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Fresh Water Mollusks of the Grassy Butte Area McKenzie County, North Dakota

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FRESH WATER MOLLUSKS OF THE GRASSY BUTTE AREA MCKENZIE COUNTY, NORTH DAKOTA

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by

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ABSTRACT

Eight molluscan species consisting of 92 specimens from six localities in the Grassy Butte area of North Dakota are here identified.and located stratigraphically. The genera identified are Viviparus, Lioplacodes, Campeloma, and Reesidella. These fauna come from the Tongue River formation and the Sentinel Butte member of the Tongue River formation of upper Paleocene time.

FRESH WATER MOLLUSKS OF THE GRASSY BUTTE AREA MCKENZIE COUNTY, NORTH DAKOTA

Introduction

Material for the Study

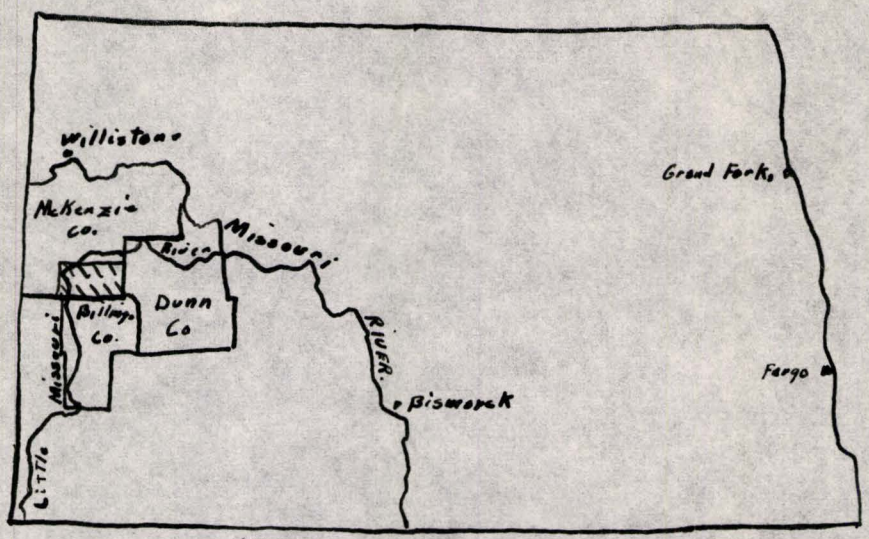
This is a study of a collection of molluscan fossils from the Fort Union group of western North Dakota obtained by Mr. Elmer G. Meldahl in the summer of 1955 while mapping in the Grassy Butte area.

This collection, taken from six localities, contains 92 specimens which are sparseley located and poorly preserved in a gray silty clay. The larger specimens, Campeloma nebrascensis (Meek and Hayden) and Viviparus raynoldsansus (Meek and Hayden), generally have the first three or four whorls missing; all the specimens have the outer lip detached; and the pelecypods are too poorly preserved to identify.

Location

The Grassy Butte Area is located in southern McKenzie County, North Dakota. It is bordered on the north by the North Unit of the Theodore Roosevelt National Memorial Park, on the south by Billings County and on the east by Dunn County. The area is situated mainly in townships 148 and 149 N. and ranges 98 to 103 W. U.S. highway #85 extends north-south through the eastern part of the area and North Dakota highway #7, running east-west, intersects

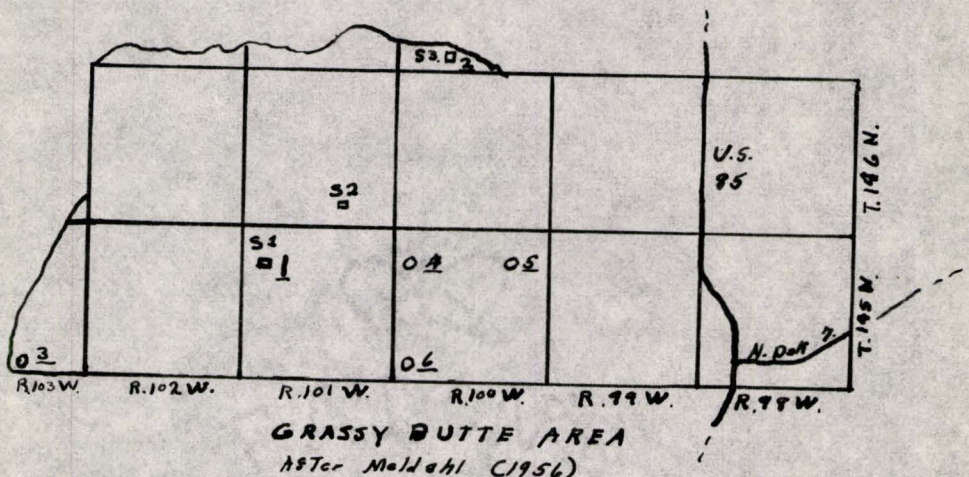
PLATE I.



