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SECTIONS OF THE WARGAL LIMESTONE, WESTERN SALT RANGE, PAKISTAN

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ABSTRACT

Four sections of the Wargal Limestone were measured, described, and sampled in detail. Numerous small faults are present normal to the dip and along bedding planes. Thickness of the formation ranges from 174 m at Zaluch Nala to 130 m at Chatuwala Nala. Colonial coral zones are present near the base of the formation and at the top of the formation.

INTRODUCTION

The Wargal Limestone was formally named by Tiechert (1966) in his review of the nomenclature and correlation of the Permian "Productus Limestone". The Wargal Limestone is equivalent to the Middle Productus limestone of previous workers (Waagen, 1879, 1887, 1891; Reed, Cotter, and Lahiri, 1930; Gee, 1947; Schindewolf, 1954; Gee in Pascoe, 1959; Dunbar, et al., 1960). The historical development of nomenclature concerning the Wargal Limestone is presented by Teichert (1966, p. 12).

Four sections of the Wargal Limestone were measured, described, and sampled during December 1980 and February 1981 (Fig. 1). Samples were collected from each bed, or at 30 cm intervals; whichever was smaller. A total of 2,047 samples were collected. A detailed study of the carbonate petrology and interpreted carbonate microfacies is being conducted by Haneef and the biostratigraphic distribution of the bryozoans is being studied by Gilmour.

Although the sections of Wargal Limestone in the Salt Range have been referred to as unfaulted sequences in previous reports, we noted many small faults both normal to the dip and along bedding planes during our study. Much time was spent following and matching beds to ensure a complete description and collection of each section.

STRATIGRAPHIC SECTIONS

Four stratigraphic sections were measured and sampled (Fig. 1–6).

