic lavas and their derivative volcaniclastic rocks,
- tuffs, minor gabbro, and local shallow-water sedimentary rocks. Includes Skolai Group of Early Permian age, equivalent rocks in the Strelna Formation, the Tetelna Volcanics of Pennsylvanian age, and related unnamed rocks. Metamorphosed to greenschist factes and, locally, amphibolite factes in its southern extent, mainly between the Border Ranges and the Chitina Valley faults and to prehnite-pumpellyite facies elsewhere. In the Talkeetna Mountains, metamorphosed mainly to greenschist facies, locally to amphibolite
- MISSISSIPPIAN(?) ROCKS--Pyroclastic rocks and ash flows interbedded with thin layers of sedimentary rocks metamorphosed to quartz-orthoclase-sericite schist and gneiss on north-central flank of Alaska Range.

Totatlanika Schist

- PALEOZOIC ROCKS--North of Chitina Valley fault, mainly marble, in places containing tremolite, with subordinate amphibolite. Includes parts of the Kaskawulsh Group (Devonian) of Canadian usage. Near Cantwell in south-central Alaska Range, limestone, slate, and conglomerate with some fossils of Devonian age. West of Chulitna River, unfossiliferous argillite and graywacke, mildly metamorphosed. In northeast corner of map area, includes unmetamorphosed rocks of the Funnel Creek, Adams, Hillard, Road River,
- McCann Hill, and Nation River Formations B_v PALEOZOIC VOLCANIC ROCKS--Greenstone with minor quartzite, chert, and phyllite IR LOWER PALEOZOIC ROCKS--Argillite, graywacke, phyllite, quartzite, slate, limestone, and chert, ranging in age from Cambrian through Devonian. In west part of map area, includes the Tonzona Group; slightly to moderately metamorphosed. In east part of area, includes unnamed rocks formerly included in the Birch
- Creek Schist; metamorphosed to greenschist and amphibolite facies 182v LOWER PALEOZOIC VOLCANIC ROCKS--Greenstone with some metadiorite, metagabbro, and interbedded phyllite of
- IRape LOWER PALEOZOIC AND(OR) PRECAMBRIAN ROCKS--Highly metamorphosed clastic rocks. Includes Keevy Peak Formation and rocks formerly included in the Birch Creek Schist
- Y PRECAMBRIAN Y ROCKS--Basalt, red beds, sandstone, shale, and limestone of Tindir Group SV9 LOWER JURASSIC, PERMIAN, AND PENNSYLVANIAN ROCKS--In part covered by Tertiary sedimentary rocks and intruded by granitic rocks of Mesozoic and Tertiary age
- Tpc PLIOCENE CONTINENTAL DEPOSITS--Pebble to boulder conglomerate and coarse sandstone, with interbedded mud-
- flow deposits, claystone, and local thin lignite beds. Includes Nenana Gravel UPPER TERTIARY CONTINENTAL DEPOSITS--sandstone, siltstone, claystone, minor conglomerate and coal beds. Includes upper part of Kenai Group in Cook Inlet area and Nenana Gravel and related unnamed rocks in west-central Alaska Range. Includes rocks ranging in age from Oligocene(?) through Pliocene
- Tmc MIOCENE CONTINENTAL DEPOSITS--Sandstone, siltstone, shale, claystone, conglomerate, and coal beds. Includes the Sanctuary, Suntrana, Grubstake, and Lignite Creek Formations in the central Alaska Range and the Frederika Formation in the Wrangell Mountains
- mTc MIDDLE TERTIARY CONTINENTAL DEPOSITS--Sandstone, siltstone, conglomerate, claystone, and coal beds. Includes the Healy Creek Formation (Oligocene and Miocene) in the central Alaska Range; the Gakona Formation (Oligocene) in the edst-central Alaska Range (Wolfe, J. A., written commun., 1974); and the Tsadaka Formation (Oligocene) in the Matanuska Valley
- ITc LOWER TERTIARY CONTINENTAL DEPOSITS--Claystone, siltstone, sandstone, conglomerate, and coal beds. Includes the Chickaloon and Wishbone Formations in the Matanuska Valley and equivalent rocks in the Cook Inlet area. Includes rocks ranging in age from Paleocene through Eocene
- TXc PALEOCENE CONTINENTAL DEPOSITS--Conglomerate, arkose, sandstone, coaly shale, and shale. Consists of the Cantwell Formation in the central Alaska Range and the Arkose Ridge Formation in the Matanuska Valley
- TKc TERTIARY AND UPPER CRETACEOUS CONTINENTAL DEPOSITS--Conglomerate, breccia, sandstone, mudstone, shale, tuffaceous rocks, and lignite. Includes rocks ranging from Late Cretaceous to Pliocene Kc UPPER CRETACEOUS CONTINENTAL DEPOSITS--Conglomerate, sandstone, tuffaceous sandstone, siltstone, shale,
- VOLCANIC ROCKS MAINLY SUBAERIAL QV QUATERNARY VOLCANIC ROCKS--Chiefly andesitic flows and associated pyroclastic rocks on volcanoes in southern Alaska Range and on Augustine Island. Olivine basalt, containing abundant peridotite and granulite
- inclusions, in lava flows of Prindle volcano northeast of Tanana River QUATERNARY AND TERTIARY VOLCANIC ROCKS--Mainly andesite and basaltic andesite flows and subordinate pyro-
- clastic rocks of the Wrangell Lava, of Miocene through Holocene age. Also includes basaltic flows and pyroclastic rocks of Tertiary or Quaternary age northeast of Tanana River TERTIARY VOLCANIC ROCKS--Andesitic lava, breccia, and tuff northeast of Tanana River; acidic lava flows, mostly rhyolite and trachyte with some andesite south of the central Alaska Range; basalt flows and
- associated pyroclastic rocks in Talkeetna Mountains; mafic and felsic flows, tuffs, and flow breccias in the southern Alaska Range; and lapilli and ash of Miocene or younger age west of Cook Inlet Tertiary Felsic Volcanic ROCKS--Lava, tuff, tuff breccia, pumice breccia, volcanic conglomerate, and tuffa-
- ceous sedimentary rocks LOWER TERTIARY OR UPPER CRETACEOUS VOLCANIC ROCKS--Rhyolitic and andesitic porphyritic flows, tuffs, and breccias in northwest part of map area
- TRIASSIC VOLCANIC ROCKS--Basaltic lava, commonly amygdaloidal, with local thin interbeds of volcaniclastic rocks, and local basal conglomerate. Includes the Nikolai Greenstone and related rocks of Middle and(or) Late Triassic age
- FELSIC ROCKS TERTIARY GRANITIC ROCKS--Middle and late Tertiary quartz diorite to granite in the Alaska-Aleutian Range batholith; epizonal to hypabyssal quartz monzonites and granites in the central Alaska Range; shallowseated dacite, rhyodacite, granodiorite, and quartz diorite in the Wrangell Mountains; mainly rhyolite and trachyte in the Matanuska Valley; and granodiorite in the Gulf of Alaska ærea and eastern Chugach
- 769 OLIGOCENE GRANITIC ROCKS--Quartz diorite, granodiorite, and quartz monzonite in the Prince William Sound
- TERTIARY AND CRETACEOUS GRANITIC ROCKS--Granodiorite to granite in the Alaska-Alleutian Range batholith and quartz diorite and granodiorite in the Talkeetna batholith. Both are of Late Cretaceous and early Tertiary age
- TERTIARY AND(OR) MESOZOIC GRANITIC ROCKS--Quartz monzonite, granodiorite, and quartz diorite with subordinate granite and diorite. Probably Mesozoic in age but may include rocks of Tertiary age
- CRETACEOUS GRANITIC ROCKS--Granodiorite with subordinate granite, quartz monzonite, and diorite. Includes extensive migmatitic granodiorites in the central Alaska Range

