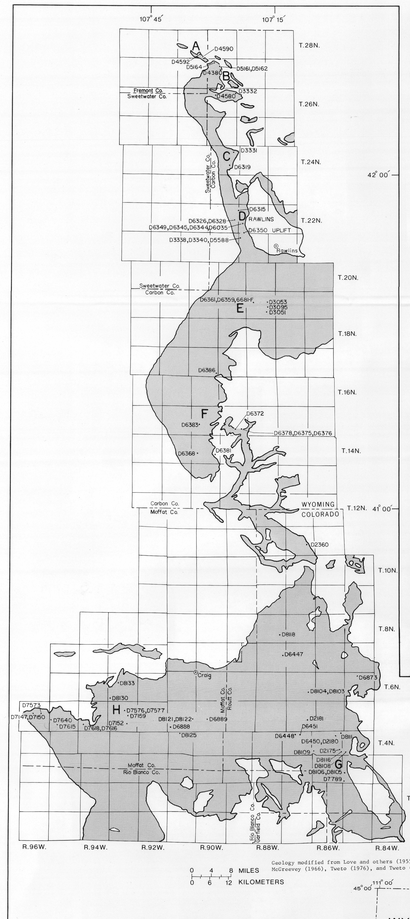
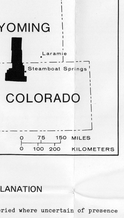
DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

PREPARED IN COOPERATION WITH THE U.S. DEPARTMENT OF ENERGY

MISCELLANEOUS FIELD STUDIES
MAP MF-1548





INDEX MAP OF NORTHWESTERN COLORADO AND SOUTH-CENTRAL WYOMING SHOWING OUTCROPS OF UPPER CRETACEOUS ROCKS (STIPPLED AREA) AND MESOZOIC FOSSIL LOCALITIES

Geology modified from Love and others (1955), Welder and McGreevey (1966), Tweto (1976), and Tweto (1979)

0 4 8 MILES
0 6 12 KILOMETERS

METHODS

This chart depicts the time-stratigraphic relations of some Upper Cretaceous rocks along the eastern and southeastern margins of the Greater Green River Basin, south-central Wyoming and northwestern Colorado. The purpose of this report is to release a preferred set of correlations based upon marine mollusk biostratigraphy. The senior author, with the help of R. K. Love, has acquired, synthesized, compiled, and interpreted data from various sources. These include selected published documents (see "References Cited") and unpublished reports of fossil identifications by W. A. Cobban who examined collections made by the late J. R. Gill. Numerous measured sections of Gill's were also utilized. It must be emphasized that all interpretations on this chart are based on information obtained from these sources and the senior author has yet to substantiate these observations in the field. Not all data from the area of this study is included herein because it is either repetitive in nature or its reliability is uncertain. This uncertainty is due to the ambiguity inherent in both fossil identification and stratigraphic interpretation. Questionable unpublished material has been omitted while published data which is inconsistent with the senior author's correlations may be found in the footnote portion of this report. The rock units are assigned to a range of ammonites that have been related to an absolute time scale. The ammonite zonation and age boundaries are adapted from Obradovich and Cobban (1975). "D" numbers are provided for each geographic locality where fossils were collected and described by personnel of the U.S. Geological Survey. These fossils may be accessed at the offices of the Survey in Lakewood, Colorado.

EXPLANATION

UNCONFORMITY—Queried where uncertain of presence

MISSING SECTION

CORRELATION LINE—Queried where uncertain

26319 U.S. Geological Survey Mesozoic locality (Denver catalog)

Numbers 01-08 are localities from published data and may or may not represent U.S. Geological Survey Mesozoic localities

25588* Indicates a closely comparable species such as *Baculites* cf. *B. olivaeformis*—The age of these forms has not been made known to the senior author but it is assumed that the age would be near that of the species for which it is listed.