INDEX MAP OF NORTH DAKOTA

▨ = AREA 0 40 miles After Meldahl (1956)

FIG 1.



GRASSY BUTTE AREA

After Meldahl (1956)

S1 = Stratigraphic section

1 = Fossil location

FIG. 2

U.S. highway #85 in the southwestern part of the area (see Plate I, Fig. 1).

Purpose

The purpose of this investigation is to identify the species of fresh water mollusks in the Elmer G. Meldahl collection.

Acknowledgments

For guidance, assistance, and advice given me while preparing this report, I would like to express my thanks to Mr. F. D. Holland, Jr., Assistant Professor, Department of Geology, University of North Dakota, and Mr. Everett E. Wilson, also of the Geology department, University of North Dakota.

Previous Work

The earliest study of molluscan species from the Fort Union group was made by F. B. Meek and F. V. Hayden during the 1850's and 1860's. Meek (1876) published a monograph which contains almost all the characteristic species of the group. Other reports which contain many of the same species and a few additional ones were made by White (1886) from the Wasatch group in Utah, Yen (1947) from several locations in southwestern Montana, and Tozer (1956) from the Paleocene of western Alberta, Canada. Other reports on the molluscan species of the Fort Union group have been made, but those

cited describe and illustrate the majority of the species of the group.

