DIGITAL COMMONS
@ UNIVERSITY OF SOUTH FLORIDA

University of South Florida
Digital Commons @ University of South Florida

Alaskan Caver

Newsletters and Periodicals

May 1982

Alaskan Caver, Volume 7, No. 3, May-June 1982

Richard A. Hall

Follow this and additional works at: https://digitalcommons.usf.edu/alaskan_caver

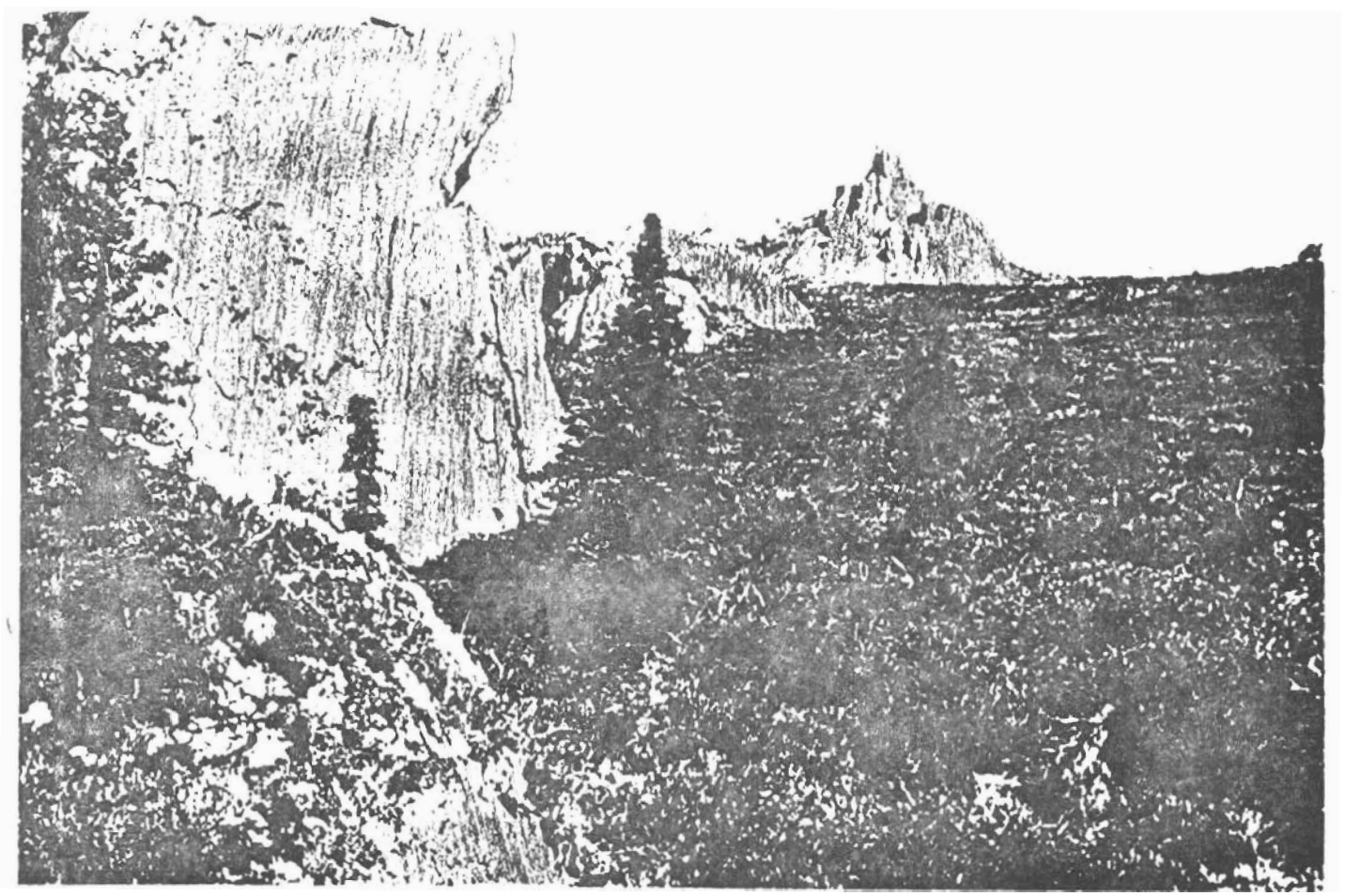
Recommended Citation

Hall, Richard A., "Alaskan Caver, Volume 7, No. 3, May-June 1982" (1982). *Alaskan Caver*. 34.
https://digitalcommons.usf.edu/alaskan_caver/34

This Book is brought to you for free and open access by the Newsletters and Periodicals at Digital Commons @ University of South Florida. It has been accepted for inclusion in Alaskan Caver by an authorized administrator of Digital Commons @ University of South Florida. For more information, please contact digitalcommons@usf.edu.

