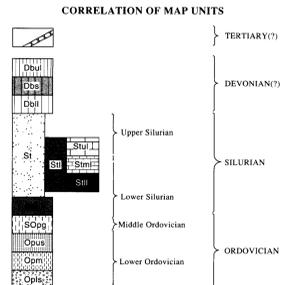
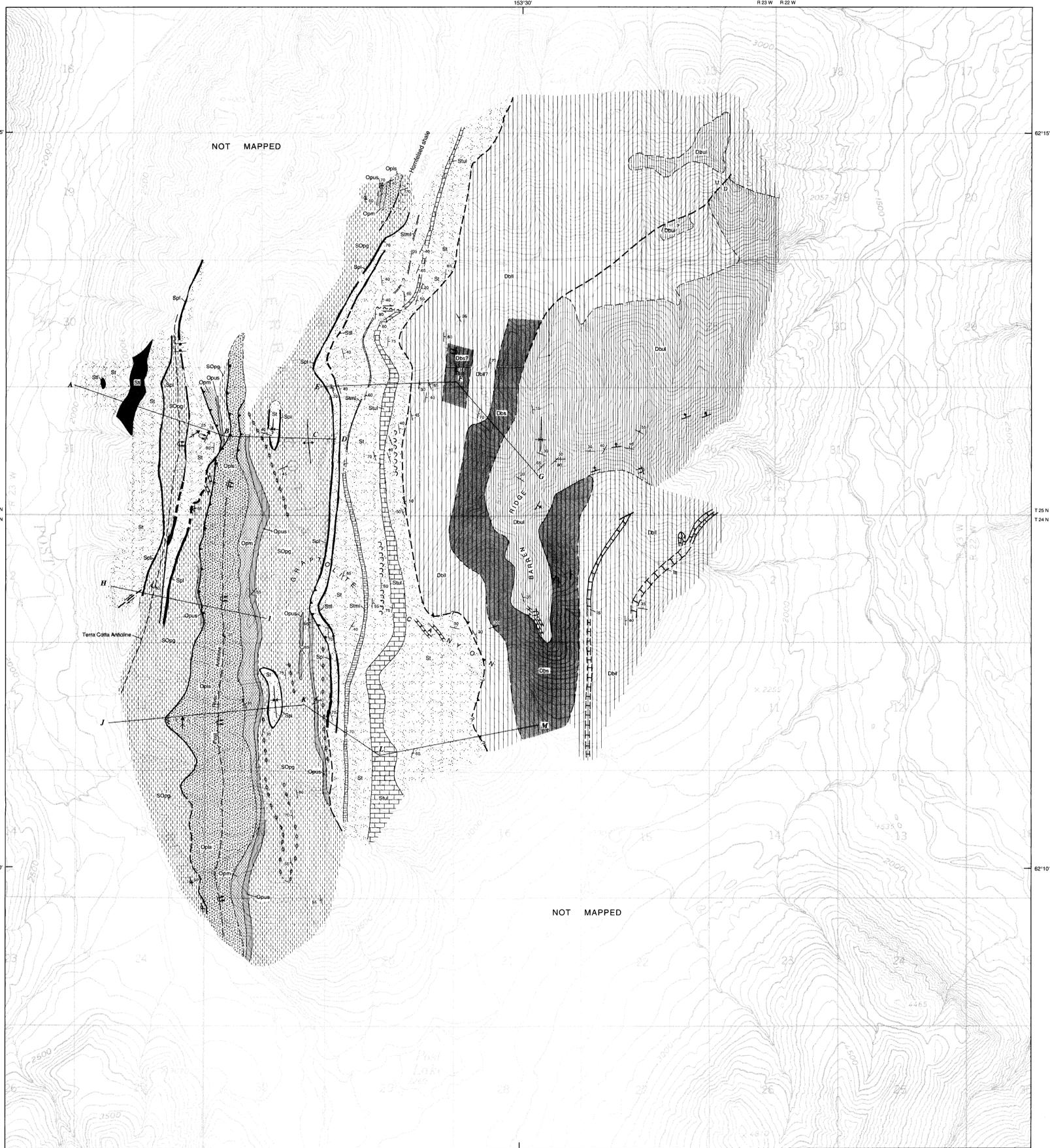
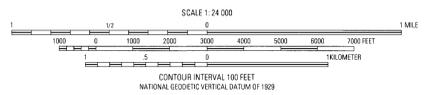


