

Introduction
by
Daniel R. Shawe

About 400 fossiliferous segments of drill core from the lower part of the Mancos Shale of Late Cretaceous age were collected by the author during an exploratory drilling program for uranium deposits conducted in 1955 and 1956 by the Geological Survey in the Disappointment Valley area, San Miguel County, Colo. The samples were submitted to the late J. B. Reeside, Jr., of the Geological Survey for identification. Reeside's identifications are being released in open file in order to make them available to those interested.

Reeside, in a written communication (March 1956), divided the lower 855 feet of the Mancos Shale into six fossil zones on the basis of fossils in drill cores from hole DVR-1. He wrote as follows:

"The Mancos Shale can perhaps best be classified by equivalence to subdivisions recognized in the Great Plains. I would assign the highest fossils in the cores to a later Niobrara equivalent and would extend this to about 225 feet depth. In this interval *Inoceramus stantoni* Sokolow, *Baculites codyensis* Reeside, *B. asper* Morton, *Phlycteroceras oregonense* Reeside are more distinctive species, and *Ostrea congesta* Conrad ranges throughout. The next 150 feet, to about 375 feet depth, must represent the earlier Niobrara, but there are few distinctive fossils in the cores. I would assign the next 170 feet to about 540 feet depth, to the later Carlile, in which interval *Inoceramus dimidiatus* White, *I. fragilis* Hall and Meek, *Scaphites whitfieldi* Cobban, *S. ferrensis* Cobban, *Prionocyclus macombi* Meek, and *P. wyomingensis* Meek are distinctive. The next 240 feet, to about 780 feet depth, must represent the earlier Carlile, but *Collignonicerias hyatti* (Stanton) in the upper part and *C. woollgari* (Mantell) in the lower part are the only distinctive fossils. One would expect a late Greenhorn fauna in the next 45 feet, to 825 feet depth, but nothing distinctive is available. The remaining cores, to 855 feet depth, contain chiefly *Gryphaea newberryi* Stanton, which is associated with the early Greenhorn, in Gilbert's original sense of the name, or with the next-to-the-top of four units, in the broader sense of Greenhorn now prevalent. *G. newberryi* is widespread in Utah, western Colorado, and Arizona at or near the base of the marine Upper Cretaceous beds."

Reeside described (written communication, May 1956) fossils from drill cores of DVR-2, representing a much narrower stratigraphic interval at the base of the Mancos. He stated: "I would assign the first 127 feet to an equivalent of the lowest part of the Carlile Shale, the zone of *Collignonicerias woollgari* (Mantell). The next lower 46 feet to about 173 feet depth, like the similar interval in DVR-1, would be expected to yield an uppermost Greenhorn fauna, but nothing distinctive is available. The remaining 13 feet of the hole, to 189.0 feet depth, contains the distinctive forms *Gryphaea newberryi* Stanton and *Exogyra columbella* Meek, which mark the lower part of the Greenhorn of Gilbert or the upper middle part of the Greenhorn, as the term is now applied."

Complete lists of fossils identified in cores from drill holes DVR-1 and DVR-2 are given in tables 1 and 2.

This material is of limited interest and is being made available in this form to those who have need of it. A formal publication superseding or incorporating it is not planned.

Table 1.--Fossils in core from diamond drill hole DVR-1
[Near center of NE $\frac{1}{4}$ sec. 30, T. 43 N., R. 16 W.]

