

EXPLANATION

STRATIGRAPHIC POSITION UNCERTAIN

**UNCONFORMITY**  
**NORTH OF TINTINA FAULT ZONE**  
**STRATIGRAPHIC POSITION REASONABLY CERTAIN**

**Quaternary**  
 Surficial deposits  
 Qal, flood-plain deposits  
 Qaf, alluvial-fan deposits  
 Qt, river-terrace deposits  
 Ql, loess

**Cretaceous and Tertiary**  
 Sandstone, mudstone, and conglomerate  
 Sandstone and conglomerate poorly sorted, friable, composed mostly of lithic fragments and about 5 percent potash feldspar. Thin lignitic coal beds common. Nonmarine

**Upper Cretaceous to Pliocene (?)**  
 Sandstone, conglomerate, and argillite. Sandstone, dark greenish-gray feldspathic (about 15 percent potash feldspar) lithic graywacke with secondary chlorite and epidote. Conglomerate clasts of chert, volcanic rocks, argillite, and sandstone in matrix of graywacke or argillite. Argillaceous rocks mainly dark gray argillite but include olive-gray shale and mudstone. Contains a few stratigraphically long-ranging marine pelecypods. Apparently becomes nonmarine in Eagle quadrangle to the south where it contains plants of probable Albian age.

**Lower Cretaceous to Mandak Formation**  
**LOCAL UNCONFORMITY**  
 Member B  
 Rhythmically interbedded dark-gray argillite and medium-gray sandstone. Sandstone mainly fine-grained quartz arenite with carbonate cement. Convolute structures and cross laminations common. Includes a few beds of chert-peat conglomerate and gritstone, siliceous argillite, limestone-chert breccia, limestone, and graywacke. Contains rare *Inoceramus* and *Buchia*

Member A  
 Medium-gray massive quartzite with a few interbeds of dark-gray siltstone and argillite. Weathers nearly white and forms resistant ridges. Contains shell beds of *Buchia* "sublaevis" and a few belemnites, ammonites, and *Inoceramus*. Age, Valanginian

**Middle and Upper Triassic and Jurassic (?)**  
 Carbonaceous shale and argillite  
 Mainly grayish-black carbonaceous shale and argillite. Minor beds and laminae of quartzite. Includes large area of phyllite and quartz-chlorite schist in vicinity of Indian Grave Mountain. Contains *Polypychites*, *Buchia* and foraminifers of Valanginian age in uppermost part. Middle part has *Buchia okensis* of Early Cretaceous (Berriasian) age and foraminifers of possible Jurassic age. Lower part, mapped locally as Tr1, consists mainly of dark-gray limestone and very fossiliferous oil shale. Contains *Monotis*, *Haiobola*, *Baenella*, *Dicophyllites*, and *Nathorstites*. Age, Middle Triassic (Ladinian) to Late Triassic (Norian)

**Permian**  
 Tahkandit Limestone  
 Very pale orange coarse-grained bioclastic limestone. Forms massive cliffs. Grayish-green glauconitic sandstone and chert-peat conglomerate in basal part. Contains abundant brachiopods and a few corals, arenaceous foraminifers, and bryozoa

**Upper Precambrian and Lower Cambrian (?)**  
 Chert-peat conglomerate  
 Chert-peat conglomerate and chert arenite. Minor siltstone, bioclastic limestone, and quartz arenite. Mostly nonfossiliferous but locally has abundant bryozoa and brachiopods

**Upper Devonian**  
 Siliceous shale and chert  
 Grayish-black laminated siliceous shale and chert. Minor dark-gray siltstone, quartzite, and limestone. Plant stems common in eastern part of quadrangle; bryozoa, crinoid stems, brachiopods, and corals occur in western part

**Devonian**  
 Nation River Formation  
 Rhythmically interbedded mudstone, sandstone, gritstone, and conglomerate. Graded beds common. Mudstone is olive-gray and nearly everywhere has plant fragments and spores of probable Late Devonian age. Sandstone is olive-gray chert-quartz arenite and wacke, commonly with carbonate cement. Gritstone and conglomerate composed mostly of varicolored chert granules and pebbles

**Devonian**  
 McCann Hill Chert  
 Thin-bedded and laminated dark- to light-gray chert, siliceous shale, and minor chert gritstone. Contains plant fragments, poorly preserved spores, and rare conodonts, gastropods, and cephalopods. Basal part of formation has beds of dark-gray bioclastic limestone with remarkably varied fauna including corals, brachiopods, trilobites, fish, and ostracods of Middle Devonian (Eifelian) age

**Silurian**  
 Woodchopper Volcanics  
 Mostly dark greenish-gray spilitic basalt and lapilli tuff. Amygdulose and pillow structures common. Minor thin interbeds of shale, chert, sandstone, and cross-laminated siltstone with plant fragments, dolomite, and limestone.  
 Dwd, dark-gray laminated dolomite with minor interbeds of chert.  
 Dwl, dark-gray bioclastic limestone with brachiopods, stromatopora, crinoids, and corals of Middle Devonian age.  
 Dws, dark-gray laminated shale with minor interbeds of limestone