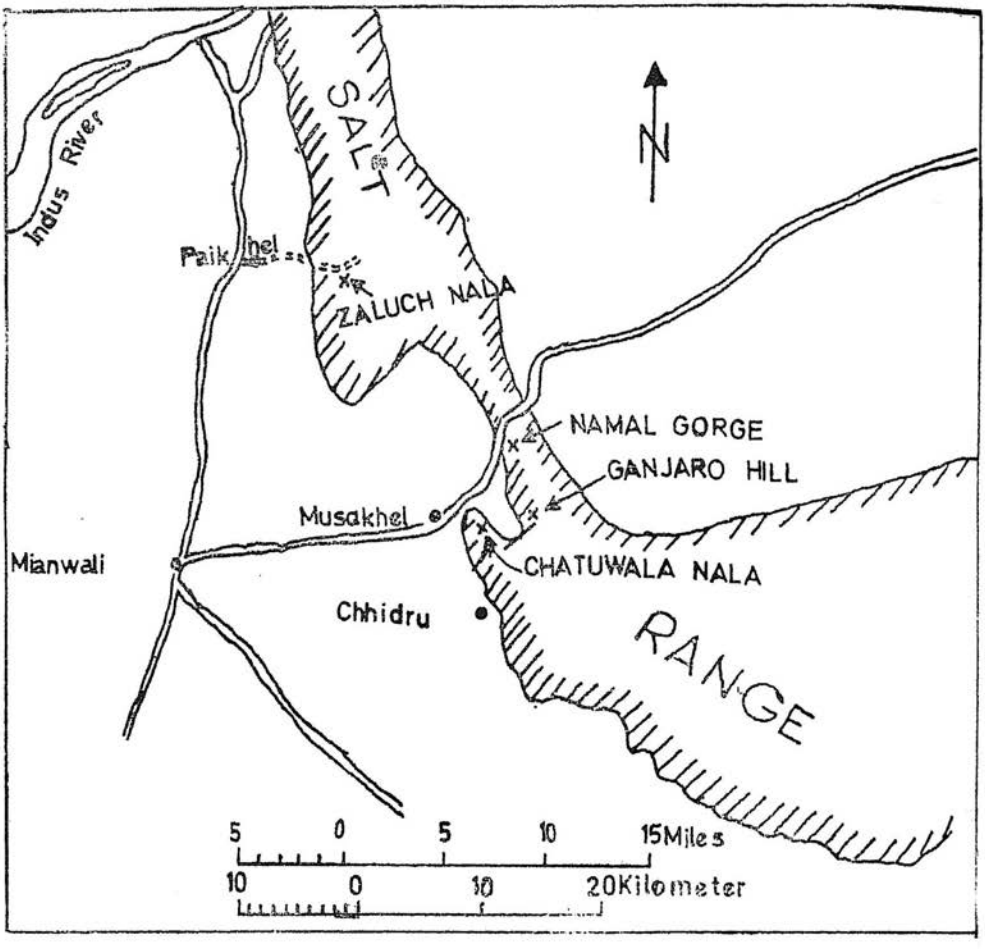

Fig. 1. Map showing location of four measured sections in Salt Range.

From west to east, these sections are Zaluch Nala, Nammal Gorge, Chatuwala Nala, and Ganjaro Hill. Samples from these four sections are stored and available for study at both the University of Peshawar and Eastern Washington University.

Zaluch Nala

Teichert (1966) measured and described the section of the Wargal Limestone at Zaluch Nala and designated it as a temporary standard pending further study of the formation near the village of Wargal, which he believed would be a suitable type locality. Including the uppermost nodular beds, the thickness of the formation is 174 m. Teichert (1966) reported 179 m. of section. The slight difference in thickness is probably due to different interpretations of the faulted section at approximately 40 m. above the base.

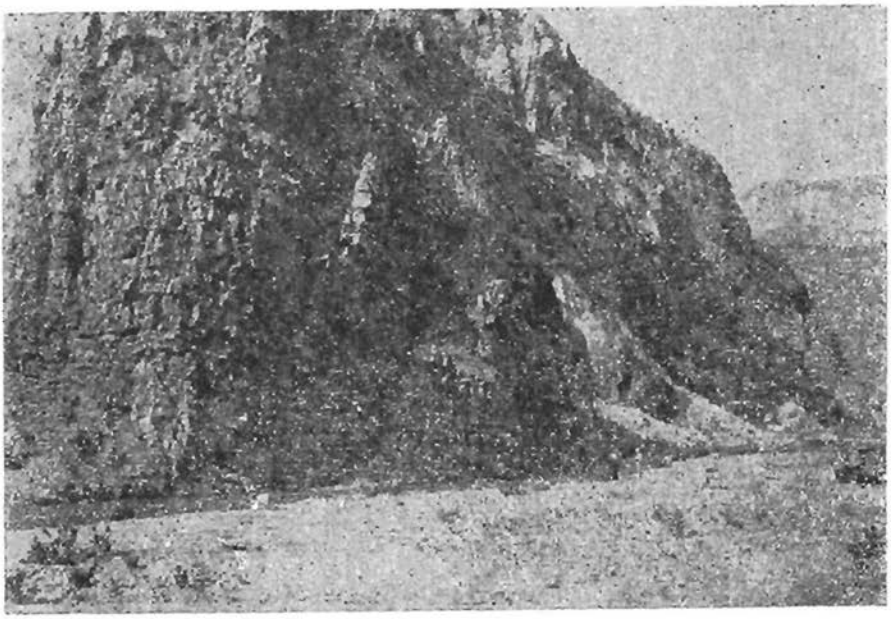

Fig. 2. Wargal Limestone exposed in Nammal Gorge. Base of measured section begins at lower left corner of photograph just above stream.

The section is reached by driving north from Mianwali to the village of Paikhel and proceeding east for approximately 10 km to Zaluch Nala. Most of the formation is well exposed in the east side of the canyon. Only the upper nodular beds were measured on the west side of the canyon.

Fossils are very abundant throughout the formation. Although brachiopods are very abundant and prominent, bryozoans, gastropods, pelecypods, and other groups are also well represented. Two colonial coral zones were collected; one at 27 m. and the other at 168 m.

Nammal Gorge

Nammal Gorge contains a well-exposed section of the Wargal Limestone on the northeast limb of a faulted anticline. Unfortunately the lowermost few meters of section in the core of the anticline are not exposed. Teichert (1966) and Kummel and Teichert (1970) mentioned the rocks in Nammal Gorge and reported a thickness of 146 m. In our study, we measured 154 m. The strata dip northeast.