Sample No. DVR-1	Distance (feet) above base of Mancos Shale	Fossils
Upper Niobrara equivalent--Continued		
153.2	706.5	<i>Inoceramus</i> sp., <i>Ostrea congesta</i> Conrad, <i>Baculites codyensis</i> Reeside.
155.0	704.7	<i>Inoceramus</i> aff. <i>I. stantoni</i> Sokolow, <i>Ostrea congesta</i> Conrad.
163.4	696.3	<i>Inoceramus</i> sp., <i>Ostrea congesta</i> Conrad.
164.7	695.0	<i>Baculites</i> sp.
165.0	694.7	<i>Inoceramus</i> sp., <i>Baculites</i> sp.
165.4	694.3	<i>Baculites codyensis</i> Reeside.
167.5	692.2	<i>Inoceramus</i> sp., <i>Baculites codyensis</i> Reeside.
168.0	691.7	<i>Inoceramus</i> sp., <i>Baculites codyensis</i> Reeside.
169.3	690.4	<i>Inoceramus</i> aff. <i>I. cardissoides</i> Goldfuss.
170.0	689.7	<i>Inoceramus</i> sp., coaly material of unknown origin.
170.5	689.2	<i>Inoceramus</i> fibers, <i>Ostrea congesta</i> Conrad.
171.5	688.2	<i>Phlycteroceras oregonense</i> Reeside.
172.3	687.4	<i>Inoceramus</i> sp., <i>Ostrea congesta</i> Conrad.
174.4	685.3	<i>Inoceramus</i> sp., <i>Ostrea congesta</i> Conrad.
175.0	684.7	<i>Inoceramus</i> sp., <i>Ostrea congesta</i> Conrad, <i>Anisomyon</i> n. sp. (see also 148.5).
175.3	684.4	<i>Ostrea congesta</i> Conrad.
175.5	684.2	Do.
175.6	684.1	<i>Inoceramus</i> sp., <i>Ostrea congesta</i> Conrad.
176.0	683.7	Do.
177.0	682.7	<i>Inoceramus</i> sp., <i>Ostrea congesta</i> Conrad, <i>Anisomyon</i> n. sp. (see also 148.5, 175.0).
177.1	682.6	<i>Inoceramus</i> sp., <i>Ostrea congesta</i> Conrad.
178.4	681.3	<i>Inoceramus</i> aff. <i>I. cardissoides</i> Goldfuss, <i>Ostrea congesta</i> Conrad, <i>Baculites</i> aff. <i>B. asper</i> Morton.
179.0	680.7	<i>Inoceramus</i> sp., <i>Ostrea congesta</i> Conrad, <i>Baculites</i> sp.
179.4	680.3	<i>Inoceramus</i> sp., <i>Ostrea congesta</i> Conrad.
179.8	679.9	Do.
180.0	679.7	Do.
182.0	677.7	Do.
184.0	675.7	Do.
184.8	674.9	Do.
185.0	674.7	Do.
185.5	674.2	<i>Inoceramus</i> sp.
186.8	672.9	<i>Inoceramus</i> fibers.
187.2	672.5	Do.
189.0	670.7	<i>Inoceramus</i> sp., <i>Ostrea congesta</i> Conrad.
190.2	669.5	<i>Ostrea congesta</i> Conrad, <i>Baculites</i> sp.
191.1	668.6	<i>Inoceramus</i> sp., <i>Ostrea congesta</i> Conrad.
192.4	667.3	<i>Pteria gastrades</i> (Meek).
192.6	667.1	<i>Inoceramus</i> aff. <i>I. stantoni</i> Sokolow.
192.8	666.9	<i>Inoceramus</i> sp., <i>Ostrea congesta</i> Conrad.
193.3	666.4	<i>Inoceramus</i> fibers, <i>Ostrea congesta</i> Conrad.
193.7	666.0	<i>Inoceramus</i> sp.
193.8	665.9	<i>Inoceramus</i> sp., <i>Ostrea congesta</i> Conrad, <i>Baculites</i> sp.
