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MEASURED STRATIGRAPHIC SECTION OF
THE LISBURNE GROUP LIMESTONE (85LSB), WESTERN
SADLEROCHIT MOUNTAINS, MT. MICHELSON C-3 QUADRANGLE, ALASKA

By

James G. Clough and Arne A. Bakke

Alaska Division of Geological & Geophysical Surveys

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794 University Ave, Basement
Fairbanks, Alaska 99709

INTRODUCTION

A 1307 ft thick (398 m) stratigraphic section (85LSB) (plate 1) was measured on the west side of the Katakaturuk River canyon, western Sadlerochit Mountains (Mt. Michelson C-3 Quadrangle), (plate 1) on July 21 and 22, 1985 for the purpose of stratigraphic studies of the Lisburne Group Limestone (Alapah and Wahoo formations). The lower 65 ft (20 m) of the section is Nanook Limestone (0 to 25 ft), Endicott Group (25 to 35 ft), and a 30 ft covered interval (35 to 65 ft). The portion of this section that is Lisburne Group is then 1242 ft thick (379 m). The stratigraphic section was measured by Jacob's staff, lithologies were described, and 39 rock samples were taken at major lithologic changes and where deemed necessary. Sample numbers correspond to height-above-base of section (i.e. 85LSB 265 is 265 ft above the base of the section). Thin sections prepared from rock samples were studied for petrography (by J.G. Clough) and biostratigraphy (by B.L. Mamet). Two rock samples were analyzed for Total Organic Carbon (TOC) (table 1). This report presents the preliminary findings of this study of the 85LSB stratigraphic section.

INTERVAL DESCRIPTIONS (plate 1)

Descriptions of intervals A-BB shown on plate 1 are based on field observations as well as petrographic and biostratigraphic studies. Rock colors were assigned to samples with the use of the Geological Society of America's Rock-color Chart (GSA, 1951). Rock names consist of a Dunham (1962) limestone classification term- mudstone, wackestone, packstone or grainstone, preceded by one or more word modifiers comprising the major components present in the rock. The most abundant component is named first and hyphen is added where components are equal in abundance (i.e. bryozoan-echinoderm packstone). Whenever taxa are indeterminate or abundance is widely varied the term bioclastic is used. Microfaunal assemblage zones (MAZ) are described in the chapter which follows.

Pre-Lisburne Group

NANOOK LIMESTONE

A. (0-25 ft) Patches of outcrop mostly covered by talus. Now mapped as Nanook Limestone by Robinson and others (1986). Age of this interval is uncertain but most probably within one of the Nanook Units 1-7 of Dutro (1970) which are now considered to be older than Late Cambrian to Silurian in age (Blodgett and others, 1986). Rock type: dolomitic mudstone.

@ (25 ft) UNCONFORMITY

ENDICOTT GROUP ?

- B. (25-35 ft) Thin bedded, calcareous-cemented quartzose sandstone with chert clasts up to 2" thick. Age uncertain but probably Endicott Group.
- C. (35-65 ft) COVERED INTERVAL

Lisburne Group

ALAPAH FORMATION

- D. (65-85 ft) Medium bedded, medium gray limestone with thin chert lenses. Weathers to light olive gray. Rock types include: peloidal wackestone to packstone containing minor echinoderm debris. MAZ 16_{inf}/16_{sup}, base of Lisburne, basal Chesterian (B.L. Mamet, 1986, written comm.)
- E. (85-155 ft) COVERED INTERVAL
- F. (155-285 ft) Medium to thick bedded, medium light gray limestone with localizes thin chert lenses. Weathers to various colors including distinctive pale red. Rock types include: echinoderm-bryozoan-peloidal packstone to grainstone with minor thin beds of lime to dolomitic mudstone at 265 ft. MAZs 16_{sup} and >16_{sup}
- G. (285-430 ft) Medium to thick bedded, light to medium gray limestone. Weathers to yellowish to light olive gray. Numerous peaked low-amplitude stylolites at 422'. Rock types include: mudstone to bioclastic wackestone to grainstone. Base of cliff forming limestone at 285 ft.
- H. (430-520 ft) Medium bedded, light gray limestone weathering to light olive gray. Rock type: echinoderm peloidal packstone. MAZ 17.
- I. (520-525 ft) Medium bedded, gray limestone with chert lenses and nodules to 1 ft thick. Rock type: echinoderm-bryozoan grainstone. MAZ >17
- J. (525-575 ft) Rubble crop to talus covered patchy outcrop. Rock types from this interval include: echinoderm-bryozoan grainstone, laminated mudstone, and spiculitic microdolomitic mudstone. Should include collapse breccia and evaporites at this height above base (B.L. Mamet, 1986, written comm.).
- K. (575-645 ft) Thin to medium bedded, light gray limestone with abundant lenses of black chert. Weathers to yellowish gray. Rock types include: echinoderm-bryozoan packstone to grainstone.

