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CONTENTS

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Contents

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Paleo-Environment of the Guilmette Limestone (Devonian) near Wendover, Utah*

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ABSTRACT.—The Guilmette Limestone (Devonian) is well exposed in the western part of the Leppy Range in Nevada, north of Wendover. At this locality, a complete section comprising slightly more than 1400 feet of the Guilmette Limestone was measured, sampled, and studied in detail. A duplicate section, about one half mile to the south, was also measured and described to complement the main section. Light- to medium-gray, micritic to skeletal limestone comprises the lower part of the section. The middle part of the section is typified by a thick- to medium-bedded, fine textured limestone which varies from skeletal to reef types. The upper part is characterized by interbedded micritic to skeletal limestone and dolomite. Warm, shallow, and quiet to slightly agitated water conditions seemingly predominated throughout Guilmette time, as evidenced by typical marine fossil assemblages of corals, stromatoporoids, pelecypods, brachiopods, gastropods, stromatolites, and algae.

CONTENTS

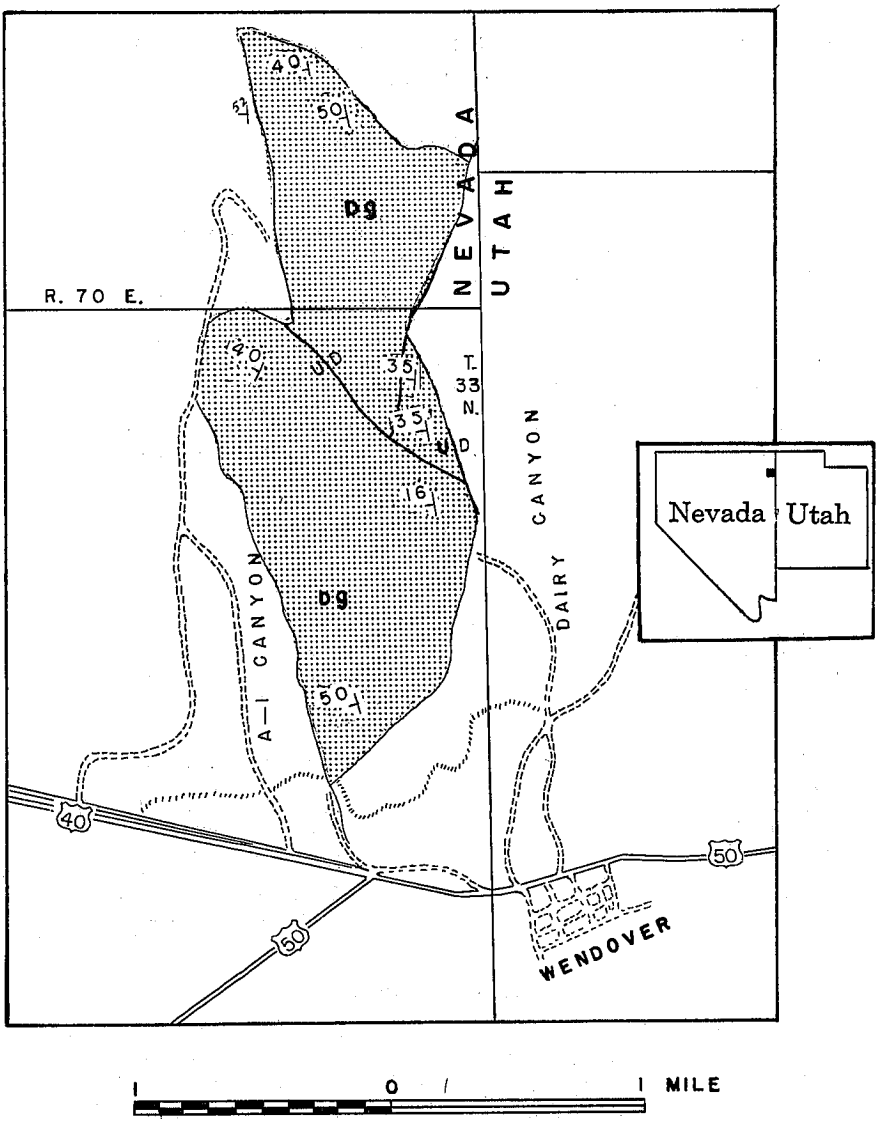
TEXT

ILLUSTRATIONS

INTRODUCTION

The Guilmette Limestone (Devonian) is superbly exposed in the western part of the Leppy Range north of Wendover, Nevada. At this locality, a complete section comprising slightly more than 1400 feet of the Guilmette was measured, sampled, and studied in detail. A second section, about one-half mile to the south, was also measured and described to complement the main section. Light- to medium-gray, micritic to skeletal limestone comprises the lower part of the section. The middle part of the section is typified by thick- to medium-bedded, finely textured limestone which varies from skeletal to reefal types. The upper part is characterized by interbedded micritic to skeletal limestone and dolomite. Warm, shallow, and quiet to slightly agitated water conditions