- CRETACEOUS AND JURASSIC GRANITIC ROCKS--Quartz diorite with subordinate granodiorite and diorite
- Mzg MESOZOIC GRANITIC ROCKS--Dominantly granodiorite, but ranging in composition from diorite to granite JURASSIC GRANITIC ROCKS--Quartz diorite and granodiorite of Early and Middle Jurassic age in the Alaska-Aleutian Range batholith; granodiorite with subordinate quartz monzonite and quartz diorite of probable early Middle Jurassic age in the Talkeetna batholith; and syenite porphyry and granodiorite northeast
- JURASSIC OR TRIASSIC GRANITIC ROCKS--Granodiorite, locally quartz monzonite, quartz diorite, or diorite
- UPPER PALEOZOIC GRANITIC ROCKS--Monzonite and syenite of Pennsylvanian and(or) Permian age
- PALEOZOIC GRANITIC ROCKS--Chiefly quartz diorite or quartz diorite porphyry LOWER PALEOZOIC AND(OR) PRECAMBRIAN GRANITIC ROCKS--Granitic intrusive rocks metamorphosed to amphibolitefacies biotite augen gneiss and gneiss
- Tmi TERTIARY MAFIC ROCKS--Diabase sills in central Alaska Range and gabbro and basalt west of the Chulitna
- TMzmi TERTIARY AND(OR) MESOZOIC MAFIC ROCKS--Gabbro and basalt, probably mostly Tertiary in age MESOZOIC MAFIC ROCKS--Gabbro with subordinate basalt and basaltic breccia; highly altered; age unknown but probably Mesozoic northeast of Tanana River. Gabbroic rocks along Denali fault and in central Alaska
- Jmi JURASSIC MAFIC ROCKS--Gabbroic rocks of Late Jurassic age UPPER PALEOZOIC MAFIC ROCKS--Gabbroic rocks of probable Pennsylvanian and Permian age. May include rocks

