

Stratigraphy and Depositional Environment of Greenhorn Limestone (Upper Cretaceous) of Kansas

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Selected Plates

(Available online at <http://www.kgs.ku.edu/Publications/Bulletins/209/index.html>)

Explanation of Plate 2

Bivalves and ammonites from the Lincoln Member.

- A, F**, *Exogyra columbella* Meek: Exterior views of left valves, both X1, KU82083, KU82084, lower part of Lincoln Member at Locality 23.
- B-E**, *Ostrea beloiti* Logan: B, interior view of right valve, X1, KU82073, lowermost bed of Lincoln Member at Locality 8; C, exterior view of right valve, X1, KU82074, lowermost bed of Lincoln Member at Locality 8; D, interior view of left valve, X1, KU82072, lowermost bed of Lincoln Member at Locality 8; E, interior view of left valve, X1, KU82071, lowermost unit of Lincoln Member at Locality 28.
- G**, *Inoceramus* cf. *I. tenuistriatus* Nagao and Matsumoto: internal mold of left valve, X1, KU82094, middle part of Lincoln Member at Locality 12.
- H**, *Acanthoceras?* sp.: flattened internal mold, X1, KU82099, lower part of Lincoln Member at Locality 12.
- I, J**, *Stomohamites* cf. *S. simplex* (d'Orbigny): I, internal mold, X2, KU82122, lower part of Lincoln Member at Locality 23; J, crystalline-calcite internal mold, X2, KU82081, lowermost unit of Lincoln Member at Locality 3.
- K-M, Q**, *Eucalycoceras* sp. B: K, L, latex casts of external molds, K is X2, L is X1, KU82091, KU82090, middle part of Lincoln Member at Locality 26; M, latex cast of external mold, X1, KU82089, lower part of Lincoln Member at Locality 30; Q, internal mold, X2, KU82092, middle part of Lincoln Member at Locality 26.
- N**, *Borissjakoceras* cf. *B. orbiculatum* Stephenson: internal mold, X1, KU82100, lower part of Lincoln Member at Locality 12.
- O, S-U**, *Eucalycoceras* sp. A: O, latex cast of external mold, X1, KU82088, middle part of Lincoln Member at Locality 8; S, internal mold fragment, X1, KU82086, lower part of Lincoln Member at Locality 23; T, latex cast of external mold fragment, U, ventral view of internal mold fragment, both X1, KU82087, KU82085, lower part of Lincoln Member at Locality 23.
- P**, *Desmoceras* (s.l.) sp.: internal mold, X1, KU82082, middle part of Lincoln Member at Locality 26.
- R**, *Camptonectes* sp.: flattened valve, X2, KU82093, lower part of Lincoln Member at Locality 12.
- V**, *Desmoceras* sp.: flattened internal mold, X1, KU82189, lower part of Lincoln Member at Locality 12.