*A thesis submitted to the faculty of the Department of Geology, Brigham Young University in partial fulfillment of the requirements for the degree Master of Science, July 28, 1967.



TEXT-FIGURE. 1.—Index map of Guilmette Limestone outcrops near Wendover, Utah.

seemingly predominated throughout Guilmette time as evidenced by typical marine fossil assemblages of corals, pelecypods, brachiopods, gastropods, stromatoporoids, and algae.

Major objectives of this study are to make (1) a detailed field and laboratory investigation of the petrology and petrography of this formation; (2) an

interpretation of sedimentary environments of the Guilmette Limestone; and (3) a study of the biotic elements and their interrelationship to the sediments.

LOCATION

The study area lies within Sections 3, 4, and 10, T. 33 N., R. 70 E., and Section 34, T. 34 N., R. 70 E., Elko County, Nevada. It is accessible by dirt roads which extend a mile or so north of Wendover, Utah-Nevada (Text-fig. 1).

METHOD OF STUDY

Field work was done during June 1966 and May 1967. Two complete sections of the Guilmette Limestone were measured, described, and sampled. Certain lithotopes were walked out to determine lateral and vertical lithologic and biologic facies changes. Facies which are of greatest value in petrologic, petrographic, and paleontologic interpretation are illustrated (Plates 1-4).

Both stratigraphic sections were measured using a 100-foot steel tape and Brunton Compass. Unit members were painted on the outcrop, and samples were collected from each distinct lithic and paleontologic change.

Laboratory research began in July 1966 and was completed in May 1967. The major portion of laboratory work entailed preparation and study of thin sections. Standard thickness 1" x 2" slides were prepared for routine petrographic (binocular and polarizing microscope) studies. To determine the fabric and other features of specimens which require a larger area, 2" x 3" slides were prepared. Most sections were ground to standard thickness of 0.03 mm; 2" x 3" slides were left slightly thicker. Each carbonate sample was examined by X-ray diffraction to determine the proportional content of calcite and dolomite. Photomicrographs were made of representative thin sections from each of the lithologic and biologic facies of the formation.

During this study the carbonate energy index of Plumley, Risley, Graues, and Kaley (1962, p. 88-89) was used. Carbonate terms used in this study are taken directly from the sources included and quoted, or represent modification in definition.

Micrite.—Carbonate material, whether crystalline or grained, that is 0.05 mm or smaller in diameter or across faces. Micrite is lime mud or its indurated equivalent, and dolomicrite is dolomite mud or its equivalent (Bissell and Chilinger, 1967).

Micritic limestone.—A limestone which consists of 90% or more micrite (Leighton and Pendexter, 1962).

Biomicrite.—A major group of biogenic limestone containing a significant admixture of fine-textured carbonate material filling the spaces between organic tests and fragments (Bissell and Chilinger, 1967).

Pellet.—A grain composed normally of micritic material, lacking significant internal structure and generally ovoid in shape. Most pellets in limestones are very coarse sand to coarse silt-size grains.

Sparite.—A loose descriptive term applied to any transparent or translucent crystalline calcite and aragonite.

Pelmicrite.—Composed of up to 30% pellets in a micritic matrix (modified after Folk, 1952).

Pelsparite.—Composed of up to 30% pellets in a sparry matrix (modified after Folk, 1952).

HISTORY AND NOMENCLATURE

The Guilmette Limestone was proposed by Nolan (1935, p. 20) for exposures in Guilmette Gulch on the west side of the Deep Creek Mountains, Gold Hill, Nevada. Nolan (1935, p. 20) described the formation as follows:

> The Guilmette Limestone is composed chiefly of dolomite but also some thick limestone beds and several lenticular sandstones. The dolomite for the most part differs in character from those found in Simonson dolomite. . . . The most abundant variety is a fine-grained dolomite, dark to medium gray on fresh fracture and weathering to lighter shades of gray . . . less abundant but far more striking in character is a dark dolomite filled with fragments of tubular corals.