- L. (645-658 ft) COVERED INTERVAL
- M. (658-664 ft) Thin to medium bedded, light gray limestone weathering to yellowish gray limestone. Rock type: echinoderm-peloidal packstone. MAZ 18.
- N. (664-729 ft) Thin to medium bedded, light to dark gray limestone to microdolomite with chert lenses. Weathers to various colors, mainly yellowish gray, pinkish gray and grayish orange. Locally thinly laminated and microbrecciated. Rock types include: bioclastic wackestone, evaporitic solution collapse breccia, and spiculitic microdolomite. Chalcedony pseudomorphs replacing evaporites (anhydrite ?) from 681 to 684 ft, highest evaporite level of the Alapah (B.L. Mamet, 1986, written comm.). Total Organic Carbon (wt%) in sample LSB 681 is 0.25 (R.A. Jacobson, 1985, written comm.)
- O. (729-760 ft) Alternating thin to medium bedded, very light to dark gray, very fine-grained ("lithographic") limestone to microdolomite. Weathers to yellowish gray and olive gray. Rock types include: mudstone, cryptalgal laminated mudstone, bioclastic and spiculitic mudstone to wackestone. Base of massive cliff forming limestone at 750 ft. Total Organic Carbon (wt%) in sample LSB 758 is 0.83 (R.A. Jacobson, 1985, written comm.)
- P. (760-820 ft) Massive bedded, light gray to pale red coarsely crystalline limestone with abundant quartz crystals and chert lenses. Weathers to yellowish gray to orange. Locally limonite stained. Some layering evident. Appears to be dynamically metamorphosed with recrystallization most evident between 779 to 785 ft. Wood and Armstrong (1975) report a similar zone of recrystallized limestone in a stratigraphic section of the Lisburne Group located 7 miles to the west in the Sadlerochit Mountains, although their zone is stratigraphically higher lying between 1080 to 1140 ft. They attribute this to fault zone thrusting. However, Wood and Armstrong (1975) indicate that no direct evidence for thrusting at this level occurs and we report the same. MAZ 18?
- Q. (820-830 ft) Medium bedded dark gray, very fine-grained limestone weathering to yellowish gray. Similar to interval O. Rock type: bioclastic packstone. MAZ 18.
- R. (830-917 ft) Medium bedded, light gray limestone with minor chert lenses. Weathers to olive gray to yellowish gray. Rock types include: bryozoan echinoderm wackestone alternating with bryozoan-echinoderm packstone. MAZ 19. This interval represents a zone between the Mississippian and Pennsylvanian where, due to hiatus in the North American mid-continent, there is no agreement to boundary

placement (B.L. Mamet, 1986, written comm.) (see chapter on Microfaunal Assemblage Zones).

@ (917 ft) PARACONFORMITY

WAHOO FORMATION

S. (918-932 ft) Thin wavy bedded, gray limestone weathers to pale red to yellowish orange. Rock types include: echinoderm bryozoan packstone to whole fossil wackestone. Entire crinoids commonly preserved in this interval. Some condensed fabric in packstone, grain boundaries are sutured. Glauconitic and hematitic staining and replacement of grains common. Sample LSB 918 contains two specimens of indeterminate fine-ribbed productoid brachiopods, one Neospirifer sp. brachiopod, and an indeterminate smooth brachiopod (R.B. Blodgett, 1986, written comm.).

T. (932-995 ft) Alternating thin to medium bedded, light gray limestone weathering to yellowish gray. Very thinly bedded and pale red weathering at 957 ft. Black, gray and red chert bed to 16" thick at 956 ft. Rock types include: bryozoan-echinoderm wackestone alternating with bioclastic mudstone to wackestone (thinly bedded units). Similar to unit below but more fragmentation of fossils. MAZ 20. Sample LSB 945 contains both fine-meshed (fenestellid) and coarse-meshed (polyporid) fenestrate bryozoans (R.J. Cuffey, 1986, written comm.).

U. (995-1005 ft) COVERED INTERVAL

V. (1005-1040 ft) Medium bedded, light gray limestone weathering to yellowish gray. Rock types include: bryozoan-echinoderm packstone. MAZ 20?

W. (1040 ft) PARACONFORMITY (LSB 1040). 1" thick thinly laminated lime mudstone.

X. (1040-1060 ft) Massive bedded, light gray limestone weathering to yellowish gray. Rock types include Donezella echinoderm-bryozoan grainstone (LSB 1041) and Donezella echinoderm-bryozoan oolitic grainstone (LSB 1059). These rocks contain up to 60% Donezella, a problematical green alga. At 1041 ft a few single-coat ooids appear and at 1059' single- and multiple-coat ooids are common. MAZ 21.