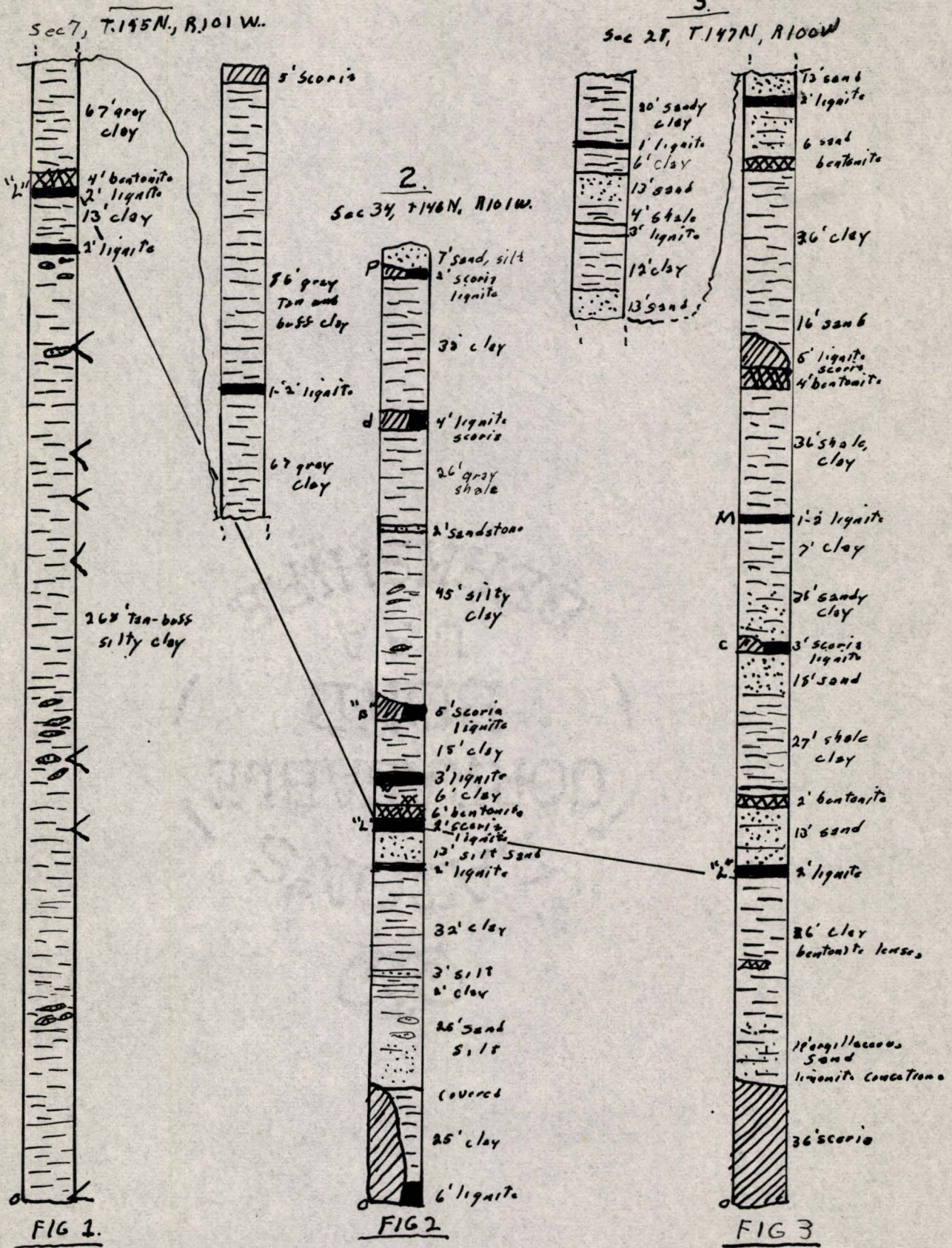
Stratigraphic Summary

The fossils were collected from the Tongue River formation and the Sentinel Butte member of the Tongue River formation. The Tongue River formation comprises the upper portion of the Fort Union group, while the Cannonball-Ludlow formation comprises the lower portion of the Fort Union group. The extensive flora and vertebrate fauna of the Fort Union group establish its Paleocene age (Yen, 1947, p. 37). According to Yen (1947, p. 36):

> "The abundance of viviparids and unios implies that the enclosing rocks were fluviatile deposits. These forms in the living fauna exist more commonly in rivers and streams of various sizes."

The species of this report are located stratigraphically with reference to the "L" lignite bed and the "B" lignite bed in an area ranging from 200 feet above and 282 feet below the "L" bed. The "L" bed marks the base of the Sentinel Butte member of the Tongue River formation, while the "B" bed is a localized bed occurring about 35-40 feet above the "L" bed (see Plate II). The contact of the Sentinel Butte member with the lower part of the Tongue River formation is essentially a color boundary, the Sentinel Butte being darker in color, with little lithologic difference (Meldahl, 1956).

PLATE II



Fossil locations

STRATIGRAPHIC SECTIONS
GRASSY BUTTE AREA
After Meldahl (1956)

For a complete geologic description of the area, the reader is referred to Meldahl (1956).

Stratigraphic Occurance

A list of the species present and the stratigraphic location at which they were found is given in Table I. The geographic location of the specimens is given in Plate I, Figure 2.

The predominance of the family Viviparidae in the area is shown in Table I. The species Viviparus raynoldsansus (Meek and Hayden), Campeloma nebrascensis (Meek and Hayden), and Reesidella protea (Yen) are found at the base of the clay (Plate II, Fig. 1) 282-175 feet below the "L" bed, and also at the top of the clay, 62-15 feet below the "L" bed where they are more abundant, but are absent from the portion of the clay bed between 158-62 feet below the "L" bed. On the other hand, Lioplacodes nebrascensis nebrascensis (Meek and Hayden) and Lioplacodes tenuicarinata (Meek and Hayden) are not present at the top and bottom of the clay but seem to be rather abundant in the 158-62 feet interval below the "L" bed. This may indicate a slight change in the environment during the time the clay was being deposited which was more favorable for Lioplacodes in the 158-62 feet interval.

Another slight change, back to the original conditions,

Location of the Speciemens in Reference to the "L" Bed

Species	Ft. Below "L"Bed							Above "L"		
	282	177	158	107	62	55	35	35	38	200
Viviparus raynoldsansus(Meek & Hayden)	3				18	4	1		1*	1*
Viviparus trochiformis(Meek & Hayden)	2	1					2			
Viviparus retusus(Meek & Hayden)						1	1			
Lioplacodes nebrascensis nebrascensis(M & H)			10	3						
Lioplacodes tenuicarinata(Meek & Hayden)	1		4	1			2			
Lioplacodes limnaeiformis(Meek& Hayden)			5	1						
Campeloma nebrascensis(Meek & Hayden)	1	2			10	2	6*			
Reesidella protea(Yen)	5	1			2		1			
pelecypod fragments	X	X	X	X	X	X	X	X*	X*	
plant fragments								X*		

*represents those localities, other than stratigraphic section one where speciemens were found. X epresents present but too fragmented to determine a number of speciemens.