PREVIOUS WORK

Schaeffer (1960, p. 71-73) measured and described a total thickness of 2,229 feet for the Guilmette Limestone on Silver Island, northeast of Wendover. He (1960, p. 68) described the Guilmette Limestone as:

> Black limestone predominates in the lower 1,340 feet of the formation, whereas medium-gray limestone which weathers light to gray predominates in the upper 890 feet of the formation. A shaly, calcareous, argillaceous, arenaceous dolomite is present from 300 to 350 feet below the top of the Guilmette Limestone on Silver Island.

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To all the faculty of the Department of Geology and graduate student colleagues, sincere thanks also are proffered.

PETROLOGY AND GEOLOGY

Guilmette Limestone in the studied area consists of 22 definitive field units of unique lithologic character. Based upon the interpretation of the environment of deposition, three major divisions are recognized. The divisions are in turn separated into one or more zones according to changes in the fossil content of the rocks.

Division I.—The oldest division includes the basal 260.1 feet of the formation, units 1 to 7. Lithologically, this division contains micrite, pelmicrite, dolomicrite and pelsparite. It is dark to light gray on both fresh and weathered outcrops. Brachiopods, corals, bryozoans, gastropods, and algal or stromatoporoid masses comprise the remainder of the detrital matrix of this division.

Two zones are recognized, based upon the content and type of fossils within the micritic matrix characteristic of Division I. Zone 1 contains 50% or more skeletal material, as opposed to Zone 2 which is essentially devoid of fossil elements.

Zone 1 extends from 57 feet to the base of the formation and includes Units 1 and 2. Lithologically, this basal zone grades from 10 feet of argillaceous limestone at the top, downward through 37 feet of micrite, to 10 feet of dolomite at the base of the formation. Zone 1 is characteristically gray on both fresh and weathered exposures. Corals, brachiopods, bryozoans, and algal heads form more than 50% of the detrital matrix of this zone (Plate 3, figs. 3, 4).

During Zone 1 time, energy conditions were slightly more vigorous than during Zone 2 time, as evidenced by the fact that some corals, bryozoans, and brachiopods are preserved in an unoriented manner. Those which are in growth position, mainly the algal heads, denote lack of agitation, probably accumulated below wave base. Those fossils found in a disarrayed fashion suggest low energy turbulence and probably were growing above wave base. Warm, shallow, normal marine conditions are suggested by the entire assemblage.

Units 3 to 7 are included in Zone 2 which extends from 57 feet to 260 feet above the base and comprises 103 feet of sediments. Lithologically, Zone 2 is a micritic limestone varying to a dolomicrite, or a pelmicrite. The rocks are typically dark- to light-gray on fresh exposures and light-gray on weathered outcrops. The top 10 feet of this zone is characterized by one-half-inch to one-inch thick veins of white, secondary calcite. Sixty feet below the top of Zone 2 there is a three-foot thick bed of calcite that exhibits flow structure (Plate 3, fig. 5). This type of flow structure is interpreted to be penecontemporaneous with the deposition. Gastropods, brachiopods, and stromatoporoid heads constitute up to 10% of this zone by volume. The fossils are found in growth position, and show no evidence of agitation (Plate 2, figs. 1-4).

Zone 2 was probably deposited under warm, quiet, shallow, normal marine conditions. Quiet conditions are suggested by the unabraded nature and growth position of the fossils. Well-developed algal and stromatoporoid heads are indicative of shallow water (photic zone) conditions.

In summary, zones 1 and 2 are characterized by a low-energy environment of deposition. The life forms within these zones show no evidence of transportation and evidence of only slight agitation. The fine-grained character of the sediments also suggests quiet, normal marine conditions.

Division II.—This division extends from 260.1 to 608.3 feet above the base of the formation and includes Units 8 to 12, comprising 348.2 feet of strata. Uniform abundance of fossil elements makes zonation impracticable. Lithologically, Division II is micritic to finely crystalline limestone which is dark- to light-gray in both fresh and weathered outcrops. Fossil elements consisting of gastropods, pelecypods, corals, and algal bodies comprise the remainder of the detrital matrix of this division. Pelecypods and algal heads, plus some of the gastropods, brachiopods, and corals appear to be in growth position (Plate 4, figs. 2, 6). The remainder of the gastropods, corals and brachiopods likely were washed into the area by current action, as evidenced by abraded surfaces and random orientation within the rock (Plate 3, fig. 6; Plate 4, fig. 3).