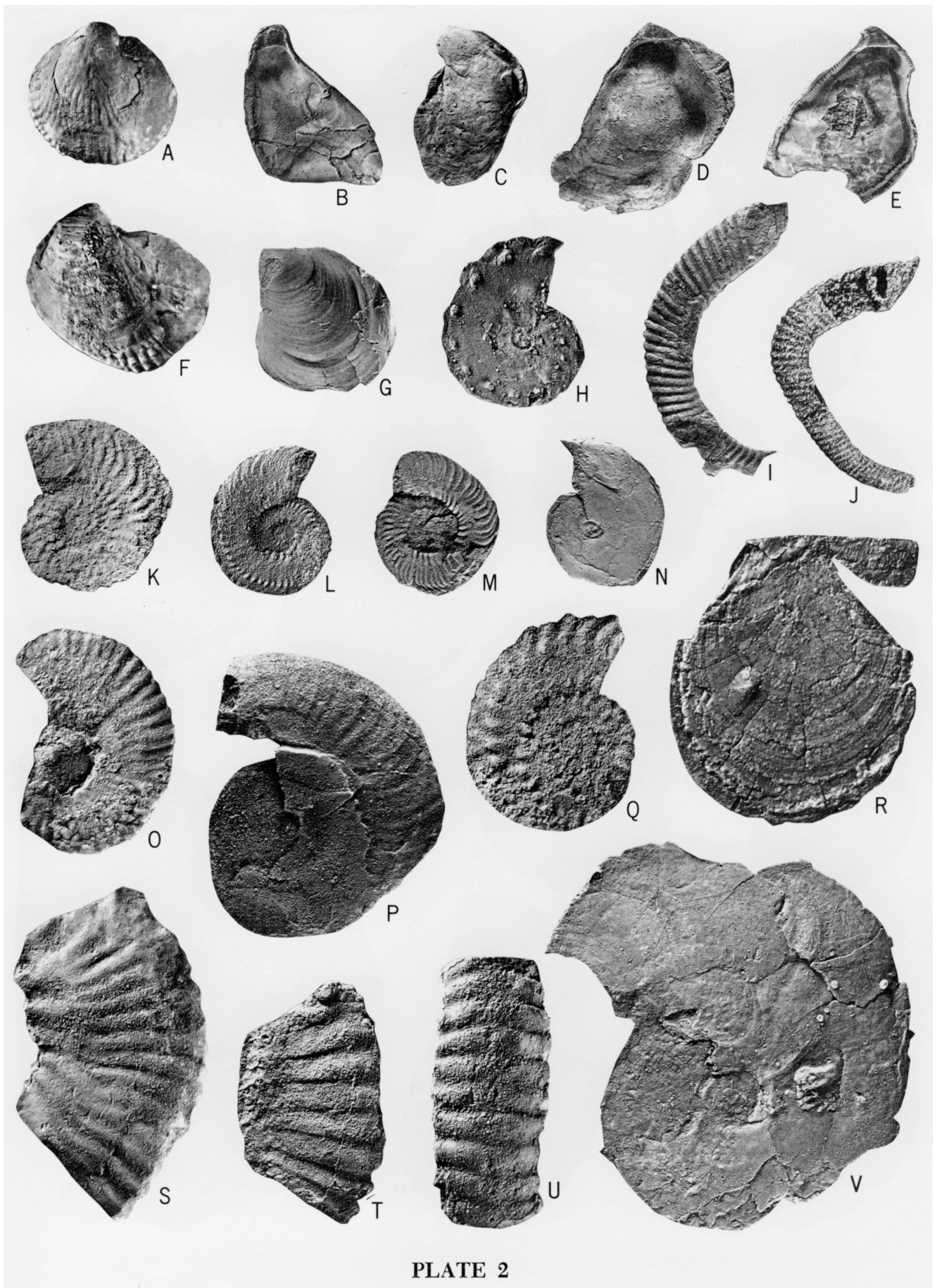


PLATE 2

Explanation of Plate 3

Bivalves from the Lincoln Member.

- A-F**, *Exogyra* aff. *E. boveyensis* Berquist: A, interior view of left valve, X2, KU82080, uppermost unit of Lincoln Member at Locality 8; B, exterior view of right valve, X2, KU82078, uppermost unit of Lincoln Member at Locality 8; C, interior view of two left valves, X2, KU82076, lowermost unit of Lincoln Member at Locality 26; D, cluster of valves on *Inoceramus*, X1/2, KU82077, lowermost unit of Lincoln Member at Locality 26; E, interior view of right valve, X2, KU82075, lowermost unit of Lincoln Member at Locality 5; F, interior view of right valve, X1, KU82079, uppermost unit of Lincoln Member at Locality 8.
- G**, *Inoceramus* sp., partially crushed right valve, X2, KU82098, middle part of Lincoln Member at Locality 47.
- H-N**, *Inoceramus prefragilis* Stephenson: H, partially crushed internal mold of left valve, X1, KU82102, uppermost unit of Lincoln Member at Locality 8; I, flattened internal mold of left valve, X1/2, KU82107, lowermost unit of Lincoln Member at Locality 26; J,N, internal molds of left valve (J) and right valve (N), both X1, KU82096, KU82152, middle part of Lincoln Member at Locality 8; K, internal mold of left valve, X1, KU82097, basal unit of Lincoln Member at Locality 40; L, flattened internal mold, X1, KU82186, Graneros-Greenhorn transition beds at Locality 12; M, flattened internal mold of right valve, X1, KU82095, middle part of Lincoln Member at Locality 26.