Note: These symbols (-26319 or -01) indicate the occurrence of the listed fossil or other species of the same age and the approximate stratigraphic position from which they were collected. Because the precise position of the boundary between zone fossils is uncertain, arbitrary boundaries have been selected. These lines define the approximate range of each ammonite. Fossil localities shown in the various columns, marked A - H, are illustrated directly opposite the range for which they correspond. Additionally, the fossil site and its associated ammonite(s) are also given in the list of fossil localities.

[1] From Obradovich and Cobban (1975), format modified after J. D. Fouch.
[2] Modified from Reynolds (1966, p. B72) and Reynolds (1976, pp. 19 and 20).
[3] Gill and others (1970, p. 8) report *Baculites* sp. (weak flank ribs) and *Baculites obtusus* from the middle of the Haystack Mountains Formation west of Rawlins, Wyoming.
[4] The Deep Creek Sandstone Member of the Haystack Mountains Formation and Espy Tongue of the Steele Shale as herein adopted by the U.S. Geological Survey.
[5] Hale (1961, p. 130, 132, and 136) reports *Baculites asperiformis* from 327 ft (99.7 m) below the Deep Creek Sandstone Member in sec. 12, T. 19 N., R. 88 W. and *Baculites* cf. *B. grandis* 110 ft (33.5 m) below top of Lewis Shale in the SW/4 sec. 24, T. 19 N., R. 90 W. Hale, also reports the following faunal zones for eastern Washakie Basin rocks:
1. Dad Sandstone Member - *Baculites elinobatus* and younger
2. Hatfield Sandstone Member - *Baculites scotti* - *Baculites gregoryensis*
3. Espy Tongue of the Steele Shale - *Baculites* aff. *asperiformis*
4. Deep Creek Sandstone Member - late *Baculites asperiformis*
[6] For Hale (1961).
[7] Modified from Gill and others (1973, p. 25).
[8] In northwestern Colorado, this unit may be locally referred to as the Fox Hills Sandstone.
[9] For Kucera (1959).
[10] For Bass and others (1955).
[11] Kiteley (1981, p. II-5) reports the following faunal zones for rocks in northwestern Colorado:
1. Unnamed sandstone - *Baculites asperiformis*
2. Korapos Sandstone Member and Nutty Mountain sandstone* - Between *Baculites asperiformis* and *Baculites perplexus*

*1st Mancos sandstone of Kosiahi (1959) as reported by Kiteley (1981, p. II-6).

Katich (1959, p. 27) reports the following faunal zones for rocks in the Craig area:
1. Base of lewis Shale - late *Baculites eliasi*
2. Korapos Sandstone Member - *Baculites obtusus*
3. Unnamed sandy zone - Early *Scaphites hippocrepis* - Late *Desmoscaphites bassleri*

[12] For Hancock (1925).
[13] Of Kosiahi (1959).

