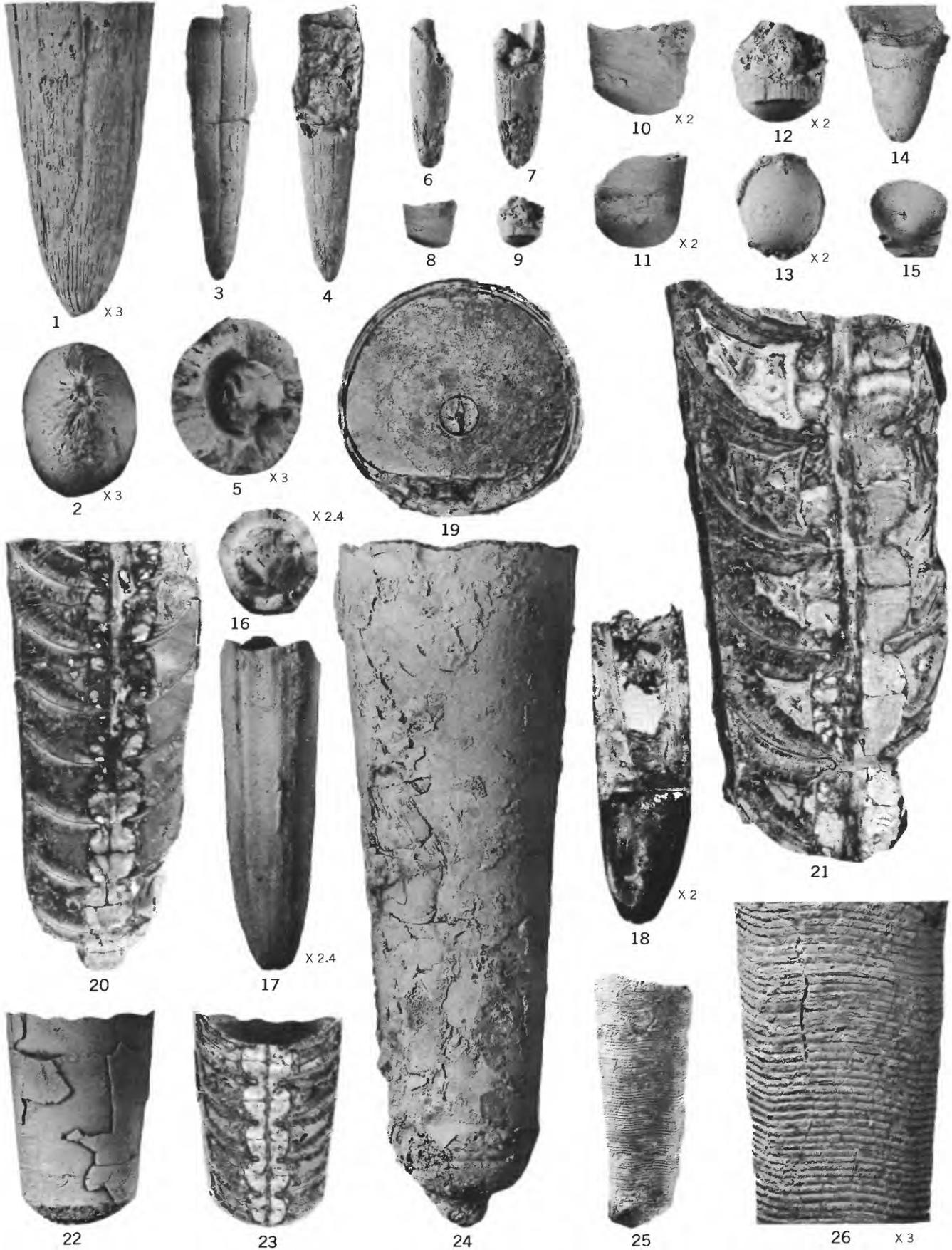


Carboniferous Cephalopods of Arkansas

GEOLOGICAL SURVEY PROFESSIONAL PAPER 460





BELEMNITES: *HEMATITES*, *BACRITIMIMUS*, AND *PALEOCONUS* AND NAUTILOIDS: *DENTOCERAS* AND *RAYONNOCERAS*

PLATE 2

[All figures natural size]

FIGURE 1. *Rayonnoceras? eccentricum* Gordon, n. sp. (p. 100).

Longitudinal section (ventrodorsal) showing septa and siphuncle with nummuloidal connecting rings, USNM 119011, from USGS loc. 15297, Pitkin limestone near top.

2. *Rayonnoceras* sp. (p. 99).

Longitudinal section showing siphuncle and endosiphuncle, septa, distorted on crushed side, and cameral deposits, USNM 120200, from USGS loc. 17694, Ruddell shale.

3. *Rayonnoceras cadyi* Croneis (p. 94).

Longitudinal section showing siphuncle, somewhat distorted septa, and cameral deposits of the holotype, MCZ 2337, Fayetteville shale.

4-7. *Rayonnoceras fayettevillense* Croneis (p. 95).

4. Longitudinal section (ventrodorsal) of the holotype, MCZ 2331, Fayetteville shale.

5. Longitudinal section (ventrodorsal) of another specimen at a slightly earlier stage, USNM 118999, from USGS loc. 5568, Fayetteville shale.

6. Transverse section of another specimen, USNM 118999, from the same locality and horizon as the last.

7. Exfoliated very young specimen showing siphuncle, septa and cameral deposits, USNM 118999, from the same locality and horizon as the last.

8, 9. *Rayonnoceras solidiforme* Croneis (p. 97).

8. Dorsal view of part of the phragmacone of the holotype, MCZ 2334, showing a repaired break in the shell, Fayetteville, shale.

9. Longitudinal section (ventrodorsal) of another part of the phragmacone of the holotype, MCZ 2330.



ORTHOCONIC NAUTILOIDS: *RAYONNOCERAS*

PLATE 3

[All figures natural size except as indicated otherwise on plate]

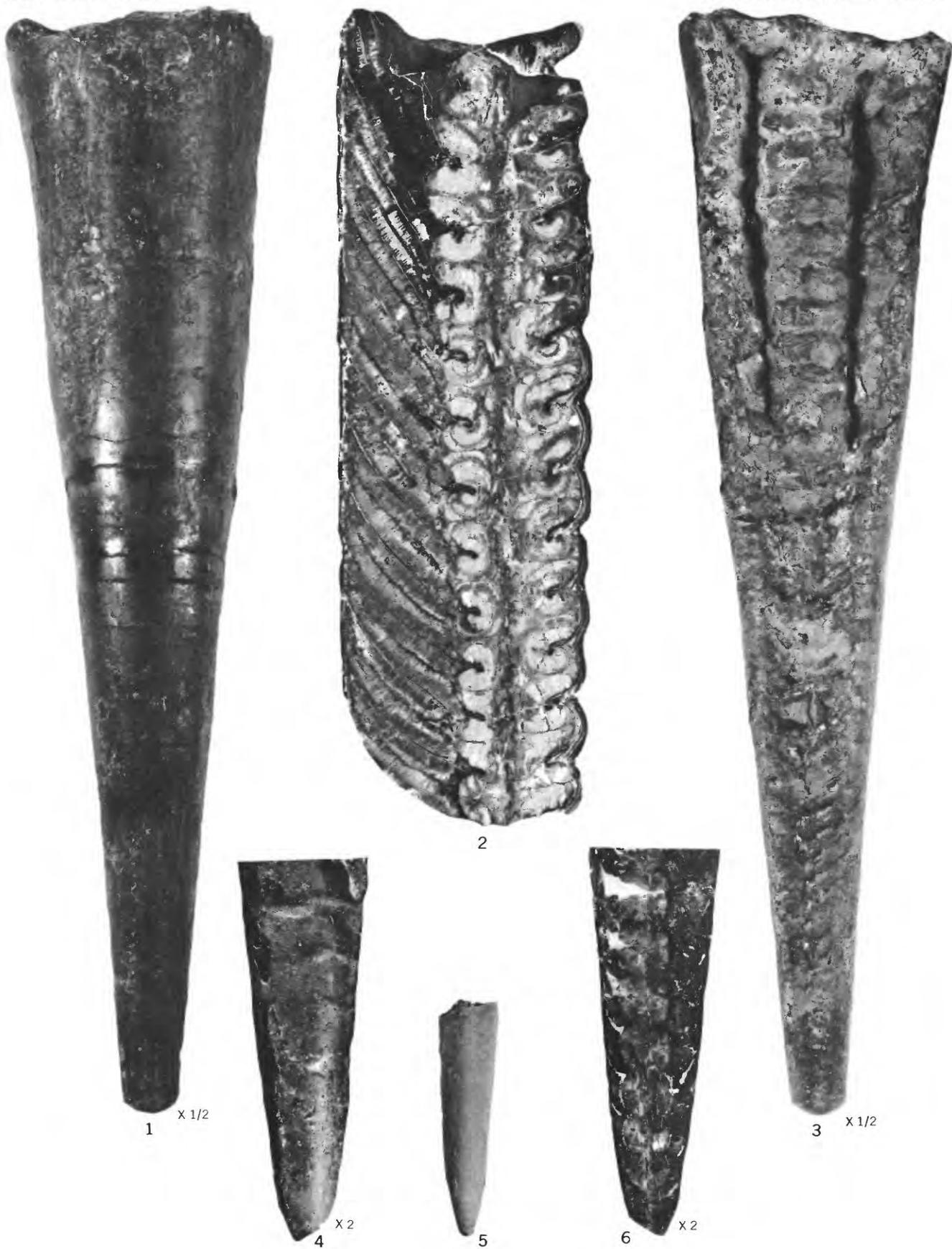
FIGURES 1-3. *Rayonnoceras solidiforme* Croneis (p. 97).

1, 3. Reduced dorsal and ventral views of a phragmacone partly exfoliated and crushed on the ventral side, USNM 119007, from USGS loc. 15066, Fayetteville shale.

2. Longitudinal section (ventrodorsal) of another specimen from the same locality and horizon as the last.

4-6. *Rayonnoceras fayettevillense* Croneis (p. 95).

Enlarged lateral view, ventral view, and enlarged longitudinal section (ventrodorsal) of the apical part of a phragmacone, USNM 119005, USGS loc. 1293B, Fayetteville(?) shale.



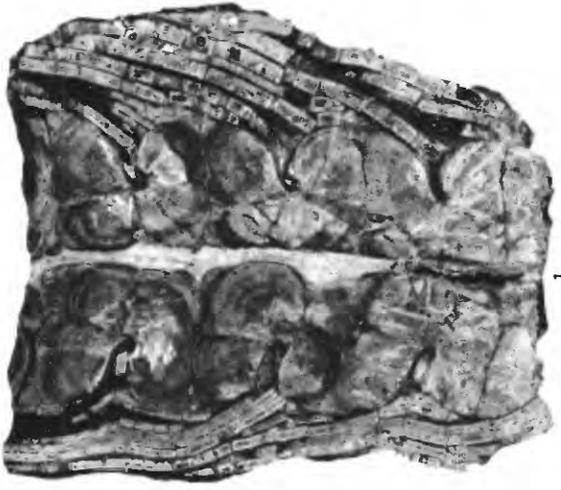
ORTHOCONIC NAUTILOIDS: *RAYONNOCERAS*

PLATE 4

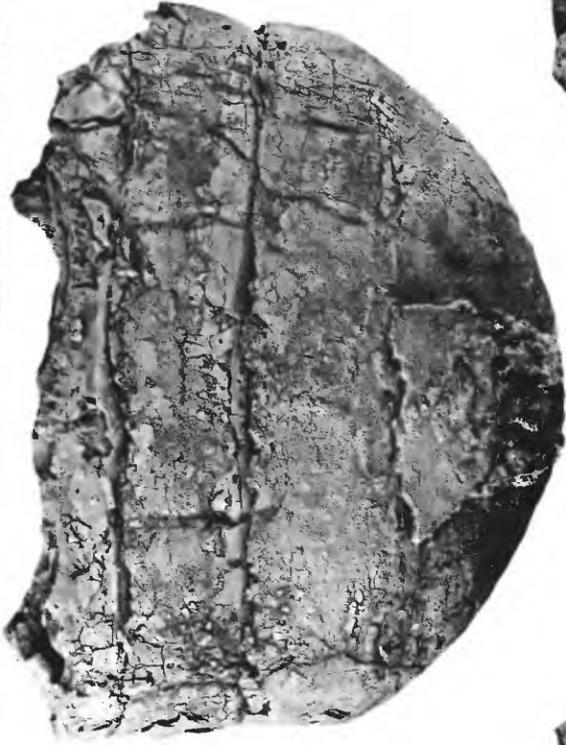
[All figures natural size]

FIGURES 1-4. *Rayonoceras vaughanianum* (Girty) (p. 98).

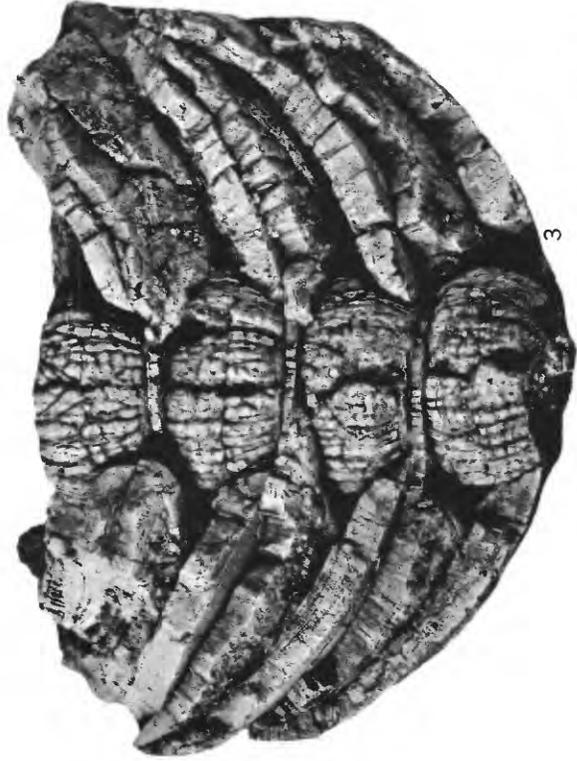
1. Longitudinal section through a crushed specimen with very weak cameral deposits, USNM 119009, from USGS loc. 15080, Caney shale.
- 2, 3. View showing siphuncle, septa, and cameral deposits, and external view of another specimen, USNM 82221 (the holotype of *R. girtyi* Foerste and Teichert), Caney shale, Oklahoma.
4. View showing siphuncle, septa, and cameral deposits of part of the holotype, USNM 119577, from USGS loc. 2080, Caney shale, Oklahoma.



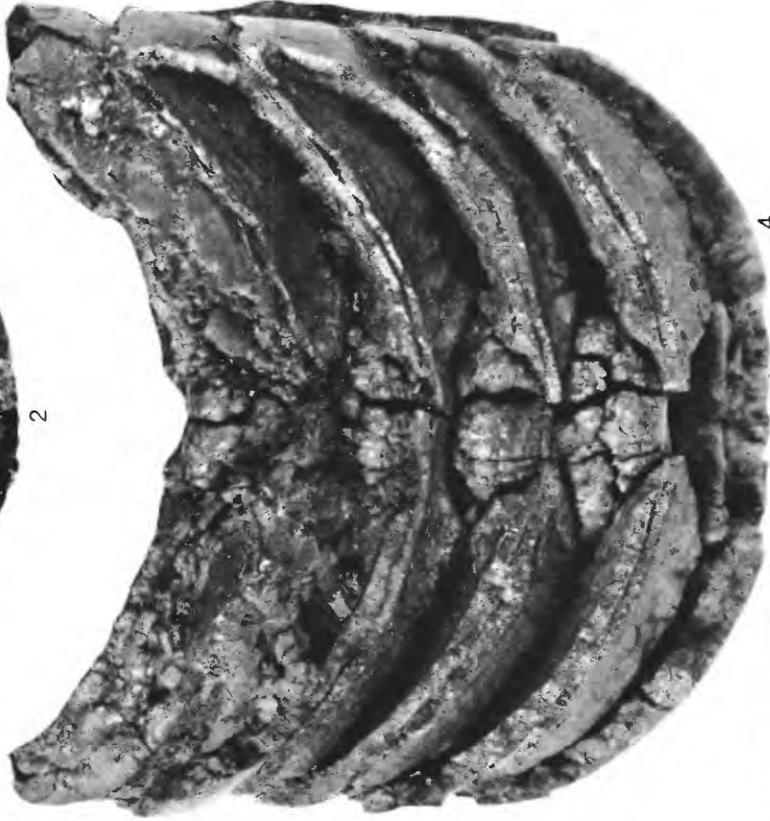
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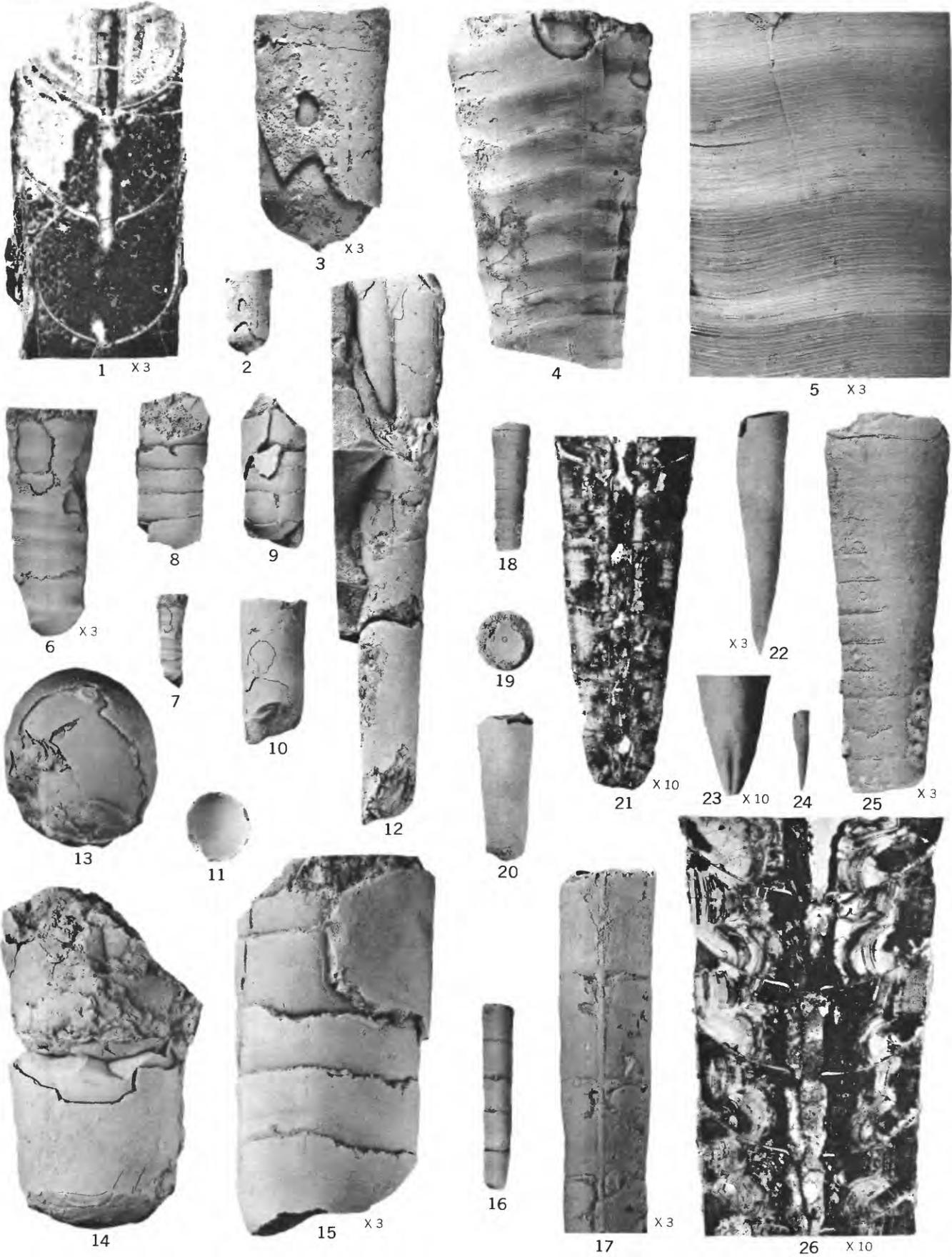
4