PLATE 3

Explanation of Plate 4

Ammonites from the Lincoln Member.

A, C, *Calycoceras? canitaurinum* (Haas): A, internal mold fragment, X1/2, KU82105, basal unit of Lincoln Member at Locality 3; C, internal mold, X1/2, KU82104, basal unit of Lincoln Member at Locality 61.

B, *Dunveganoceras* cf. *D. pondi* Haas: latex cast of external mold fragment, X1/2, KU82103, basal unit of Lincoln Member at Locality 61.

D, F, *Acanthoceras wyomingense* (Reagan): D, internal mold fragment, X1/2, KU82153, lower part of Lincoln Member at Locality 23; F, internal mold, X1/2, KU82106, basal unit of Lincoln Member at Locality 69.

E, *Pseudocalycoceras* sp.: internal mold, X1, KU82101, lower part of Lincoln Member at Locality 23.

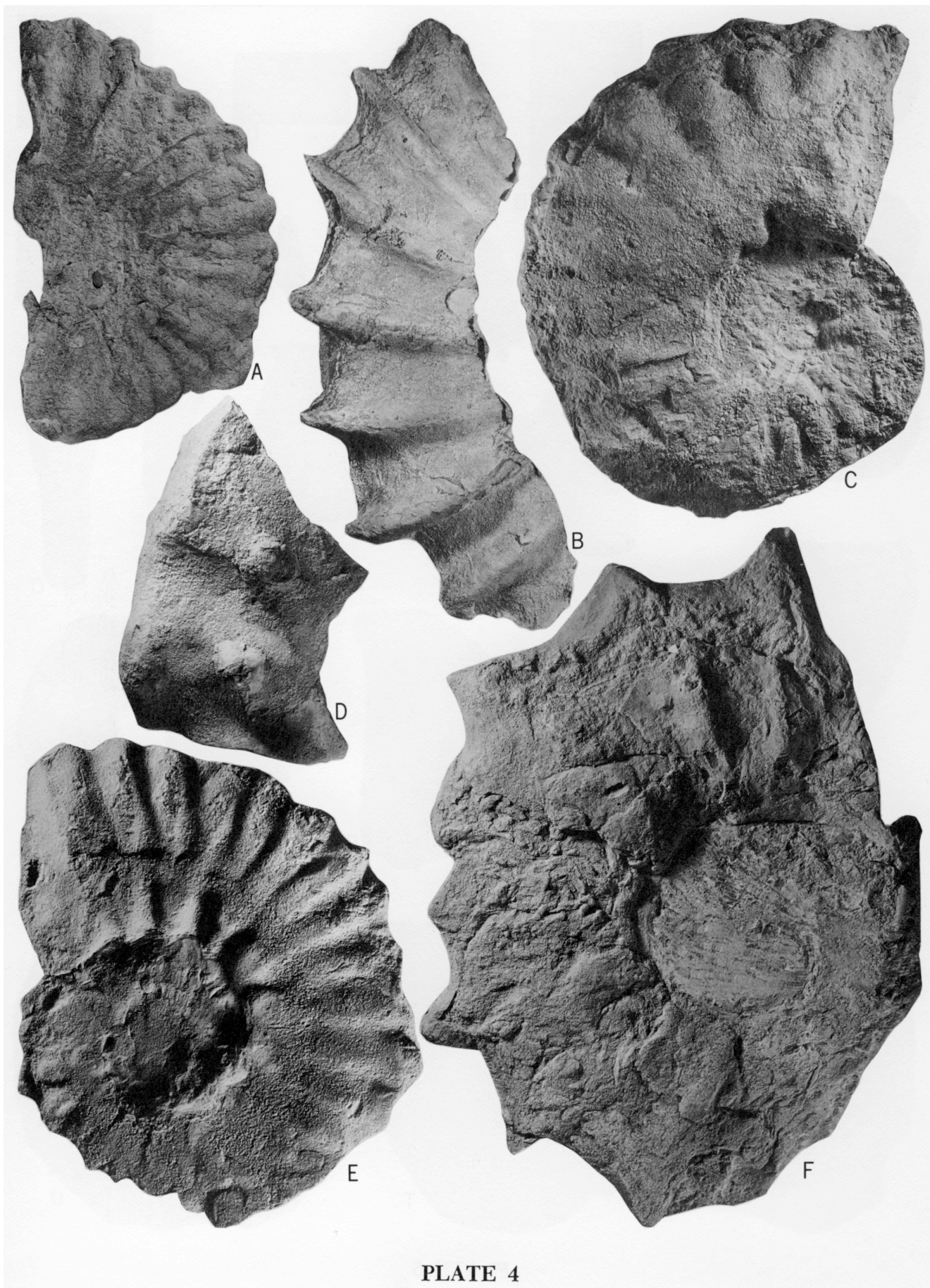


PLATE 4

Explanation of Plate 5

Mollusks from the Hartland Member

- A, F, K**, *Worthoceras vermiculum* (Shumard): A,F, crushed internal molds, both X2, KU82116, KU82115, marker bed HL-2 at Locality 11; K, internal mold, X2, specimen collected by W. A. Cobban, marker bed HL-2 at Locality 3.
- B, C**, *Allocrioceras annulatum* Shumard: internal mold fragments, B is X2, C is X1, KU82125, KU82124, marker bed HL-2 at Locality 6.
- D**, *Hemiptychoceras reesidei* Cobban & Scott: latex cast of internal mold, X2, KU82123, marker bed HL-2 at Locality 2.
- E, J**, *Phelopteria* sp. A: E, flattened left valve, X1, KU82138, marker bed HL-2 at Locality 5; J, interior view of right valve, X1, KU82137, marker bed HL-2 at Locality 3.