**Ordovician**  
 Road River Formation  
 Dark-gray graptolitic shale with lesser amounts of grayish-black laminated chert and very minor dark-gray limestone, greenish-gray dolomite, grayish-black chert arenite, and conglomerate. Chert, chert arenite, and chert conglomerate occur mainly in basal part of formation. Graptolites indicate that all series of the Ordovician and Silurian may be represented with the exception of the Tremadoc, and possibly the Arenig and Wenlock

**Cambrian**  
 Argillite  
 Recessive unit consisting of light olive-gray argillite, siltstone, and cross-laminated quartzite. Worm(?) burrows occur in quartzite; *Olthania* (trace fossil) in argillite. Oolitic and sandy limestone near base has *Archaeocyathus* of Early Cambrian age

**Stratigraphic Position Uncertain**  
 Limestone and dolomite  
 Pure carbonate sequence, of which upper two-thirds is mainly thick-bedded fine- to medium-grained pale yellowish-brown limestone with crinoidal limestone at top. Minor dolomite, oolitic limestone, and sandy limestone. Lower third mainly laminated and extensively silicified dolomite, commonly oolitic and pisolitic. Upper two-thirds has a shelly fauna which ranges from Lower Cambrian to Upper Ordovician. Lower third is nonfossiliferous

**Devonian**  
 Lower dolomite  
 Light- to medium-gray laminated dolomite. Forms massive cliffs. Feathers very pale orange. Contains some chert, dolarenite, silicified dolomite breccia, dolomite-chert gritstone, and dark-gray shale. Cut by diabase dikes

**Devonian**  
 Shale  
 Grayish-black carbonaceous shale. Has minor interbeds of quartzite, dark-gray limestone, oolitic limestone, laminated dolomite, massive dolomite, and dolomite conglomerate. Cut by diabase dikes

**Devonian**  
 Upper dolomite  
 Light- to medium-gray laminated dolomite. Forms massive cliffs. Feathers very pale orange. Contains some chert, dolarenite, silicified dolomite breccia, dolomite-chert gritstone, and dark-gray shale. Cut by diabase dikes

**Devonian**  
 Basalt and red beds  
 Dark greenish-gray basalt. Commonly amygdaloidal with pillow structures. Feldspar and pyroxene mainly unaltered but at a few localities they are chloritized and the rock is greenstone. Minor basaltic tuff with pebbles and cobbles of basalt. Red beds mostly grayish-red shale and siliceous shale. Minor greenish-gray shale, jasper, greenstone-dolomite conglomerate, hematitic dolarenite, and vitric tuff and lava largely replaced by hematite and carbonate

**Devonian**  
 Sandstone and shale  
 Mainly light-gray thin- to medium-bedded sandstone (dolarenite) and olive-gray shale. Minor gritstone and conglomerate. Dolarenite composed mostly of rounded dolomite grains with subordinate chert and quartz grains. Cross laminations common. Weathers very pale orange and resembles crystalline dolomite at a distance. Gritstone and conglomerate composed mostly of dolomite and chert clasts and some granules, pebbles, and cobbles of granitic, volcanic, and metamorphic rocks

**Devonian**  
 Limestone  
 Dark-gray laminated limestone with slabby and platy parting. Has interbeds of greenish-gray shale, siltstone, and sandstone. Includes minor pale yellowish-brown sandy and gritty limestone, light-gray laminated dolomite, light olive-gray medium-bedded calcareous dolomite, and chert-carbonate gritstone

**Devonian**  
 Dolomite  
 Light-gray fine- to medium-grained laminated dolomite and dolomitic limestone. Extensively silicified and commonly oolitic. Forms massive cliffs. Nonfossiliferous

**Devonian**  
 Limestone  
 Very fine to medium grained pale yellowish-brown limestone. Laminated to very thick bedded, shaly to massive parting. Has interbeds of edgewise limestone conglomerate, oolitic limestone, and sandy limestone. Minor dolomite, grayish-black chert, dark-gray fissile siltstone, siltstone, and at base, limestone boulder conglomerate. The medium-grained sandy (chert and quartz) limestone commonly contains trilobites and brachiopods. Age, Middle and Late Cambrian and (near Tatonduk River) earliest Ordovician

**Devonian**  
 Limestone  
 Pure carbonate sequence, of which upper two-thirds is mainly thick-bedded fine- to medium-grained pale yellowish-brown limestone with crinoidal limestone at top. Minor dolomite, oolitic limestone, and sandy limestone. Lower third mainly laminated and extensively silicified dolomite, commonly oolitic and pisolitic. Upper two-thirds has a shelly fauna which ranges from Lower Cambrian to Upper Ordovician. Lower third is nonfossiliferous

**Devonian**  
 Argillite  
 Dark-gray argillite with minor interbeds of sandstone (chert and quartz arenite) and chert-peat conglomerate. Contains a goniatite of late Paleozoic age near intersection of Wood and Black Rivers. May also include Precambrian and Mesozoic rocks