Low-energy conditions are evidenced for part of Division II by the growth position of the pelecypods, algal and stromatoporoid heads, and part of the

gastropods, brachiopods, and corals. Higher energy conditions are indicated by the abraded, randomly oriented nature of the remainder of the gastropods, brachiopods, and corals. This variation in energy intensities is likely due to slight fluctuations in the depth of water, alternately bringing the bottom above wave base for higher energy conditions while the low energy environment prevailed when the surface of deposition was situated below wave base.

A five-foot bed of shale occurs 123.7 feet below the top of this division, and contains unabraded, essentially *in situ* pelecypods suggesting quiet, shallow, near-shore marine conditions (Plate 4, fig. 2).

In summary, Division II represents alternating quiet and slightly agitated water. The *in situ* fossils, plus the high percentage of micritic material in the matrix, is typical of quiet water. Agitated water conditions are suggested by abraded, randomly oriented fossils in a slightly coarser (finely crystalline) matrix.

Division III.—This division, the uppermost in the formation, extends from 608.3 feet above the base to the top of the formation and includes Units 13 to 22. It comprises the top 836.8 feet of the formation. Lithologically, this division is a micritic to finely crystalline limestone which is dark- to light-gray in both fresh and weathered outcrop. Fossil elements, including corals, bryozoans, gastropods, brachiopods, and algal and stromatoporoid bodies, comprise the fossil remains.

Three zones, based upon the type and concentration of fossil elements within the micritic limestone, characterize Division III. Zones 1 and 3 are micritic limestone containing 30% or less fossil material by volume. Zone 2 is biomicritic limestone which contains more than 50% fossil material.

Explanation of Plate 1

GUILMETTE LIMESTONE OUTCROPS

Fig. 1.—View north; Guilmette Formation faulted over Ely Limestone at left; skyline on the upper left defines top of the formation.

Fig. 2.—View south across the Guilmette Formation; town of Wendover in the background.

Explanation of Plate 2

PHOTOGRAPHS OF GUILMETTE LIMESTONES

Fig. 1.—Micrite; matrix, detrital. Detrital material consists of fine- to coarse-grained skeletal fragments, calcilutite, and about 50% clay. Midway in Unit 6. x 1.

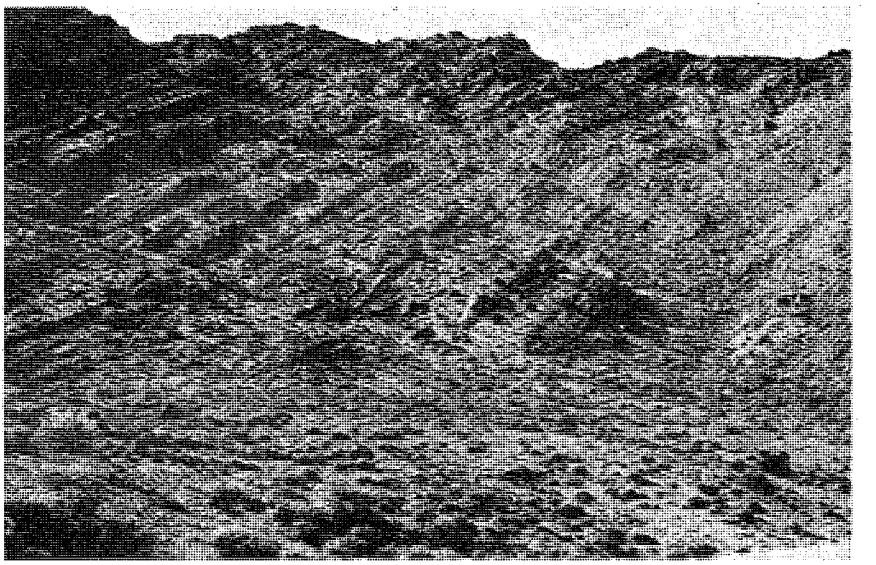
Fig. 2.—Micrite; matrix consists of micrite (lime mud to microcrystalline limestone). Midway in Unit 6. x 1.