THE ALASKAN CAVER

Volume 7 Number 3 May - June 1982



Devonian Limestone Pillars West of the Nabesna River

July 15	Glacier Grotto Meeting. Meetings are held in room 314 of Grant Hall, Alaska Pacific University at 7:30 pm.
August 19	Glacier Grotto Meeting. Meetings are held in room 314 of Grant Hall, Alaska Pacific University at 7:30 pm. The program will be an NSS slide show.
Labor Day	Possible caving trip to Chitistone Valley.
September 16	Glacier Grotto Meeting. Meetings are held in room 314 of Grant Hall, Alaska Pacific University at 7:30 pm.
October 21	Glacier Grotto Meeting. Meetings are held in room 314 of Grant Hall, Alaska Pacific University at 7:30 pm. The program will be an NSS slide show.

The ALASKAN CAVER is a periodic publication of the Glacier Grotto of the National Speleological Society. Subscriptions are free to members. Membership dues are $5 per annum. Dues can be sent to Elisabeth Hall at 4607 Klondike Crt., Anchorage, AK 99504. Copyright 1982 by Glacier Grotto. Material not copyrighted by individuals or other groups may be copied by other NSS publications provided credit is given to the ALASKAN CAVER and a copy of such publication is sent to the editor.

Editor:
Richard Hall
Publishers:
David Moll
Rusty Rubeck

GROTTO OFFICERS

President	Julius Rockwell
V. President	David Street
Secretary	Richard Hall
Treasurer	Elisabeth Hall
At Large	David Moll
Publicity	Barbara Jansen

LIMESTONE IN THE EASTERN PART OF THE ALASKA RANGE

The Alaska Range forms a large horseshoe in South Central Alaska with one end pointing southwest down the Aleutian Range and the other end pointing southeast at the St. Elias Mountains. Nowhere in the Alaska Range are there expansive deposits of limestone due partly to extensive faulting and partly to the luck of the draw. This discussion covers most of the Nabesna Quadrangle, the southern part of the Mount Hayes Quadrangle and small portions of the Gulkana and Tanacross Quadrangles. Portions of the Alaska Range in this area are also refered to as the Mentasta and Nutzotin Mountains.

Tectonicly, the Alaska Range straddles the Denali fault in this area with older Devonian base rocks on the north side and rocks of various younger ages on the south side. There are also several other faults parallel to the Denali fault and various age rocks can be seen juxtaposed to many different ages.

The area of consideration is served by several highways. The Alaska Highway trends 30 to 40 miles north of the Denali Fault and the Richardson Highway is almost to the western border. The Glenn Highway (also called the Tok Cutoff in this area) cuts diagonally across the area and the Nabesna Road runs parallel to the Alaska Range east of the Cutoff. Despite the extensive-sounding (for Alaska) road system, almost all of the limestone is more than a day's hike from the roads.

Three ages of limestone have substantial outcrops in this area while several smaller bands of limestone occur in other places. Triassic rocks occur south of the Denali Fault. Permian limestone likewise appears south of the Denali Fault as well as in the Healy Quadrangle to the west of the study area. North of the fault is some Devonian limestone dissimilar to other nearby rocks. There are also extensive areas of glaciers and Quaternary lava which may also contain caves.