- G, H, I**, *Cerithiella* sp. A: G, calcite replica, X2, KU82140, marker bed HL-2 at Locality 66; H, recrystallized shell, X2, KU82141, marker bed HL-2 at Locality 11; I, recrystallized shell, X1, KU82139, marker bed HL-2 at Locality 35.
- L, M**, *Inoceramus prefragilis* Stephenson: L, internal molds of two left valves, X1, KU82129, marker bed HL-2 at Locality 35; M, internal mold of left valve, X1, KU82128, marker bed HL-2 at Locality 3.
- N, O**, *Martesia?* sp.: calcareous tubes, both X1, KU82135, KU82136, marker bed HL-2 at Locality 35.
- P**, *Mytiloides labiatus* (Schlotheim): partially preserved, flattened right valve, internal aspect, X1, KU82131, lower part of Bridge Creek member equivalent to upper part of Hartland Member of central Kansas, Locality 14.
- Q, R**, *Inoceramus flavus* Somay: Q, latex cast of interior of right valve, X1, KU82190, marker bed HL-2 at Locality 3; R, paired internal molds of deformed specimen (possibly *I. prefragilis* Stephenson), X1, KU82130, middle part of Hartland Member at Locality 13.
- S**, *Inoceramus* cf. *I. tenuistriatus* Nagao & Matsumoto: internal mold of left valve, X1, KU82133, marker bed HL-2 at Locality 4.
- T**, *Inoceramus* sp.: Flattened internal mold of right valve, X1, KU82132, upper part of Hartland Member at Locality 9.
- U**, *Acrothoracian* barnacle boring impressions on internal mold of *Inoceramus*, X1, KU82134, lower part of Hartland Member at Locality 5.