- Tum TERTIARY ULTRAMAFIC ROCKS--Dunite and serpentinite MESOZOIC ULTRAMAFIC ROCKS--Layered dunite complex in central Alaska Range
- MESOZOIC AND(OR) PALEOZOIC ULTRAMAFIC ROCKS--Serpentinized peridotite PALEOZOIC ULTRAMAFIC ROCKS--Mainly ultramafic rocks with subordinate mafic rocks of probable Devonian age in northern part of map area east of Fairbanks. Peridotite, dunite, and pyroxenite of probable Paleozoic
- ULTRAMAFIC ROCKS OF UNCERTAIN AGE--Serpentinized dunite, peridotite, and minor pyroxenite north of Border Ranges fault; dunite at southern tip of Kenai Peninsula
- IMizmo LOWER MESOZOIC METAMORPHIC ROCKS--Small masses of metamorphosed sedimentary, volcanic, and igneous rocks,
- largely of pre-Cretaceous age, scattered throughout the Aleutian Range batholith JRm JURASSIC AND TRIASSIC METAMORPHIC ROCKS--Intercalated blueschist, greenschist, mica schist, impure marble, and subordinate metachert of Late Triassic and Early Jurassic age at southern tip of Kenai Peninsula
- TRIASSIC AND PERMIAN METAMORPHIC ROCKS--Marble, quartzite, greenschist, chlorite schist, garnet schist, and subordinate gneiss in Aleutian Range batholith; mainly of Late Triassic age
- MESOZOIC AND(OR) PALEOZOIC--Metaplutonic, metasedimentary, and metavolcanic rocks near Anchorage and amphibolite-facies schist along south side of Matanuska Valley IR.m LOWER PALEOZOIC METAMORPHIC ROCKS--Undifferentiated metasedimentary and metaigneous rocks of Devonian age
- PALEOZOIC AND(OR) PRECAMBRIAN METAMORPHIC ROCKS--Schist and gneiss of many different compositions, primarily of the greenschist and amphibolite facies, most of which were formerly included in the Birch Creek Schist

SYMBOLS Fault, approximately located Dotted where concealed or inferred. Contact, approximately located Dotted where concealed or inferred

Volcanic vent or cone

Bull. 1202-C, pls. 4 and 5, 1:63,360,1966. Bela Csejtey, unpublished compilation.

- F. R. Weber, unpublished compilation, 1:250,000.
- 6. Misc. Field Studies Map MF-358, 1:250,000, 1972. Modified by H. L. Foster.
- 7. Prof. Paper 70, pl. 9, 1:625,000, 1911. Modified by the compiler.
- 10. Geol. Quad. Map GQ-810, 1:63,360, 1970. 11. Geol. Quad. Map GQ-809, 1:63,360, 1970.
- Geol. Quad. Map GQ-808, 1:63,360, 1970.

- 15. Geol. Quad. Map GQ-805, 1:63,360, 1970.
- 17. Prof. Paper 293, pl. 1, 1:250,000, 1958.
- 21. Misc. Geol. Inv. Map I-394, 1:63,360, 1964.
- 22. Bull. 1181-H, pl. 1, 1:125,000, 1965.

- 26. Bull. 1249, pl. 1, 1:63,360, 1968.

- 34. Bull. 498, pl. 3, 1:250,000, 1912. Modified by D. L. Richter.
- 36. Bull. 1071-G, pl. 21, 1:250,000, 1960.
- 37. Bull. 792, pl. 2, 1:500,000, 1927. 38. Prof. Paper 758-A, pl. 1, 1:250,000, 1973.
- 39. Misc. Field Studies Map MF-372, 1:1,000,000,-1972. Source of data for plutonic rocks in Alaska-
- Aleutian Range batholith. Modified by authors.
- 40. Open-file report 413, pl. 1, 1:250,000, 1970.

ALASKA GULF 50 50 IOO Kilometers

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43. Prof. Paper 475-B, p. 57, fig. 16, 1:300,000, 1963.