ORTHOCONIC NAUTILOID: *RAYONNOCERAS VAUGHANIANUM* (GIRTY)

PLATE 5

[All figures natural size except as indicated otherwise on plate]

- FIGURES 1-3. *Michelinoceras wapanuckense* (Girty) (p. 106).
1. Thin section (enlarged) showing orthochoanitic siphuncle and parts of four camerae of a phragmacone, a previously unfigured specimen from the original lot, USNM 119067, from USGS loc. 2082, Caney shale, Oklahoma.
 - 2, 3. Side and enlarged side views of part of a phragmacone, USNM 119012, from USGS loc. 15062, Pitkin limestone, upper shale member.
- 4, 5. *Brachycycloceras washingtonense* Gordon, n. sp. (p. 108).
Side view and enlarged view of surface of part of the body chamber, of a specimen with widely spaced annuli USNM 119750, from USGS loc. 17292, Fayetteville shale.
- 6, 7. *Dinocycloceras prolixum* Gordon, n. sp. (p. 130).
Enlarged side and side views of the holotype, USNM 119015, from USGS loc. 1999, Hale formation, Prairie Grove member.
- 8, 9, 15. *Bactrites? redactus* Gordon, n. sp. (p. 104).
Side view, ventral view showing the siphuncle, and enlarged dorsal view showing the septal furrow of part of a phragmacone; the holotype, USNM 119019, from USGS loc. 8623, Witts Springs formation.
- 10-12. *Bactrites? carbonarius* Smith (p. 103).
10, 11 Side and oral views of the paratype, LSJU 5611, Moorefield formation.
12. Side view of the holotype, LSJU 5610, same horizon and locality as the last.
- 13, 14. *Bactrites? smithianus* Girty (p. 104).
Apical and side views of a short fragment of a large phragmacone, USNM 119021, from USGS loc. 15394, Imo formation.
- 16, 17. *Bactrites? gaitherensis* Gordon, n. sp. (p. 104).
Side and enlarged ventral views of holotype, SUI 1984, Witts Springs formation.
- 18, 21-26. *Pseudorthoceras stonense* Gordon, n. sp. (p. 111).
18, 25. Side and enlarged side views of the holotype, USNM 119023, from USGS loc. 15062, Pitkin limestone, upper shale member.
21. Thin section (enlarged) showing siphuncle and cameral deposits in six apical camerae of a paratype, USNM 119066, from USGS loc. 14360, same horizon as the last.
22-24. Enlarged side view ventral view showing the cicatrix of attachment, and side views of apical tip of a paratype, USNM 119025, from USGS loc. 15058, same horizon as the last.
26. Thin section (enlarged) showing the cyrtchoanitic siphuncle thick siphuncular deposit on ventral side and mural deposits in six camerae of a paratype, USNM 119025, from USGS loc. 15058, same horizon as the last.
- 19, 20. *Pseudorthoceras knoxense* (McChesney) (p. 109).
Side and end views of part of a phragmacone, USNM 119022, from USGS loc. 15910, Witts Springs formation.

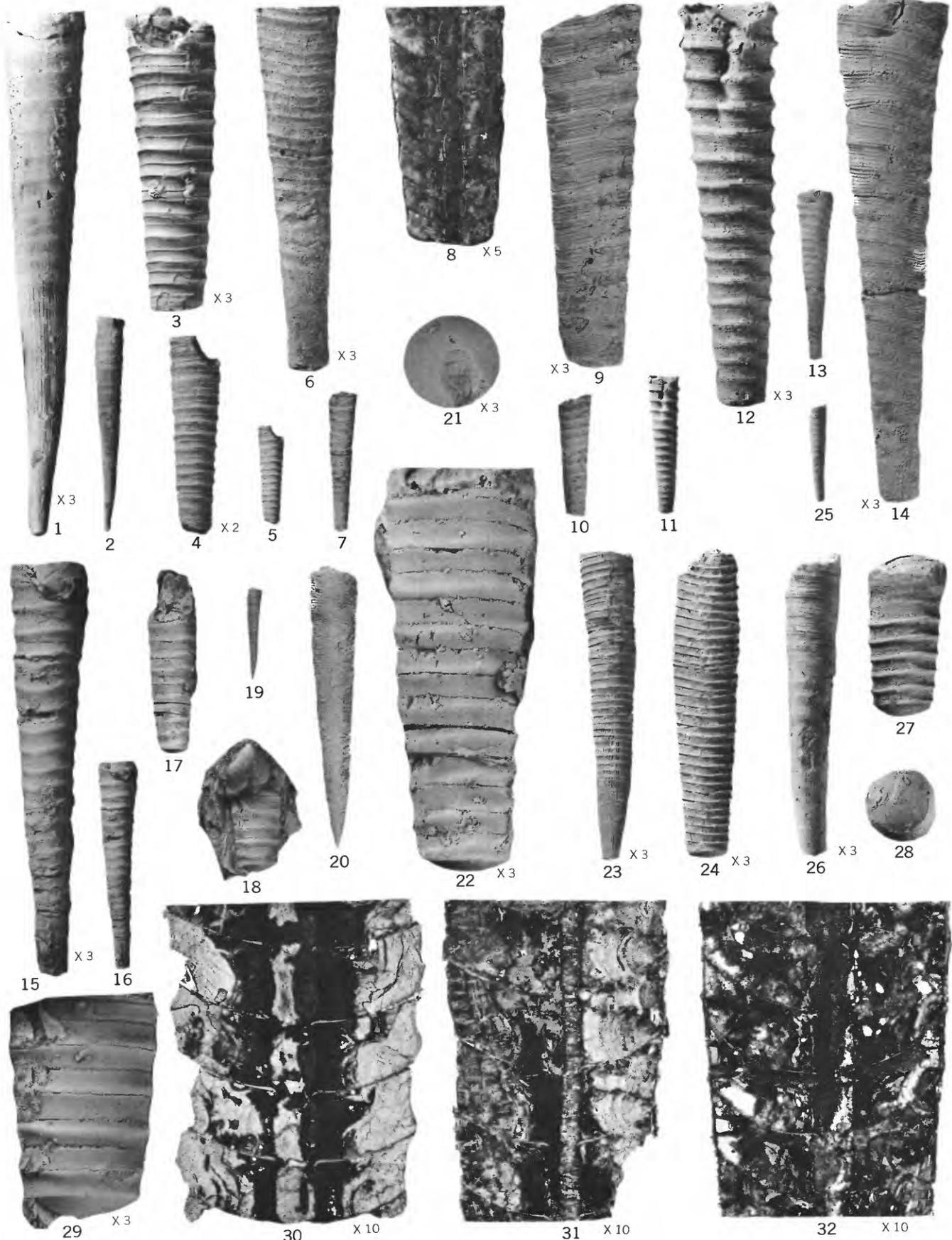


ORTHOCONIC NAUTILOIDS: *MICHELINOCERAS*, *BRACHYCYCLOCERAS*, *DINOCYCLOCERAS*, *BACTRITES*, AND *PSEUDORTHOCERAS*

PLATE 6

[All figures natural size except as indicated otherwise on plate]

- FIGURES 1-8. *Reticycloceras girtyi* Gordon, n. sp. (p. 117).
1, 2. Enlarged side view and side view of the apical end of a paratype, USNM 119037, from USGS loc. 1492A, Pitkin limestone.
3, 8. Enlarged dorsal view and longitudinal section (lateral) at the opposite side of the holotype USNM 119035, from USGS loc. 1487E, Fayetteville shale, upper member.
4, 5. Enlarged side and side views of a paratype, USNM 119036, from the same locality and horizon as the holotype.
6, 7. Enlarged side and side views of another paratype USNM 119038, from USGS loc. 3639 (?) Fayetteville shale, upper member.
- 9-14, 25-28, 32. *Reticycloceras croneisi* Gordon (p. 116).
9, 10. Enlarged side and side views of the holotype, USNM 119029, from USGS loc. 15060, Pitkin limestone, upper shale member.
11, 12. Enlarged dorsal and dorsal views of a specimen USNM 119032, from USGS loc. 15703, Fayetteville shale, upper member.
13, 14. Side and enlarged side view of a part of a phragmacone, a paratype, USNM 119033, from USGS loc. 15932, Imo formation.
25, 26. Side and enlarged side views of the apical part of a paratype, USNM 119031, from USGS loc. 15062, Pitkin limestone, upper shale member.
27, 28. Ventrolateral and apicad views of a part of a body chamber showing the final septum of the phragmacone, a paratype, USNM 119034, from USGS loc. 14369, Imo formation.
32. Enlarged view of thin section (ventrodorsal) showing the siphuncle and cameral deposits in six camerae of a paratype, USNM 119068, from USGS loc. 15058, Pitkin limestone, upper shale member.
- 15-22, 29, 30. *Reticycloceras sequoyahense* (Snider) (p. 118).
15, 16. Enlarged ventrolateral and ventrolateral views of part of a phragmacone, USNM 119041, from USGS locality 1603, Fayetteville shale, Wedington sandstone member.
17, 21, 22. Side view and enlarged apicad and side views of the lectotype, WMUC 16232, Fayetteville shale, Oklahoma.
19, 20. Side and enlarged side views of the apical tip of a phragmacone, USNM 119042, from USGS loc. 5568, Fayetteville shale.
18, 29. Dorsal and enlarged dorsal views of an internal mold showing the septal furrow, USNM 119043, from USGS loc. 15922, Fayetteville shale, Wedington sandstone member.
30. Enlarged view of thin section showing the siphuncle and cameral deposits in five camerae, USNM 119041, from USGS loc. 1603.
- 23, 24, 31. *Reticycloceras peytonense* Gordon, n. sp. (p. 118).
23. Enlarged lateral view of the early part of an incomplete phragmacone, the holotype, USNM 119039, from USGS loc. 14369, Imo formation.
24. Enlarged lateral view of a paratype, USNM 119040, from the same locality and horizon as the holotype.
31. Enlarged view of thin section showing the siphuncle and cameral deposits in four camerae, a paratype, USNM 119040, from the same locality and horizon as the last.

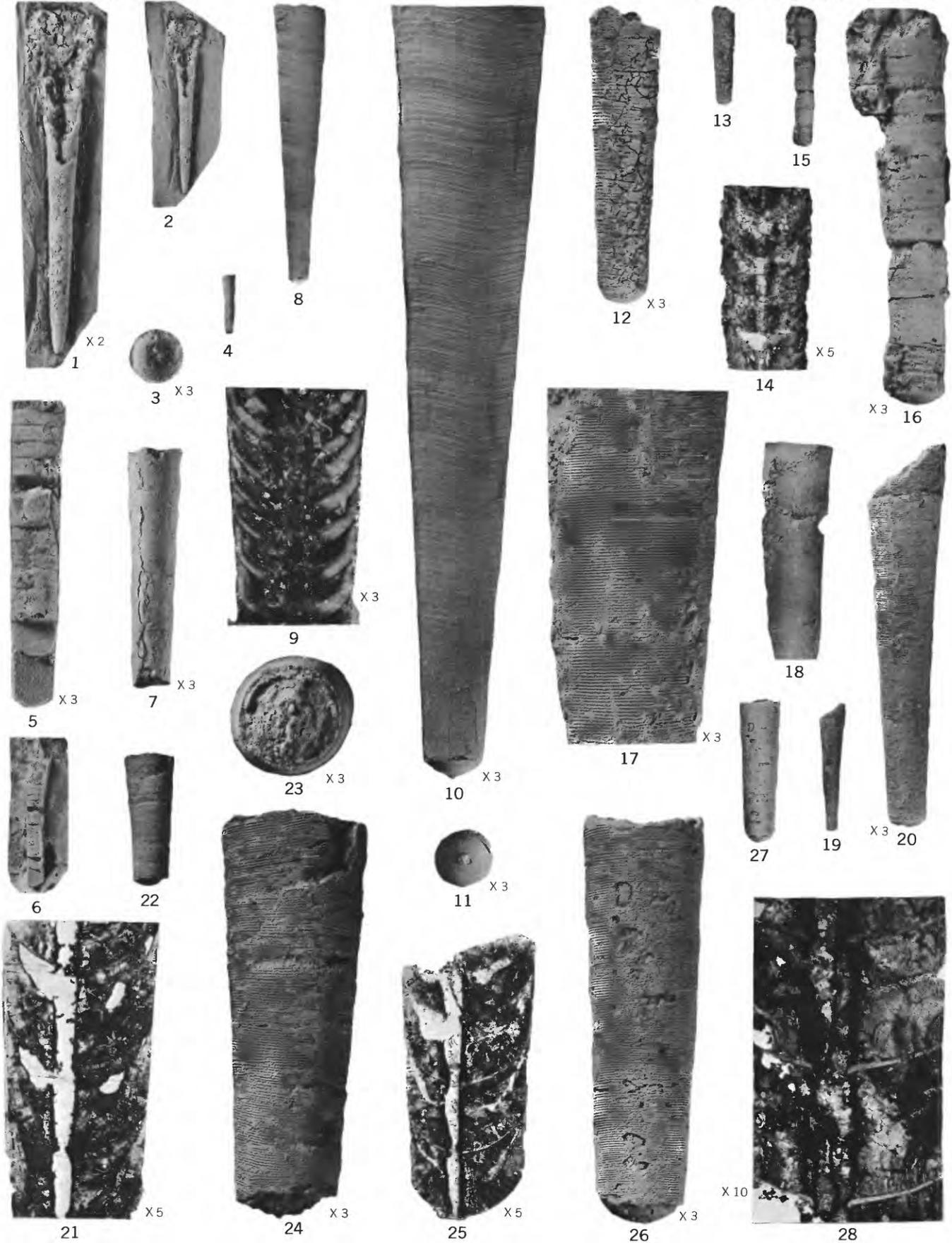


ORTHOCONIC NAUTILOIDS: *RETICYLOCERAS*

PLATE 7

[All figures natural size except as indicated otherwise on plate]

- FIGURES 1-4, 7. *Dolorthoceras tenuifilosum* Gordon, n. sp. (p. 121).
1, 2. Enlarged side view and side view of the apical end of a phragmacone, the holotype, USNM 119046, from USGS loc. 5568, Fayetteville shale.
3, 4, 7. Side view and enlarged orad and side views of a paratype showing faint longitudinal lirae, USNM 119047, from the same lot as the holotype.
- 5, 6. *Dolorthoceras* cf. *D. caneyanum* (Girty) (p. 120).
Enlarged side view and side view of a phragmacone, USNM 119603, from USGS loc. 7089 Fayetteville shale, basal limestone bed.
- 8-11. *Dolorthoceras incisum* Gordon, n. sp. (p. 121).
8, 10, 11. Side view and enlarged side and apical views of the holotype, USNM 119044, from USGS loc. 15303, Imo formation.
9. Longitudinal section on opposite side of the holotype showing cameral deposits; the siphuncle is largely destroyed.
- 12-14. *Mitorthoceras yellvillense* Gordon, n. sp. (p. 125).
12, 13. Enlarged side view and side view of the holotype, USNM 119054, from USGS loc. 5568, Fayetteville shale.
14. Enlarged view of a thin section showing the partly destroyed siphuncle and the cameral deposits in five camerae of a paratype, USNM 119055, from the same lot as the holotype.
- 15, 16. *Mitorthoceras girtyi* Gordon, n. sp. (p. 123).
Side and enlarged side views of the holotype, USNM 119602, from USGS loc. 7089, Fayetteville shale, basal limestone bed.
- 17, 18. *Mitorthoceras* cf. *M. perfilosum* Gordon (p. 125).
Enlarged side view and side view of a specimen, USNM 119053, from USGS loc. 14346, Walls Ferry limestone.
- 19, 20, 28. *Mitorthoceras crebriliratum* (Girty) (p. 122).
19, 20. Side and enlarged side views of a specimen, USNM 119048, from USNM loc. 3301, Fayetteville shale.
28. Enlarged view of a thin section showing siphuncle and cameral deposits in parts of two camerae of a specimen, USNM 119049, from USGS loc. 15062, Pitkin limestone, upper shale member.
- 21-27. *Mitorthoceras perfilosum* Gordon (p. 124).
21. Enlarged view of a thin section (ventrodorsal) showing the siphuncle and cameral deposits in parts of four camerae of a paratype, USNM 119051, from USGS loc. 14566, Chainman shale, Utah.
22-24. Side view and enlarged apical and side views of a paratype, USNM 119052, from USGS loc. 9895, Ruddell shale.
25. Enlarged view of a thin section (ventrodorsal) of another paratype, USNM 119051, from USGS loc. 14566, Chainman shale, Utah.
26, 27. Enlarged ventral view and ventral view of the holotype, USNM 119050, from USGS loc. 14566, Chainman shale, Utah.