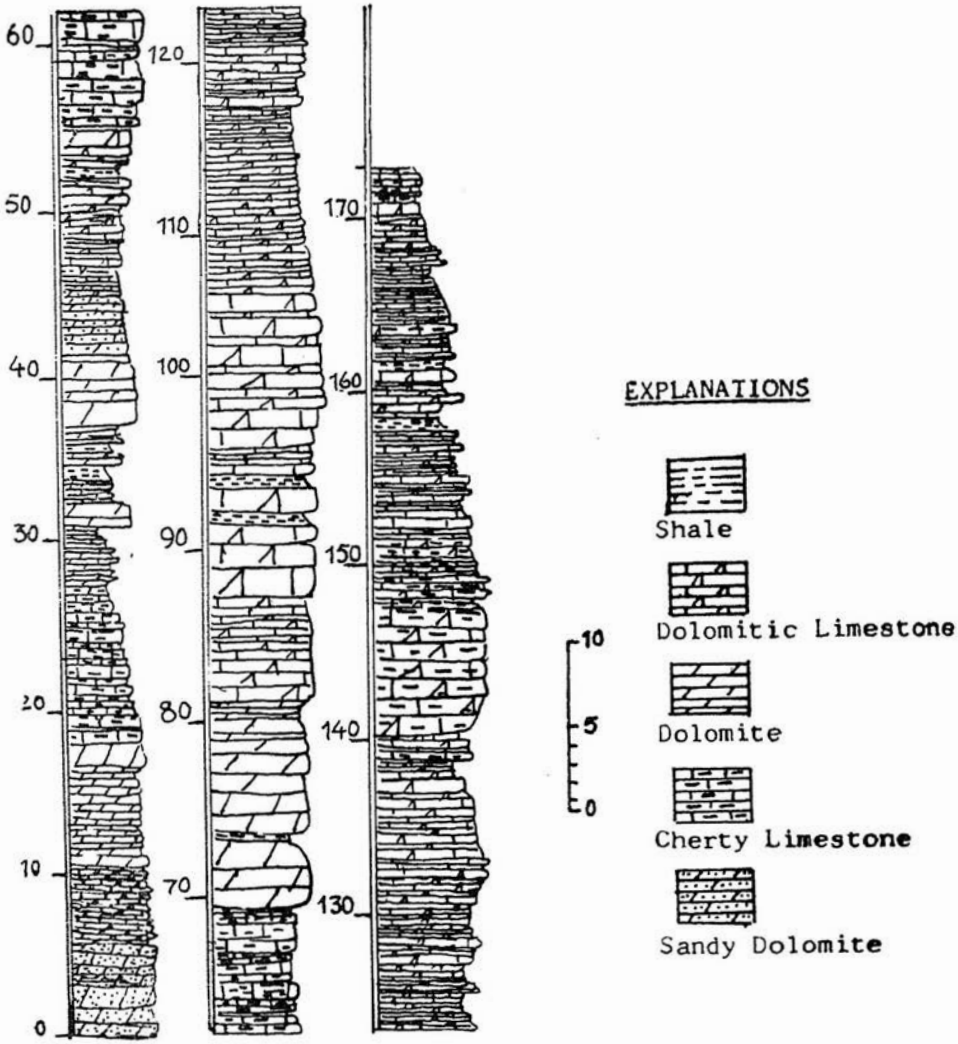

Fig. 3. Columnar section of Wargal Limestone in Zaluch Nala.