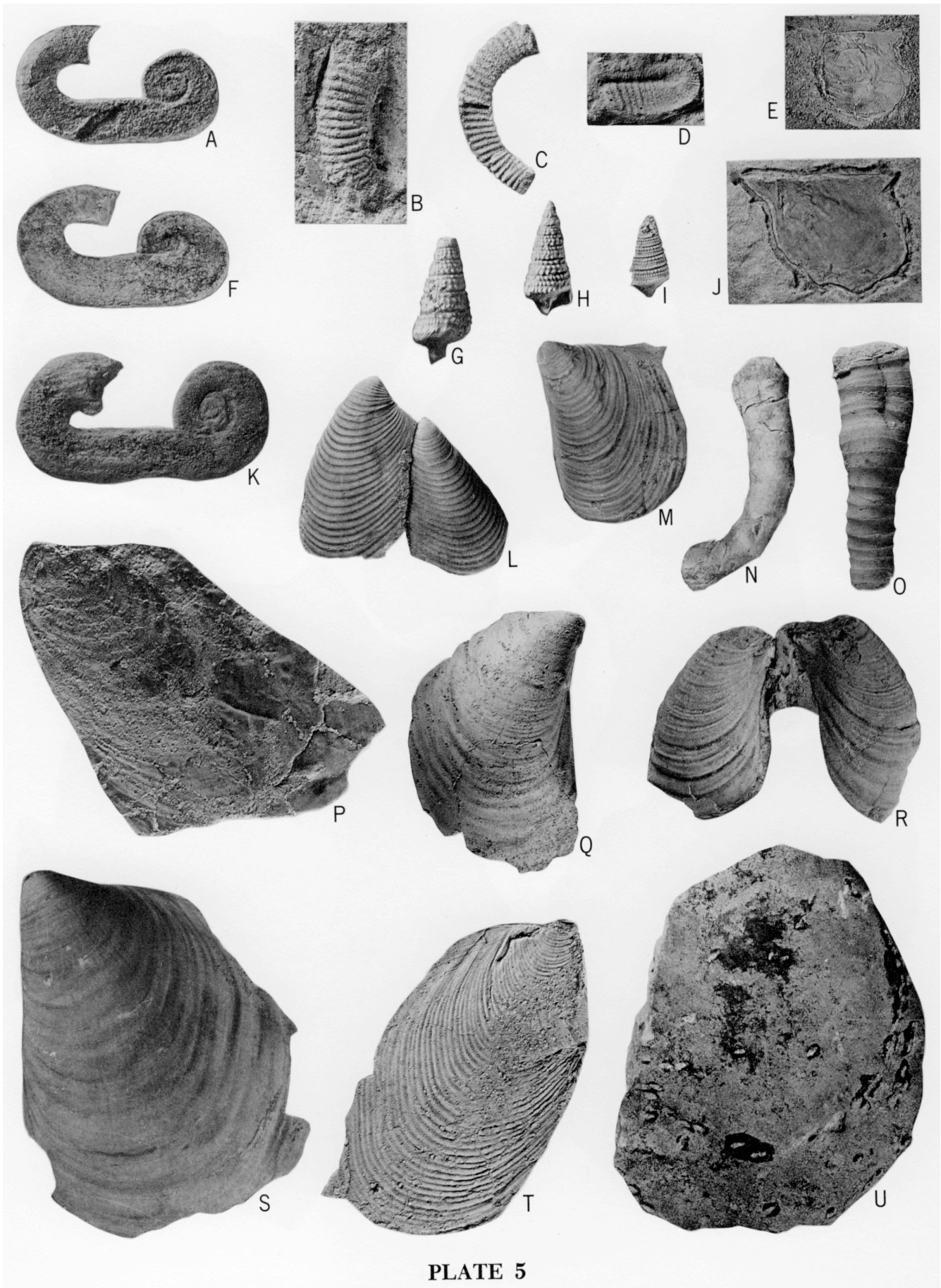


PLATE 5

Explanation of Plate 6

Ammonites from the Hartland Member

- A, B, N**, *Sciponoceras gracile* (Shumard): A, latex cast of external mold, X1, KU82109, marker bed HL-2 at Locality 24; B, fragment of internal mold, X1, KU82110, marker bed HL-2 at Locality 26; N, internal mold, X1/2, KU82108, float from marker bed HL-2 at Locality 3.
- C, O**, *Baculites* sp.: C, internal mold fragment, X1, KU82111, marker bed HL-2 at Locality 26; O, flattened mold, X1, KU82112, marker bed HL-2 at Locality 11.
- D, I**, *Kanabicerias septemseriatum* (Cragin): internal mold fragments, ventral aspect, both X1, KU82119, KU82120, marker bed HL-2 at Locality 3.
- E**, *Desmoceras* (s.l.) sp.: internal mold, X1, KU82121, middle part of Hartland Member at Locality 13.
- F, G**, *Pseudocalycoceras dentonense* (Moreman): F, fragment of internal mold, X1, KU82114, marker bed HL-2 at Locality 11; G, latex cast of external mold fragment, X1, KU82113, marker bed HL-2 at Locality 11.
- H**, *Tragodesmoceras bassi* Morrow, internal mold, X1, KU82127, upper part of Hartland Member at Locality 51.
- J**, *Watinoceras* sp. (possibly a coarse variant of *W. reesidei* Warren): latex cast of external mold, X1, KU82126, upper part of Hartland Member at Locality 51.
- K, M**, *Metoicoceras whitei* Hyatt: K, internal mold of young specimen, X1, KU82118, marker bed HL-2 at Locality 15. M, internal mold, X1, KU82117, marker bed HL-2 at Locality 3.
- L**, *Calycoceras* cf. *C. naviculare* (Mantell): distorted internal mold, X1/2, specimen from Fort Hays Kansas State College collection, 13967, probably from first bed above marker bed HL-2 at Locality 1.