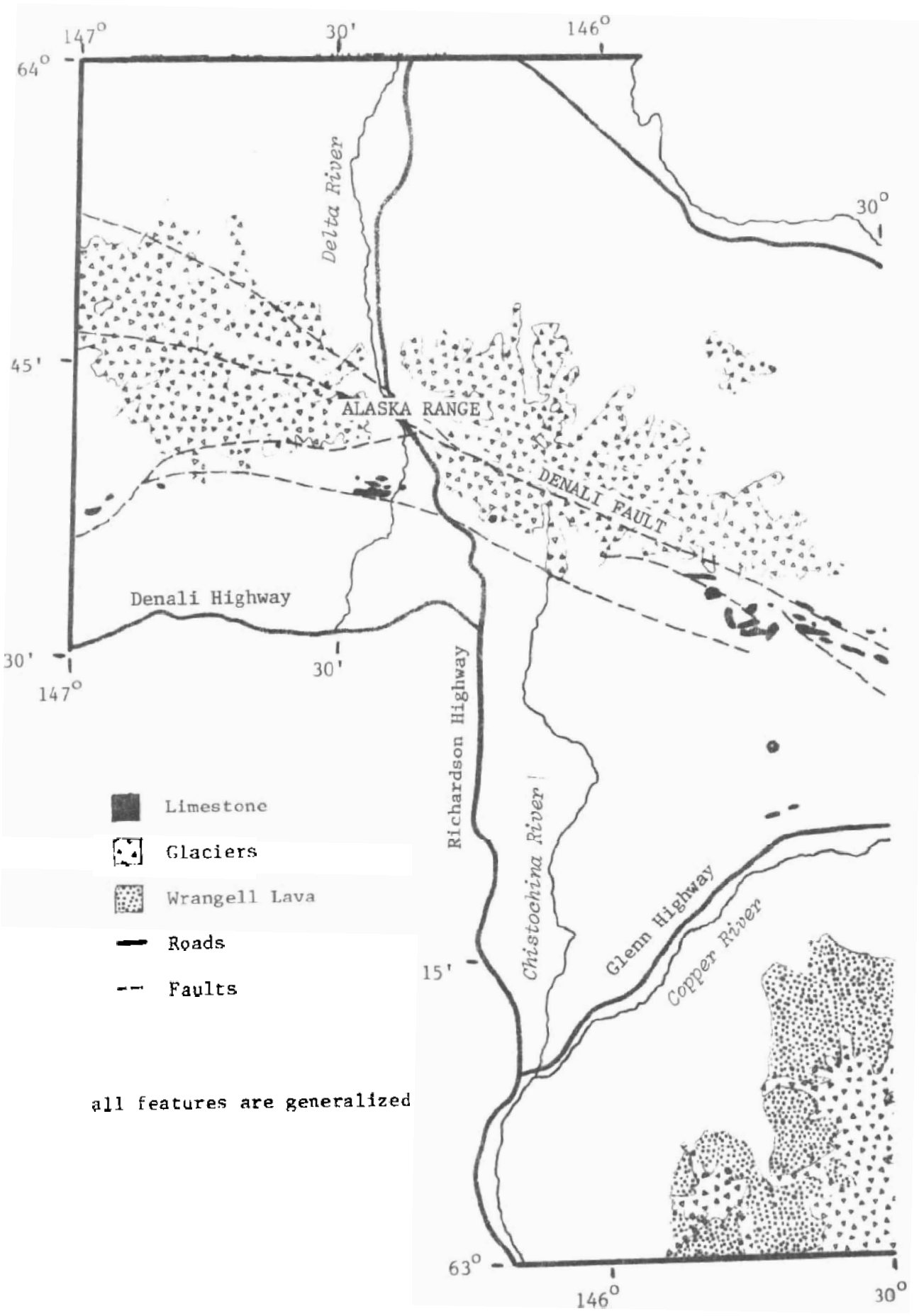
1. The Triassic limestone referred to in Mendenhall & Schrader, 1903, p34 as the Nabesna Limestone, is similar to the Chitistone and Nizina Limestones which are prevalent in the Wrangell Mountains of the McCarthy Quadrangle (Alaskan Caver V.6 No.1). They likewise unconformably overly the Nikolai Greenstone. Richter, 1976 describes these formations relating that they:

> "Include an upper unit of thin bedded limestone and a lower unit of massive limestone separated by local angular unconformities. Near intrusive rocks the limestone is thermally metamorphosed to conspicuous white tremolite-bearing marble with garnet-epidote-magnetite tactite.
>
> The upper unit consists of dark-gray fine-grained thin-bedded limestone. The beds are a few centemeters to as much as 2 m thick with thin interbeds of black cherty siliceous argillite and dark gray carbonaceous shale. Minor beds of medium- to course-grained calcareous sandstone and calcareous grit as much as 1 meter thick, are scattered through unit. The limestone is chiefly micrite and biomicrite, locally recrystallized and dolomitized and weathers light gray (micrite) and buff (spiculitic biomicrite)." ... "Thickness 0 to 120 m."
>
> "The lower unit is gray to dark-gray and fine-grained massive-bedded limestone with lenses and nodules of gray and black chert and irregular patchworks of disseminated fine-grained quartz. Bedding is generally not discernable. Chiefly micrite, dismicrite, or microsparite, commonly recrystallized or strongly brecciated and veined by coursely crystalline calcite; locally dolomitized. Weathers light gray. Typically unfossiliferous."..."Thickness 20 to more than 250 m."