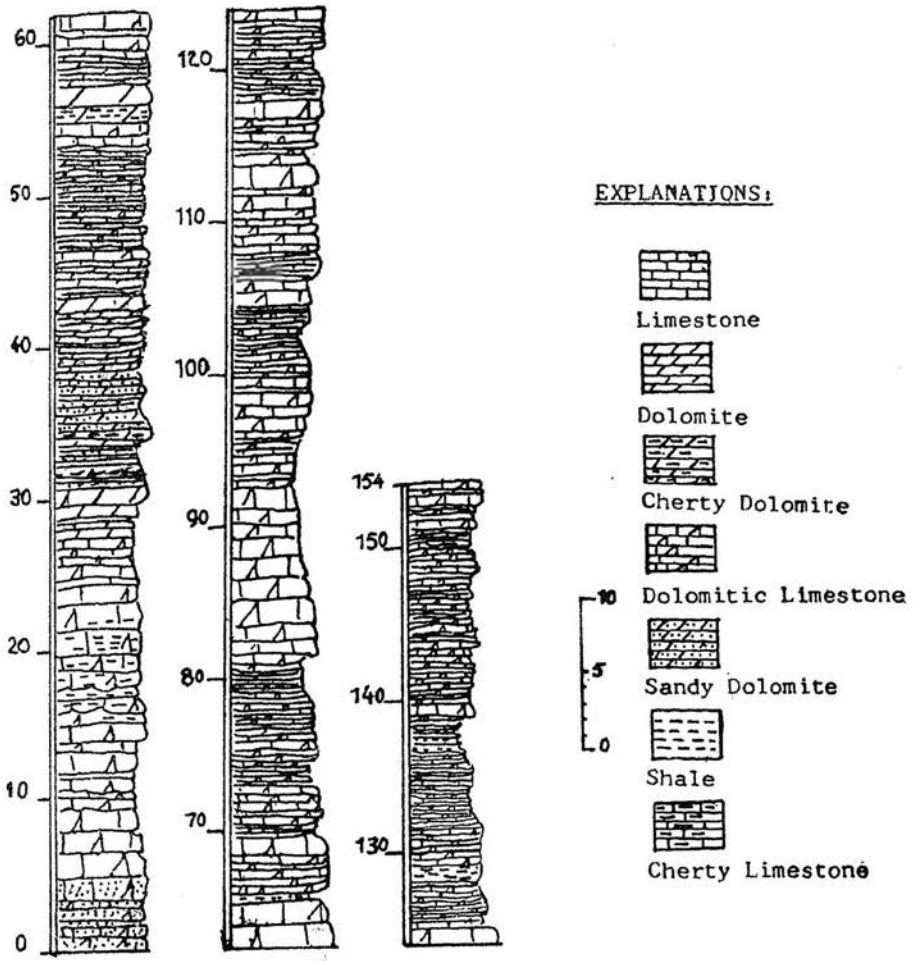

Fig. 4. Columnar section of Wargal Limestone in Nammal Gorge.