**Devonian**  
 Dolomite  
 Mainly light-gray laminated dolomite. Chert laminae and silicification common. Minor dolomite-cobble conglomerate, sandy dolomite, laminated limestone, sandy limestone, bedded chert, shale, argillite, and quartzite. Probably Precambrian but could be Paleozoic

**Devonian**  
 Volcanic rocks  
 Amygdaloidal basalt flows, pillow lavas, tuff breccia, and minor interbeds of dolomite, limestone, chert, argillite, and quartzite. Probably Precambrian but could be Paleozoic

**Devonian**  
 Sedimentary rocks undifferentiated  
 Dark-gray laminated limestone and sandy limestone, olive-gray, dark-gray, and grayish-red shale, argillite, and phyllitic argillite, quartzite, and chert grit, chert, and medium-gray laminated dolomite. Includes a diabase dike along Edwards Creek. Probably Precambrian; possibly Paleozoic.

**Devonian**  
 Quartz monzonite  
 Medium-grained quartz monzonite. Chief accessory mineral is biotite. Hornblende less abundant. Muscovite occurs locally where biotite rare or absent. Quartz monzonite has minor aplite dikes and xenoliths of schist; forms generally structureless bodies discordant with surrounding schist but in places seems to grade into gneiss

**Devonian**  
 Ultramafic rocks  
 Greenish-black mafic and ultramafic intrusive rocks originally rich in olivine and pyroxene but later altered to serpentinite and chlorite

**Devonian**  
 Quartz-mica schist  
 Mostly medium-grained quartz-muscovite-biotite schist. Minor greenish interlayers of chlorite-rich schist. Contains garnet and staurolite near contacts with quartz monzonite. Derived mainly from regional metamorphism of quartz-rich sedimentary rocks. Represents greenschist facies

**Devonian**  
 Gneiss  
 Quartz-plagioclase-biotite-muscovite gneiss. Separates staurolite-garnet-bearing schist from quartz monzonite and seems to grade into both

**Devonian**  
 Chlorite schist  
 Mainly fine-grained grayish-green chlorite-sericite-tremolite schist. Derived by regional metamorphism of argillaceous and cherty rocks. Represents greenschist facies

**Devonian**  
 Greenstone  
 Fine-grained greenish-gray basaltic greenstone composed largely of chlorite and epidote

**Devonian**  
 Fault  
 Dashed where approximately located. U, upthrown side; D, downthrown side

**Devonian**  
 Fault zone  
 Inferred and approximately located; concealed beneath sedimentary rocks and alluvium

**Devonian**  
 FOLDS  
 Anticline showing trace of axial plane and plunge of axis  
 Syncline showing trace of axial plane and plunge of axis  
 Plunge of minor anticline  
 Plunge of minor syncline

**Devonian**  
 BEDDING  
 FIELD MEASUREMENT  
 PHOTOGEOLOGIC INTERPRETATION OR DISTANT MEASUREMENT FROM HELICOPTER  
 Strike and dip of beds  
 Strike of vertical beds  
 Strike and dip of overturned beds  
 Horizontal beds

**Devonian**  
 FOLIATION  
 FIELD MEASUREMENT  
 PHOTOGEOLOGIC INTERPRETATION OR DISTANT MEASUREMENT FROM HELICOPTER  
 Strike and dip of foliation  
 Strike of vertical foliation  
 Horizontal foliation

**Devonian**  
 Fossil identifications  
 Identifications by paleontologists of the Paleontology and Stratigraphy Branch, U.S. Geological Survey unless otherwise noted

**Devonian**  
 Cambrian - A. R. Palmer, P. E. Cloud, Jr. (University of Minnesota)  
 Ordovician and Silurian - R. J. Ross, Jr., W. B. N. Berry (University of California), W. A. Oliver, Jr., J. W. Huddle, J. M. Berdan, R. A. Scott  
 Devonian - W. A. Oliver, Jr., R. A. Scott, J. M. Berdan, J. W. Huddle, A. R. Palmer, M. Gordon, Jr., H. Duncan, C. W. Merriam, J. T. Dutro, Jr., S. H. Mamay, A. R. Ormiston (Harvard College)  
 Carboniferous and Permian - M. Gordon, Jr., R. A. Scott, I. G. Sohn, H. Duncan, J. T. Dutro, Jr., S. Mamay, J. C. Melik (Mobil Exploration Co.)  
 Triassic - N. J. Silberling  
 Jurassic(?) and Lower Cretaceous - D. L. Jones, H. Bergquist, R. A. Scott, J. A. Wolfe, R. H. Tschudy  
 Upper Cretaceous and Tertiary - J. A. Wolfe, R. A. Scott, R. H. Tschudy

**Devonian**  
 Field Assistants  
 1960 R. N. Passero and H. J. Roepke  
 1961 J. C. Melik and R. L. Taylor  
 1962 A. Aadland  
 1963 D. L. Giles and R. H. Rohrbacher

This map is preliminary and has not been edited or reviewed for conformity with Geological Survey standards.

PRELIMINARY GEOLOGIC MAP OF THE CHARLEY RIVER QUADRANGLE EAST CENTRAL ALASKA

By Earl E. Brabb and Michael Churkin, Jr. 1964