This description is for the Nabesna Quadrangle in general while the makeup and thickness of the rocks differ from area to area. In the Mount Hayes Quadrangle it includes some fine-grained quartz and the upper thin-bedded rocks are missing. The overall thicknesses of the upper and lower formations vary considerably and either one may be missing in a specific location either because of removal of the beds or faulting.

This limestone is known to contain caves in the McCarthy Quadrangle and probably contains caves somewhere in this area as long as a large enough thickness is found and gradient and water requirements are met.

2. The Permian limestone is similar to the Skolai Limestone found in the Wrangell Mountains (Alaskan Caver V.6 No.2) and is called the Eagle Creek Formation in Nokleberg, 1982. Richter, 1976 describes it as:

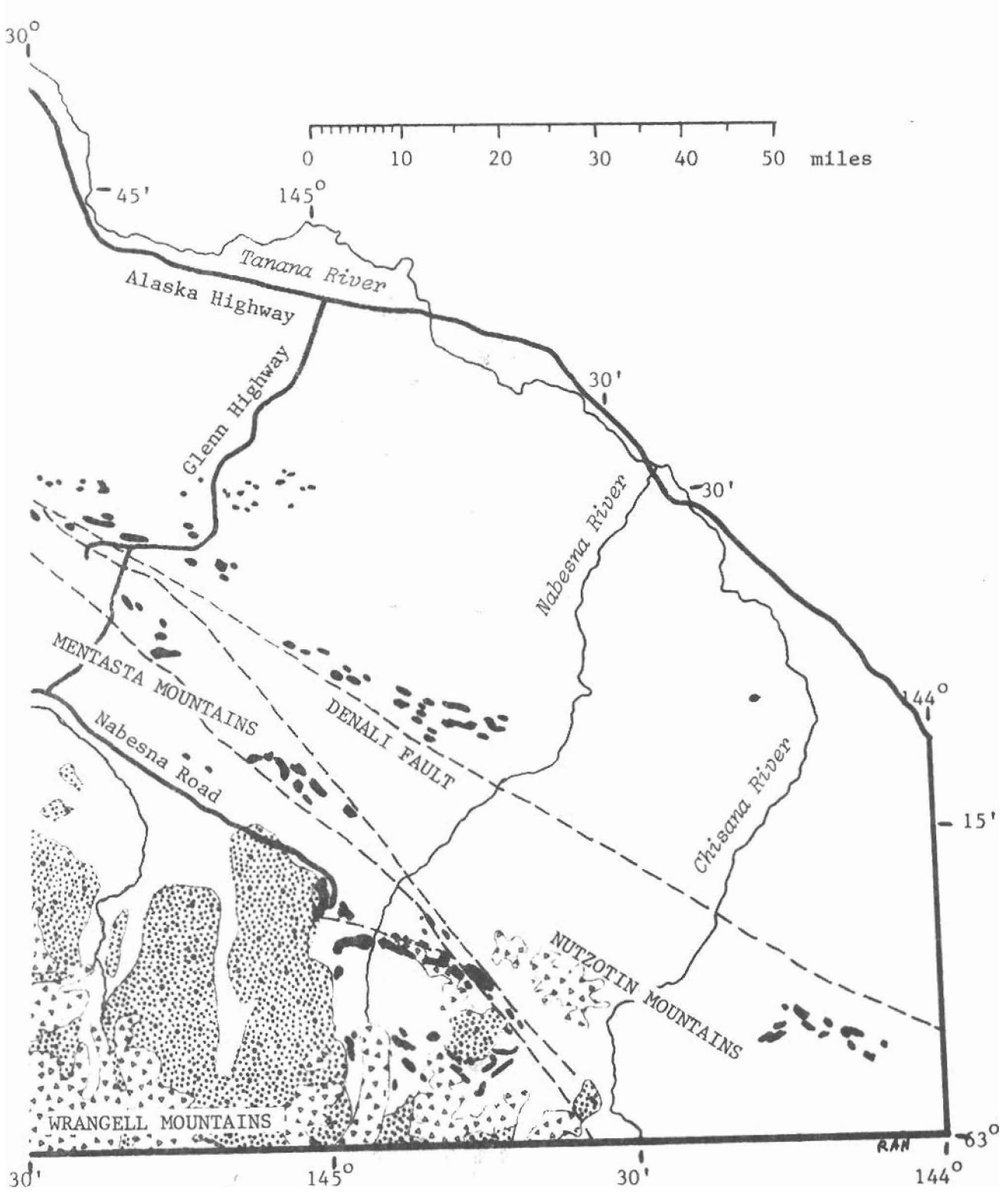

147°
30'
146°
64°
30°
Delta River
45'
ALASKA RANGE
DENALI FAULT
Denali Highway
30'
147°
30'
Richardson Highway
Chistochina River
Glenn Highway
Copper River
15'
63°
146°
30°
Limestone
Glaciers
Wrangell Lava
Roads
Faults
all features are generalized

LIMESTONE, GLACIERS, AND LAVA

IN THE SOUTHEAST ALASKA RANGE AND VICINITY

(Portions of Gulkana, Mt. Hayes, Nabesna, and Tanacross Quadrangles)

ALASKA



> "Light gray, thin- to thick-bedded fossiliferous limestone; generally fine grained (biosparrudite) but commonly recrystallized. Contains minor nodules of gray chert and base is locally marked by course-grained clastic limestone containing abundant volcanic clasts. Limestone generally occurs at base of Eagle Creek Formation but is variable in thickness and locally absent." ..."Thickness 0 to 100 m."

It appears at the base of a thick section of Permian argillite and above a thick section of Permian volcanic rocks. It is seldom greater than a hundred feet thick but can go up to 100 meters and thins northward. The age and appearance correlate with the Golden Horn Limestone Lentil in McCarthy Quadrangle and its correlated band of limestone elsewhere in the McCarthy Quadrangle. The Golden Horn has a maximum thickness of 250 meters but elsewhere (west and south) in the McCarthy quadrangle it is limited to 100 meters.