Table I

may be indicated in the 62-15 feet interval as evidenced by the reoccurance of Viviparus, Campeloma, and Reesidella and the absence of Lioplacodes.

The chart also shows a definite lack of abundance of specimen above the "L" bed. This seems to indicate that the "L" bed is a good marker between the Sentinel Butte member and the lower Tongue River formation.

The chart also indicates the small area, locality 1, in which the majority of the specimens were found. Plate II shows that the clay underlying the "L" bed in localities other than locality 1 is of much lesser thickness. This may indicate a period of time of deposition too short to develop any extensive fauna or a slight environmental change unsuited for molluscan faunal development.

A further study of the fauna in the area would provide more detailed analysis of the environment of the deposits.

Geographic Distribution of Collection

The collection represents six localities in the Grassy Butte Area, and contains 92 specimens. (Plate I, Fig. 2).

Locality 1. Sec. 7, T. 145 N, R. 101 W.

The specimens here were collected from stratigraphic section one (Plate II, Fig. 1), and are divided into six groups.

Group A. Base of section, 282 feet below "L" bed.

3 Viviparus raynoldsansus (Meek and Hayden)

2 Viviparus trochiformis (Meek and Hayden)

5 Reesidella protea (Yen)

1 Lioplacodes nebrascensis nebrascensis (Meek and Hayden)

1 Campeloma nebrascensis (Meek and Hayden)

Pelecypod fragments

Group B. 177 feet below "L" bed.

1 Viviparus trochiformis (Meek and Hayden)

1 Reesidella protea (Yen)

2 Campeloma nebrascensis (Meek and Hayden)

Pelecypod fragments

Group C. 158 feet below "L" bed.

4 Lioplacodes limnaeiformis (Meek and Hayden)

10 Lioplacodes nebrascensis nebrascensis (Meek and Hayden)

5 Lioplacodes tenuicarinata (Meek and Hayden)

Pelecypod fragments

Group D. 107 feet below "L" bed.

1 Lioplacodes limnaeiformis (Meek and Hayden

3 Lioplacodes nebrascensis nebrascensis (Meek and Hayden)

1 Lioplacodes tenuicarinata (Meek and Hayden)

Pelecypod fragments

Group E. 62 feet below "L" bed.

18 Viviparus raynoldsansus (Meek and Hayden)

2 Reesidella protea (Yen)

10 Campeloma nebrascensis (Meek and Hayden)

Pelecypod fragments

Group F. 55 feet below "L" bed.

4 Viviparus raynoldsansus (Meek and Hayden)

1 Viviparus retusus (Meek and Hayden)

2 Campeloma nebrascensis (Meek and Hayden)

Pelecypod fragments

Group G. 50-35 feet below "L" bed.

1 Viviparus raynoldsansus (Meek and Hayden)

1 Viviparus retusus (Meek and Hayden)

2 Viviparus trochiformis (Meek and Hayden)

1 Reesidella protea (Yen)

2 Lioplacodes limnaeiformis (Meek and Hayden)

Locality 2. Sec. 32, T. 147 N, R. 100 W.

The specimens here were collected from stratigraphic section three (Plate II, Fig. 3) and are divided into two groups.

Group A. 15 feet above "L" bed.

Specimens here were all flora, (one maple leaf and some fern leaves) well preserved in a gray clay stone.

Group B. 200 feet above "L" bed.

1 Viviparus raynoldsansus (Meek and Hayden)

Locality 3. Sec. 34, T. 145 N, R. 103 W, 40 feet above "L" bed.

6 Campeloma nebrascensis (Meek and Hayden)

Pelecypod fragments

Locality 4. Sec. 7, T. 145 N, R. 100 W, 1 foot above "L" bed.

Pelecypod fragments

Locality 5. Sec. 11, T. 145 N, R. 400 W, 1 foot above "B" bed.

1 unidentifiable mollusca fragment, Viviparus, sp. indet.

Locality 6. Sec. 31, T. 145 N, R. 100 W, 10 feet above "B" bed.

Pelecypod fragments

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