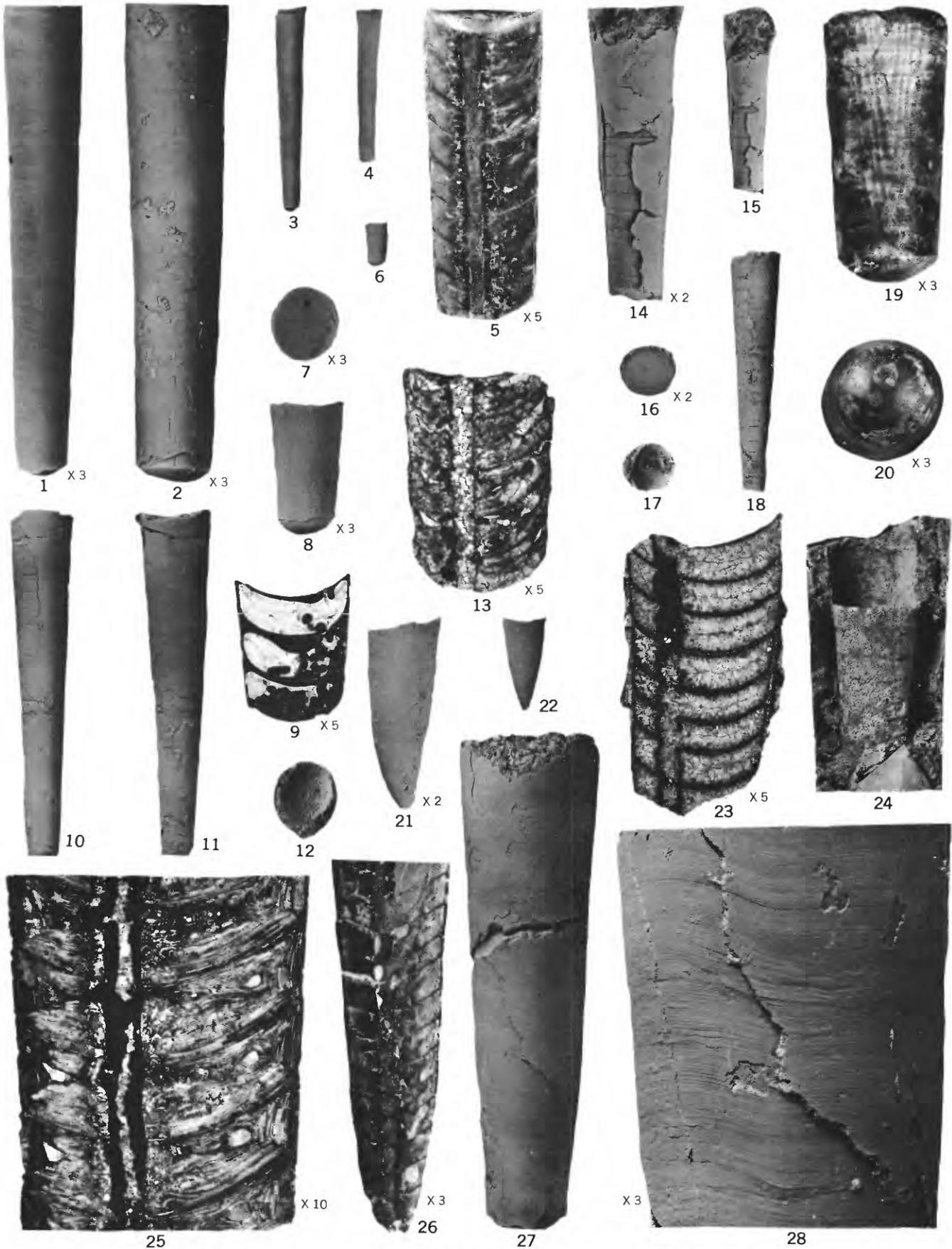


ORTHOCONIC NAUTILOIDS: *DOLORTHO CERAS* AND *MITORTHO CERAS*

PLATE 8

[All figures natural size except as indicated otherwise on plate]

- FIGURES 1-5, 25. *Euloxoceras angustius* Gordon, n. sp. (p. 127).
1, 3. Enlarged side view and side view of a paratype, USNM 119059, from USGS loc. 14369, Imo formation.
2, 4. Enlarged dorsal view and side view of the holotype, USNM 119057, from the same lot as the last.
5. Enlarged view of a longitudinal section (ventrodorsal) showing the siphuncle and cameral deposits in eight camerae of another paratype, USNM 119059, from the type locality.
25. Enlarged view of a thin section (ventrodorsal) showing the siphuncle, partly filled with matrix and cameral deposits in 3 camerae and parts of 3 others, USNM 119058, from USGS loc. 15058, Pitkin limestone, upper shale member.
- 6-9. *Euloxoceras?* sp. A (p. 129).
6-8. Side view and enlarged orad and side views of a specimen, USNM 119064, from USGS loc. 2849 green, Bloyd shale, Brentwood member.
9. Enlarged view of a thin section (ventrodorsal) showing the very excentric position of the septal necks (connecting rings and other parts of the siphuncle have been destroyed) in another specimen from the same lot.
- 10-13. *Euloxoceras greenii praecursor* Gordon, n. subsp. (128).
10-12. Dorsal, side, and orad views of the holotype, USNM 119061, from USGS loc. 8786, Fayetteville shale, basal limestone bed.
13. Enlarged view of a thin section (ventrodorsal) showing the siphuncle and deposits in five camerae, taken from part of the holotype.
- 14-16, 23. *Mooreoceras normale* Miller, Dunbar, and Condra (p. 113).
14-16. Enlarged side view, side and enlarged apicad views of a specimen, USNM 119026, from USGS loc. 1999, Hale formation, Prairie Grove member.
23. Enlarged view of a thin section (ventrodorsal) of a specimen with a very excentric siphuncle, USNM 119027, from USGS loc. 2849, Bloyd shale, Brentwood limestone member.
- 17, 18. *Mooreoceras wedingtonianum* Gordon, n. sp. (p. 113).
Dorsal and orad views of the holotype, USNM 119028, from USGS loc. 1603, Fayetteville shale, Wedington sandstone member.
- 19, 20. *Tripterocerooides?* sp. (p. 115).
Dorsal and apicad views of part of a body chamber and the outermost septum of the phragmacone showing chevronlike color banding, USNM 119056, from USGS loc. 14369, Imo formation.
- 21, 22, 26. *Mooreoceras* sp. B (p. 114).
21, 22. Enlarged side view and ventral view of an apical tip, USNM 119073, from USGS loc. 15932, Imo formation.
26. Enlarged longitudinal section (ventrodorsal) of another tip showing the siphuncle and the siphuncular and cameral deposits which are thick on the ventral side of the conch, USNM 119074, from USGS loc. 15936, Imo formation.
24. *Mooreoceras* sp. A (p. 114).
Ventral view of the internal mold in its sandstone matrix, USNM 119604, previously figured by Weller and Girty, from USGS loc. 1248X, Batesville sandstone.
- 27, 28. *Adnatoceras alaskense* Gordon (p. 126).
Side view and enlarged view of the surface of the only known Arkansas specimen, USNM 119608, from USGS loc. 2051C, Moorefield formation.



ORTHOCONIC NAUTILOIDS: *EULOXOCERAS*, *MOOREOCERAS*, *TRIPTEROCEROIDES?*, AND *ADNATOCERAS*

PLATE 9

[Figure is one-half natural size]

FIGURE 1. *Endolobus clorensis* Collinson (p.134).

Reduced side view of the best preserved specimen, USNM 119797, from USGS loc. 15075, Fayetteville shale.



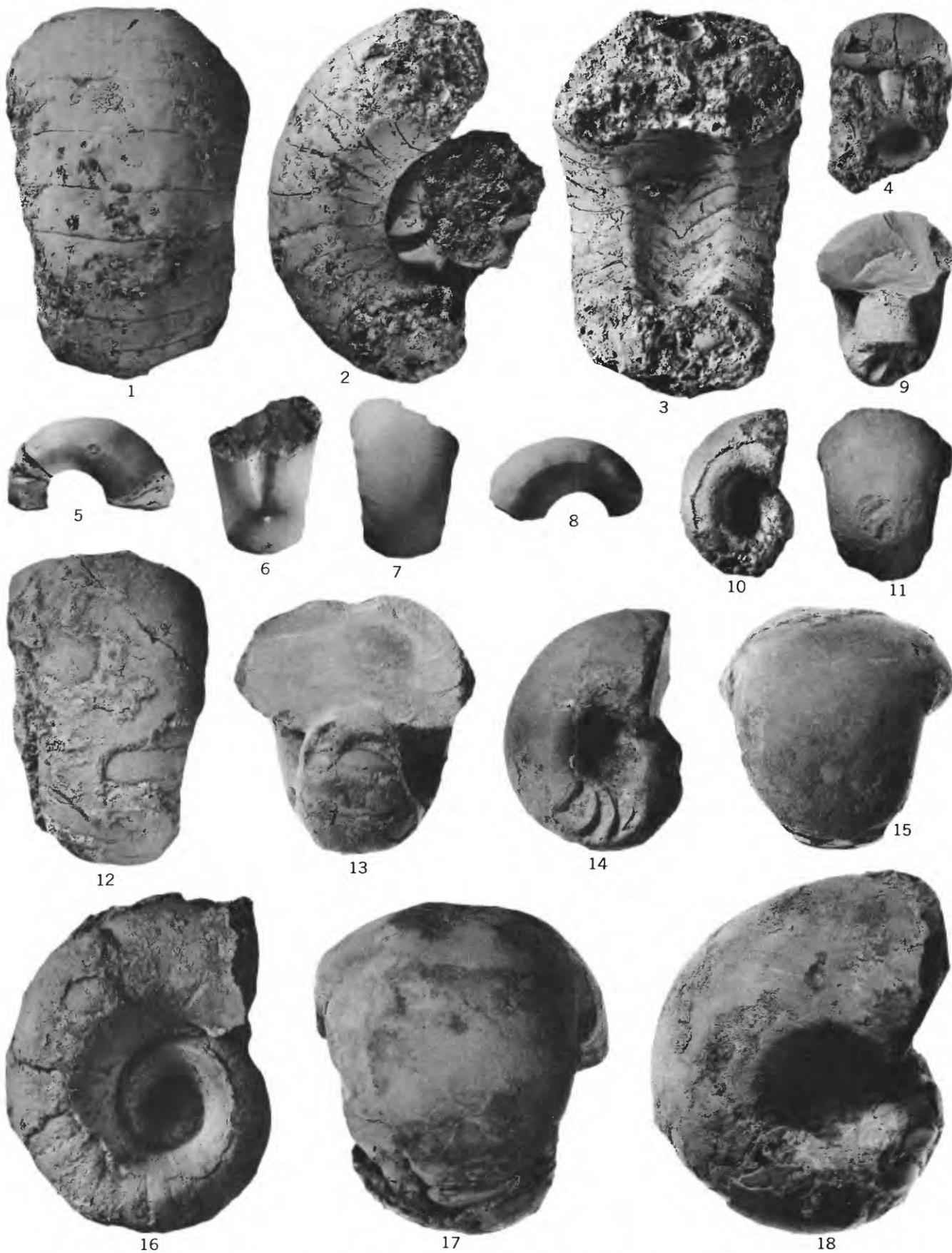
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COILED NAUTILOID: *ENDOLOBUS CLORENSIS* COLLINSON

PLATE 10

[All figures natural size]

- FIGURES 1-4, 12, 16. *Knightoceras oxylobatum* Miller and Downs (p. 139).
1-4. Ventral view, side with inner whorls, dorsal view of the outer volution showing the narrow annular lobe of the suture and dorsal view of the inner whorls, and of the holotype, USNM 119617, from USGS loc. 8190, Atoka formation.
12, 16. Back and side views of a hypotype, USNM 119691, from USGS loc. 8181, Hale formation, Prairie Grove member.
- 5-8. *Endolobus ornatus* Girty (p. 135).
Side, dorsal, ventral, and opposite side views of the holotype, USNM 119609, from USGS loc. 2051C, Moorefield formation.
- 9-11, 13-15, 17, 18. *Knightoceras patulum* (Unklesbay) (p. 138).
9-11. Front, side, and back views of a small specimen, USNM 119708, from USGS loc. 8181, Hale formation, Prairie Grove member.
13-15. Front, side, and back views of a topotype, USNM 119798, from USGS loc. 15387, Union Valley sandstone, Oklahoma.
17, 18. Back and side views of another topotype, USNM 119799.

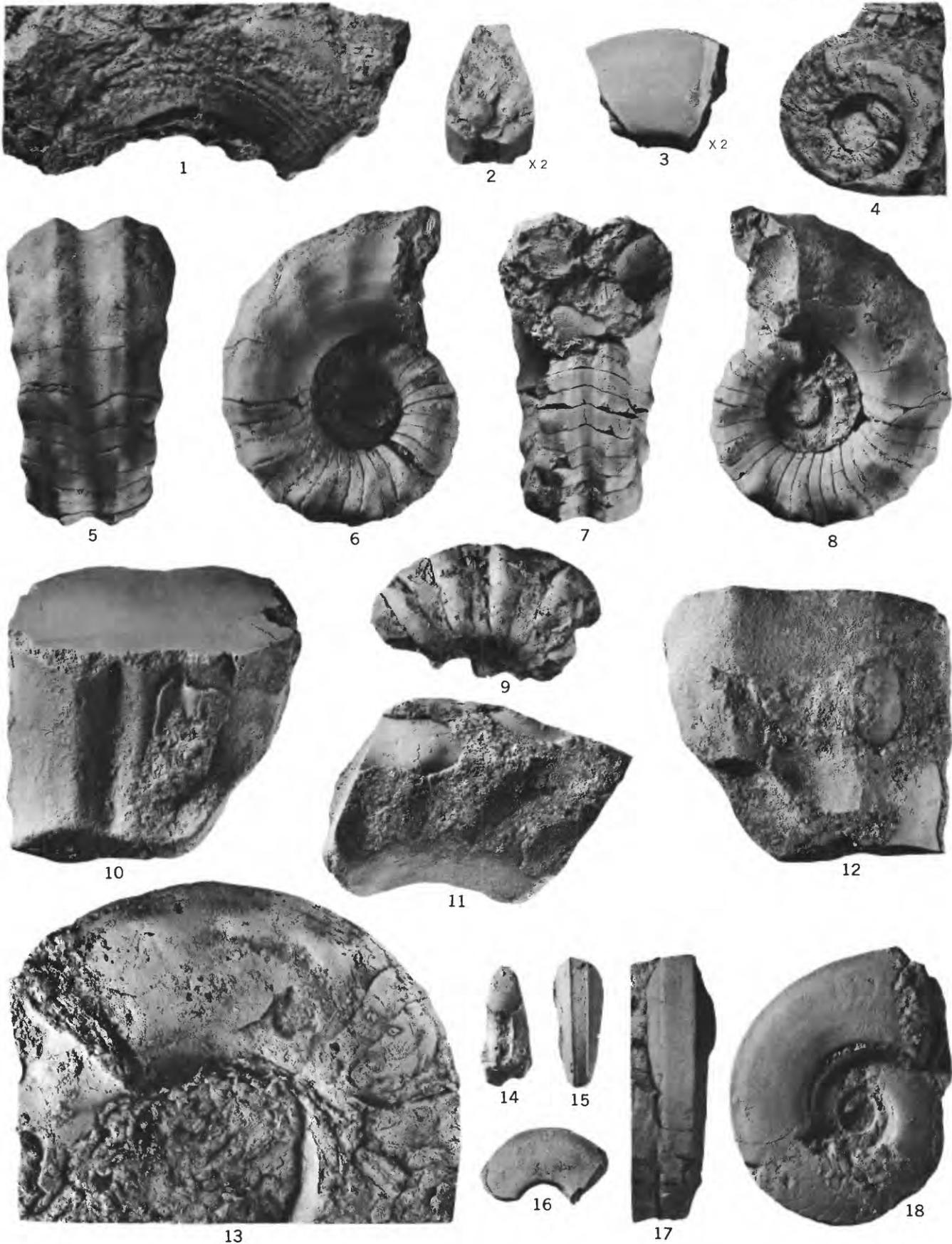


COILED NAUTILOIDS: *ENDOLOBUS* AND *KNIGHTOCERAS*

PLATE 11

[All figures natural size except as indicated otherwise on plate]

- FIGURE
1. *Triboloceras?* sp. (p. 144).
Side view of a fragment of a volution, USNM 119698, from USGS loc. 9897, Walls Ferry limestone.
 - 2, 3. *Stroboceras (Epistroboceras)* sp. (p. 147).
Enlarged end and side views of a fragment of a whorl, USNM 119703, from USGS loc. 8786, Fayetteville shale, basal limestone bed.
 4. *Stroboceras* cf. *S. sulcatum* (Sowerby) (p. 145).
Side view of a specimen, USNM 119699, from USGS loc. 15922, Fayetteville shale, Wedington sandstone member.
 - 5–12. *Tylonautilus gratiosus* (Girty) (p. 141).
5–8. Back, side, front, and opposite side views of a specimen, WMUC 48193, from the Fayetteville shale, upper part.
9. Side view of a fragment, USNM 119696, from USGS loc. 1491, of the Fayetteville shale.
10–12. Side, dorsal, and ventral views of a small part of a large volution, USNM 119697, from USGS loc. 13974, Pitkin limestone.
 13. *Metacoceras* sp. (p. 142).
Side view of an incomplete weakly ribbed specimen showing part of the phragmacone and part of the body chamber, USNM 119694, from USGS loc. 13977, Bloyd shale, Kessler limestone member.
 - 14–18. *Aphelaeceras arkansanum* Gordon, n. sp. (p. 148).
14–16. Dorsal, ventral, and side views of part of a body chamber, USNM 119701, from USGS loc. 15068, Imo formation.
17, 18. Back and side views of the holotype, USNM 119700, from USGS loc. 8871, Pitkin(?) limestone.



COILED NAUTILOIDS: *TRIBOLOCERAS*, *APHELAECERAS*, *STROBOCERAS*, *EPISTROBOCERAS*,
TYLONAUTILUS, AND *METACOCERAS*

PLATE 12

[All figures natural size]

FIGURES 1-3, 7-10. *Stearoceras smithi* Gordon, n. sp. (p. 150).

1-3. Front, side, and back views of part of a phragmacone, a paratype, LSJU 5592, Atoka formation.

7-9. Ventral, side, and dorsal views of the holotype, LSJU 5590, from the same locality and horizon as the last.

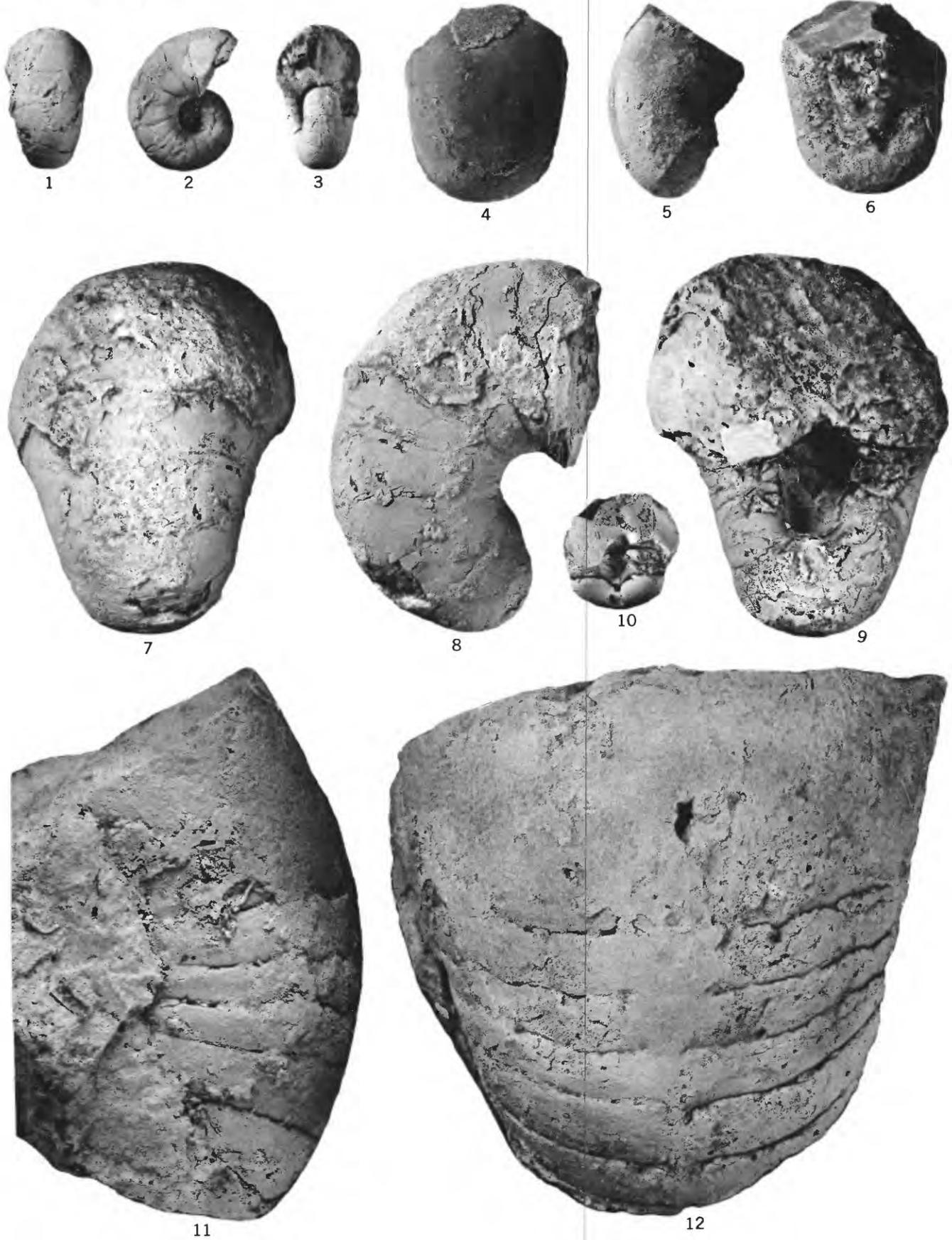
10. Dorsal view of a small piece of a phragmacone showing the annular lobe, a paratype, LSJU 5591, from the type locality.