In Richter et al, 1977, which covers parts of the Mt. Hayes Quadrangle, the Eagle Creek Formation is broken more finely than elsewhere in the area. While most reports only break it into limestone and argillite, Richter et al, 1977 breaks it into upper argillite, upper limestone, lower argillite, and lower limestone members.

3. The Devonian limestone appears north of the Denali Fault and though a minor member in a wide area of Devonian rocks it is the most prominent member of the formation. Richter, 1976 briefly describes it as:

> "Gray to dark-gray recrystalized limestone; weathers light gray, and forms conspicuous castles and pinnacles protruding above the generally colluvium-covered phyllite surface. Rugose and tabulate corals from widely scattered localities indicate a Middle Devonian age."

It is described in Moffit, 1941 p125-126 as follows:

> "The most conspicuous members of the Devonian group of sedimentary deposits are limestone beds. They owe their prominence to the peculiarity of their weathered outcrops, which, because of their form and color are a notable feature of the landscape. The limestone is massive in structure, coursely crystalline and light bluish gray. Its resistance to weathering and its granular texture together with the accidents of folding and faulting, have contributed to produce an alignment of light-gray pinnacles and crags that contrasts strongly with the darker background, which stands high above the associated rocks and makes it easy for the eye to follow the course of the beds for many miles across the country. The limestone occurs in several distinct beds separated by phyllite or schist members derived from original mud and sand deposits."

4. Richter et al, 1977 mentions some thin- to medium-bedded gray and light gray locally volcanic-rich limestone lenses up to 25 m thick within the Permian-Pennsylvanian Age volcanic Slana Spur Formation in the Mt. Hayes A-1 Quadrangle.

5. Richter et al, 1977 also mentions gray marble interbedded in a Devonian schist, phyllite, and marble formation north of the Denali Fault. This is also mentioned in Richter, 1976 but neither separates the limestone from the phyllite and schist on their maps. However, Moffit, 1954, p.89 & 91, maps it separately and describes it as "a little crystalline limestone, which is more common in the eastern part of the area than in the western part." "The limestones, however, offer more help in deciphering the structure for they commonly indicate the trend of the folded beds.