PROPERTY OF
DGGS LIBRARY



- DESCRIPTION OF MAP UNITS**
- Intrusive rocks (Tertiary?)**—Intrusive igneous dikes, sills, and small stocks (most are not shown). Dark greenish-gray; weathers to orange-brown, porphyritic, mafic to intermediate in composition. For more detailed description, see Bundtzen and others (1987).
 - Upper limestone member (Devonian?)**—Medium-dark-gray limestone, thick to thin-bedded, planar to cross-laminated. Weathers medium gray. Finely crystalline, with some secondary light-colored dolomite. Some minor yellowish-orange cross-laminated silty limestone interbeds. 130 m thick.
 - Siltstone member**—Very thin bedded calcareous siltstone and sandy limestone. Slabby to shaly, yellowish weathering, cross-laminated, relatively nonresistant. 180 m thick.
 - Lower limestone member**—Same lithology as upper limestone member (Dblu). 70 m thick. Locally includes resistant limestone marker bed (da).
 - Terra Cotta Mountains Sandstone (Upper and Lower Silurian; Ludlovian and Wenlockian)**—Sandstone, calcareous, with rhythmically interbedded siltstone, mudstone, argillite, and sandy limestone. Thick limestone units are mapped separately as members. Sandstone is micaceous, quartzofeldspathic wacke with prominent graded bedding and sole markings characteristic of turbidites. Distinctive olive-brown color, weathering orange-brown. 500 m thick exclusive of limestone members. Locally contains knobby-limestone marker bed (arc pattern). Includes local carbonate conglomerate/breccia (triangle pattern in section L-M). Locally divided into one or more members.
 - Limestone member—Ludloffian (Silurian)**
 - Upper limestone member (Upper Silurian; Pridolian and Ludlovian)**—Thin to thick-bedded, planar, laminated limestone. Medium dark gray; weathers medium gray, blocky to slabby. Nonfossiliferous except for domal stromatolite(?) structure. 100 m thick.
 - Middle limestone member (Lower Silurian; Wenlockian)**—Planar, laminated, silty limestone. Dark gray, finely crystalline. Characterized by pelecypods and straight-shelled cephalopods. 35–60 m thick.
 - Lower limestone member (Lower Silurian; Wenlockian)**—Thick-bedded, relatively pure limestone; medium dark gray, in part mottled very pale brown. Blocky except in local part where limestone is laminated and platy to slabby. 45–60 m thick.
 - Post River Formation (Lower Silurian to Lower Ordovician; Llandoveryan to Tremadocian)**
 - Limestone member (Lower Silurian; Llandoveryan)**—Dark gray, laminated, argillaceous limestone with graptolite-shale partings. Limestone is thin bedded and can be split into platy and slabby fragments having graptolite-bearing surfaces. 18 m thick.
 - Graptolite Canyon Member (Lower Silurian to Lower Ordovician; Llandoveryan to Arenigian)**—Dark gray graptolite shale and banded siliceous shale-mudstone with graptolite partings. Siliceous marker bed, 3 m thick, with prominent worm casts (pattern) near middle part of member. Rare thin interbeds of argillaceous dolomite. 30 m thick.
 - Upper siltstone member (Lower Ordovician; Arenigian)**—Calcareous siltstone interbedded with silty shale. Lithologically similar to lower siltstone member (Opls). Graptolites common locally. 30 m thick.
 - Mudstone member (Lower Ordovician; Arenigian)**—Dark gray, nonfossiliferous, silt-rich argillaceous rock or mudstone. Splits into rough-surfaced slabs that commonly bear pyritized graptolites. 75 m thick.
 - Lower siltstone member (Lower Ordovician; Tremadocian)**—Calcareous and micaceous siltstone and sandstone, interbedded with silty shale. Characterized by thin rhythmic bedding and cross lamination. Medium gray with olive tint, weathering pale yellowish orange. Sand and silt grains are mainly quartz and muscovite. Bedding planes uneven, crinkly, with phylitic partings. Multibranched graptolites present but very rare. 50+ m thick.
- Contact**—Dashed where approximately located; dotted where concealed; queried where inferred.
- Fault**—Dashed where approximately located; dotted where concealed; queried where inferred. Ball and bar on downthrown side. Arrows indicate relative horizontal movement and direction of dip.
- Fault (or lineament) from aerial photographs**—Not checked or identified on ground.
- Thrust fault**—Sawtooth on upper plate; dashed where approximately located or concealed. Arrow on section shows relative movement.
- Anticline**—Showing trace of axial plane and direction of plunge of axis; dashed where approximately located.
- Syncline**—Showing trace of axial plane and direction of plunge of axis; dashed where approximately located; dotted where concealed.
- Minor anticline**—Showing direction of plunge.
- Minor syncline**—Showing direction of plunge.
- Overtaken anticline**—Approximately located.
- Overtaken syncline**—Approximately located.
- Strike and dip of beds**
- Dip known**
- Dip known and top known from sedimentary features**
- Dip unknown**
- Overtaken, tops known**
- Vertical**
- Horizontal**
- Crumpled, plicated, crenulated, or undulatory beds and average dip**
- Strike and direction of dip of joints**
- Strike and dip of schistosity**
- Strike of vertical schistosity**
- Strike and dip of schistosity and parallel bedding**
- Graptolite collection site**—Letter refers to table 1.1 (on sections only)
- Graptolites identified in field but not collected on sections only**
- Shelly-fossil locality (on sections only)**
- Field camp location**—Camp number and year (on section E-F-G only)