4-6. *Stearoceras* sp. (p. 151).

Ventral, side, and dorsal views of an incomplete body chamber retaining part of an inner volution, USNM 119801, from USGS loc. 1390, Bloyd shale, Brentwood limestone member.

11, 12. *Solenochilus* cf. *S. peculiare* Miller and Owen (p. 153).

Ventral and side views of an internal mold in sandstone, USNM 119751, from USGS loc. 16350, Atoka formation.



COILED NAUTILOIDS: *STEAROCERAS* AND *SOLENOCHILUS*

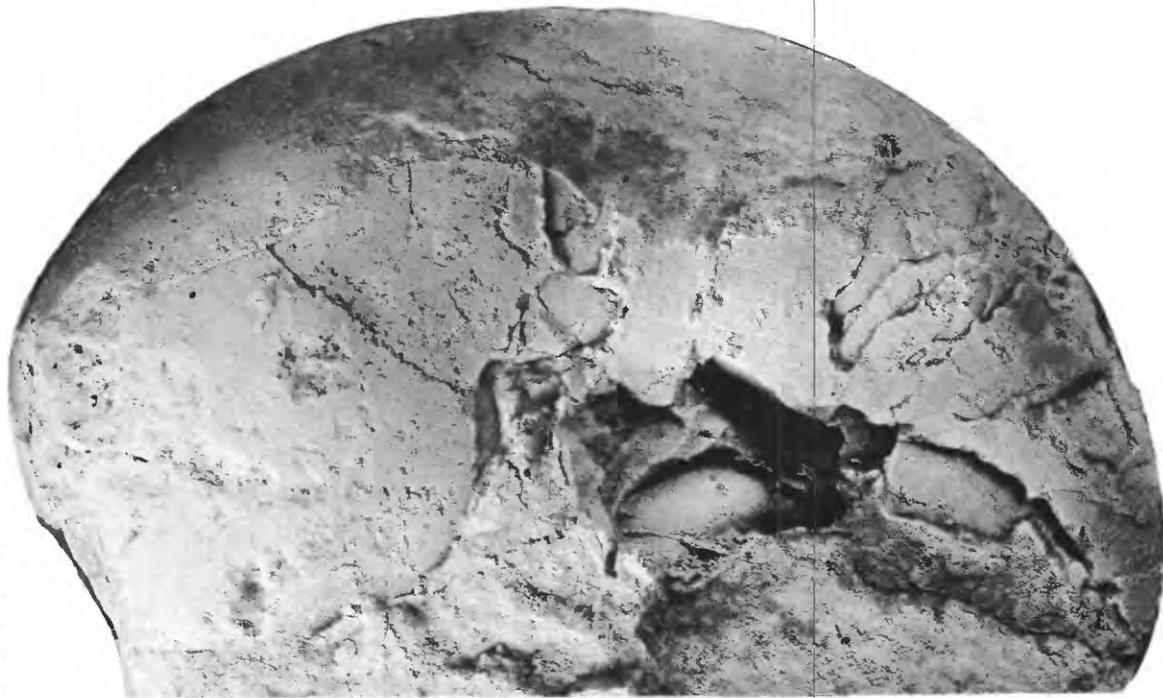
PLATE 13

[Both figures natural size]

FIGURES 1, 2. *Solenochilus floweri* Gordon, n. sp. (p. 154).
Side and ventral views of the holotype, USNM 120192, an incomplete body chamber and phragmacone, from USGS loc. 17690, Atoka formation.



2



1

COILED NAUTILOID: SOLENOCHILUS

PLATE 14

[All figures natural size]

FIGURES 1, 2. *Megaglossoceras gliechi* Gordon, n. sp. (p. 163).

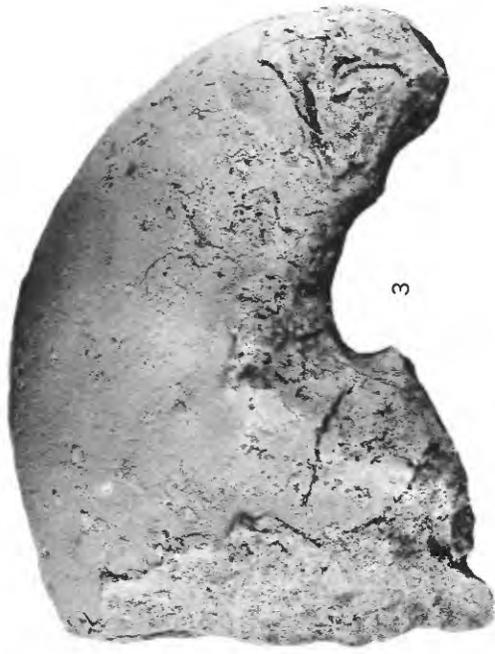
Side and ventral views of the holotype, USNM 120194, from USGS loc. 17690, Atoka formation.

3, 4. *Stearoceras* aff. *S. gibbosum* (Hyatt) (p. 149).

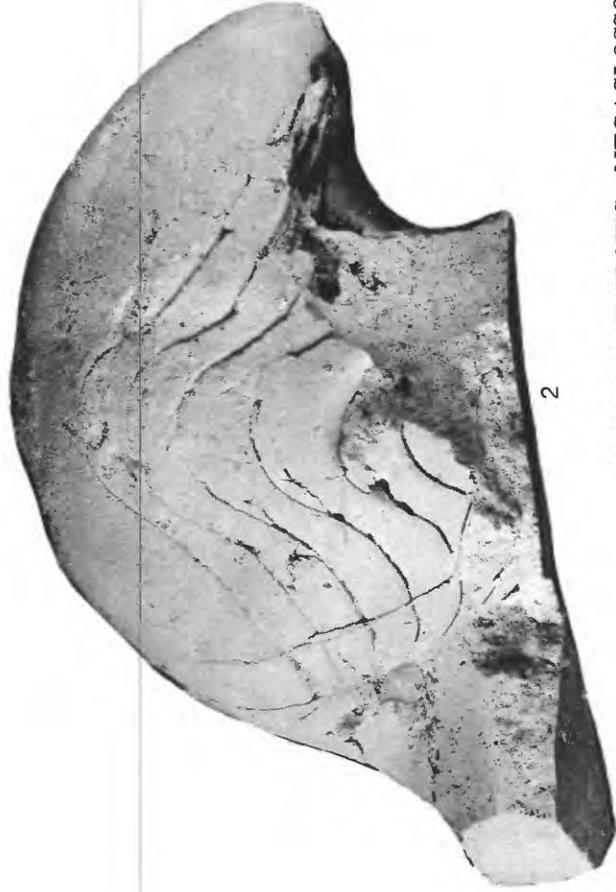
Side and ventral views of a nearly complete body chamber retaining several camerae of the phragmacone, USNM 120191, from USGS loc. 17690, Atoka formation.



1



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2



4

COILED NAUTILOIDS: MEGAGLOSSOCERAS AND STEAROCERAS

PLATE 15

[All figures natural size except as indicated otherwise on plate]

FIGURES 1-6. *Liroceras? bicostatum* Gordon, n. sp. (p. 156).

1, 6. Side and ventral views of an incomplete specimen, the holotype, USNM 119705, from USGS loc. 14369, Imo formation.

2-4. Back view, enlarged dorsal view showing part of inner whorls, and side view of a paratype, USNM 191802, Fayetteville shale.

5. Side view of a paratype, USNM 119706, from the type locality.

7, 8. *Peripetoceras ozarkense* Gordon, n. sp. (p. 160).

Side and back views of the holotype, USNM 119704, from USGS loc. 3641A, Fayetteville shale, basal limestone bed.

9, 10. *Peripetoceras* sp. (p. 161).

Back and side views of the only specimen, USNM 119753, from USGS loc. 1292, Atoka formation.

11, 13. *Coelogasteroceras gracile* Gordon, n. sp. (p. 159).

Back and side views of the holotype, USNM 119709, from USGS loc. 8623, Witts Springs formation.

12. *Mariceras?* sp. A (p. 132).

Ventral view of a lightly flattened specimen, USNM 119069, from USGS locality 14380, Fayetteville shale.

14, 17. *Mariceras?* sp. (p. 133).

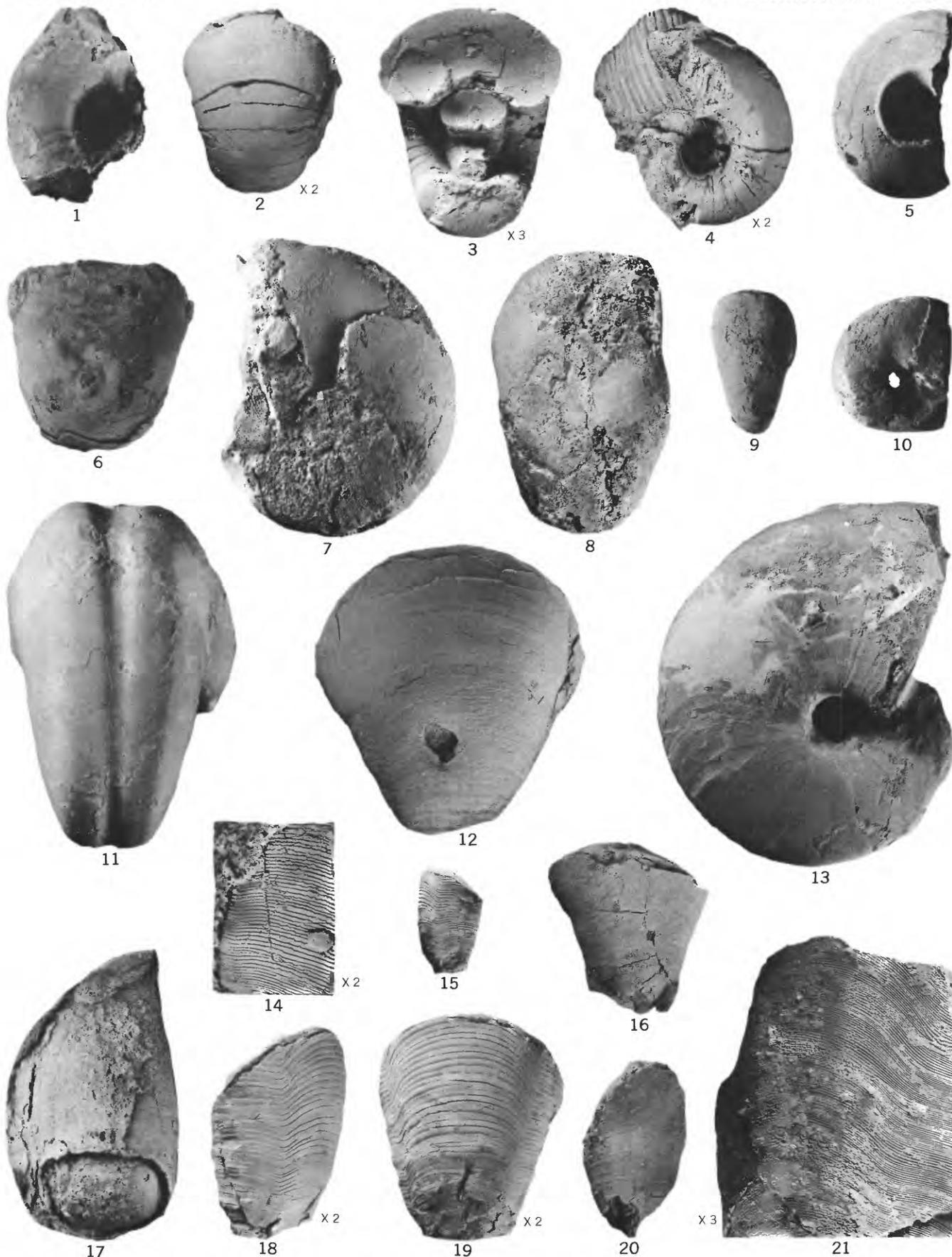
Enlargement of surface and oblique side view of a latex cast made from an external mold, USNM 119072 from USGS loc. 15851, Johns Valley shale.

15, 18, 19. *Mariceras* sp. C (p. 133).

Side view and enlarged opposite side and ventral views of a small specimen, USNM 119071, from USGS loc. 15934, Imo formation.

16, 20, 21. *Mariceras* sp. B (p. 132).

Ventral and side views and enlargement showing the surface detail of a finely lirated shell, USNM 119070, from USGS loc. 15058, Pitkin limestone, upper shale member.

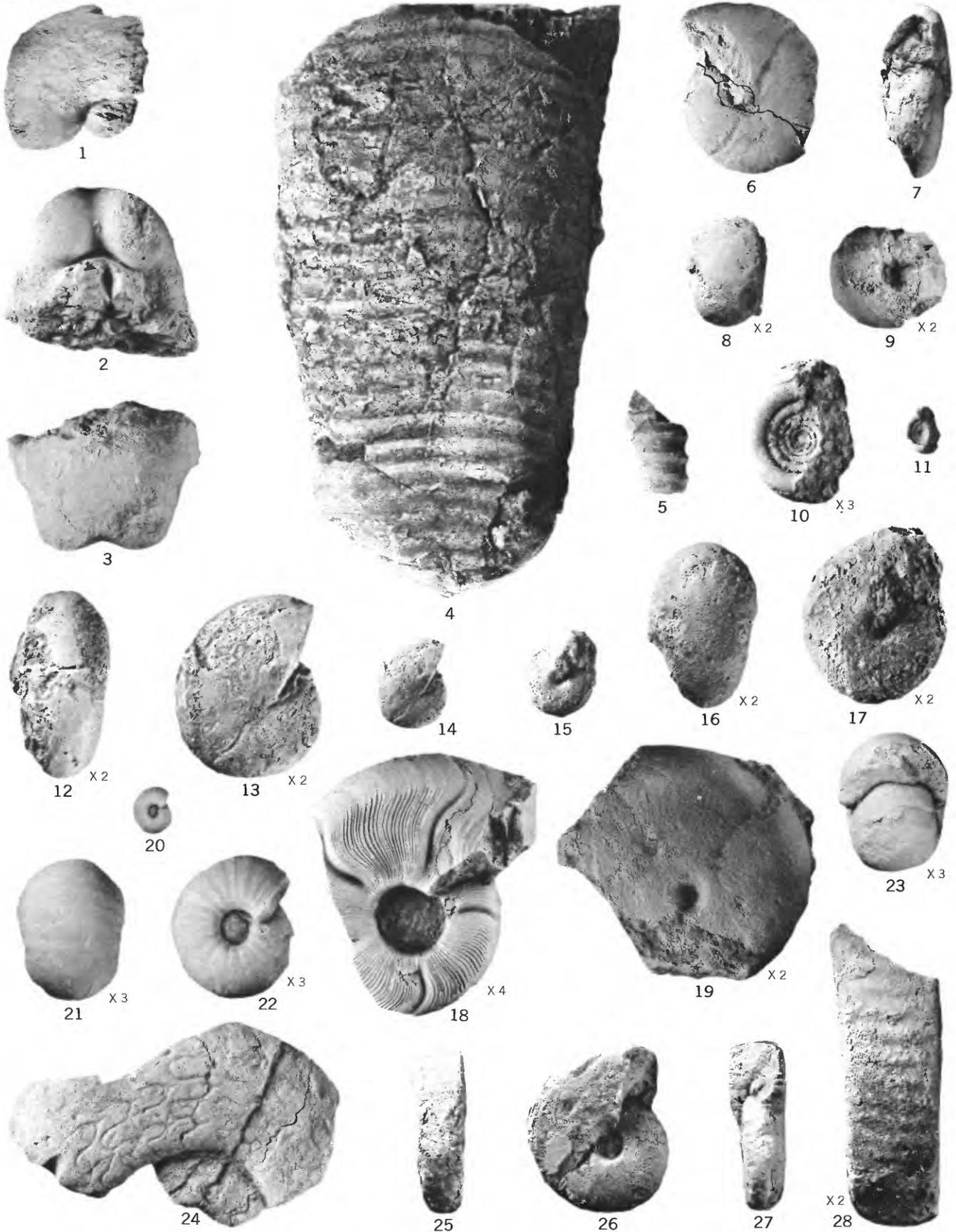


COILED NAUTILOIDS: *LIROCERAS?*, *PERIPETOCERAS*, *COELOGASTEROCERAS*, AND CYRTOCONIC NAUTILOIDS: *MARICERAS*

PLATE 16

[All figures natural size except as indicated otherwise on plate]

- FIGURES 1-3. *Ephippioceras ferratum* (Cox) (p. 162).
Side, dorsal, and ventral views of an incomplete specimen, USNM 119710, from USGS loc. 1386, Hale formation.
- 4, 5. *Brachycycloceras washingtonense* Gordon, n. sp. (p. 108).
4. View of a large crushed specimen including parts of the phragmacone and body chamber, the holotype, USNM 119017, from USGS loc. 1608, Fayetteville shale, Wedington sandstone member.
5. Side view of a specimen representing the early part of the phragmacone of a paratype, USNM 119018, from the type locality.
- 6, 7. *Imitoceras indianense* (Miller) (p. 166).
Side and front views of the holotype, WMUC 6216, Borden group, Indiana.
- 8, 9. *Gattendorfia* sp. (p. 170).
Enlarged back and side views of a poorly preserved specimen, USNM 119470, from USGS loc. 14346, Walls Ferry limestone.
- 10, 11. *Kazakhstania?* sp. (p. 171).
Enlarged side view and side view of a specimen, USNM 119471, from USGS loc. 9897, Walls Ferry limestone.
- 12-14. *Imitoceras sinuatum* Gordon, n. sp. (p. 166).
Enlarged back and side views and side view of the holotype, USNM 119465, from USGS loc. 14346, Walls Ferry limestone.
- 15-17. *Gattendorfia?* sp. (p. 170).
Enlarged back and side views and side view of a specimen showing surface sculpture, USNM 119468, from USGS loc. 14346, Walls Ferry limestone.
18. *Girtyoceras meslerianum* (Girty) (p. 233).
Enlarged side view of a paratype, USNM 119595, from USGS loc. 2083, Caney shale, Oklahoma.
19. *Sudeticeras* sp. (p. 195).
Enlarged side view of a specimen showing faint surface sculpture, USNM 119510, from USGS loc. 14352, Ruddell shale.
- 20-23. *Cravenoceras? oklahomense* Elias (p. 206).
Enlarged back, side, and front views and side view of the holotype, Univ. of Nebraska collection, "Springer formation," Goddard shale member, Oklahoma.
24. *Merocanites* cf. *M. drostei* Collinson (p. 284).
Side view of a septate fragment showing parts of two volutions, SUI 1907, from the Boone formation, Reeds Spring chert member, Missouri.
- 25-28. *Stenopronorites* sp. A (p. 290).
Back, side, front, and enlarged ventral views of a specimen, USNM 120673, from USGS loc. 17691, Atoka formation.