AGE IN M.Y.	ERA	SYSTEM	SERIES	STAGE	WESTERN INTERIOR AMMONITE ZONES[1]	A RAWLINS DRAW[2]	B TULLY RANCH[2]	C SEPARATION RIM	D POINT OF ROCKS[3]	E ESPY RANCH[5]	F BIRD GULCH—WILD COW CREEK	G OAK CREEK	H WEST OF CRAIG[11]	AGE IN M.Y.
70	MESOZOIC	CRETACEOUS	UPPER CRETACEOUS	MAESTRICHTIAN (part)	*Discoscaphites roanensis*, *Hoplescaphites nicolleti*	Lance Formation (part)	Lance Formation (part)	Lance Formation (part)	Lance Formation (part)	Lance Formation (part)	Lance Formation (part)	Lance Formation (part)	Lance Formation (part)	70
					Hoplescaphites aff. *H. nicolleti*, *Sphenditoceras*(*Coahuilites*)							Fox Hills Formation[8]	Fox Hills Formation[8]	
					Baculites clinolobatus	Fox Hills Formation	Fox Hills Formation	Fox Hills Formation	Fox Hills Formation	Fox Hills Formation	Fox Hills Formation	D6447 D8118	D5 D2181	
					Baculites grandis	Lewis Shale	Lewis Shale	Lewis Shale	Lewis Shale	Lewis Shale	Lewis Shale	Lewis Shale	Lewis Shale	
					Baculites baculus	01 D4590		Dad Sandstone Member	03 D5588* D3340 D6328	Dad Sandstone Member	Dad Sandstone Member D6368,D6381		Dad Sandstone Member D8133	
					Baculites eliasi				D3338 D6326	.04	D6383,D2360	Twentymile Sandstone Member	Twentymile Sandstone Member	
					Baculites jenseni			Almond Formation	Almond Formation	Almond Formation	Almond Formation	D6450 D2180		
					Baculites reesidei			Pine Ridge Sandstone	Pine Ridge Sandstone	Pine Ridge Sandstone	Pine Ridge Sandstone	D8104		
				?	*Baculites cuneatus*		Pine Ridge Sandstone of the Mesaverde Group					D8103 Trout Creek Sandstone Member	Trout Creek Sandstone Member	
					Baculites compressus							D8111,D2173 Oak Creek sandstone[9]		
					Didymoceras chevenneense							D8116 Double ledge sandstone[10]		
					Exiteloceras jenneyi							D8109	Tow Creek Sandstone Member	
					Didymoceras stevensoni									
					Didymoceras nebrascense								Contact sandstone[12]	
					Baculites scotti							D7640	Upper Buck Tongue	
					Baculites gregoryensis							D7615		
					Baculites perplexus (late form)							D8121	Loyd Sandstone Bed	
					Baculites gilberti							D8130 D7147	Lower Buck Tongue	
					Baculites perplexus (early form)							D7572 D7150		
					Baculites sp. (smooth)							D8106	Hunt Creek sandstone[9]	
					Baculites asperiformis							D8105 D6431		
					Baculites maclearni							D7789	Devils Grave sandstone[9]	
					Baculites obtusus							D8125		
					Baculites sp. (weak flank ribs)		D3332 D4580 D4380					D6448	Morapos Sandstone Member	
					Baculites sp. (smooth)							D8108,D6873	Unnamed member	
					Scaphites hippocrepis III	D4592 D5164	Steele Shale							
					Scaphites hippocrepis II									
					Scaphites hippocrepis I	D5162 D5161								
80				SANTONIAN (part)	*Desmoscaphites bassleri*	Niobrara Formation (part)	Niobrara Formation (part)	Niobrara Formation (part)	Niobrara Formation (part)	Steele Shale (part)	Steele Shale (part)	Mancos Shale (part)	Mancos Shale (part)	80

LIST OF FOSSIL LOCALITIES

A
Rawlins Draw

01 Lewis Shale, near base. Eapp and Cobban, 1962, p. D54. *B. grandis*

D4590 North center SW1/4SW1/4 sec. 36, T. 28 N., R. 90 W. Lewis Shale, about 60 ft (18.3 m) above base. Reynolds, 1966, p. B72; Reynolds, 1968b. Collected by M. W. Reynolds. *B. baculus*

D4592 East center SW1/4SE1/4 sec. 26, T. 28 N., R. 90 W. Steele Shale, about 1100 ft (335.3 m) below top. Reynolds, 1966, p. B72; Reynolds, 1968b. Collected by M. W. Reynolds, J. R. Gill, and R. C. Givens. *S. hippocrepis* III

D5164 North edge SW1/4SE1/4SW1/4 sec. 5, T. 27 N., R. 89 W. Steele Shale, about 360 ft (91.4 m) below Cody sandstone* of Weimer and Guyton (1961). Reynolds, 1968a. Collected by M. W. Reynolds. *S. hippocrepis* III

* - Considered a unit of the Steele Shale of this report

D5162 East edge SW1/4SE1/4SW1/4 sec. 9, T. 27 N., R. 89 W. Steele Shale, about 1500 ft (457.2 m) above base. Reynolds, 1968a. Collected by M. W. Reynolds. *S. hippocrepis* I