194.1	665.6	<i>Ostrea congesta</i> Conrad, <i>Baculites</i> sp., fish scales.
194.3	665.4	<i>Inoceramus</i> sp., <i>Ostrea congesta</i> Conrad, <i>Baculites</i> sp.
194.6	665.1	<i>Inoceramus</i> sp., <i>Ostrea congesta</i> Conrad.
196.5	663.8	Do.
196.6	663.1	<i>Ostrea congesta</i> Conrad, <i>Pecten</i> (<i>Synsphyronema</i> ?) sp.
197.0	662.7	<i>Inoceramus</i> sp., <i>Ostrea congesta</i> Conrad, fish scale and bone.
197.3	662.4	<i>Inoceramus</i> sp., <i>Ostrea congesta</i> Conrad.
198.3	661.4	<i>Inoceramus</i> sp., <i>Ostrea congesta</i> Conrad, fish scales.
36.5	823.2	<i>Inoceramus</i> sp., <i>Ostrea congesta</i> Conrad.
36.7	823.0	<i>Ostrea congesta</i> Conrad, <i>Dentalium</i> ? sp.
39.2	820.5	<i>Baculites codyensis</i> Reeside.
44.0	815.7	<i>Inoceramus</i> sp., <i>Ostrea congesta</i> Conrad, centrum of fish vertebra.
47.2	812.5	<i>Inoceramus</i> ? sp.
48.0	811.7	<i>Inoceramus</i> sp., <i>Ostrea congesta</i> Conrad.
49.0	810.7	<i>Ostrea congesta</i> Conrad.
53.5	806.2	<i>Baculites codyensis</i> Reeside.
54.0	805.7	<i>Ostrea congesta</i> Conrad.
55.3	804.4	<i>Ostrea</i> sp. fish scales.
68.6	791.1	<i>Inoceramus</i> aff. <i>I. stantoni</i> Sokolow.
69.2	790.5	<i>Ostrea congesta</i> Conrad (spat), <i>Baculites</i> aff. <i>B. asper</i> Morton.
82.0	777.7	<i>Ostrea congesta</i> Conrad.
83.0	776.7	<i>Ostrea congesta</i> Conrad, crustacean claw.
89.5	770.2	<i>Ostrea congesta</i> Conrad.
92.1	767.6	<i>Inoceramus stantoni</i> Sokolow.
112.3	747.4	<i>Ostrea congesta</i> Conrad (spat), <i>Baculites asper</i> Morton.
118.5	741.2	<i>Ostrea congesta</i> Conrad.
122.5	737.2	<i>Inoceramus</i> sp., <i>Ostrea congesta</i> Conrad, <i>Baculites codyensis</i> Reeside.
124.5	735.2	<i>Inoceramus</i> sp., <i>Baculites codyensis</i> Reeside.
140.0	719.7	<i>Ostrea congesta</i> Conrad, <i>Baculites</i> aff. <i>B. asper</i> Morton.
142.8	716.9	<i>Ostrea congesta</i> Conrad.
143.0	716.7	<i>Inoceramus</i> sp.
148.5	711.2	<i>Inoceramus</i> fibers, <i>Anisomyon</i> n. sp.
150.0	709.7	<i>Baculites codyensis</i> Reeside.
150.4	709.3	<i>Ostrea congesta</i> Conrad, fish scales.
150.8	708.9	<i>Inoceramus</i> aff. <i>I. undulatopectatus</i> Roemer.
150.9	708.8	<i>Inoceramus</i> aff. <i>I. stantoni</i> Sokolow.
151.1		
152.0	707.7	<i>Inoceramus</i> sp.
152.2	707.5	<i>Inoceramus</i> sp., <i>Baculites</i> sp.
152.3	707.4	<i>Inoceramus</i> sp., fish bone.
152.9	706.8	<i>Inoceramus</i> sp., <i>Ostrea congesta</i> Conrad.
153.1	706.6	<i>Inoceramus</i> aff. <i>I. stantoni</i> Sokolow.

