PRE-NIOBRARA CRETACEOUS MEGAFAUNAL ZONES

By

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INTRODUCTION

The purpose of this paper is to summarize the existing knowledge concerning the megafaunal zones of the pre-Niobrara Cretaceous of Wyoming. Most of the data for the summary were derived from publications of, and discussions with Dr. William Cobban of the U. S. Geological Survey and the late Dr. J. B. Reeside, Jr. Inasmuch as the writer has many interpretations of his own in this report, and because Dr. Cobban has not been able to review this manuscript, the interpretations presented are to be regarded as the responsibility of the writer.

The present paper will show the geographic and stratigraphic distribution of each megafaunal zone recognized in Wyoming, and wherever possible references will be given to good illustrations and some of the better collecting localities with which the writer is familiar.

Figure 1 shows the distribution in time of the Cretaceous rocks older than Niobrara for most of Wyoming. The faunal zones proposed by Cobban and Reeside (1952) are used as the scale against which the rock units are equated. Hence, true thickness of units is in no way represented.

The ammonites constitute most of the index fossils used in this report. These forms are one of the most useful groups of marine Upper Cretaceous fossils. Their rapid evolutionary changes and their occurrence in beds of diverse lithology make them of invaluable aid in correlation. The writer's experience suggests the ammonites are more common in the pre-Niobrara Cretaceous rock of Wyoming and adjacent areas than in post-Niobrara Cretaceous rocks. Forms with the original shell material are often found in calcareous concretions, particularly in certain beds in the Frontier formation. Impressions of ammonites are common in the lower Cody, Carlile shale, and equivalents. The writer would like to emphasize that ammonites can be very useful in solving difficult correlation problems; and in those cases where only fragments can be obtained, they can also sometimes be identified by an expert.

MEGAFAUNAL ZONES

Inoceramus deformis (Meek)—This faunal zone represents the oldest of the known faunal zones of Niobrara age. The writer has observed this pelecypod in the Cody shale just southeast of the town of Buffalo. Cobban (1951, pp. 60-65) also reports I. deformis from near the base of the Niobrara formation about two miles southeast of Sinclair along U.S. Highway 30, 7.6 miles east of Medicine Bow. The approximate distribution of the marine waters in Wyoming and adjacent areas during the life span of this form is shown in figure 6.

Scaphites corvensis (Cobban)—The youngest of the ammonite zones for the Carlile shale is represented by this species (Cobban, 1951 c, pl. 7, figs. 6-17). According to Cobban (1958, p. 118), S. corvensis is known to occur on both the west and east flanks of the Powder River Basin and in the northern part of the Black Hills. Collections of this form can be made in (1) the Sage Breaks member of the Carlile shale from Newcastle northwestward to Carter County, Montana, (2) in the upper part of the Carlile shale near Buffalo, Montana, (3) near Hardin (Richards, 1955, p. 93).

Scaphites nigricollens (Cobban)—This species (Cobban, 1951 c, pl. 5, figs. 9-26; pl. 6; pl. 7, figs. 1-5) has been collected from the middle of the Turner sandy member of the Carlile shale along the east and northeast flanks of the Powder River Basin (Cobban, 1958, p. 119), and near Hardin, Montana, from the Carlile shale member of the Cody shale. The paleogeography of Wyoming and adjacent areas during the approximate time this species lived is shown in figure 5.

Scaphites whitfieldi (Cobban)—This species is common in the lower part of the Turner sandy member of the Carlile shale along the northeast flank of the Powder River Basin. Hose (1955, pp. 62, 98, pl. 10) collected this ammonite from the Carlile shale near the town of Buffalo and Veatch (1906) reported the form from a bed 570 feet above the Dakota, three miles southeast of Rawlins. A common associate of this form is Prionocyclus wyomingensis meek (Stanton, 1993, pl. 40). According to Cobban (1951, p. 62), this zone is also present in the Frontier Formation about 2 miles southeast of Sinclair. The type locality for Prionocyclus wyomingensis is in the valley of the Medicine Bow River in Carbon County. P. wyomingensis is also common in the Frontier Formation in (1) the Black Mountain area of the southeastern part of the Big Horn Basin, (2) along the east flank of the Carbon Basin, and (3) on the south flank of the Como Bluff anticline in Albany County. The Scaphites whitfieldi - Prionocyclus wyomingensis zone is one of the most widespread faunal zones in the Rocky Mountains and western Great Plains.

Scaphites warreni (Meek and Hayden)—Rubey collected this species (Cobban, 1951b, pl. 3, figs. 8-27) along the southwest flank of the Black Hills, one mile south of Newcastle, in Sec. 2, T-44-N, R-61-W, about 20 feet above the shark-toothed conglomerate of the Turner sandstone. Fossils commonly found with S. warreni include Inoceramus dimidius White (Stanton, 1893, pl. 10; figs. 5 and 6) and Prionocyclus macombi Meek (Stanton, 1893, pl. 41).

Collignoniceras woollgari (Mantell)—This coiled, ornate ammonite (Meek, 1876, pl. 7, figs. 1-h, 3; Shimer and Shrock, 1944, pl. 247, figs. 1, 2), often occurs as impressions in shale. In Utah and Colorado, this faunal zone is not so ubiquitous in occurrence as the overlying Scaphites warreni and Scaphites whitfieldi-Prionocyclus