Fig. 3.—Micrite; matrix, detrital. Detrital material consists of fine- to medium-grained skeletal fragments and calcilutite. Midway in Unit 3. x 1.

Fig. 4.—Micrite; matrix, detrital. Detrital material consists of fine- to medium-grained skeletal fragments and calcilutite. Channels of crystalline dolomite replacing calcite. Unit 4. x 1.

Fig. 5.—Laminated limestone (stromatolites). Unit 19. x 3.

Fig. 6.—Laminated limestone (stromatolites). Unit 7. x 3.



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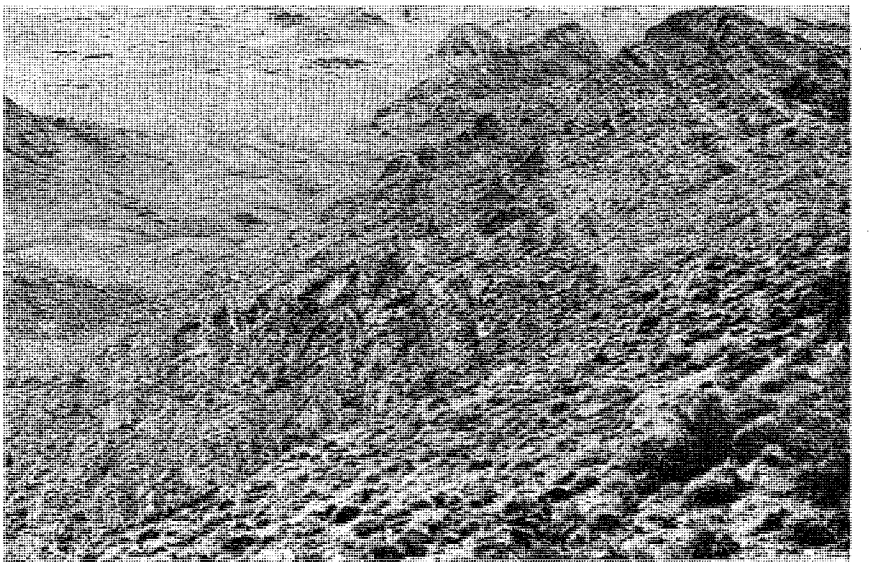

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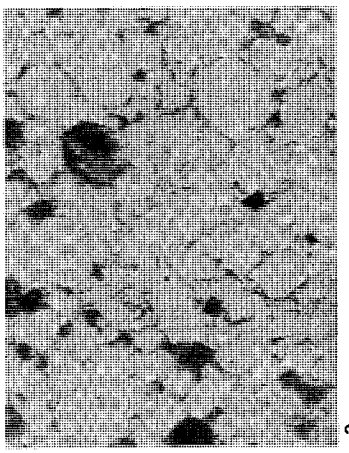
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EXPLANATION OF PLATE 3

GUILMETTE CARBONATES

FIG. 1.—Biomicrite; matrix, detrital. Detrital matrix consists of fine-grained skeletal fragments and calcilutite. Midway in Unit 7. x 1.

FIG. 2.—Calcareous quartz sandstone. Matrix consists of medium-grained, well-rounded to subrounded quartz grains and calcite cement. Midway in Unit 17. x 3.

FIG. 3.—Algal heads and corals embedded in micritic limestone matrix. Unit 1. x 1.

FIG. 4.—Corals embedded in micritic matrix. Unit 1. x 1.

FIG. 5.—Gastropods embedded in micritic limestone. Unit 15. x 1.

FIG. 6.—Biomicrite; matrix, detrital. Detrital material consists of fine- to coarse-grained skeletal fragments and calcilutite. Midway in Unit 10. x 1.

EXPLANATION OF PLATE 4

GUILMETTE CARBONATES

FIG. 1.—Biomicrite, matrix, detrital. Detrital grains consist of fine- to coarse-grained skeletal fragments. Unit 10. x 1.

FIG. 2.—Pelecypods embedded in shale. Unit 10. x 1.

FIG. 3.—Brachiopods embedded in limestone. Unit 10. x 1.

FIG. 4.—Algal heads embedded in micritic limestone. Unit 11. x 1.

FIG. 5.—Laminated limestone (stromatolites). Unit 5. x 1.

FIG. 6.—Pelecypods embedded in micritic limestone. Unit 10. x 1.