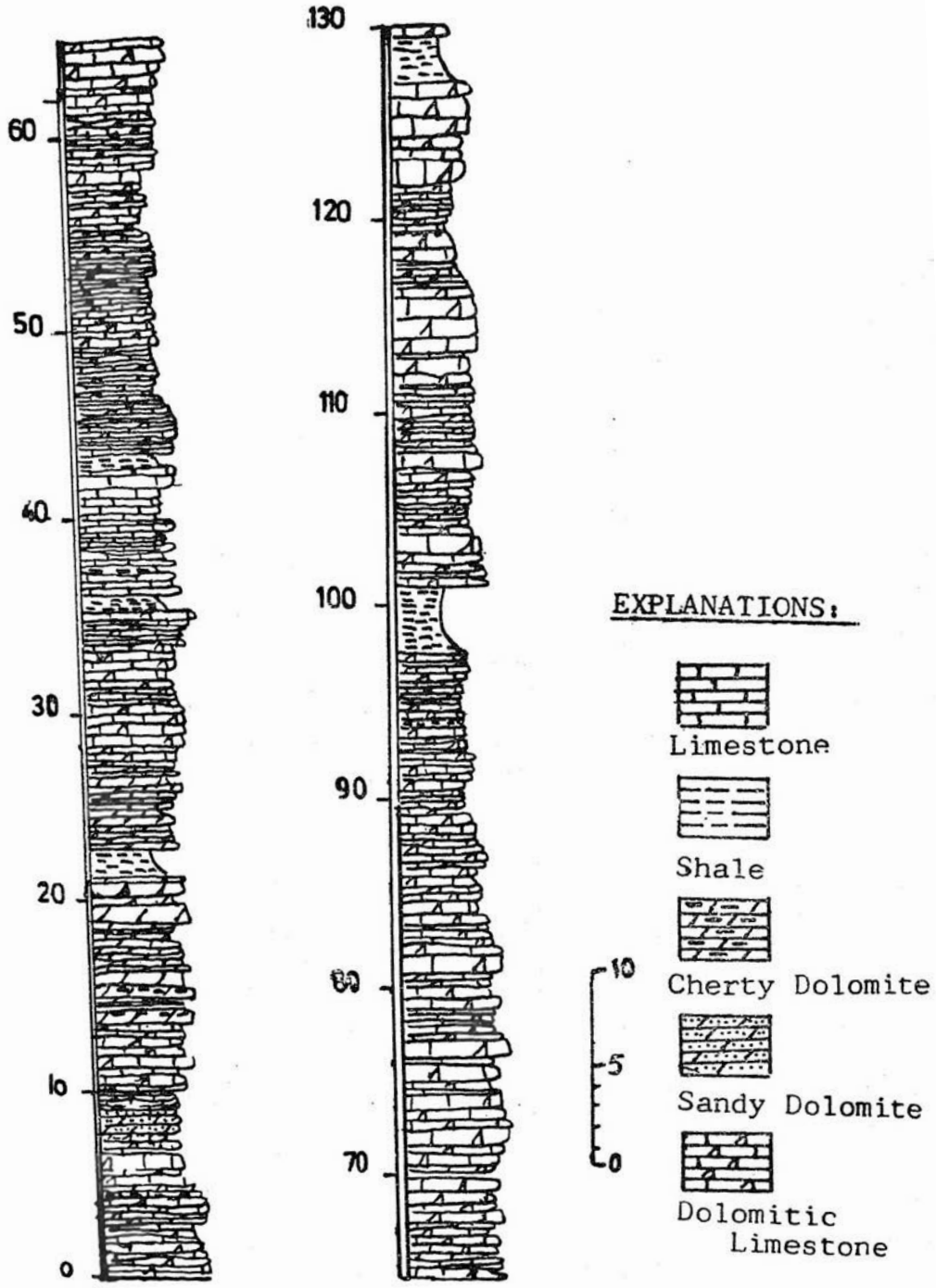

Fig. 5. Columnar section of Wargal Limestone at Chatuwala Nala.

Nammal Gorge is approximately 30 km east of Mianwali. To reach the section, proceed east from Mianwali past Musa Khel and turn left on gravel road towards Nammal dam. Section begins at base of cliff on northwest side of canyon (Fig. 2).

Brachiopods are very abundant. Bryozoans, molluscs, crinoids, and other fossil groups are equally abundant throughout the section. A colonial coral zone was noted at the 154 m.