6. Moffit 1954, p 101 mentions some uncommon yet conspicuous massive recrystallized Mississippian limestone of no caving consequence.

7. Nokleberg, 1982 mentions several other minor formations including some Triassic marble in the western Mt. Hayes Quadrangle.

The map on pages 4 and 5 shows the location of limestone, glaciers, and lava in the eastern Alaska Range and neighboring areas. The limestone shown consists of all ages of limestone since it is impossible to differentiate them at this scale. The following paragraphs differentiate the various age rocks on the map.

Beginning at the western end of the map on page 4, the first limestone encountered consists of minor formations including some Triassic marble (7) mentioned in Nokleberg, 1982. The next deposit is Permian rocks (2) six miles up the Delta River from the Richardson Highway. Just north of Mankomin Lake (halfway between the Richardson and Glenn Highways) and 5 to 10 miles south of the Denali Fault is an area of Permian rocks (2) as well as the Permian/Pennsylvanian limestone (4) both of which are described in detail by Richter et al, 1977. The rocks just to the east of them are Triassic limestone (1). The limestone patches just north of the Denali Fault are Devonian (3) and the isolated deposits further south are Permian and Devonian.There are also other possible cave scenes in the area.

On page 5, the most northerly formation shown is the Devonian Marble (5) described in Moffit, 1954 and appears as very small dots on this map. To the south of it but still north of the Denali Fault is Devonian limestone (3). These bands of Devonian limestone cross the Tok Cutoff near Mentasta with an overall thickness of up to 75 feet just north of the road. The patches of limestone to the east, while still north of the Denali Fault, and the isolated patch near the Chisana River are likewise Devonian (3). The cover picture on this issue of the Alaskan Caver is of some of the pillars west of the Nabesna River and is from Moffit, 1954 p 95. The limestone south of the Denali Fault within 10 miles of the Glenn Highway is a mix of Permian (2) and Triassic (1). The limestone about six miles north of the Nabesna Road, as well as the limestone trending east from the end of the Nabesna Road which is sometimes covered by glaciers and the patches toward the eastern edge of the map are all of Triassic age. The limestone furthest south (between 144° 30' and 145°) is of Permian age (2).

There are innumerable small glaciers as well as many larger glaciers in the Wrangell Mountains, in the Alaska Range of the Mount Hayes Quadrangle and in the Nutzotin Mountains. Caves at the terminus of most glaciers is likely. Especially good access is found along the Richardson Highway.

There is a good deal of Quaternary and Tertiary lava called the Wrangell Lava in the area. It is common in southwest Nabesna Quadrangle, and neighboring parts of Gulkana and McCarthy Quadrangles. The existance of caves is questionable because much of the Wrangell Lava has been heavily glaciated.

Rich Hall

References:

Mendenhall, W. C., and Schrader, F. C., 1903, The mineral resources of the Mount Wrangell district, Alaska: U.S. Geol. Survey Prof. Paper 15.

Moffit, F. H., 1941, Geology of the upper Tetling River district, Alaska: U. S. Geol. Survey Bull 917, p. 115-155.

Moffit, F. H., 1954, Geology of the Eastern Part of the Alaska Range and Adjacent Area: U. S. Geol. Survey Bull. 989-D.

Nokleberg, W. J., Albert, N. R. D., Bond, G. C., Herzon, P. L., Miyaoka, R. T., Nelson, W. H., Richter, D. H., Smith, T. E. , Stout, J. H., Yeend, W., and Zehner, R. E., Geologic Map of the Southern Part of the Mount Hayes Quadrangle, Alaska: U. S. Geol Survey Open File Report 82-52.

Richter, D. H., 1976, Geological map of the Nabesna quadrangle, Alaska: U. S. Geol. Survey Misc. Investigations Series Map I-392.

Richter, D. H., Sharp, W. N., Dutro, J. T. Jr., and Hamilton, W. B.,1977, Geologic map of parts of the Mount Hayes A-1 and A-2 quadrangles, Alaska: U. S. Geol. Survey Misc. Investigations Series Map I-1031.

Glacier Grotto
The Alaskan Caver
Richard Hall, Editor
4607 Klondike Court
Anchorage, Alaska
99504

NEWS - DATED MATERIAL