Base from U.S. Geological Survey, 1:63,360, McGrath (A-1), (A-2), (B-1), (B-2), 1958. Universal Transverse Mercator projection.



Geology by Michael Churkin, Jr., assisted by William Kern, 1969, Rod May, 1970, and Gary Winkler, 1976, and by Bruce Reed and Mike Estlund.

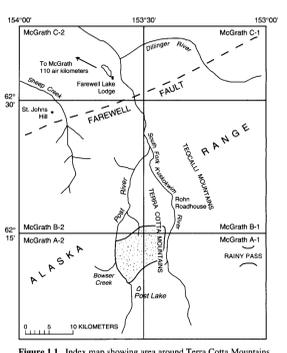
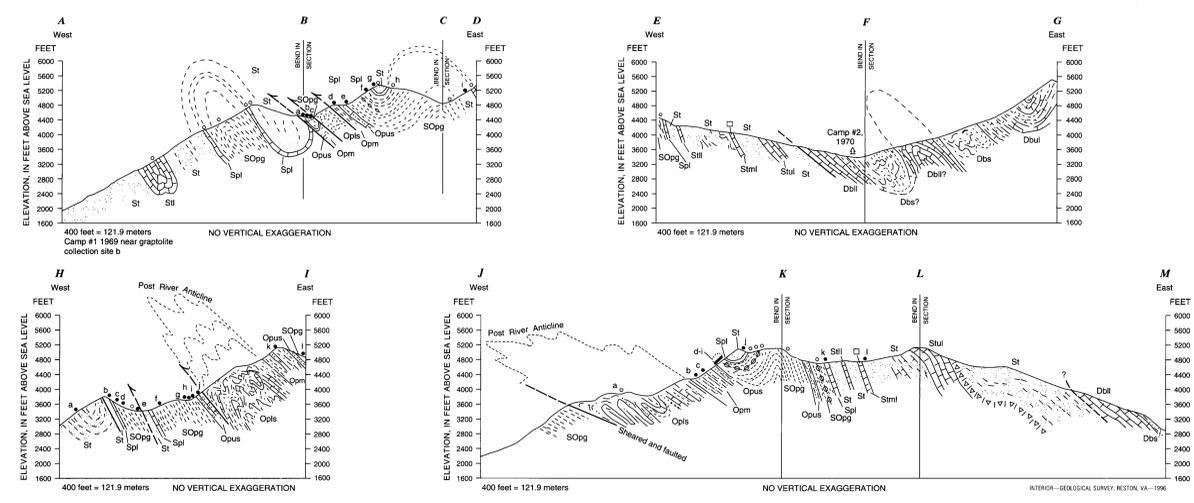