D5161 South edge SW1/4SW1/4SE1/4 sec. 9, T. 27 N., R. 89 W. Steele Shale, about 1590 ft (411.2 m) above base. Reynolds, 1968a. Collected by M. W. Reynolds. *S. hippocrepis* I

B
Tully Ranch

D3332 SE1/4SE1/4SE1/4 sec. 1, T. 26 N., R. 89 W. Steele Shale, about 270 ft (82.3 m) below base of "Kav-1" of Weimer and Guyton (1961). Reynolds, 1966, p. B72; Reynolds, 1971. Collected by A. D. Zapp. *B. sp.* (weak flank ribs)

D4580 Center NW1/4SE1/4 sec. 8, T. 26 N., R. 89 W. Steele Shale, from limestone concretions in bentonitic unit. Reynolds, 1966, p. B72; Reynolds, 1971. Collected by J. R. Gill and R. C. Givens. *B. sp.* (weak flank ribs)

D4380 SW1/4SE1/4SE1/4SE 1/4 sec. 16, T. 27 N., R. 89 W. Steele Shale, from tan silty concretions about 200 ft (61 m) below prominent sandstone. Reynolds, 1966, p. B72; Reynolds, 1968a. Collected by M. W. Reynolds, J. R. Gill, and W. A. Cobban. *B. sp.* (smooth)

C
Separation Rim

D6319 Center SW1/4SW1/4 sec. 23, T. 24 N., R. 89 W. Basal sandstone of Mesaverde Formation*. Collected by J. R. Gill. *B. maclearni*

* - Unnamed sandstone of Haystack Mountains Formation of this report

D3331 Center NW1/4SW1/4 sec. 11, T. 24 N., R. 89 W. Above lowest sandstone in Steele-Mesaverde transition and about 1000 ft (304.8 m) above CO-21. Reynolds, 1966, p. B72. Collected by A. D. Zapp. *B. obtusus*

02 From the Steele Shale. Reynolds, 1976, p. 17. *B. sp.* (smooth)

D
Point of Rocks

03 From the Fox Hills Formation. Gill and others, 1970, p. 6. *B. clinolobatus*

D5588 SW1/2SW1/4 sec. 6, T. 21 N., R. 88 W. Lewis Shale, about 410 ft (125 m) below top. Gill and others, 1970, p. 40; Gill, 1974. Collected by J. R. Gill and J. Reinkind. *B. clinolobatus*

D3340 SW1/4SW1/4SW1/4 sec. 7, T. 21 N., R. 88 W. Lewis Shale, upper part, 1750 ft (533.4 m) above base. Collected by A. D. Zapp. *B. clinolobatus*

D6328 NE1/4SE1/4 sec. 23, T. 22 N., R. 89 W. Steele Shale, 1320 ft (402.3 m) above base. 270 ft (82.3 m) above base of Dad Sandstone Member. Gill and others, 1970, p. 41. Collected by J. R. Gill. *B. grandis*

D3338 SE1/4SW1/4 sec. 6, T. 21 N., R. 88 W. Lewis Shale, about 100 ft (30.5 m) above base. Reynolds, 1966, p. B72. Collected by R. A. Tourtelot. *B. eliasi*

D6326 SW1/4SW1/4 sec. 13, T. 22 N., R. 89 W. Lewis Shale, 50 ft (15.2 m) above base. Gill and others, 1970, p. 41. Collected by J. R. Gill. *B. eliasi*

D6350 SE1/4 sec. 31, T. 22 N., R. 88 W. Steele Shale, from limestone concretions 370 ft (112.8 m) below base of Deep Creek Sandstone Member. Gill, 1974. Collected by J. R. Gill. *B. obtusus*

D6315 Center NE1/4 sec. 12, T. 22 N., R. 89 W. Steele Shale, 470 ft (143.2 m) below base of Deep Creek Sandstone Member. Gill, 1974. Collected by J. R. Gill and G. A. Bergman. *B. obtusus*