Table 1.--Fossils in core from diamond drill hole DVR-1
Continued

Sample No. DVR-1	Distance (feet) above base of Mancos Shale	Fossils
Upper Niobrara equivalent--Continued		
225.6	634.1	<i>Inoceramus</i> sp., <i>Ostrea congesta</i> Conrad.
226.0	633.7	<i>Ostrea congesta</i> Conrad, fish bone.
227.0	632.7	<i>Inoceramus</i> sp.
227.7	632.0	Do.
229.7	630.0	Do.
230.4	629.3	Do.
232.0	627.7	Do.
232.1	627.6	Do.
232.2	627.5	Do.
232.3	627.4	Do.
232.3	627.4	Do.
232.8	626.9	Do.
232.9	626.8	Do.
233.0	626.7	Do.
233.1	626.6	<i>Inoceramus</i> sp., <i>Ostrea congesta</i> Conrad.
233.2	626.5	<i>Ostrea congesta</i> Conrad.
235.2	624.5	<i>Anisomyon</i> n. sp. (see also 148.5, 175.0, 179.4).
236.0	623.7	<i>Inoceramus</i> sp.
236.1	623.6	<i>Inoceramus</i> sp., <i>Ostrea congesta</i> Conrad.
236.1	623.6	<i>Inoceramus</i> sp.
236.1	623.6	<i>Ostrea congesta</i> Conrad.
236.6	623.1	Do.
238.0	621.7	<i>Inoceramus</i> sp., <i>Ostrea congesta</i> Conrad.
238.5	621.2	Do.
238.6	621.1	<i>Inoceramus</i> fibers, <i>Ostrea congesta</i> Conrad, large fish scale.
245.5	614.2	<i>Ostrea congesta</i> Conrad.
252.4	607.3	Do.
252.5	607.2	<i>Inoceramus</i> aff. <i>I. deformis</i> Meek.
252.6	607.1	Undetermined fragment of fossil.
256.2	603.5	<i>Inoceramus</i> sp., <i>Ostrea</i> sp.
256.3	603.4	<i>Inoceramus</i> sp.
256.4	603.3	Do.
256.6	603.1	<i>Ostrea</i> sp., centrum of fish vertebra.
258.7	601.0	<i>Ostrea congesta</i> Conrad, fish scale.
258.8	600.3	Fish scales.
266.0	593.7	<i>Inoceramus</i> fibers, <i>Ostrea</i> sp.
288.1	571.6	<i>Inoceramus</i> sp.
289.1	570.6	<i>Ostrea</i> sp. Surface with much glauconite.
293.5	566.2	<i>Ostrea</i> sp., fish scales.
294.6	565.1	Gastropod fragments, fish scales.
294.7	565.0	<i>Inoceramus</i> sp., <i>Pteria gastrades</i> (Meek).
301.2	558.5	<i>Inoceramus</i> sp.
322.2	537.5	<i>Ostrea</i> sp.
348.2	511.5	<i>Inoceramus</i> sp.
364.8	494.9	<i>Baculites</i> aff. <i>B. codyensis</i> Reeside.
365.0	494.7	<i>Inoceramus</i> sp.
372.4	487.3	<i>Ostrea</i> ? sp.