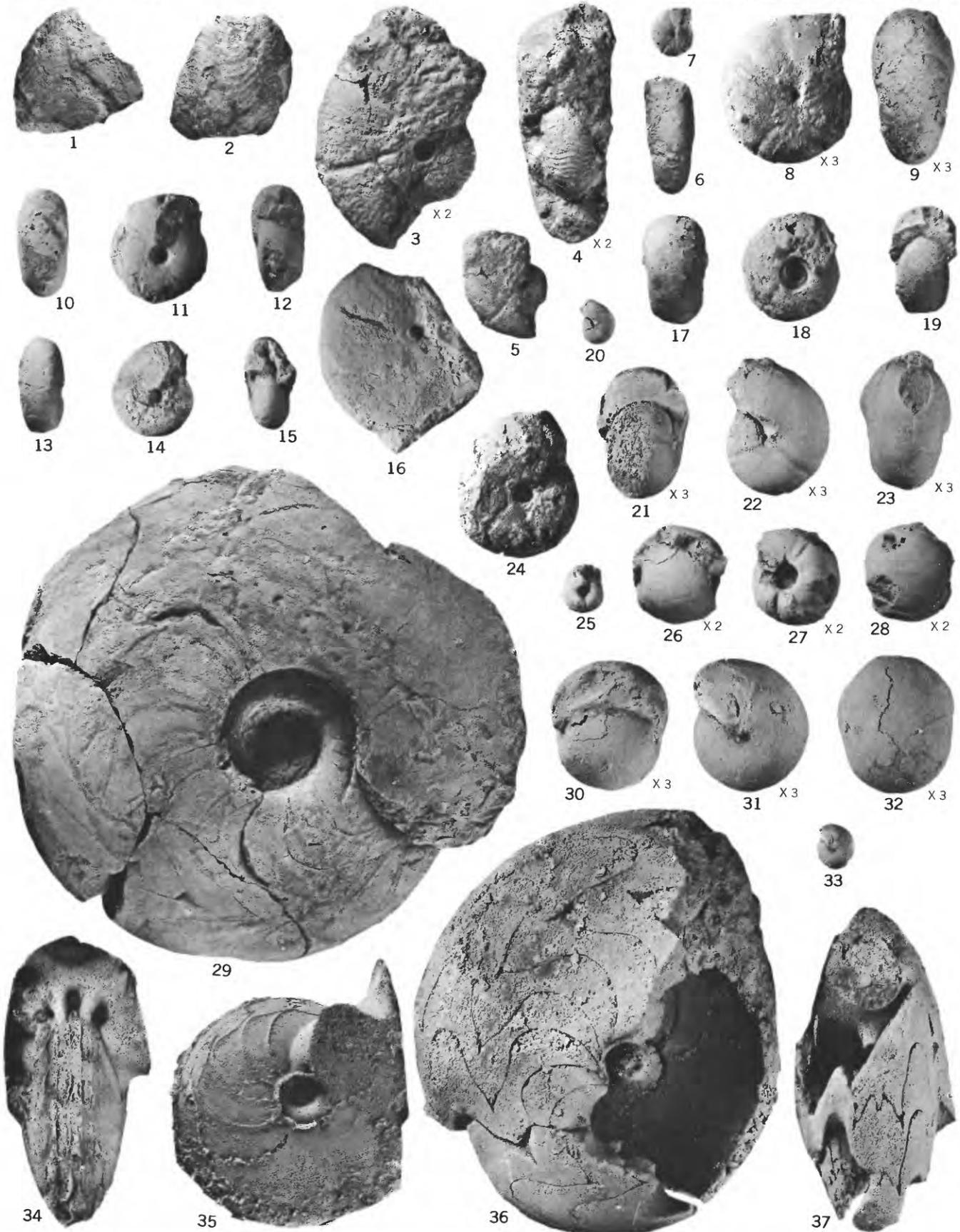


COILED NAUTILOID: *EPHIPPIOCERAS*: ORTHOCONIC NAUTILOID: *BRACHYCYCLOCERAS*;
 AMMONOIDS: *IMITOCERAS*, *GATTENDORFIA*, *KAZAKHSTANIA*?, *CRAVENOCERAS*?,
MEROCANITES, *SUDETICERAS*, *GIRTYOCERAS*, AND *STENOPRONORITES*

PLATE 17

[All figures natural size except as indicated otherwise on plate]

- FIGURES 1, 2. *Ammonellipsites (Pericyclus)* sp. (p. 174).
Side and ventral views of a small fragment of a whorl, USNM 119478, from USGS loc. 9897, Walls Ferry limestone.
- 3-6. *Ammonellipsites (Stenocyclus) ballardensis* Gordon, n. sp. (p. 174).
Enlarged side and front views and side and back views of the holotype, USNM 119479, from USGS loc. 8380, Boone formation, Grand Falls chert member, Kansas.
- 7-9. *Muensteroceras?* sp. (p. 181).
Side view and enlarged side and back views of a specimen, USNM 119495, from the same lot as the last.
- 10-16. *Muensteroceras arkansanum* Gordon, n. sp. (p. 177).
10-12. Back, side, and front views of the holotype, USNM 119480, from USGS loc. 9897 Walls Ferry limestone.
13-15. Back, side, and front views of a paratype, USNM 119481, from the same lot as the holotype.
16. Side view of a larger incomplete shell, a paratype, USNM 119481, from the same lot as the holotype.
- 17-19. *Muensteroceras collinsoni* Gordon, n. sp. (p. 178).
Back, side, and front views of the holotype, USNM 119484, from USGS loc 14386, Walls Ferry limestone.
- 20-23. *Muensteroceras (Cluthoceras) glicki* Gordon, n. sp. (p. 182).
Side, and enlarged front, side, and back views of the holotype, USNM 119496, from USGS loc. 15791, Fayetteville shale.
24. *Muensteroceras?* sp. (p. 181).
Side view of a poorly preserved specimen, USNM 119494, from USGS loc. 9899, Boone formation, St. Joe limestone member.
- 25-28, 30-33. *Muensteroceras pisiforme* Gordon, n. sp. (p. 180).
25-28. Side view and enlarged front, side, and back views of a large, widely umbilicate paratype, USNM 119492, from USGS loc. 5552, Fayetteville shale.
30-33. Enlarged front, side, and back views and side view of the holotype, USNM 119489, from USNM loc. 3301, Fayetteville shale.
29. *Muensteroceras pfefferae* (Miller and Werner) (p. 179).
Side view of a hypotype, SUI 1910, from the Boone formation, St. Joe limestone member, Missouri.
- 34-37. *Beyrichoceras hornerae* Miller (p. 183).
Front and side views of a latex internal mold and side and ventral views of the holotype, YPM 17112, from a boulder derived from the Boone formation, Missouri.



AMMONOIDS: *AMMONELLIPSITES*, *MUENSTERCERAS*, AND *BEYRICHOCERAS*

PLATE 18

[All figures natural size except as indicated otherwise on plate]

FIGURES 1-6. *Goniatites* aff. *G. crenistria* Phillips (p. 187).

1-3. Enlarged oblique, side, and back views of a specimen, USNM 119501, from USGS loc. 2051C, Moorefield formation.

4-6. Side, front, and enlarged ventral views of another specimen, USNM 119610, from the same lot as the last.

7, 13-16. *Goniatites granosus* Portlock (p. 192).

7. Side view of the holotype, GSGB 31860, County Tyrone, Ireland.

13. Enlarged view of a fragment of a whorl showing the granules along the longitudinal lirae, USNM 119506, from USGS loc. 1245A, Ruddell shale.

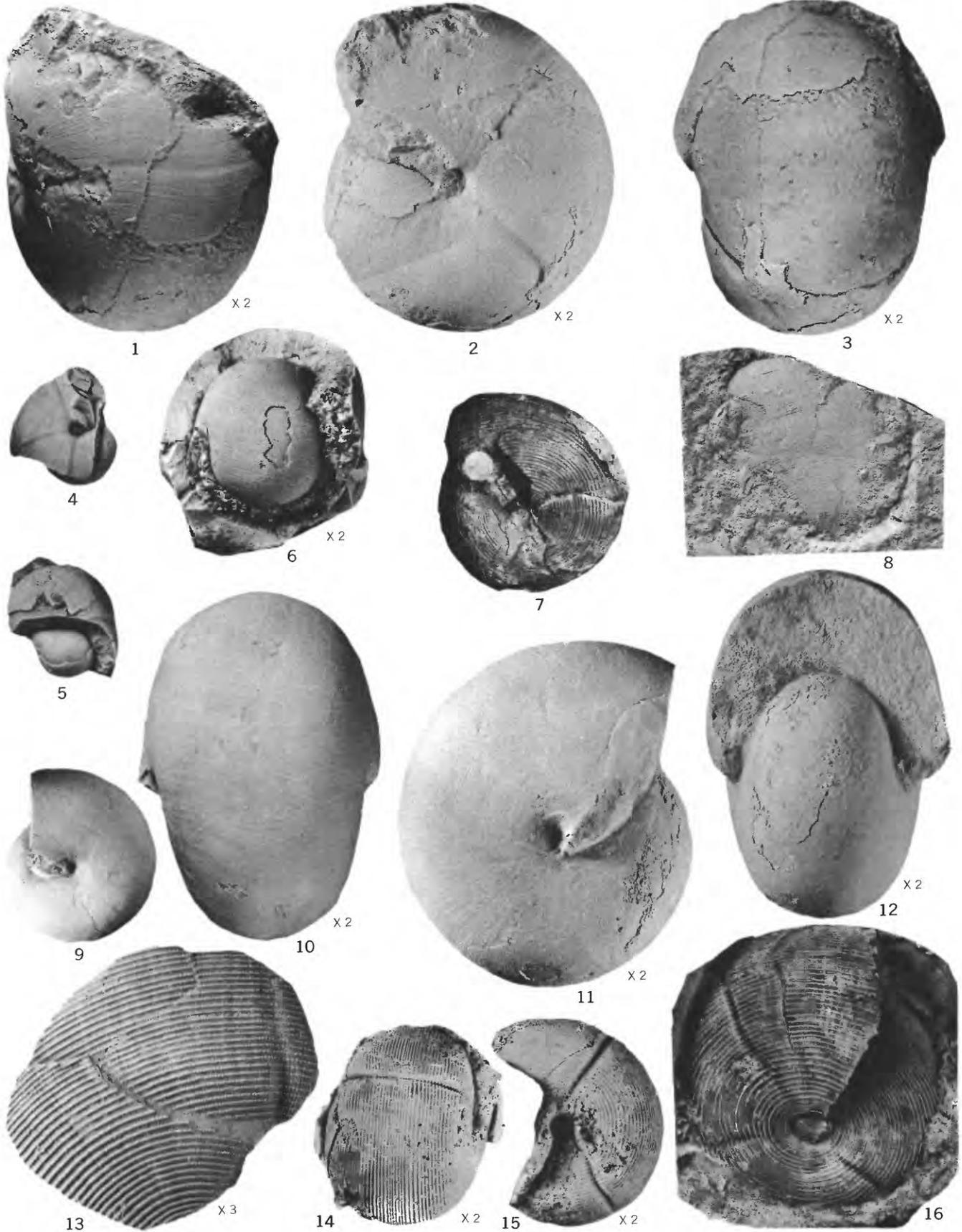
14, 15. Enlarged ventral and side views of a specimen at early maturity, a latex cast from an external mold, USNM 119507, from USGS loc. 6932, Caney shale erratic.

16. Oblique view of a large mature specimen with coarse liration, a latex cast of an external mold, USNM 119509, from USGS loc. 15084, Caney shale erratic.

8-12. *Goniatites multiliratus* Gordon (p. 186).

8. Flattened fragment in shale of a large specimen, USNM 119498, from USGS loc. 8743, Moorefield formation.

9-12. Side view and enlarged back, opposite side, and front views of the holotype USNM 119499, from USGS loc 6619A, Caney shale, Oklahoma.



AMMONOIDS: *GONIATITES*

PLATE 19

[All figures natural size except as indicated otherwise on plate]

- FIGURES 1–12. *Goniatites choctawensis* Shumard (primary types of *Glyphioceras cumminsi* Hyatt) (p. 189).
1–6. Front, side, and back views and enlarged front, side, and back views of the lectotype, UT 12031, Barnett formation, Texas.
7, 8. Back and side views of a large paratype, UT 12032, from the same locality as the lectotype.
9–12. Side view and enlarged front, side, and back views of a small paratype, UT 12030, from the type locality.
- 13–29. *Goniatites choctawensis* Shumard (p. 189).
13–15, 20. Enlarged front, side, and back views and side view of a specimen, USNM 119503, from USGS loc. 8772, Ruddell shale.
16–19. Side view and enlarged front, side, and back views of a young specimen, USNM 119503, from the same lot as the last.
21–23. Front, side, and back views of a mature specimen USNM 119502, from USGS loc. 6888, Caney shale, Oklahoma.
24. Fragment of the whorl of a large specimen in a late mature stage, USNM 119502, from the same lot as the last.
25–28. Side view and enlarged back, opposite side, and front views of a specimen in an early mature stage, USNM 119502, from the same lot as the last.
29. Fragment of a large shell at late maturity, a latex cast from an external mold, USNM 119505, from USGS loc. 8773, Ruddell shale.

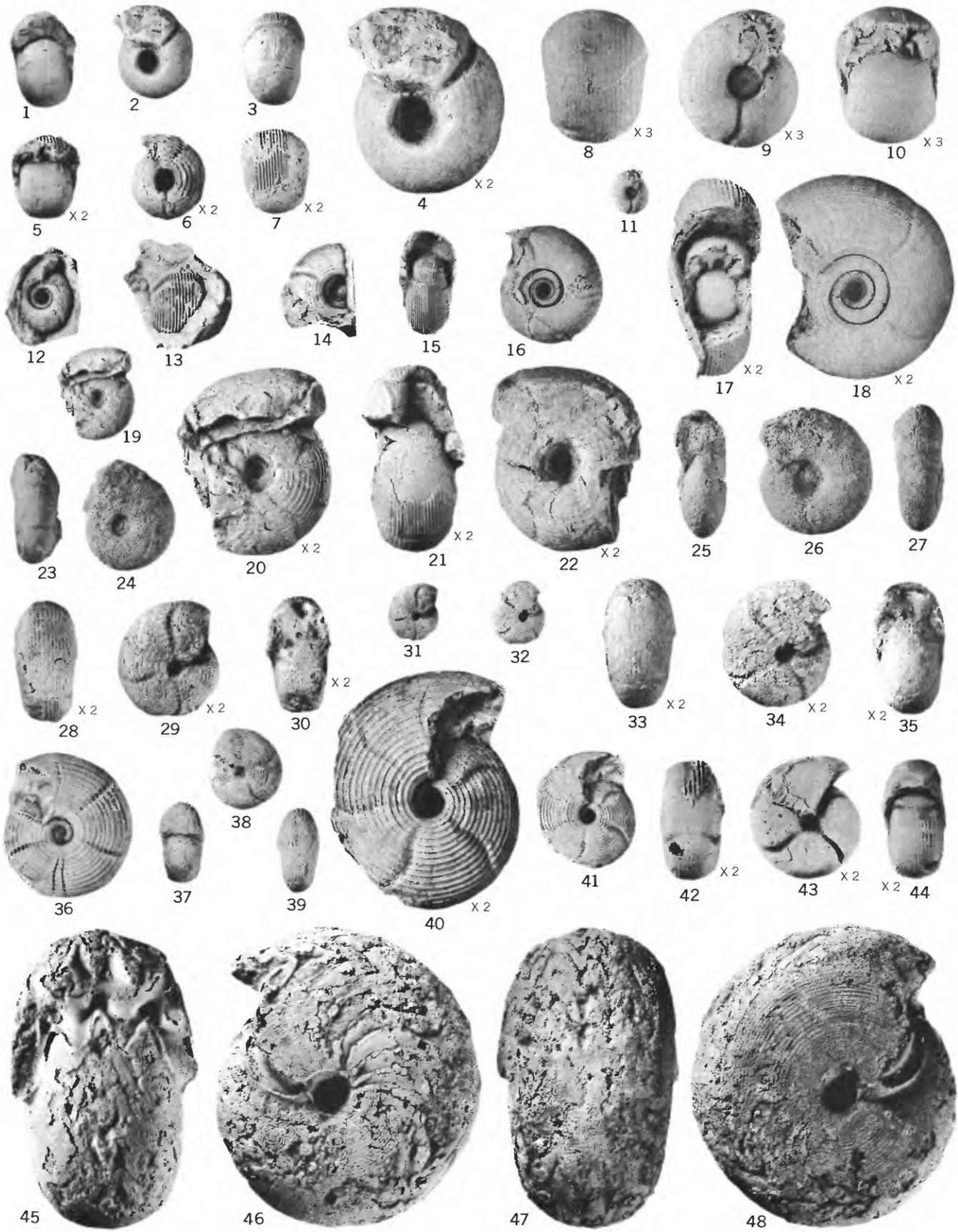


AMMONOIDS: *GONIATITES CHOCTAWENSIS* SHUMARD

PLATE 20

[All figures natural size except as indicated otherwise on plate]

- FIGURES 1–11. *Neoglyphioceras newsomi* (Smith) (p. 202).
1–4. Front, side, and back views and enlarged side view of the outer half volution of the holotype, LSJU 5877 (inner whorls reconstructed), Ruddell shale.
5–7. Enlarged front, side, and back views of a small specimen, USNM 119515, from USGS loc. 8770, Ruddell shale.
8–11. Enlarged back, side, and front views and side view of the inner whorls of the holotype.
- 12–14. *Neoglyphioceras claudi* (Miller and Youngquist) (p. 200).
12. Side view of a small specimen, a latex cast from an external mold, USNM 119512, from USGS loc. 6932, Caney shale erratics.
13, 14. Ventral and side views of another specimen, a latex cast from an external mold, USNM 119512, from the same lot as the last.
- 15–18. *Neoglyphioceras crebriliratum* Gordon, n. sp. (p. 201).
15, 16. Front and side views of the holotype, a latex cast from an external mold, USNM 119513, from USGS loc. 14344, Fayetteville shale, near base.
17, 18. Enlarged front and side views of a paratype, a latex cast from an external mold, USNM 119514, from the same lot as the holotype.
- 19–27. *Neoglyphioceras caneyanum* (Girty) (p. 198).
19–22. Side view and enlarged side, front, and opposite side views of the lectotype, USNM 119589, from USGS loc. 2078, Caney shale, Oklahoma.
23, 24. Back and side views of a specimen, USNM 119711, from USGS loc. 1234B Batesville sandstone.
25–27. Front, side, and back views of another specimen, USNM 119607, from the same lot as the last.
- 28–44. *Neoglyphioceras subcirculare* (Miller) (p. 203).
28–31. Enlarged back, side, and front views and side view of the holotype, WMUC 8754 (with red dot) unnamed shale, Kentucky.
32–35. Side view and enlarged back, side, and front views of a paratype, WMUC 8754, from the same lot as the last.
36. Side view of a large specimen, USNM 119611, from USGS loc. 1245B, Ruddell shale.
37–39. Front, side, and back views of an average sized specimen, USNM 119516, from USGS loc. 8772, Ruddell shale.
40, 41. Enlarged side view and side view of another specimen, a latex cast of an external mold, USNM 119517, from USGS loc. 8773, Ruddell shale.
42–44. Enlarged back, side, and front views of a specimen showing sutures on the internal mold, USNM 119516, from USGS loc. 8772, Ruddell shale.
- 45–48. *Goniatites kentuckiensis* Miller (p. 191).
Front, side, back, and opposite side of a topotype, WMUC 6211, from an unnamed shale, Kentucky.