D6349 SW1/4SW1/4SE 1/4 sec. 19, T. 22 N., R. 88 W. Steele Shale, from thin bedded sandstone, about 570 ft (173.7 m) below base of Deep Creek Sandstone Member. Gill, 1974. Collected by J. R. Gill. *B. sp.* (weak flank ribs)

D6345 SW1/4SE1/4 sec. 19, T. 22 N., R. 88 W. Steele Shale, from reddish ironstone concretions about 1710 ft (521.2 m) below base of Deep Creek Sandstone Member and about 50 ft (15.2 m) above D6344. Gill, 1974. Collected by J. R. Gill. *B. sp.* (weak flank ribs)

D6344 Same locality as D6345. Steele Shale, from yellowish limestone concretions 1760 ft (536.4 m) below base of Deep Creek Sandstone Member and 340 ft (103.6 m) above D6035. Gill, 1974. Collected by J. R. Gill. *B. sp.* (smooth)

D6035 NE1/4SE1/4SE1/4 sec. 19, T. 22 N., R. 88 W. Steele Shale, from glauconitic sandstone 2100 ft (640.1 m) below base of Deep Creek Sandstone Member. Gill, 1974. Collected by J. R. Gill and G. A. Bergman. *S. hippocrepis* III

D6375 SE1/4NE1/4SE 1/4 sec. 26, T. 15 N., R. 89 W. Steele Shale, 1470 ft (448.1 m) below base of Allen Ridge Formation and about 510 ft (155.4 m) below base of Deep Creek Sandstone Member. Gill, 1974. Collected by J. R. Gill. *S. sp.* (weak flank ribs)

D6376 Same locality as D6375. Steele Shale, 1540 ft (469.4 m) below base of Allen Ridge Formation and about 580 ft (176.8 m) below base of Deep Creek Sandstone Member. Gill, 1974. Collected by J. R. Gill. *S. sp.* (smooth)

G
Oak Creek

D6447 SE1/4NW1/4SW1/4 sec. 13, T. 7 N., R. 88 W. Lewis Shale, 875 ft (266.7 m) below top. Collected by J. R. Gill, R. E. Burkholder, and W. A. Cobban. *Sphenodiscus* (*Coahuilites*). *S. clinolobatus*

D8118 Center NE1/4 sec. 26, T. 8 N., R. 88 W. Lewis Shale, from high in formation. Collected by J. R. Gill and T. B. McHargue. *B. clinolobatus*

05 Lewis Shale, near base. Eapp and Cobban, 1960, p. D247. *B. grandis*

D2181 SW1/4 sec. 23, T. 5 N., R. 87 W. Lewis Shale, from ferrocalcareous concretions near base. Collected by A. D. Zapp and W. A. Cobban. *B. grandis*

D6450 Same locality as D2180. Williams Fork Formation, from siltstone concretions higher in the shale unit above D2180. Collected by J. R. Gill, R. E. Burkholder, and W. A. Cobban. *B. reesidei*

D2180 SW1/4SW1/4 sec. 14, T. 4 N., R. 86 W. Williams Fork Formation, from limestone concretions in dark shale below Twentymile Sandstone Member and about 300 ft (91.4 m) above top of Iles Formation. Collected by W. A. Cobba . *B. reesidei*

D8104 Same locality as D8103. Iles Formation, 25 ft (7.6 m) above base of Trout Creek Sandstone Member. Collected by J. R. Gill and T. B. McHargue. *B. obsequmenus*, *E. jenneyi*

D8103 NW1/4SE1/4SW1/4 sec. 26, T. 6 N., R. 87 W. Iles Formation, 15 ft (4.6 m) below base of Trout Creek Sandstone Member. Collected by J. R. Gill and T. B. McHargue. *B. obsequmenus*, *E. jenneyi*