372.8	486.9	<i>Inoceramus</i> sp.
Upper Carlile equivalent, 320.0 to 482.7 feet above base of Mancos Shale		
377.0	482.7	<i>Inoceramus</i> sp.
379.8	479.9	<i>Inoceramus</i> fibers.
383.0	476.7	<i>Inoceramus</i> sp.
384.3	475.4	<i>Scaphites</i> sp.
384.5	475.2	Fish scale.
390.1	469.6	Do.
390.6	469.1	<i>Baculites</i> sp.
391.0	468.7	Do.
394.0	465.3	<i>Inoceramus</i> sp.
394.7	465.0	Fish scale.
396.7	463.0	<i>Inoceramus</i> sp., fish scale.
399.5	460.2	<i>Baculites</i> sp.
412.0	447.7	<i>Inoceramus</i> sp., <i>Ostrea</i> sp., fish vertebra.
412.1	447.6	<i>Ostrea</i> sp.
413.3	446.4	<i>Ostrea</i> sp., fish bone.
413.9	445.8	<i>Inoceramus</i> aff. <i>I. perplexus</i> Whitfield.
414.3	445.4	<i>Inoceramus</i> sp.
414.5	445.2	<i>Inoceramus</i> aff. <i>I. fragilis</i> Hall and Meek.
415.0	444.7	<i>Inoceramus</i> sp., <i>Baculites</i> sp.
415.6	444.1	Do.
416.6	443.1	Do.
419.3	440.4	Do.
421.8	437.9	<i>Inoceramus</i> sp.
427.0	432.7	<i>Inoceramus fragilis</i> Hall and Meek.
427.5	432.2	<i>Inoceramus</i> sp.
428.6	431.1	Do.
428.8	430.9	<i>Inoceramus</i> aff. <i>I. perplexus</i> Whitfield.
428.9	430.8	<i>Inoceramus</i> sp.
429.5	430.2	<i>Scaphites whitfieldi</i> Cobban.
429.9	429.8	<i>Inoceramus</i> sp.
430.0	429.7	<i>Scaphites whitfieldi</i> Cobban
430.3	429.4	Pyritized larval ammonites, possibly <i>Scaphites</i> , fish scale.
430.4	429.3	<i>Inoceramus</i> sp., <i>Scaphites</i> sp.
431.0	428.7	Fish scales.
431.5	428.2	Plates of a lepidid barnacle, fish scales.
432.7	427.0	<i>Inoceramus</i> sp., <i>Scaphites</i> sp., plates of a lepidid barnacle, fish scales.
433.0	426.7	Fish scales.
433.2	426.5	<i>Scaphites whitfieldi</i> Cobban.
433.6	426.1	<i>Inoceramus</i> aff. <i>I. fragilis</i> Hall and Meek.
435.5	424.2	<i>Inoceramus</i> aff. <i>I. deformis</i> Meek.
436.4	423.3	<i>Inoceramus</i> fibers, <i>Ostrea congesta</i> Conrad.
437.0	423.0	<i>Ostrea congesta</i> Conrad, fish scale.
437.1	422.9	<i>Ostrea congesta</i> Conrad, fish scale
437.2	422.8	(<i>Hypsonotus granulosus</i> Cockerell?)