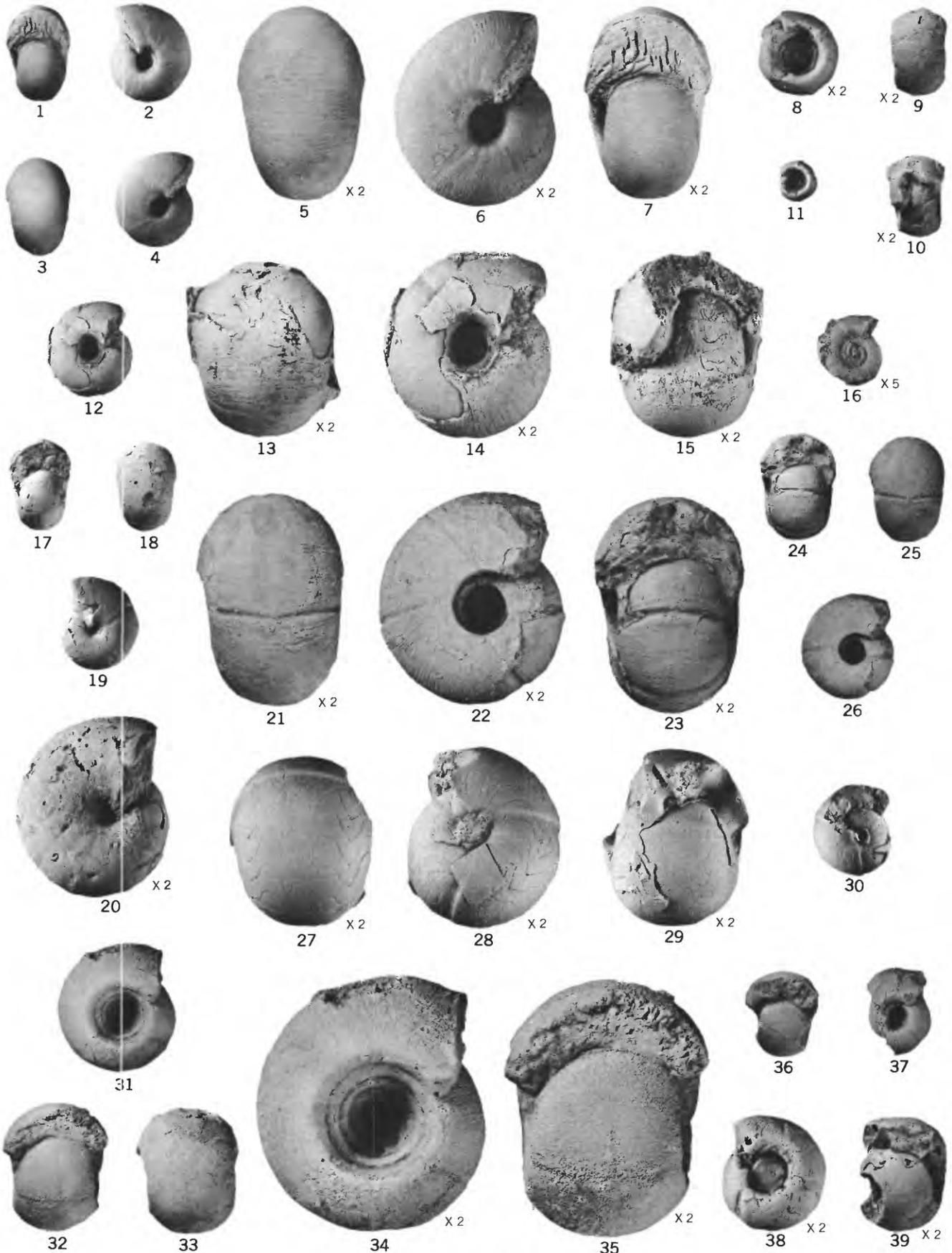


AMMONOIDS: *GONIATITES* AND *NEOGLYPHIOCERAS*

PLATE 21

[All figures natural size except as indicated otherwise on plate]

- FIGURES 1-7. *Cravenoceras miseri* Gordon, n. sp. (p. 211).
1-4. Front, side, back, and opposite side of the holotype, USNM 119528, from USGS loc. 15933, Imo formation.
5-7. Enlarged back, side, and front views of the same specimen.
- 8-11. *Cravenoceras* sp. B (p. 215).
Enlarged side, back, and front views and side view of the only specimen, USNM 119538, from USGS loc. 15059, Pitkin limestone, upper shale member.
- 12-15. *Cravenoceras lineolatum* Gordon, n. sp. (p. 211).
Side view and enlarged back, side, and front views of the holotype, USNM 119526, from USGS loc. 15064, Fayetteville shale.
- 16, 21-26. *Cravenoceras fayettevillae* Gordon, n. sp. (p. 207).
16. Enlarged side view of young specimen, USNM 119520, from USGS loc. 5552, Fayetteville shale.
21-26. Enlarged back, side, and front views and back, side and front of the holotype, USNM 119518, from USGS loc. 14391, Fayetteville shale.
- 17-20. *Cravenoceras involutum* Gordon, n. sp. (p. 210).
Front, back, and side views and enlarged view of opposite side of the holotype, USNM 119523, from USGS loc. 15062, Pitkin limestone, upper shale member.
- 27-30. *Cravenoceras incisum* (Hyatt) (p. 206).
Enlarged back, side, and front views and opposite side of the lectotype, UT 12034, Barnett formation, Texas.
- 31-37. *Cravenoceras scotti* Miller and Youngquist (p. 214).
31-35. Side, front, and back views and enlarged side and front views of a specimen, USNM 119535, from USGS loc. 8790, Fayetteville shale.
36, 37. Front and side views of another specimen from the same locality.
- 38, 39. *Cravenoceras* sp. A (p. 215).
Side and front views of the single specimen, USNM 119537, from USGS loc. 14360, Pitkin limestone, upper shale member.

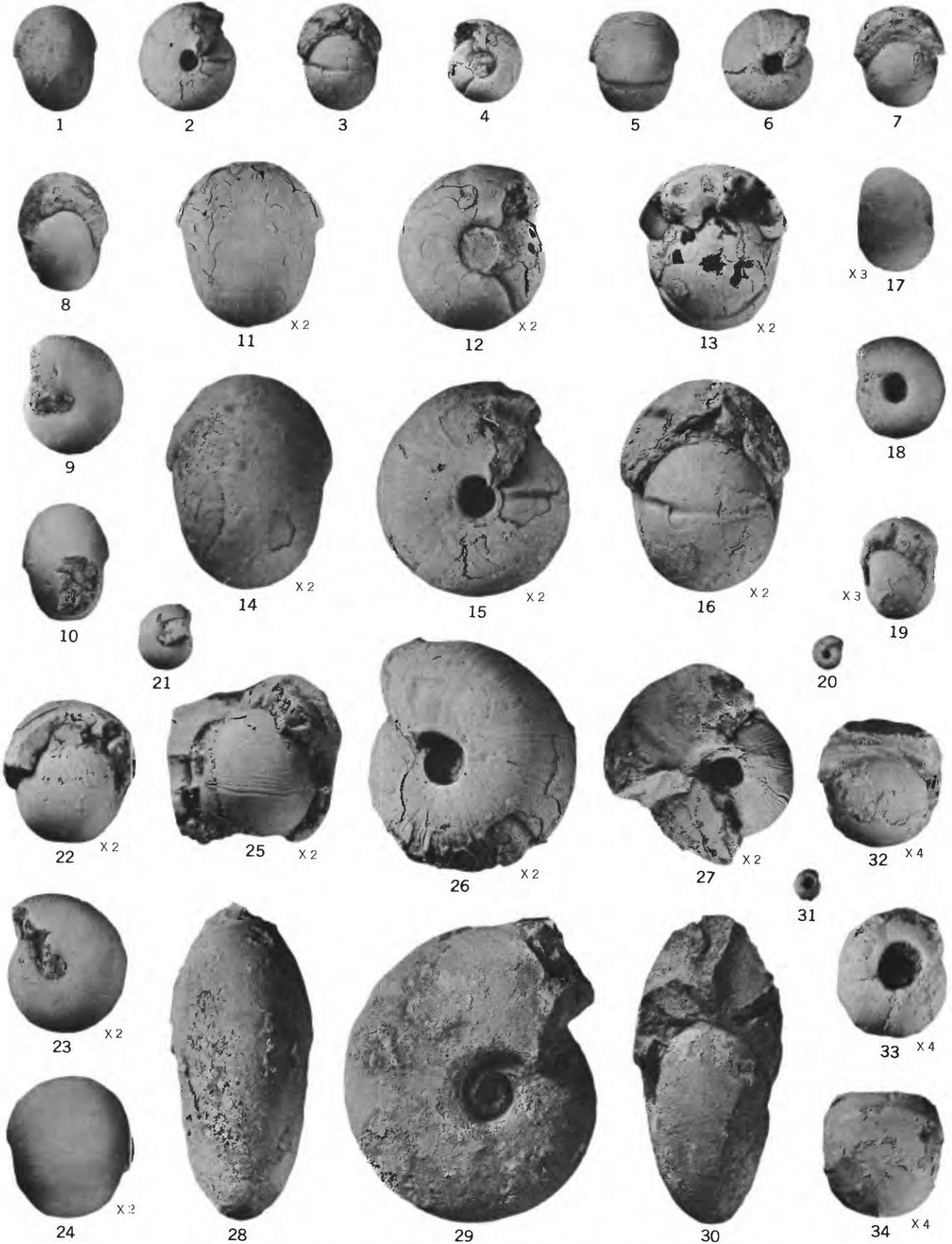


AMMONOIDS: CRAVENOCERAS

PLATE 22

[All figures natural size except as otherwise indicated in plate]

- FIGURES 1-7, 11-20, 25-27. *Paracravenoceras ozarkense* Gordon (p. 217).
1-3, 14-16. Back, side, and front views and enlarged back, side, and front views of the holotype, USNM 119539, from USGS loc. 14391, Fayetteville shale.
4, 11-13. Side view and enlarged back, opposite side, and front views of an internal mold, USNM 119542, Fayetteville shale.
5-7. Back, side, and front views of a specimen, USNM 119545, from USGS loc. 1487E, Fayetteville shale, near top.
17-20. Enlarged back, side, and front views and opposite side of a young shell showing the wavy transverse striae, a paratype, USNM 119542, from USNM loc. 3301, Fayetteville shale.
25, 27. Enlarged ventral and side views of a specimen with well preserved surface sculpture, USNM 119543, from USGS locality 17292, Fayetteville shale.
26. Enlarged side view of another specimen from the same lot as the last.
- 8-10, 21-24. *Paracravenoceras barnettense* (Plummer and Scott) (p. 216).
8-10. Front, side, and back views of the lectotype, UTBEG P-7564, from locality 205-T-24, Barnett formation.
21-24. Side view and enlarged front, opposite side, and back views of a paratype, UTBEG-P-7564 from the same lot as the lectotype.
- 28-30. *Cravenoceras richardsonianum* (Girty) (p. 212).
Back, side, and front views of a nearly complete specimen, USNM 119532, from USGS loc. 13974, Pitkin limestone.
- 31-34. *Cravenoceras richardsonianum* (Girty)? (p. 212).
Side view and enlarged front, side, and back views of a young specimen doubtfully referred to this species, USNM 119534, from USGS loc. 1496, Pitkin limestone.

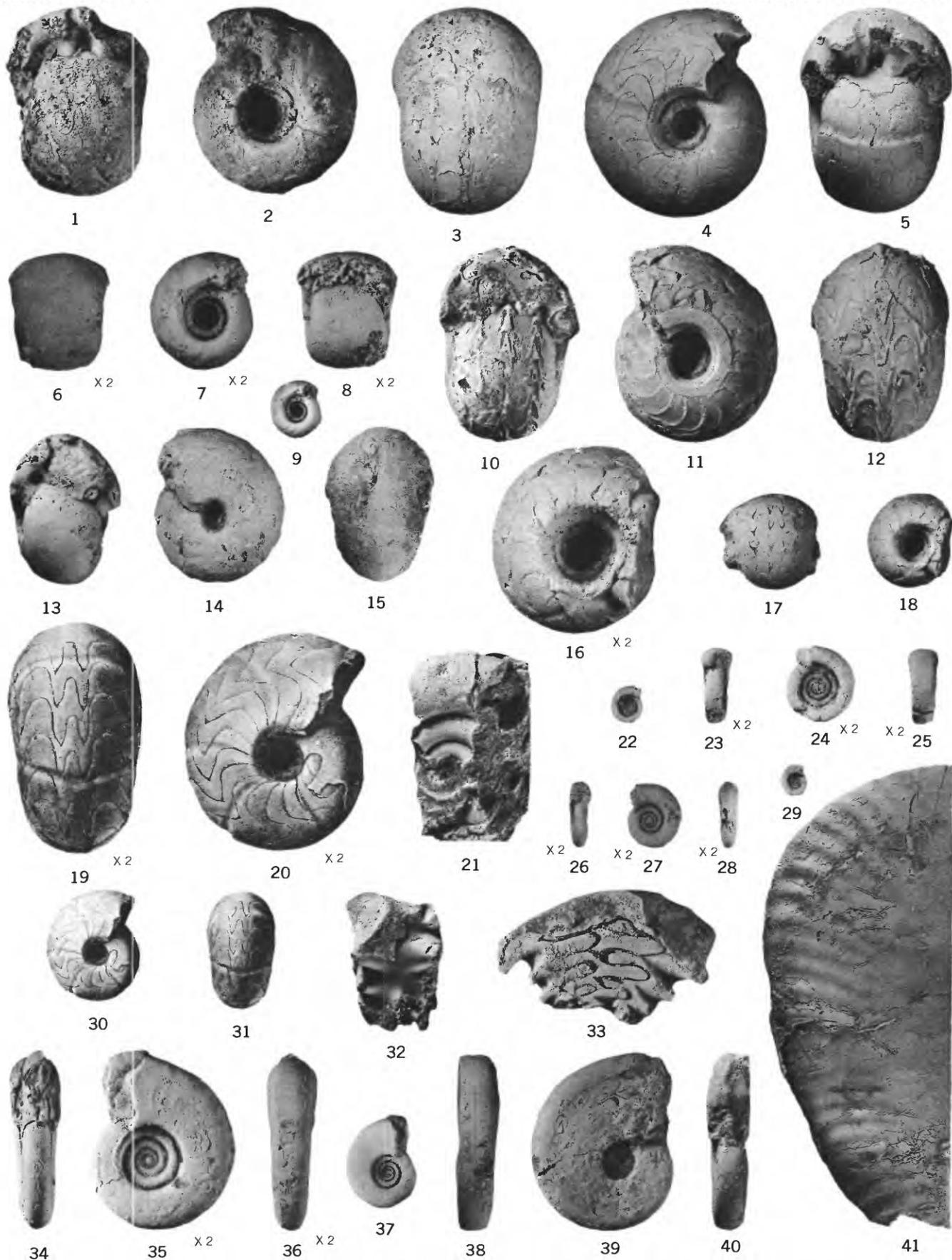


AMMONOIDS: CRAVENOCERAS AND PARACRAVENOCERAS

PLATE 23

[All figures natural size except as indicated otherwise on plate]

- FIGURES 1, 2, 6–9. *Glaphyrites depressus* Gordon, n. sp. (p. 221).
1, 2. Front and side views of the holotype, USNM 119547, from USGS loc. 14388, Bloyd shale, Brentwood limestone member.
6–9. Enlarged back, side, and front views and side view of a small paratype, USNM 119548, from the same lot as the holotype.
- 3–5, 10–12. *Glaphyrites oblatius* Miller and Moore (p. 224).
3–5. Back, side, and front views of the holotype, SUI 1972, Witts Springs formation.
10–12. Front, side, and back views of a slightly more compressed topotype showing the internal suture, USNM 119551, from USGS loc. 8623, Witts Springs formation.
- 13–15, 19, 20, 30, 31. *Glaphyrites morrowensis* (Miller and Moore) (p. 223).
13–15. Front, side, and back views of a specimen USNM 119550, from USGS loc. 14388, Bloyd shale, Brentwood limestone member.
19, 20, 30, 31. Enlarged back and side views and side and back views of a syntype, SUI 1980, Witts Springs formation, after Miller and Moore.
- 16–18. *Glaphyrites globosus* (Easton) (p. 222).
Enlarged side view and back and side views of the holotype, WMUC 48192, "Pitkin limestone."
21. *Protocanites* cf. *P. lyoni* (Meek and Worthen) (p. 283).
Side view of a specimen showing parts of three volutions, USNM 119473, from USGS loc. 14346, Walls Ferry limestone.
- 22–25. *Fayettevillea planorbis* Gordon (p. 225).
Side view and enlarged front, side, and back views of the holotype, USNM 119552, from USNM loc. 3301, Fayetteville shale.
- 26–29, 32, 33, 38–40. *Stenopronorites arkansiensis* (Smith) (p. 288).
26–29. Enlarged front, side, and back views and opposite side of a young specimen, USNM 119476, from USGS loc. 2849, Bloyd shale, Brentwood limestone member.
32, 33. End and side views of a fragment of a large phragmacone, the holotype of *Pronorites sieben-thali* Smith, LSJU 5607, Johns Valley shale.
38–40. Back, side, and front views of the holotype, USNM 108493, from USGS loc. 1275A10, Witts Springs formation.
- 34–37. *Pronorites baconi* (Miller, Youngquist, and Nielsen) (p. 286).
Enlarged front, side, and back views and opposite side of a specimen, USNM 119474, from USNM loc. 3301, Fayetteville shale.
41. *Stenopronorites arkansiensis* (Smith)? (p. 288).
Side view of the ventral part of a large partly crushed ribbed conch tentatively referred to this species, USNM 119477, from USGS loc. 15082, Johns Valley shale.