Zone 1, the lowermost zone of Division III extends from 608.3 feet to 1090.8 feet above the base of the formation and includes Units 13 to 17 for a total of 625.8 feet of strata.

Lithologically, Zone 3 is micritic limestone which is dark blue-gray, or dark-gray to light-gray and weathers dark- to light-gray. Unabraded, *in situ* gastropods, brachiopods, bryozoans, and stromatoporoid masses are the contained fossil elements (Plate 3, fig. 5; and Plate 2, fig. 5).

The attitude of the fossil elements, together with the lithologic character of the containing rocks, suggests lack of appreciable agitation. The fossil assemblage, as well as the enclosing rocks, is indicative of a warm, open, normal marine, sedimentary environment.

A calcareous quartz sandstone bed, 30 feet thick, occurs 25 feet below the top of Zone 1, 1035.8 feet to 1065.8 feet above the base of the formation. It grades from a micritic limestone at the top through sandy micrite and micritic sandstone to four feet of clean, well-rounded, medium-grained, calcareous quartz sandstone with distinct oscillation ripple marks (Plate 3, fig. 2). The calcareous quartz sandstone is underlain by a micrite similar to those above.

Oscillation ripple marks, plus the well-rounded, clean, mature nature of the sandstone suggest shallow, near-shore conditions. The clean nature of the underlying micrite, as opposed to the gradational nature of the sandstone and overlying micritic facies, suggests this unit records a westward regression of the sea, followed by marine transgression over this quartz sand beach.

Zone 2 extends from 1090.8 feet to 1288.8 feet above the base of the formation and includes Units 18 and 19, a total thickness of 198 feet of rocks. Lithologically, Zone 2 is micritic limestone which is dark- to light-gray on both fresh fracture and weathered outcrops. Corals, bryozoans, and algal or stromatoporoid heads constitute the remainder of the rock. In Zone 2 stromatoporoid and algal heads are found in growth position. Locally, however, corals and bryozoans are found lying on their side as well as in growth position (Plate 3, fig. 1).

Energy conditions within Zone 2 time seemingly were slightly more vigorous than during deposition of Zones 1 and 3 because corals and bryozoans are found in both growth position and in disordered fashion. Algal or stromatoporoid heads, being more stable, are typically found in growth position. Zone 2 appears to have been deposited above wave base, thus suggesting higher energy conditions. Zones 1 and 3 were probably below wave base and therefore in a lower energy environment.

Zone 3 extends from 1288.8 feet to 1445.1 feet, the top of the formation, and includes Units 20 to 22, comprising 156.3 feet of rock. Lithologically, Zone 3 is dark-gray to gray, clay micritic to pelletal limestone which weathers slightly lighter dark-gray. The lower 10 feet of this zone are characterized by one-half-inch to one-inch veins of secondary calcite. Unabraded, essentially *in situ* fossils, including gastropods, corals, and algal or stromatoporoid masses, typify the remainder of the detrital material of Zone 3 (Plate 3, fig. 5).

Unabraded and upright growth of these fossils suggest a warm, quiet, shallow infraneritic, marine environment. Upright growth position of these fossils indicates extremely low-energy conditions during deposition of these beds. The unabraded nature also indicates very little, if any, transportation of the organisms, once again indicative of low-energy conditions. Another indicator of low-energy is the extremely fine size of the micritic carbonate material, because a higher energy condition likely would tend to deposit coarser textured material.

In summary, Division III is characterized by micritic limestones containing unabraded essentially *in situ* fossils, It ranges from nonfossiliferous micrite to biomicritic limestone which lacks any recognizable clastic particles. These characteristics suggest a warm, shallow, low-energy, marine environment of deposition during Division III time.

CONCLUSIONS

The Guilmette Limestone of the Wendover area in its lithology and fossil elements is characteristic of deposition in a shallow, warm, open marine environment. Corals, brachiopods, pelecypods, algal stromatolites, and stromatoporoids suggest warm, clean, epineritic to infraneritic marine conditions. Energy conditions alternated from almost quiet water, as suggested by fossils preserved in living position surrounded by micrite to conditions of low-level agitation, characterized by disoriented and abraded fossils in a fine-grained matrix. Deeper water, below wave base, is indicated by *in situ* fossils, and shallow water, above wave base, is characterized by disarrayed, abraded fossils. Most of the thin- to medium-bedded sediments are characteristic of low-energy environment, whereas massive to medium bedding within the formation probably indicates either varying rates in the continuity of subsidence and/or supply of sediments.