D8111 NE1/4SE1/4SE1/4 sec. 12, T. 4 N., R. 86 W. Iles Formation, from ferruginous concretions at top of 10 ft (3 m) glauconitic sandstone about 15 ft (4.6 m) above Oak Creek sandstone. Collected by J. R. Gill and T. B. McHargue. *E. jenneyi*

D2173 Center SE1/2 sec. 25, T. 4 N., R. 86 W. Iles Formation, from hard limestone concretions about 600 ft (182.9 m) below top; from basal part of marine shale sequence below Trout Creek Sandstone Member. Collected by A. D. Zapp and W. A. Cobban. *E. jenneyi*

D8116 NW1/4SE1/4SE1/4 sec. 36, T. 4 N., R. 86 W. Iles Formation, from top of upper sandstone bed of Oak Creek sandstone. Collected by J. R. Gill and T. B. McHargue. *E. jenneyi*

D8109 NE1/4SW1/4 sec. 31, T. 4 N., R. 86 W. Iles Formation, 25 ft (7.6 m) below Double ledge sandstone. Collected by J. R. Gill and T. B. McHargue. *D. nebrascense*

D8106 Same locality as D8105. Mancos Shale, 35 ft (10.7 m) above base of basal Hunt Creek sandstone. Collected by J. R. Gill and T. B. McHargue. *B. perplexe* (early form)

D8105 SE1/4SE1/4SW1/4 sec. 19, T. 3 N., R. 85 W. Mancos Shale, 40 ft (12.2 m) below base of lowest sandstone bed of Hunt Creek sandstone. Collected by J. R. Gill and T. B. McHargue. *B. perplexe* (early form)

D6451 Center SW1/4SE1/4 sec. 10, T. 4 N., R. 87 W. Mancos Shale, about 250 ft (76.2 m) below lowest prominent sandstone. Collected by J. R. Gill. *B. perplexe* (early form)

D7789 SE1/2 sec. 31, T. 3 N., R. 85 W. Mancos Shale, from a single sandstone concretion from either top of Devils Grave sandstone or base of Morapos. Collected by J. R. Gill and F. J. James. *B. asperiformis*

D6448 SW1/4SE1/4SW1/4 sec. 9, T. 4 N., R. 87 W. Mancos Shale, from a septarian limestone concretion. Collected by J. R. Gill. *B. maclearni*

D8108 SW1/4SE1/4SE1/4 sec. 31, T. 4 N., R. 85 W. Mancos Shale, from unnamed member. Collected by J. R. Gill and T. B. McHargue. *B. obtusus*

D6873 Highway 40, 6.7 mi west of Steamboat Springs, Colo-Rancos Shale, from hard black shale unit. Collected by J. R. Gill and J. C. Brown. *B. obtusus*

E
Espy Ranch

04 Lewis Shale, near base. Eapp and Cobban, 1962, p. D54. *B. eliasi*

D6361 Center sec. 17, T. 19 N., R. 88 W. Haystack Mountains Formation, about 200 ft (61 m) above base of Deep Creek Sandstone Member. Gill and others, 1970, p. 20. Collected by J. R. Gill. *B. asperiformis*

D6359 Same locality as D6361. Steele Shale, 325 ft (99.1 m) below base of Deep Creek Sandstone Member. Gill and others, 1970, p. 20. Collected by J. R. Gill and G. A. Bergman. *B. obtusus*

6681-F NE1/4SW1/4SE1/4 sec. 17, T. 19 N., R. 88 W. Steele Shale, upper part. Collected by F. J. G. Barcrel and J. W. Bader. *B. sp.* (weak flank ribs)

D3053 SW1/4 sec. 14, T. 19 N., R. 88 W. Steele Shale, from a limestone concretion layer 2320 ft (710.8 m) below top. Gill and others, 1970, p. 11; Smith, 1965, p. 22. *S. hippocrepis* I