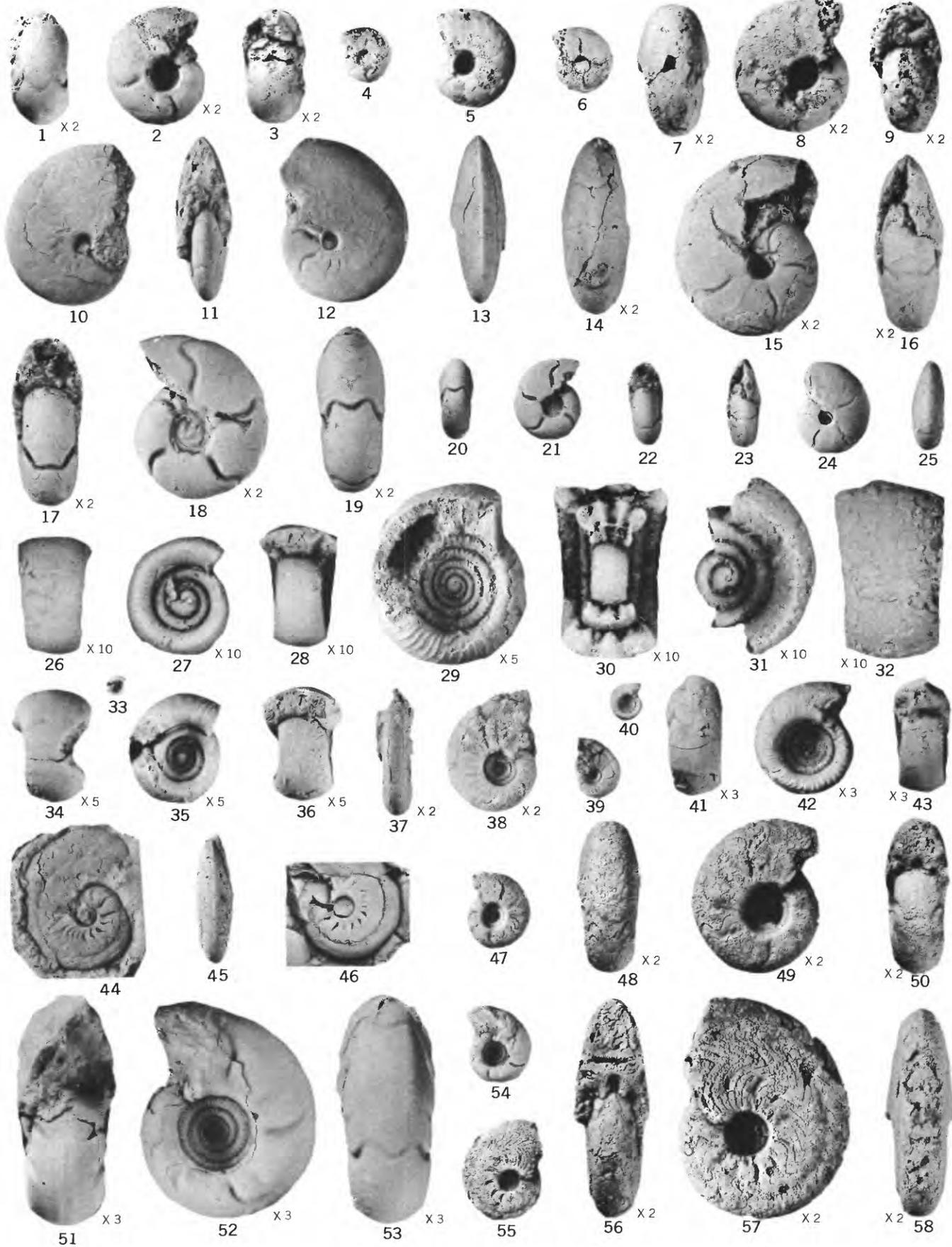


AMMONOIDS: *GLAPHYRITES*, *PROTOCANITES*, *PRONORITES*, AND *STENOPRONORITES*

PLATE 24

[All figures natural size except as indicated otherwise on plate]

- FIGURES 1-9. *Girtyoceras jasperense* Gordon, n. sp. (p. 229).
1-4. Enlarged back, side, and front views and opposite side of a paratype, USNM 119627, from USGS loc. 14376, Fayetteville shale.
5. Side view of another paratype, USNM 119627, from the same lot as the holotype.
6-9. Side view and enlarged back, opposite side, and front views of the holotype, USNM 119626, from USGS loc. 14376, Fayetteville shale.
- 10-13, 17-22, 29-32. *Girtyoceras meslerianum* (Girty) (p. 233).
10-13. Side, front, opposite side, and back views of a mature phragmacone, USNM 119629, Caney shale, Oklahoma.
17-22. Enlarged front, side, and back views and back, opposite side, and front views of the holotype, USNM 119594, from USGS loc. 2083, Caney shale, Oklahoma.
29. Enlarged side of a young specimen with strong transverse riblets, USNM 119628, a previously unfigured shell from the original lot.
30-32. Enlarged front, side, and back views of another young specimen with very weak transverse riblets, a figured paratype 119595, from the type locality.
- 14-16, 23-28, 33-36. *Girtyoceras welleri* Gordon, n. sp. (p. 233).
14-16, 23-25. Enlarged back, side, and front views and back, side, and front views of the holotype, WMUC 9619, Moorefield formation.
26-28. Enlarged back, side, and front views of a very young topotype (*Glyphioceras calyx* of Smith, 1903, p. 62, not Phillips), LSJU 5989, Moorefield formation.
33-36. Side view and enlarged back, side, and front views of a small topotype, LSJU 5990, from the same lot as the last.
- 37-39. *Girtyoceras* cf. *G. ornatissimum* Miller and Youngquist (p. 232).
Enlarged back and side views and opposite side of a partly crushed specimen, USNM 119632, from USGS loc. 15920, Fayetteville shale, near base.
- 40-58. *Girtyoceras limatum* (Miller and Faber) (p. 231).
40-43. Side view and enlarged back, side, and front views of an immature shell, USNM 119630, from USGS loc. 8772, Ruddell shale.
44-46. Side (latex cast), back (internal mold), and opposite side (latex cast) of a mature specimen, USNM 119612, (*Eumorphoceras bisulcatum* of Girty, 1911, p. 103), from USGS loc. 1245A, Ruddell shale.
47-50. Side view and enlarged back, side, and front views of the holotype of *Goniatites leviculus* Miller and Faber, WMUC 8752, unnamed shale, Kentucky.
51-54. Enlarged front, side, and back views and side view of a specimen at early maturity, USNM 119630, from USGS loc. 8772, Ruddell shale.
55-58. Side view and enlarged front, opposite side, and back views of the holotype, WMUC 8753, unnamed shale, Kentucky.

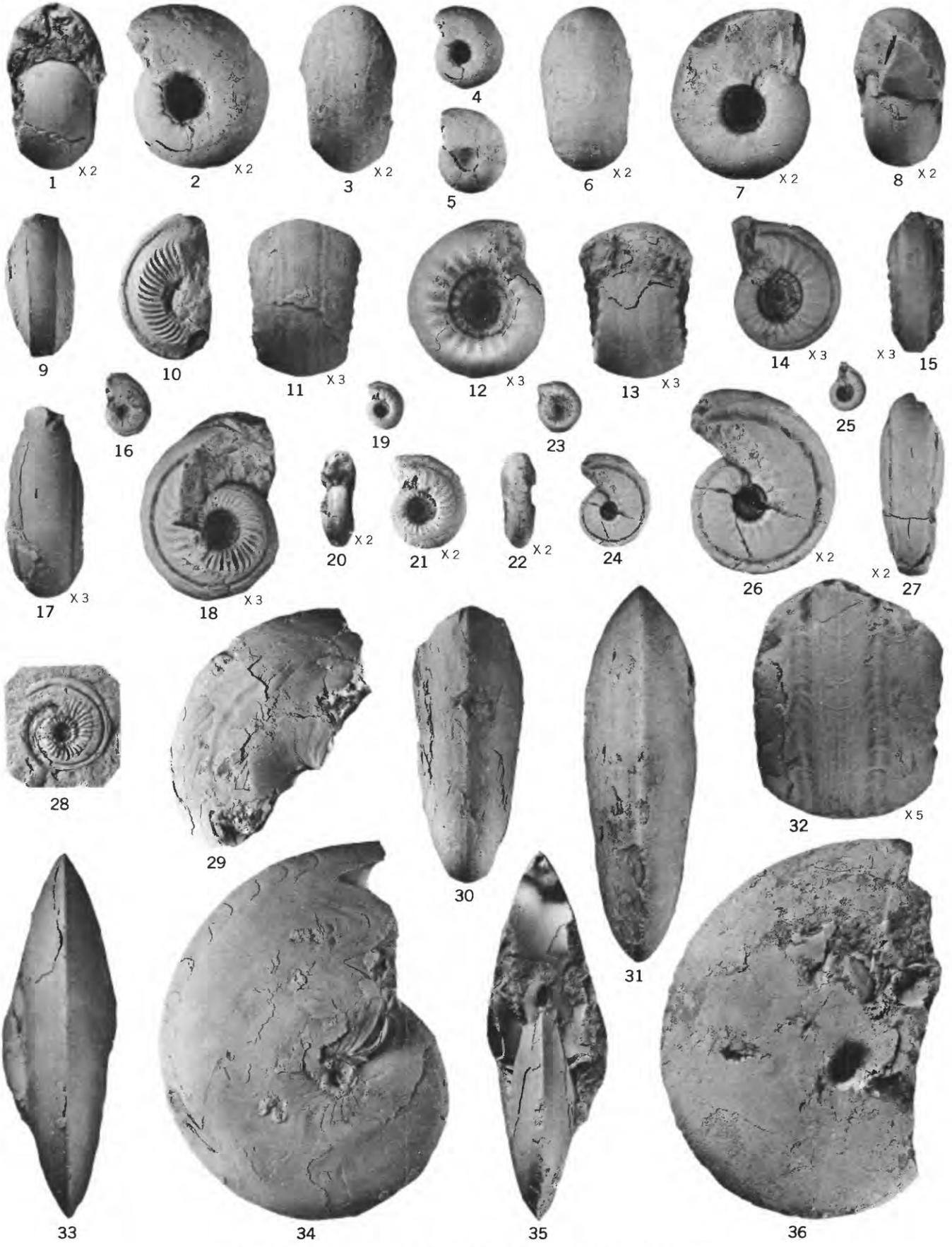


AMMONOIDS: *GIRTYOCERAS*

PLATE 25

[All figures natural size except as indicated otherwise on plate]

- FIGURES 1-8, 11-13, 23, 32. *Eumorphoceras milleri* Gordon, n. sp. (p. 238).
1-4. Enlarged front, side, and back views and side view of a paratype, USNM 119638, from USNM loc. 3301, Fayetteville shale.
5-8. Side view and enlarged back, opposite side, and front views of the holotype, USNM 119637, from the same lot as above.
11-13, 23, 32. Enlarged back, side and front views, opposite side, and enlarged view of the surface sculpture of a small paratype, USNM 119638, from the same lot as the holotype.
- 9, 10, 16-18, 28-30. *Eumorphoceras bisulcatum* Girty (p. 235).
9, 10. Back and side views of an incomplete shell at early maturity, USNM 119636, from USGS loc. 16257, Imo formation.
16-18. Side view and enlarged back and opposite side views of the holotype, USNM 119596, from USGS loc. 2082, Caney shale, Oklahoma.
28. Side view of a specimen in shale, USNM 119635, from USGS loc. 14371, Pitkin limestone, upper shale member.
29, 30. Side and ventral views of an incomplete specimen in late maturity, USNM 119634, from USGS loc. 15394, Caney shale, Oklahoma.
- 14, 15, 19-22, 24-27, 31, 36. *Eumorphoceras (Edmooroceras) plummeri* Miller and Youngquist (p. 239).
14, 15, 25. Enlarged side and back views and side view of a specimen, USNM 119642, from USGS loc. 15947, Fayetteville shale.
19-22. Side view and enlarged front, side, and back views of another specimen, USNM 119641, from USGS loc. 15911, Fayetteville shale.
24, 26, 27. Side view and enlarged side and back views of the holotype of *E. (E.) goddardense* Elias, Univ. Nebraska colln., "Springer formation," Goddard shale member, Oklahoma.
31, 36. Back and side views of a large specimen at late maturity, USNM 112994, Barnett formation, Texas.
- 33-35. *Girtyoceras meslerianum* (Girty) (p. 233).
Back, side, and front views of the holotype of *Dryochoceras brainerdi* Morgan, CU 18475, Caney shale, Oklahoma.

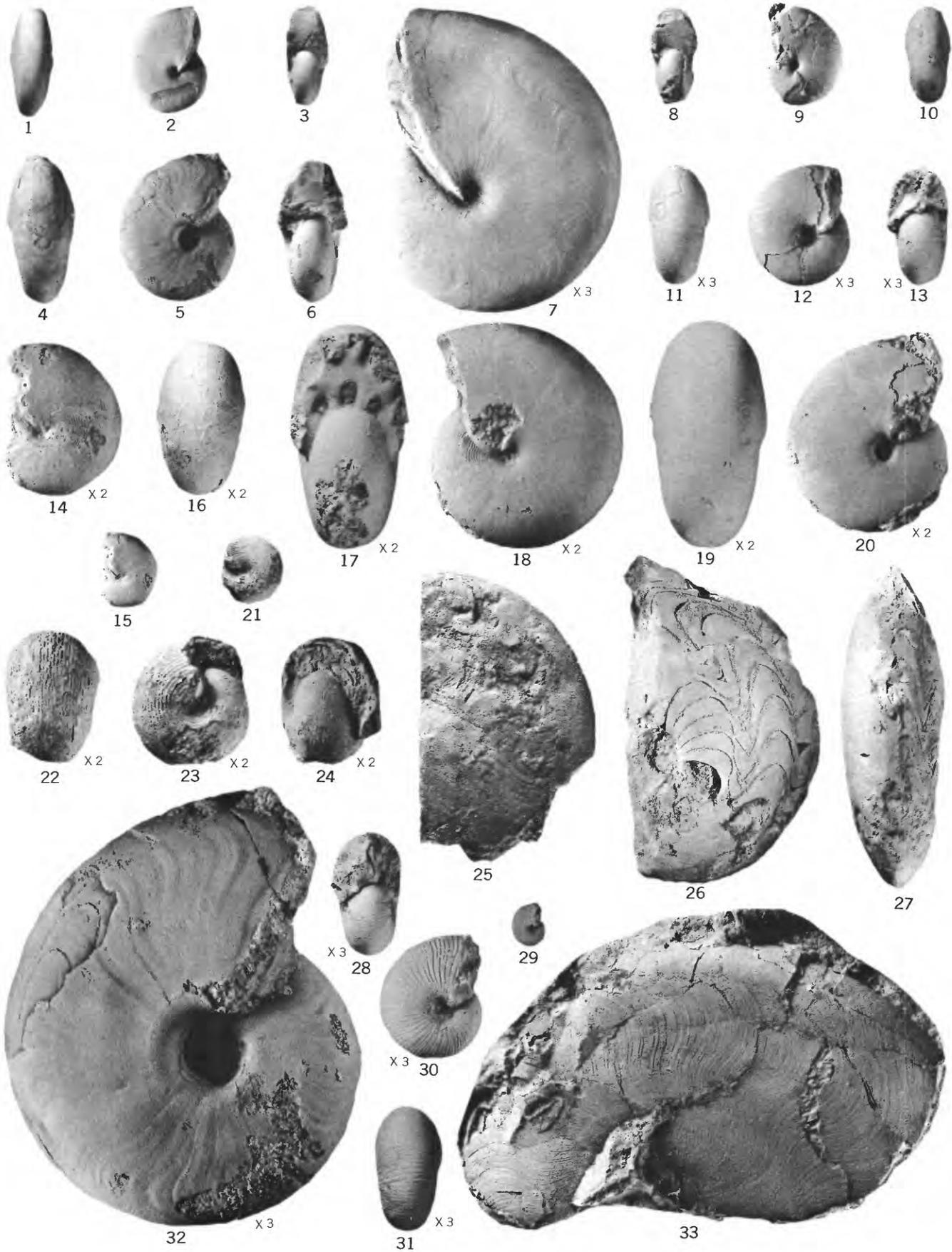


AMMONOIDS: GIRTYOCERAS AND EUMORPHOCERAS

PLATE 26

[All figures natural size except as indicated otherwise on plate]

- FIGURES 1-3, 7. *Anthracoceras paucilobum* (Phillips) (p. 243).
Back, side, and front views and enlarged opposite side view of the best preserved specimen, USNM 119643, from USGS loc. 15301, Imo formation.
- 4-6, 32. *Gordonites filifer* Gordon, n. sp. (p. 245).
Back, side, and front views and enlarged side view showing fine longitudinal lirae of the holotype, USNM 119648, from USGS loc. 1999, Hale formation, Prairie Grove member.
- 8-13, 20. *Gordonites matheri* Gordon, n. sp. (p. 246).
8-10, 20. Front, side, and back views and enlarged view of opposite side of the holotype, USNM 119650, from USGS locality 1999, Hale formation, Prairie Grove member.
11-13. Enlarged back, side, and front views of a small paratype, USNM 119651, from the same lot as the holotype.
- 14-19. *Bisatoceras (Pseudobisatoceras) secundum* Miller and Moore (p. 250).
14-16. Enlarged side view, side view, and enlarged back view of the lectotype, SUI 1969, Witts Springs formation.
17-19. Enlarged front, side, and back views of a topotype, USNM 119652, from USGS loc. 8623, Witts Springs formation.
- 21-24. *Proshumardites morrowanus* Gordon, n. sp. (p. 277).
Side view and enlarged back, side, and front views of a specimen, USNM 119679 from USGS loc. 8623, Witts Springs.
- 25-31. *Homoceratoides cracens* Gordon, n. sp. (p. 241).
25. Side view of a phragmacone showing some surface sculpture, the holotype USNM 119656, from USGS loc. 2860A, Hale formation, Prairie Grove member.
26, 27. Side and ventral views of a septate paratype, USNM 119655, from USGS loc. 2818A, Hale formation, Prairie Grove member.
28-31. Enlarged front view, side view, and enlarged side and back views of a small well-preserved paratype, USNM 119654, from USGS loc. 2849, Bloyd shale, Brentwood limestone member. Note the bifurcating transverse riblets.
33. *Gordonites* cf. *G. filifer* Gordon (p. 246).
Side view of a large incomplete shell, a latex cast of an external mold, USNM 119657, from USGS loc. 15851, Johns Valley shale.