Table 1.--Fossils in core from diamond drill hole DVR-1
Continued

Sample No.	Distance (feet) above base of Mancos Shale	Fossils
DVR-1-		
Lower Niobrara equivalent, 486.9 to 634.1 feet above base of Mancos Shale:		
225.6	634.1	<i>Inoceramus</i> sp., <i>Ostrea congesta</i> Conrad.
226.0	633.7	<i>Ostrea congesta</i> Conrad, fish bone.
227.0	632.7	<i>Inoceramus</i> sp.
227.7	632.0	Do.
229.7	630.0	Do.
230.4	629.3	Do.
232.0	627.7	Do.
232.1	627.6	Do.
232.2	627.5	Do.
232.3	627.4	Do.
232.3-	627.4-	Do.
232.8	626.9	
232.9	626.8	Do.
233.0	626.7	Do.
233.1	626.6	<i>Inoceramus</i> sp., <i>Ostrea congesta</i> Conrad.
233.2	626.5	<i>Ostrea congesta</i> Conrad.
235.2	624.5	<i>Anisomya</i> n. sp. (see also 148.5, 175.0, 178.4).
236.0	623.7	<i>Inoceramus</i> sp.
236.1	623.6	<i>Inoceramus</i> sp., <i>Ostrea congesta</i> Conrad.
236.1-	623.6-	<i>Inoceramus</i> sp.
236.6	623.1	
238.0-	621.7-	<i>Inoceramus</i> sp., <i>Ostrea congesta</i> Conrad.
238.5	621.2	
238.6	621.1	<i>Inoceramus</i> fibers, <i>Ostrea congesta</i> Conrad, large fish scale.
245.5	614.2	<i>Ostrea congesta</i> Conrad.
252.4	607.3	Do.
252.5	607.2	<i>Inoceramus</i> aff. <i>I. deformis</i> Meek.
252.6	607.1	Undetermined fragment of fossil.
256.2	603.5	<i>Inoceramus</i> sp., <i>Ostrea</i> sp.
256.3	603.4	<i>Inoceramus</i> sp.
256.4-	603.3-	Do.
256.6	603.1	
256.8	602.9	<i>Ostrea</i> sp., centrum of fish vertebra.
258.7	601.0	<i>Ostrea congesta</i> Conrad, fish scale.
258.8	600.3	Fish scales.
266.0	593.7	<i>Inoceramus</i> fibers, <i>Ostrea</i> sp.
288.1	571.6	<i>Inoceramus</i> sp.
289.1	570.6	<i>Ostrea</i> sp. Surface with much glauconite.
293.5	566.2	<i>Ostrea</i> sp., fish scales.
294.6	565.1	Gastropod fragments, fish scales.
294.7	565.0	<i>Inoceramus</i> sp., <i>Pteria gastropodes</i> (Meek).
301.2	558.5	<i>Inoceramus</i> sp.
322.2	537.5	<i>Ostrea</i> sp.
348.2	511.5	<i>Inoceramus</i> sp.
364.8	494.9	<i>Baculites</i> aff. <i>B. cadyensis</i> Reeside.
365.0	494.7	<i>Inoceramus</i> sp.
372.4	487.3	<i>Ostrea?</i> sp.
372.8	486.9	<i>Inoceramus</i> sp.
Upper Carlile equivalent, 320.0 to 482.7 feet above base of Mancos Shale		
377.0	482.7	<i>Inoceramus</i> sp.
379.8	479.9	<i>Inoceramus</i> fibers.
383.0	476.7	<i>Inoceramus</i> sp.
384.3	475.4	<i>Scaphites</i> sp.
384.5	475.2	Fish scale.
390.1	469.6	Do.
390.6	469.1	<i>Baculites</i> sp.
391.0	468.7	Do.
394.0	465.3	<i>Inoceramus</i> sp.
394.7	465.0	Fish scale.
396.7	463.0	<i>Inoceramus</i> sp., fish scale.
399.5	460.2	<i>Baculites</i> sp.
412.0	447.7	<i>Inoceramus</i> sp., <i>Ostrea</i> sp., fish vertebra.
412.1	447.6	<i>Ostrea</i> sp.
413.3	446.4	<i>Ostrea</i> sp., fish bone.
413.9	445.8	<i>Inoceramus</i> aff. <i>I. perplexus</i> Whitfield.
414.3	445.4	<i>Inoceramus</i> sp.
414.5	445.2	<i>Inoceramus</i> aff. <i>I. fragilis</i> Hall and Meek.
415.0	444.7	<i>Inoceramus</i> sp., <i>Baculites</i> sp.
415.6	444.1	Do.
416.6	443.1	Do.
419.3	440.4	Do.
421.8	437.9	<i>Inoceramus</i> sp.
427.0	432.7	<i>Inoceramus fragilis</i> Hall and Meek.
427.5	432.2	<i>Inoceramus</i> sp.
428.6	431.1	Do.
428.8	430.9	<i>Inoceramus</i> aff. <i>I. perplexus</i> Whitfield.
428.9	430.8	<i>Inoceramus</i> sp.
429.5	430.2	<i>Scaphites whitfieldi</i> Cobban.
429.9	429.8	<i>Inoceramus</i> sp.
430.0	429.7	<i>Scaphites whitfieldi</i> Cobban
430.3	429.4	Pyritized larval ammonites, possibly <i>Scaphites</i> , fish scale.
430.4	429.3	<i>Inoceramus</i> sp., <i>Scaphites</i> sp.
431.0	428.7	Fish scales.
431.5	428.2	Plates of a lepadid barnacle, fish scales.
432.7	427.0	<i>Inoceramus</i> sp., <i>Scaphites</i> sp., plates of a lepadid barnacle, fish scales.
433.0	426.7	Fish scales.
433.2	426.5	<i>Scaphites whitfieldi</i> Cobban.
433.6	426.1	<i>Inoceramus</i> aff. <i>I. fragilis</i> Hall and Meek.
435.5	424.2	<i>Inoceramus</i> sp.
436.4	423.3	<i>Inoceramus</i> aff. <i>I. dimidius</i> White.