D3095 Center S1/2 sec. 23, T. 19 N., R. 88 W. Steele Shale, from a limestone concretion layer 2747 ft (837.3 m) below top. Gill and others, 1970, p. 11; Smith, 1965, p. 22-23. *S. hippocrepis* I

D3051 SW1/4 sec. 26, T. 19 N., R. 88 W. Steele Shale, from clayey limestone concretions layer 2565 ft (1086.6 m) below top. Gill and others, 1970, p. 11; Smith, 1965, p. 22. *D. baseleri*

F
Bird Gulch-Wild Cow Creek

D6368 SW1/4SE1/4SW1/4 sec. 20, T. 14 N., R. 90 W. Lewis Shale, 20 ft (6.1 m) below a 1-ft (0.3 m) bentonite bed separated from a 1.5 ft (0.46 m) bentonite bed by 4 ft (1.4 m) of shale. Collected by J. R. Gill. *B. grandis*

D6381 SW1/4SW1/4SW1/4 sec. 25, T. 14 N., R. 90 W. Lewis Shale, from slump block. Collected by J. R. Gill. *B. grandis*

D6383 SW1/4SW1/4SE1/4 sec. 20, T. 15 N., R. 90 W. Lewis Shale, in lower part, about 50 ft (15.2 m) above lowest sandstone. Gill, 1974. Collected by J. R. Gill and G. A. Bergman. *B. eliasi*

D2360 Sec. 23, T. 11 N., R. 87 W. (Little Snake River). Lewis Shale, basal part. Collected by A. D. Zapp. *B. eliasi*

D6372 SE1/4SE1/4SW1/4 sec. 27, T. 15 N., R. 89 W. Haystack Mountains Formation, 620 ft (189 m) below base of Allen Ridge Formation and about 215 ft (65.5 m) above top of Deep Creek Sandstone Member. Gill, 1974. Collected by J. R. Gill and G. A. Bergman. *B. maclearni*

D6386 Center NE1/4 sec. 36, T. 17 N., R. 90 W. Steele Shale, from below the Deep Creek Sandstone Member. Collected by J. R. Gill and G. A. Bergman. *B. obtusus*

D6378 NE1/4SW1/4SE1/4 sec. 26, T. 15 N., R. 89 W. Steele Shale, 1280 ft (390.1 m) below base of Allen Ridge Formation and about 370 ft (100.6 m) below base of Deep Creek Sandstone Member. Gill, 1974. Collected by J. R. Gill. *B. sp.* (weak flank ribs)

H
West of Craig

06 Fox Hills Formation, about 170 ft (51.8 m) above base. Dorf, 1942, p. 21. *Sphenodiscus* (*Coahuilites*)

D8133 SW1/4SW1/4SW1/4 sec. 9, T. 6 N., R. 93 W. Lewis Shale, from lower part of Dad Sandstone Member. Collected by J. R. Gill and T. B. McHargue. *B. grandis*

D7640 SW1/4 sec. 19, T. 5 N., R. 95 W. Mancos Shale, about 360 ft (109.7 m) below base of nonmarine beds and above the Loyd Sandstone Bed. Gill and Hail, 1975. Collected by J. R. Gill. *B. perplexus* (late form)

D7615 SW1/4SW1/4SW1/4 sec. 29, T. 5 N., R. 95 W. Mancos Shale, from 1-ft (.3 m) sandstone bed with ironstone nodules 5 ft (1.5 m) above base of upper part of Buck Tongue. Collected by J. R. Gill. *B. perplexus* (late form)

D8121 SW1/4SE1/4SW1/4 sec. 24, T. 5 N., R. 91 W. Loyd Sandstone Bed, from upper 10 ft (3 m). Collected by J. R. Gill and T. B. McHargue. *B. perplexus* (late form)

D8130 NE1/4SE1/4SW1/4 sec. 31, T. 6 N., R. 93 W. Mancos Shale, from middle and basal part of Loyd Sandstone Bed. Collected by J. R. Gill and T. B. McHargue. *B. perplexus* (late form)