Predominance of fine-grained calcareous sediments suggests a depositional area within the existing miogeosyncline, with only occasional influxes of coarse debris from areas of active erosion. The craton to the east was likely one source area for sediments of this area; however, the area to the north was tectonically active during the Late Devonian (Shaeffer and Sadlick, 1962, p. 22) and could have contributed sediments to the Wendover area during Middle Devonian time as well. According to Shaeffer (1966, p. 70), the quartzite in Division III is possibly a correlative of part of the Stansbury Formation, a very coarse clastic deposit reflecting a local but sharp uplift in Medial to Late Devonian approximately 50 miles east of the area. This stratum records a regression of the sea to the west, then a transgression back over the quartz sand beach(?).

The Guilmette Limestone in the Confusion Range, approximately 55 miles south of Wendover, and in the Burbank Hills (Rush, 1951, p. 16), 100 miles southeast of Wendover, has yielded *Manticoceras,* a worldwide index fossil for Stufe *to* I of the Upper Devonian. Paddock (1956, p. 46) identified a Late Devonian fauna from the Guilmette Limestone in the Newfoundland Mountains of Utah, located approximately 25 miles northeast of Wendover. R. H. Waite (*in* Schaeffer, 1960, p. 60-70) identified *Stringocephalus,* a Medial Devonian index fossil, from the Guilmette Limestone in the Silver Island Mountains, east and north of the current study area. The author found *Stringocephalus* in Unit 6 of the Guilmette in the Leppy Range in the lower part of the formation. Thus, the Guilmette Limestone in the Wendover area is certainly representative of Middle Devonian and may also include Upper Devonian sediments, although Schaeffer (1960, p. 70) suggested that the Guilmette Limestone in the Leppy Range was restricted to the Upper Devonian.

The underlying Simonson Formation is a gray, white, tan, black, and buff dolomite which is finely crystalline and laminated. The Pilot Shale which overlies the Guilmette Limestone in A-1 Canyon is a slope-forming, fissile to platy, gray, black and tan siltstone which weathers buff, orange, gray, purple and maroon (Schaeffer 1960, p. 73).

APPENDIX

Measured section of Guilmette Limestone in Sections 3, 4, 10, T. 33 N., R. 70 E., and Sections 34, T. 34 N., R. 70 E., Elko County, Nevada.

Unit No.	Description	Unit Thickness in feet	Cumulative Thickness in feet
	Division III		
22	Micrite (calcite 98%, dolomite 2%); dark-gray, weathers dark- to light-gray, medium-bedded, contains algal and stromatoporoid heads and corals.	54.5	1445.1
21	Pelmicrite (calcite 80%, dolomite 20%); light- to dark-gray, weathers light- to dark-gray, thin- to medium-bedded, contains corals, bryozoans, algal heads, and stromatoporoids.	48.5	1390.6
20	Micrite (calcite 57%, dolomite 43%); dark-gray, weathers dark-gray, thin- to medium-bedded. One foot of calcite at the top. This unit contains gastropods.	53.3	1342.1

19	Biomicrite (calcite 57%, dolomite 43%); dark-gray to light-gray, weathers dark-gray, thin- to medium-bedded, contains algal balls, bryozoans, and corals.	104.5	1288.8
18	Biomicrite (calcite 95%, dolomite 5%); dark-gray, weathers dark-gray, thin- to medium-bedded, contains algal and stromatoporoid heads, corals, and bryozoans.	93.5	1184.3
17	This unit consists of four subunits based on lithology:		
	a. Micrite (calcite 90%, dolomite 10%); light-gray, weathers light-gray, thin-bedded.	25	1090.8
	b. Calcareous quartz sandstone. Light-brown, weathers tan, thin-bedded, ripple marks.	30	1065.8
	c. Sandy limestone (calcarenite); light-brown, weathers tan, thin-bedded.	4	1035.8
	d. Micrite (calcite 90%, dolomite 10%); dark-gray, weathers light-gray, thin-bedded, contains algal or stromatoporoid heads, gastropods, and bryozoans.	86.5	1031.8
16	Micrite (calcite 95%, dolomite 5%); light-gray, weathers light-gray; thin- to thick-bedded; fine- to medium-grained limestone, dark-gray to tan, weathers dark-gray to tan, contains bryozoans, stromatoporoids, and algae.	68	945.3
15	Micrite	91	877.3
14	Micrite (calcite 98%, dolomite 2%); dark- to light-gray, weathers light-gray; thin- to medium-bedded, contains brachiopods, gastropods, algae, and stromatoporoids.	95.2	786.3
13	Micrite, dark- to light-gray, weathers light-gray; thin- to medium-bedded, contains gastropods, brachiopods, algae, and stromatoporoids.	82.8	691.1

Division III, total thickness — 836.8 feet.