Y. (1060-1235 ft) Alternating thin to medium bedded, light gray limestone weathering to yellow gray and pinkish gray. Rock type: oolitic Donezella echinoderm-bryozoan grainstone.

Z. (1235-1245 ft) COVERED INTERVAL

AA. (1245-1307 ft) Thin to medium bedded, light gray limestone with minor very thin, brown gray interbeds. Weathers to greenish gray, yellowish gray and pale orange (at top). Rock types: recrystallized oolitic grainstone alternating with *Donezella* foram packstone. Sample LSB 1307 contains one specimen of *Neospirifer* sp. brachiopod and one indeterminate smooth brachiopod (R.B. Blodgett, 1986, written comm.). MAZ 21.

BB. (above 1307 ft) TOP OF SECTION Contact with the unconformably overlying Echooka Formation covered at this locality by talus. The unconformity cuts out 100-200 ft of Wahoo containing *Stylocodium-Osagia* oncolites (B.L. Mamet, 1986, written comm.).

MICROFAUNAL ASSEMBLAGE ZONES

Microfaunal assemblage zones of the Lisburne Group measured stratigraphic section, 85LSB, were determined from thin sections by Dr. Bernard L. Mamet, University of Montreal. Dr. Mamet has indicated that for accurate biostratigraphic determinations samples should be collected at least at every foot within measured sections of the Lisburne Group limestone (Mamet, 1986, written comm.). Anyone investigating this unit is advised to do so.

Microfaunal assemblage zones present in samples collected from the 85 LSB section are: 16 inferior (16_i), 16 superior (16_s), 17, 18, 19, 20, and 21. These zones are based primarily on foraminifera which belong to the Taimyr-Alaska transition realm which is intermediate between the Eurasiatic and North American realms (Mamet, 1962; Mamet and Belford, 1968; Armstrong and others, 1970). The following is a summary of the microfaunal assemblage zones from Armstrong and others (1970).

ZONES 16_i and 16_s: "Late Visean (early Chester).-Zone 16_{inf} and 16_{sup} are recognizable mainly on the basis of Archæodiscidae and Endothyridae; Meramec fauna, such as Eoendothyranopsis or Eoforschia, are eliminated and the Neoarchæodiscus-"Eostaffella" discoidea fauna progressively becomes a prominent feature; the base of Zone 16_{sup} is drawn at the base of the acme of Neoarchæodiscus incertus mixed with Planospirodiscus" (Armstrong and others, 1970, p. 692).

ZONES 17 and 18: "Namurian (middle to upper Chester and Morrow).-The Eumorphoceras foraminiferal equivalents (Zones 17 and 18) are recognized in the successive bursts of growth of Asteroarchaediscus paschkiricus and Globivalvulina(?) parva" (Armstrong and others, 1970, p. 692).

ZONE 19: This zone is intermediate between the Mississippian and Pennsylvanian and is missing in the North American Mid-Continent due to hiatus. Therefore there is no agreement on its position. "Zone 19, the Homoçeras foraminiferal partial equivalent (Eosigmoilina?), is known in the Sadlerochit Mountains section [of Armstrong and others, 1970] and is probable equivalent of the basal Baschkirian of the Russian platform" (Armstrong and others, 1970, p. 692).

ZONE 20: Morrow. Zone 20 is "characterized by the appearance of the Lipinella-Millerella sensu stricto assemblage" (Armstrong and others, 1970, p. 692).

ZONE 21: Atokan. Zone 21 is "recognized by the outburst of Eoschubertella-Pseudostaffella, associated with Globivalvulina sensu stricto" (Armstrong and others, 1970, p. 692-693).

TOTAL ORGANIC CARBON

Two samples (LSB 681 and LSB 758) which emitted a fetid odor when fractured in the field were submitted for weight percent Total Organic Carbon (TOC) analyses to Jacobson Consulting, Inc. of Littleton, Colorado. The results of these analyses are summarized in table 1.

Sample LSB 681 is a medium dark gray spiculitic mudstone to wackestone. It has a low amount of organic carbon (0.25%) and should be considered a poor candidate for a source rock (R.A. Jacobson, 1985).

Sample LSB 758 is a very dark gray spiculitic bryozoan wackestone. It has a moderate amount of organic carbon (0.83%) and is rated as a fair candidate for a source rock (R.A. Jacobson, 1985). However, just two feet above this sample location begins the 60 ft-thick zone of recrystallized limestone of Interval P (760-820 ft).

Table 1. Total Organic Carbon Analyses

<u>Sample Number</u>	<u>TOC (wt%)</u>	<u>Source Rock</u>
<u>Potential</u>		
LSB 681	0.25	poor
LSB 758	0.83	fair

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