46. Bull. 1058-D, pl. 18, 1:63,360, 1959.

49. Open-file map 563, 1:250,000, 1973.

51. Geol. Quad. Map GQ-979, 1:63,360, 1972.

52. Geol. Quad. Map GQ-899, 1:63,360, 1970.

53. Geol. Quad. Map GQ-844, 1:63,360, 1970.

54. Geol. Quad. Map GQ-1035, 1:63,360, 1972.

56. Geol. Quad. Map GQ-943, 1:63,360, 1970.

59. George Plafker, unpublished compilation.

60. Bull. 894, pl. 2, 1:250,000, 1938.

62. Bull. 943-C, fig. 3, 1:375,000, 1945.

69. Bull. 1058-F, pl. 18, 1:63,360, 1959.

55. Misc. Geol. Inv. Map I-438, 1:63,360, 1965.

57. Misc. Field Studies Map MF-536, 1:63,360, 1973.

58. Misc. Geol. Inv. Map I-410, 1:63,360, 1964.

61. Misc. Geol. Inv. Map I-524, 1:125,000, 1969.

63. Misc. Geol. Inv. Map I-356, 1:96,000, 1962.

66. Misc. Field Inv. Map MF-350, 1:250,000, 1972.

71. Prof. Paper 512, pls. 1 and 2, 1:63,360, 1966.

72. Misc. Geol. Inv. Map I-407, 1:250,000, 1964.

73. Geol. Quad. Map GQ-1068, 1:63,360, 1973.

74. Bull. 1058-G, pl. 29, 1:250,000, 1959.

75. Bull. 880-C, pl. 2, 1:250,000, 1937.

64. Misc. Geol. Inv. Map I-484, 1:500,000, 1967. Modified by the author.

67. Bull. 587, pl. 3, 1:250,000, 1915. Modified by George Plafker.

70. Jour. Geophys. Research, v. 78, no. 8, p. 1384, fig. 1, 1:500,000.

65. Prof. Paper 550-B, p. 63, fig. 1, 1:875,000, and Prof. Paper 550-D, p. 196, fig. 1, 1:94,000, 1966.

68. Prof. Paper 443, pl. 4, 1:250,000, 1964. Modified by R. G. Tysdal and by the compiler.

47. Misc. Geol. Inv. Map I-359, 1:63,360, 1962.

48. Prof. Paper 316-G, pl. 24, 1:250,000, 1963.

50. E. M. MacKevett, Jr., unpublished compilation.

45. Alaska Div. Geol. and Geophys. Surveys Annual Report, 1:1,000,000, 1973.

- 4. Misc. Geol. Inv. Map 1-455, 1:250,000, 1966. Modified by F. R. Weber
- 8. Bull. 1108A, pl. 1, 1:250,000, 1961.
- 9. Geol. Quad. Map GQ-811, 1:63,360, 1970.

- 13. Geol. Quad. Map GQ-807, 1:63,360, 1970.
- 14. Geol. Quad. Map GQ-806, 1:63,360, 1970.
- 16. Geol. Quad. Map GQ-804, 1:63,360, 1970.
- 18. Bull. 1039-D, pl. 11, 1:48,000, 1959.
- 19. Bull. 608, pl. 2, 1:250,000, 1915. Modified by the compiler.
- 20. Bull. 501, pl. 2, 1:250,000, 1912. Modified by the compiler.
- 23. Interpolated by the compiler on the basis of the geology of surrounding areas and topography.
- 25. Bull. 989-D, pl. 7, 1:250,000, 1954. Modified by the compiler.
- 27. Bull. 498, pl. 2, 1:250,000, 1912. Modified by the compiler. 28. Geol. Soc. America Bull., v. 84, no. 3, p. 941, fig. 2, 1:250,000, 1973. Modified by the compiler.
- 29. Geol. Soc. America Bull., v. 77, no. 6, p. 599, fig. 2, 1:316,800, 1966. Modified by the compiler. 30. Alaska Div. Mines and Minerals Geol. Report 20, fig. 1, 1:103,000, 1966. Modified by the compiler. 31. Alaska Div. Mines and Minerals Geol. Report 28, fig. 1, 1:48,000, 1967. Modified by the compiler.
- 32. Alaska Div. Mines and Minerals Open File M AOF-30, 1:63,360, 1971. Modified by the compiler. 33. Alaska Div. Mines and Minerals Geol. Report 13, fig. 1, 1:253,440, 1965. Modified by the compiler.
- 35. Misc. Geol. Inv. Map I-593, 1:250,000, 1970. Modified by H. L. Foster.

EXPLANATION AND SOURCES OF DATA FOR

PRELIMINARY GEOLOGIC MAP OF THE SOUTHEAST QUADRANT OF ALASKA

Helen M. Beikman 1974