D7147 SE1/4SE1/4 sec. 16, T. 5 N., R. 96 W. Mancos Shale, from lower part of Loyd Sandstone Bed. Collected by J. R. Gill, L. F. Blanchard, and G. N. Pipiringos. *B. gilberti*

D7577 SE1/4SW1/4 sec. 10, T. 5 N., R. 93 W. Mancos Shale, from orange-weathering limestone concretions above first ledge-forming sandstone and below Loyd Sandstone Bed. Gill and Hail, 1975. Collected by J. R. Gill. *B. perplexus* (early form)

D7150 Same locality as D7147. Mancos Shale, from middle of Buck Tongue about 250 ft (70.1 m) below base of Loyd Sandstone Bed. Collected by J. R. Gill and others. *B. perplexus* (early form)

D6888 NE1/4 sec. 31, T. 5 N., R. 91 W. Mancos Shale, from second sandstone* above Korapos Sandstone Member and 195 ft (59.4 m) below base of Loyd Sandstone Bed. Collected by J. R. Gill, G. A. Izett, and W. A. Cobban. *B. perplexus* (early form)

* - 1st Kancos sandstone of this report

D7576 Same locality as D7577. Mancos Shale, from very sandy shale about 350 ft (106.7 m) below base of Loyd Sandstone Bed. Gill and Hail, 1975. Collected by J. R. Gill. *B. asperiformis*

D7159 SW1/4SW1/4 sec. 14, T. 5 N., R. 93 W. Mancos Shale, about 560 ft (170.7 m) below base of Loyd Sandstone Bed. Gill and Hail, 1975. Collected by J. R. Gill, G. N. Pipiringos, and L. F. Blanchard. *B. asperiformis*

D6889 NE1/4SW1/4 sec. 21, T. 5 N., R. 90 W. Mancos Shale, from sandstone number 1*, about 660 ft (201.2 m) below base of Loyd Sandstone Bed and above the Korapos Sandstone Member. Collected by J. R. Gill, G. A. Izett, and W. A. Cobban. *B. asperiformis*

* - 2nd Kancos sandstone of this report

07 From just below 2nd Kancos sandstone. Eapp and Cobban, 1960, p. B247. *B. asperiformis*

D8125 Center S1/2SW1/4 sec. 10, T. 4 N., R. 91 W. Mancos Shale, above Korapos Sandstone Member. Collected by J. R. Gill. *B. maclearni*

08 From the Korapos Sandstone Member. Eapp and Cobban, 1960, p. B247. *B. maclearni*

D8122 SW1/4SE1/4SW1/4 sec. 24, T. 5 N., R. 91 W. Mancos Shale, from tepee-butte limestone, 50 ft (15.2 m) below Korapos Sandstone Member. Collected by J. R. Gill and T. B. McHargue. *B. maclearni*

D7152 SW1/4 sec. 26, T. 5 N., R. 93 W. Mancos Shale, about 225 ft (68.6 m) below base of Korapos Sandstone Member. Collected by J. R. Gill and G. N. Pipiringos. *B. maclearni*

D7616 SW1/4SW1/4SW1/4 sec. 29, T. 5 N., R. 94 W. Mancos Shale, about 1450 ft (426.7 m) below base of Iles Formation. Collected by J. R. Gill and C. Eiriksson. *B. obtusus*

D7618 SE1/4SW1/4SW1/4 sec. 29, T. 5 N., R. 94 W. Mancos Shale, from base of thick unit of interlaminated sandstone and shale about 1700 ft (518.2 m) below base of Iles Formation. Collected by J. R. Gill and C. Eiriksson. *B. sp.* (weak flank ribs)

D7573 SE1/4SW 1/4SW1/4 sec. 14, T. 5 N., R. 96 W. Mancos Shale, from unit of sandy shale and thin sandstone about 1000 ft (304.8 m) below top. Collected by J. R. Gill and C. Eiriksson. *S. hippocrepis* III

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