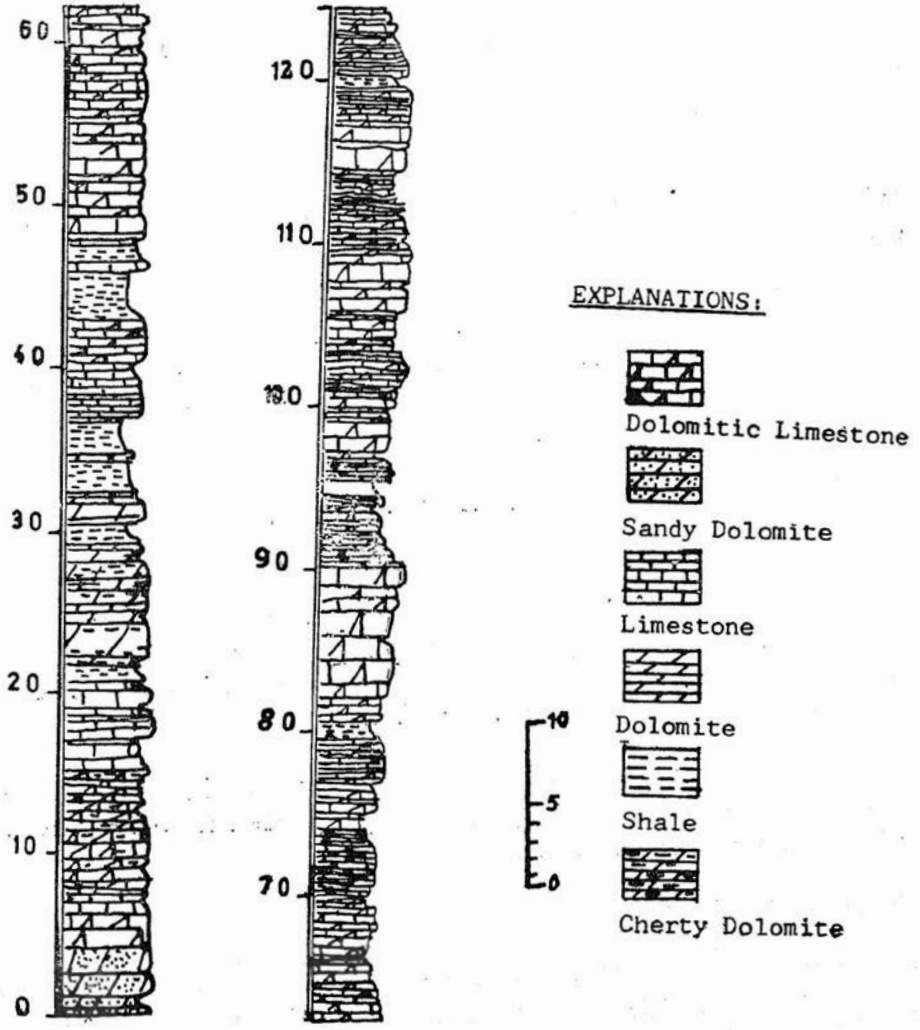

Fig. 6. Columnar section of Wargal Limestone at Ganjaro Hill.

Chatuwala Nala

The Chatuwala Nala section is 6.5 km northeast of Chhidru. The section is extremely well exposed on the northeast side of the nala except for the uppermost few meters which are covered by alluvial sediments. The Chhidru Formation is exposed on the southwest side of the nala overlying the Wargal Limestone. The Wargal Limestone, including the upper nodular beds, is at least 130 m thick at Chatuwala. However, this thickness supports the general conclusion of Kummel and Teichert (1970, p. 20) that the Wargal Limestone thins eastward through the Salt Range.

The section is reached by proceeding east from Mianwali past Musa Khel for approximately 5 km. Turn right on dirt road and proceed 4 km. Turn right and go 1.5 km. The measured section is east of the road.

Brachiopods are very abundant along with bryozoans, molluscs, crinoids, and other groups. Two colonial coral zones were collected; one at 5.2 m and the other at 126.5 m.

Ganjaro Hill Section

The Ganjaro Hill section is on the west side of the Ganjaro Hill about 3 km northeast of the Chatuwala Nala section. The Wargal section begins at the edge of the jeep road and extends up the hill. Faulting may have duplicated parts of the section which hopefully can be deciphered from the detailed petrographic and faunal studies being conducted. Thickness of the Wargal Limestone at this locality is at least 124 m.

To reach the section, drive east from Mianwali for approximately 26 km (5 km past Musa Khel). Turn right on dirt road and proceed southeast 6.2 km until road ends at dashed-out bridge. On foot, continue 1.3 k.m. to base of section. Section begins just after last major switchback.

Abundant crinoids occur in the upper half of the measured section. Brachiopods, bryozoans, molluscs, and other groups are also well represented. A colonial coral zone occurs at 14 m.

General Litbology

The base of the Wargal Limestone consists of three to nine meters of sandy dolomite and dolomitic limestone (Fig. 3–6). A six to seven meter zone of cherty limestone and cherty dolomite occurs above these sandy carbonates and a second zone of cherty carbonate beds ranges from 6 to 26 m above the first

chert. In most of the sections, these cherty zones are overlain by thick bedded to massive beds of dolomite. Overlaying this dolomite is a thick sequence of dolomitic limestone and at about 90 to 110 m the section changes from thick bedded carbonates to thin bedded carbonates. The uppermost beds contain chert and are generally nodular (Kalabagh Member).

In general, the section can be characterized as beginning with sandy carbonate at the base; changing to cherty beds above the sandy units; becoming a massive dolomite; gradually changing to thin bedded dolomitic limestone; and cherty and nodular at the top.

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