Division II

12	Biomicrite (calcite 98%, dolomite 2%); dark- to light-gray, weathers light-gray; thin- to medium-bedded; some units are medium grained. This unit contains brachiopods, algal, and stromatoporoid heads.	86.2	608.3
11	Biomicrite (calcite 98%, dolomite 2%); dark- to light-gray, weathers light-gray; thin- to medium-bedded; contains gastropods, brachiopods, pelecypods, corals, algal or stromatoporoid heads.	106.6	522.1
10	Biomicrite; dark blue-gray, weathers medium blue-gray; thin- to medium-bedded. Interbedded with dolomicrite light-tan, weathers light-tan. Micrite on the top, light-tan, weathers light-tan, thin- to medium-bedded; interbedded with dolomicrite, light-brown, weathers light-gray; contains gastropods, algae, and stromatoporoids.	87.6	415.5
9	Biomicrite (calcite 60%, dolomite 40%); dark-blue to light-gray, weathers dark blue-gray to light-gray; thin- to medium-bedded. Interbedded with dolomicrite that is light-tan and weathers light-tan; undulatory surface structure; contains brachiopods.	53.8	327.9

8	Biomicrite to pelmicrite (calcite 75%, dolomite 25%); dark- to light-gray, weathers medium-gray; thin-bedded, 2 feet of dolomite occurs in the upper part and is tan colored, but weathers tan. Fossiliferous in the lower 10 feet; contains corals, brachiopods, bryozoans, algal and stromatoporoid heads.	14	274

Division II, total thickness — 348.2 feet.

Division I

7	Pelmicrite (calcite 90%, dolomite 10%); medium- to dark-gray, weathers medium- to dark-gray; interbedded with light-tan dolomitic limestone, weathers light-tan; undulatory surface structure; contains brachiopods.	14	260.1
6	Dolomicrite (calcite 20%, dolomite 80%); dark-blue to dark-gray, weathers tan; bottom 18 feet are fossiliferous; containing brachiopods and algae. Dark blue-gray, weathers light-gray and is interbedded with micritic limestone; medium gray, weathers light-gray also pinkish gray, dark-gray; weathers light-gray. One foot of sandy, light-gray lime, weathers light-gray and dark-gray micritic lime, weathers light-gray occurs at the top. This unit is medium- to thick-bedded; contains brachiopods, and algal stromatolites.	58	246.1
5	Micrite to dolomicrite (calcite 60%, dolomite 40%); dark-gray, weathers dark light-gray; thin- to medium-bedded; contains algal stromatolites.	59.1	188.1
4	Micrite to dolomicrite (calcite 60%, dolomite 40%); dark-gray, weathers dark light-gray; thin- to medium-bedded, becomes fossiliferous in the top 8 feet; contains gastropods, algal and stromatoporoid heads, and brachiopods. Becomes thick-bedded in the middle 10 feet and thin-bedded in the bottom 5 feet; micritic limestone interbedded with dolomicrite; weathers light-brown to light-tan, and contains algal stromatolites.	24	129
3	Pelsparite to dolomicrite (calcite 26%, dolomite 74%); light-brown to dark-gray, weathers light-gray; thin- to medium-bedded; contains a few gastropods, becomes interbedded with dolomicrite and calcite veins.	48	105
2	Biomicrite (calcite 98%, dolomite 2%); dark-gray to tan; weathers light-tan to tan; grades into argillaceous limestone at the top; thin-bedded; contains corals, brachiopods, algal or stromatoporoid heads, and beds of coquina.	37	57
1	Biomicrite (calcite 98%, dolomite 2%); dark-gray; weathers light-gray; thin-bedded, interbedded with shaly and dolomitic limestone; contains corals, brachiopods, and bryozoans.	20	20

Division I, total thickness — 260.1 feet.

Total Guilmette Limestone — 1445.1 feet.

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