Table 1.1. Graptolite localities shown on cross sections

Section symbol	Sample No.	Age	Graptolite zone
Sections A-B-C-D and E-F-G			
a.....	69ACn301	Ordovician	<i>Paratrogosyrax tentaculatus</i>
b.....	69ACn311	Ordovician	approx. <i>Diplograptus? decoratus</i>
c.....	69ACn321	Ordovician	<i>P. tentaculatus</i>
d.....	69ACn331	Ordovician	<i>Tetratragraptus approximatus</i>
e.....	69ACn335	Ordovician	<i>Climacograptus bicornis</i>
f.....	69ACn362	Silurian	<i>Monograptus spiralis</i>
g.....	69ACn373	Silurian	<i>Cyrtograptus lundgreni</i>
h.....	69ACn381	Middle or Late Ordovician(?)	
i.....	70ACn423	Early Silurian	Mixed taenia in float
Section H-I			
a.....	70ACn22	Late Silurian (Ludlovian)	
b.....	70ACn31	Silurian	<i>Cyrtograptus sakmaricus-C. laqueus</i>
c.....	70ACn33	Silurian	<i>M. spiralis</i>
d.....	70ACn35	Silurian	<i>M. spiralis</i>
e.....	70ACn51	Ordovician	<i>C. bicornis</i>
f.....	70ACn62	Ordovician	<i>C. bicornis</i>
g.....	70ACn71	Ordovician	<i>D. ? decoratus</i>
h.....	70ACn72	Ordovician	<i>D. ? decoratus</i>
i.....	70ACn81	Ordovician	<i>P. tentaculatus</i>
j.....	70ACn82	Ordovician	<i>Oncograptus</i>
k.....	70ACn312	Ordovician	<i>Tetratragraptus fruticosus</i>
l.....	70ACn301	Ordovician	<i>D. ? decoratus</i>
Section J-K-L-M			
a.....	69ACn501	Early Ordovician, undifferentiated	
b.....	69ACn522	Ordovician	<i>T. approximatus?</i>
c.....	69ACn502	Ordovician	<i>T. fruticosus</i>
d.....	69ACn542	Ordovician	<i>D. ? decoratus</i>
e.....	69ACn552	Ordovician	<i>Diplograptus</i>
f.....	69ACn572	Ordovician	<i>Climacograptus tubuliferus</i>
g.....	69ACn574	Ordovician	<i>C. tubuliferus</i>
h.....	69ACn576	Ordovician	<i>C. tubuliferus</i>
i.....	69ACn583	Early Silurian?	
j.....	70ACn173	Silurian	<i>Cyrtograptus centrifugus</i>
k.....	70ACn532	Early Silurian	
l.....	70ACn552	Silurian	Approx. <i>Monograptus ludensis</i>

GEOLOGIC MAP AND CROSS SECTIONS OF PART OF THE TERRA COTTA MOUNTAINS, ALASKA RANGE, CENTRAL ALASKA

By
Michael Churkin, Jr., and Claire Carter
1996

Churkin, Michael, Jr., and Carter, Claire, 1996, Stratigraphy, structure, and graptolites of an Ordovician and Silurian sequence in the Terra Cotta Mountains, Alaska Range, Alaska: U.S. Geological Survey Professional Paper 1555.