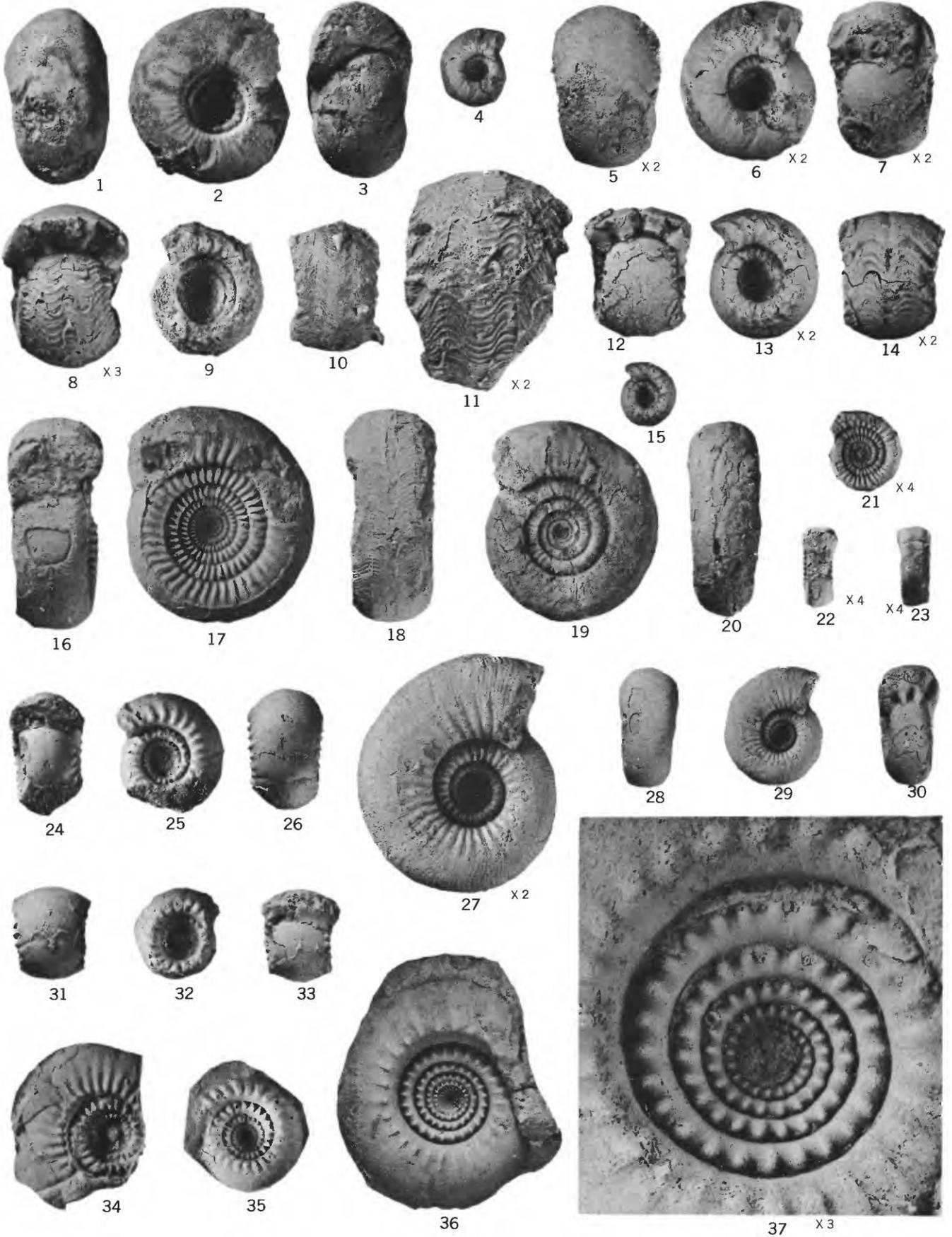


AMMONOIDS: ANTHRACOCERAS, GORDONITES, BISATOCERAS, (PSEUDOBISATOCERAS), PROSHUMARDITES, AND HOMOCERATOIDES

PLATE 27

[All figures natural size except as indicated otherwise on plate]

- FIGURES 1-8.** *Gastrioceras (Branneroceras) henbesti* Gordon, n. sp. (p. 255).
1-3. Back, side, and front views of the holotype, USNM 119660, from USGS loc. 8354, Hale formation, Prairie Grove member.
4-7. Side view and enlarged back, side, and front views of a paratype, USNM 119662, from USGS loc. 8624, the same locality as that of the holotype.
8. Enlarged front view of another small paratype showing the configuration of the transverse lirae and the internal suture, USNM 119661, from USGS loc. 8354.
- 9-15. *Gastrioceras (Branneroceras) textum* Gordon, n. sp. (p. 256).
9-11. Side and back views and enlarged side view showing surface sculpture and part of the internal suture of the holotype, USNM 119663, from USGS loc. 8354, Hale formation, Prairie Grove member.
12-15. Enlarged front, side, and back views and side view of a small paratype, USNM 119664, from the same lot as the holotype, Note the intraventral ridge, expressed as a groove on the internal mold.
- 16-23, 27-30. *Gastrioceras (Branneroceras) branneri* Smith, (p. 253).
16-18. Front, side, and back views of an evolute shell, USNM 119624, from USGS loc. 8623, Witts Springs formation.
19, 20. Side and back views of the holotype, USNM 26439, from USGS loc. 1275A10, Witts Springs formation.
21-23. Enlarged side, front, and back views of a young specimen, USNM 119659, from USGS loc. 2849, Bloyd shale, Brentwood member.
27-30. Enlarged side view and back, side, and front views of an involute specimen, the holotype of *Branneroceras branneri* var. *halense* Miller and Moore, SUI 1974, Witts Springs formation.
- 24-26, 34. *Gastrioceras (Lissogastrioceras) adaense* Miller and Owen (p. 257).
24-26. Front, side, and back views of an immature specimen, USNM 119665, from USGS loc. 15305, Witts Springs formation.
34. Side view of a latex cast of an external mold, one of those from which Smith (1903, pl. 11, fig. 1) made the restored cast he figured as *G. carbonarium* von Buch, LSJU 5605, Johns Valley shale.
- 31-33, 35-37. *Gastrioceras (Lissogastrioceras) fittsi* Miller and Owen (p. 259).
31-33. Back, side, and front views of an immature specimen, USNM 119668, from USGS loc. 8623, Witts Springs formation.
35. Side view of a latex cast of an external mold from which Smith (1903, pl. 13, fig. 12) made the cast figured as *G. listeri* Martin, LSJU 5594, Johns Valley shale.
36, 37. Side view of an internal mold and enlarged side view of a latex cast made from the external mold of the same specimen, USNM 119667, from USGS loc. 15851, Johns Valley shale. Note the fine lirae on the umbilical nodes.



AMMONOIDS: *GASTRIOCERAS*

PLATE 28

[All figures natural size except as indicated otherwise on plate]

- FIGURES 1–5. *Nomismoceras marshallense* Gordon, n. sp. (p. 248).
1–3, 5. Enlarged back, side, and front views and side view of the holotype, USNM 119646, from USGS locality 15946, Fayetteville shale.
4. Enlarged side view of a slightly less involute paratype, USNM 119647, from the type locality.
- 6–9. *Paradimorphoceras (Glyphiolobus)* sp. (p. 282).
Enlarged back, side, and front views and side view of a specimen, USNM 119688, from USGS loc. 9895, Ruddell shale.
- 10–13. *Paradimorphoceras* sp. (p. 281).
Enlarged front, side, and back views and side view of a specimen, USNM 119685, from USGS loc. 5552, Fayetteville shale.
- 14–17. *Paradimorphoceras (Glyphiolobus) lepidus* (Girty) (p. 282).
Side view and enlarged back, side, and front views of the holotype, USNM 119599, from USGS locality 2082, Caney shale, Oklahoma.
- 18–25. *Pygmaeoceras pygmaeum* (Mather) (p. 261).
18–21. Enlarged back, side, and front views and side view of a topotype, USNM 119671, from USGS loc. 1999, Hale formation, Prairie Grove member.
22–25. Side view and enlarged back, side, and front views of another topotype, from the same lot.
- 26–39. *Pygmaeoceras solidum* Gordon, n. sp. (p. 262).
26–28, 38. Enlarged back, side, and front views and side view of a small paratype, USNM 119673, from USGS loc. 8623, Witts Springs formation.
29–31, 39. Enlarged front, side, and back views and side view of another small paratype showing surface sculpture and the internal suture, USNM 119673, from the same lot.
32–37. Side, back, and front views and enlarged back, side, and front views of the holotype, USNM 119672, from USGS loc. 8623, Witts Springs formation.
- 40–47. *Bisatoceras paynei* Gordon, n. sp. (p. 249).
40–43. Side view and enlarged back, side, and front views of the paratype, USNM 119675, from USGS loc. 14390, Hale formation, Prairie Grove member.
44–47. Enlarged back, side, and front views and side view of the holotype, USNM 119674, from USGS loc. 1999, Hale formation, Prairie Grove member.

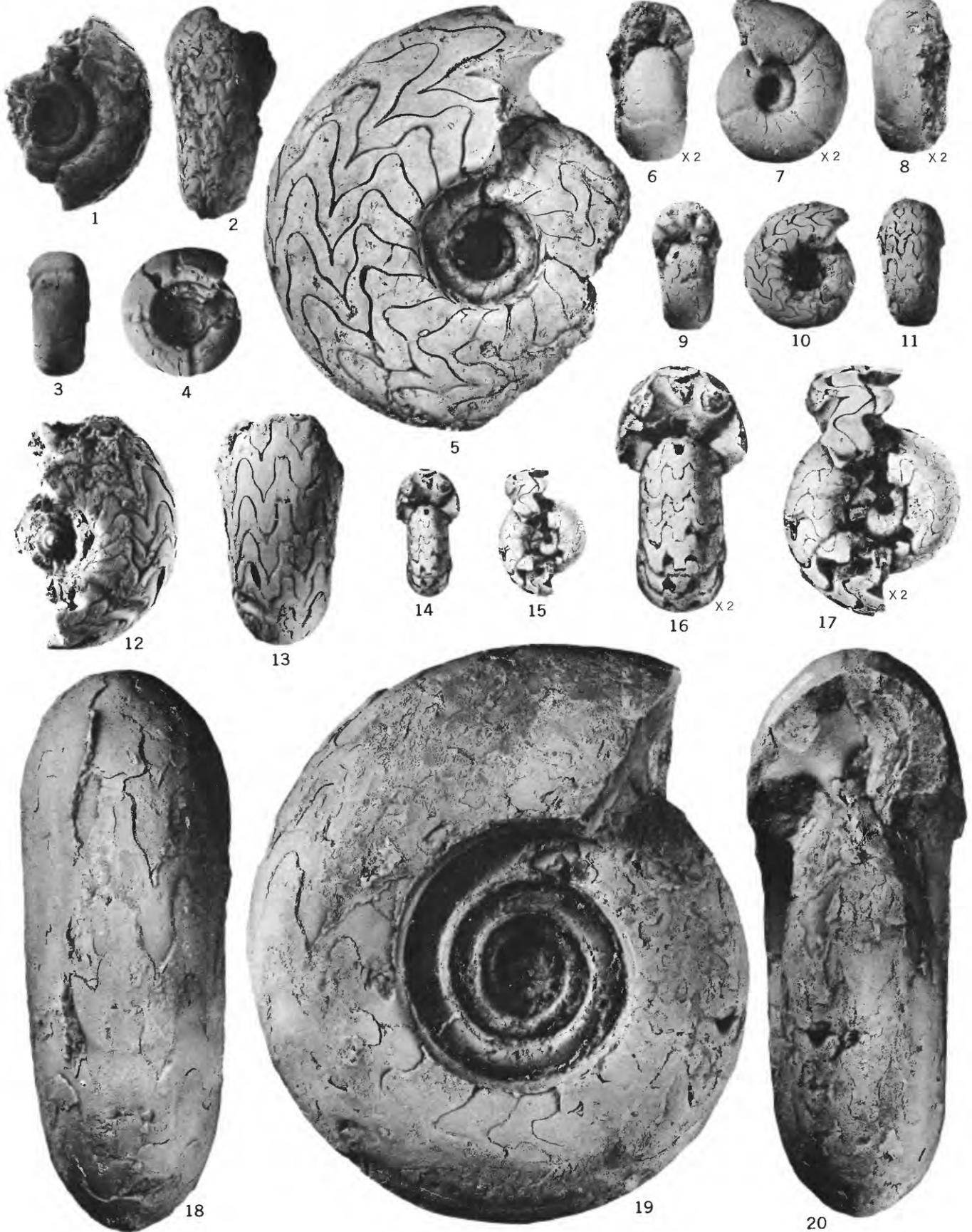


AMMONOIDS: *NOMISMOCERAS*, *PARADIMORPHOCERAS*, *P. (GLYPHILOBUS)*, *PYGMAEOCERAS*, AND *BISATOCERAS*

PLATE 29

[All figures natural size except as indicated otherwise on plate]

- FIGURES 1-4, 18-20.** *Pseudoparalegoceras (Phaneroceras) compressum* (Hyatt) (p. 264).
1, 2. Side and ventral views of an incomplete phragmacone, USNM 119713, from USGS loc. 16271, Atoka formation.
3, 4. Back and side views of a small specimen from the same locality as the last.
18-20. Back, side, and front views of the holotype, USNM 23872, Bend group, Texas.
- 5-17.** *Pseudoparalegoceras (Phaneroceras) kesslerense* (Mather) (p. 265).
5. Side view of the holotype of *P. williamsi* Miller and Downs, USNM 119618, from USGS loc. 8190, Atoka formation.
6-8. Enlarged front, side, and back views of a small specimen, USNM 119676, from USGS loc. 16271, Atoka formation.
9-11. Front, side, and back views of a small paratype of *P. williamsi* Miller and Downs, USNM 119622, from USGS loc. 8190, Atoka formation.
12, 13. Side and ventral views of another paratype of *P. williamsi* Miller and Downs, USNM 119623, from USGS loc. 8190.
14-17. Front, side and enlarged front and side views of the holotype, WMUC 16123, Bloyd shale, Kessler limestone member, after Miller and Moore.

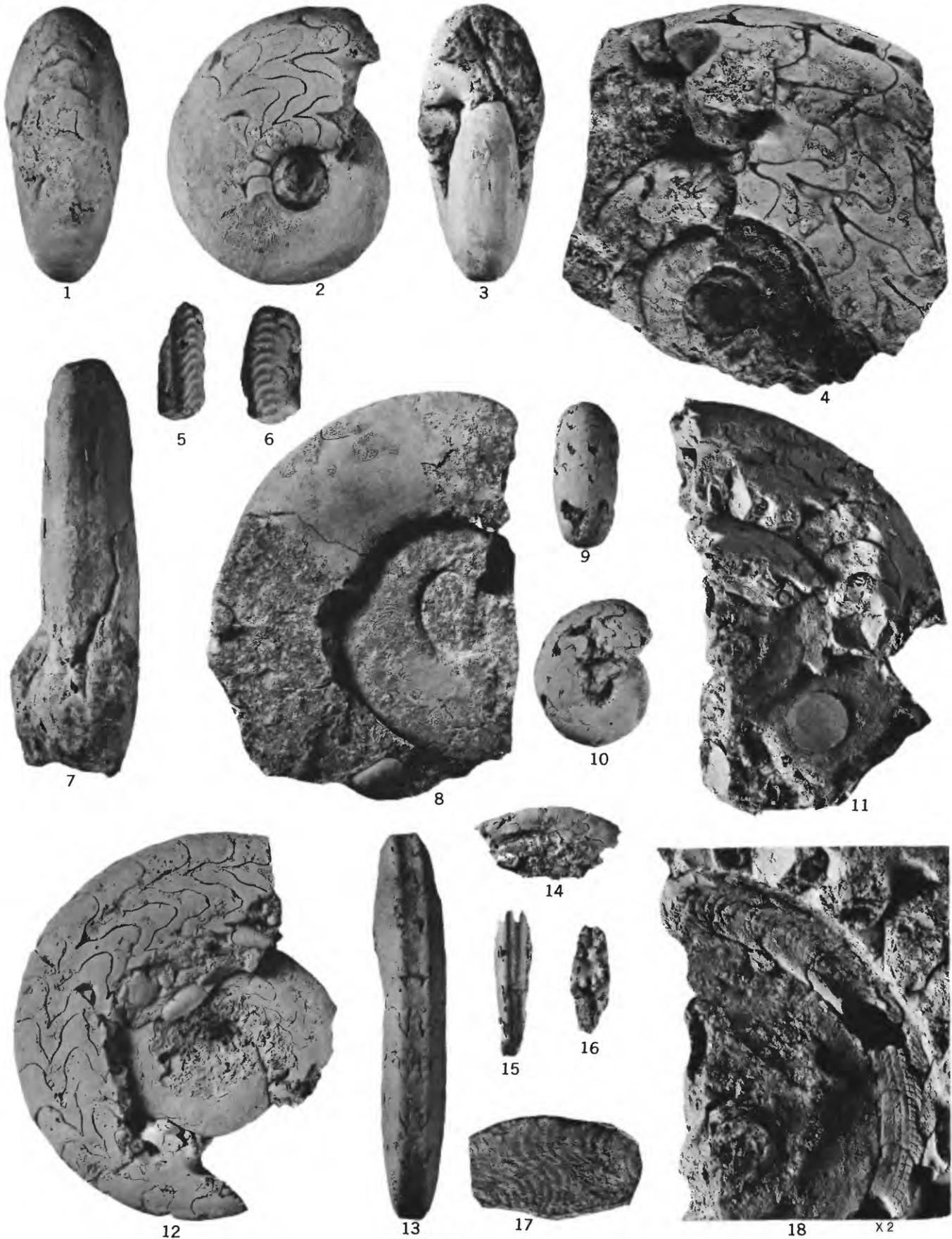


AMMONOIDS: *PSEUDOPARALEGOCERAS*

PLATE 30

[All figures natural size except as indicated otherwise on plate]

- FIGURES 1-3, 9, 10. *Paralegoceras iowense* (Meek and Worthen) (p. 268).
1-3. Back, side, and front views of the holotype of *P. newsomi* Smith, all but the outer one quarter revolution a restoration, LSJU 5608, Atoka formation.
9, 10. Inner whorls of the holotype of *P. newsomi* Smith, partly restored LSJU 5609.
4. *Paralegoceras (Diaboloceras) varicostatum* (Miller and Furnish) (p. 270).
Part of a large specimen, USNM 119678, from USGS loc. 16271, Atoka formation.
- 5, 6, 17. *Axinolobus* cf. *A. modulus* Gordon (p. 276).
5, 6. Ventral and side views of a fragmental specimen, USNM 120195, from USGS loc. 17693, reworked pebble in the Atoka formation.
17. Fragment of a whorl showing surface sculpture similar to that of *Winslowoceras* and *Eowellerites*, a latex cast of an external mold, USNM 119681, from USGS loc. 3660, Bloyd shale, Kessler limestone member.
- 7, 8. *Axinolobus modulus* Gordon (p. 275).
7, 8. Ventral and side views of holotype, USNM 119684, from USGS loc. 2000, Morrow series, Oklahoma.
- 11, 14-16, 18. *Eowellerites discoidalis* Gordon, n. sp. (p. 273).
11. Side view of the holotype with a small fragment of an inner whorl in place, USNM 119682, from USGS loc. 1292, Atoka formation.
14-16. Side, ventral, and end views of the small fragment.
18. Enlarged view of the inner part of the holotype with the fragment removed to show the configuration of the surface sculpture.
- 12, 13. *Winslowoceras henbesti* Miller and Downs (p. 272).
Side and ventral views of the holotype, USNM 118929, from USGS loc. 8190, Atoka formation.



AMMONOIDS: *PARALEGOCERAS*, *AXINOLOBUS*, *EOWELLERITES*, AND *WINSLOWCERAS*