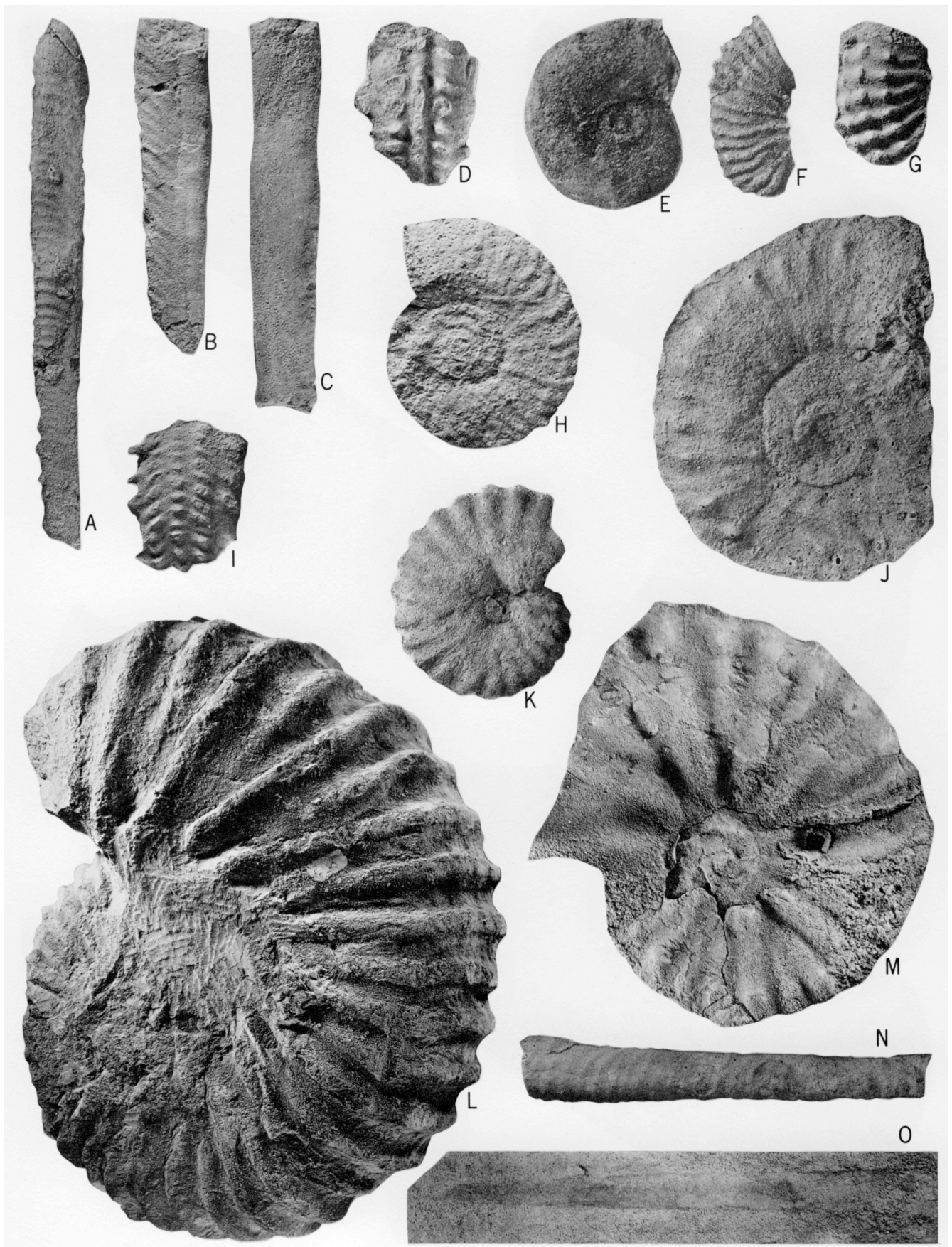


PLATE 6

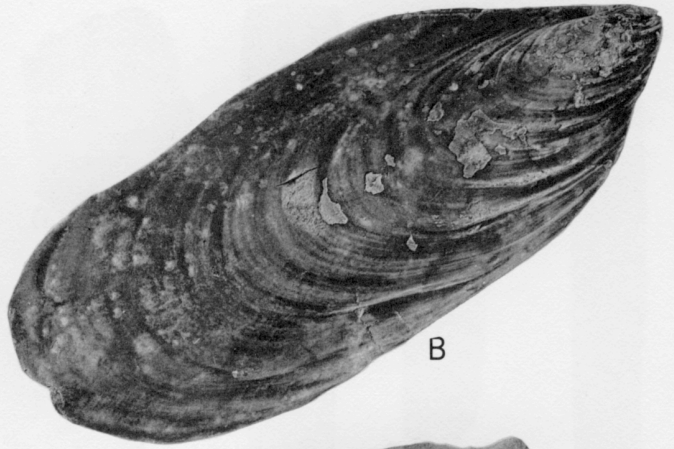
Explanation of Plate 7

Bivalves from the Jetmore Member

A-G, *Mytiloides labiatus* (Schlotheim): A, internal mold of right valve, X1, KU82160, middle part of Jetmore Member at Locality 6; B, internal mold of right valve, not coated, X1, KU82159, middle part of Jetmore Member at Locality 38; C, internal mold of left valve, X1, KU82162, basal bed of Jetmore equivalent of Bridge Creek Member at Locality 14; D, internal mold of right valve, X1/2, KU82165, middle part of Jetmore Member at Locality 46; E, internal mold of right valve, X1, KU82163, lower part of Jetmore Member at Locality 38; F, internal mold of right valve, X1, KU82161, middle part of Jetmore Member at Locality 4; G, internal mold of right valve, X1, KU82164, middle part of Jetmore Member at Locality 28.



A



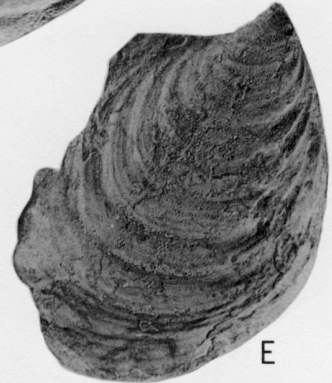
B



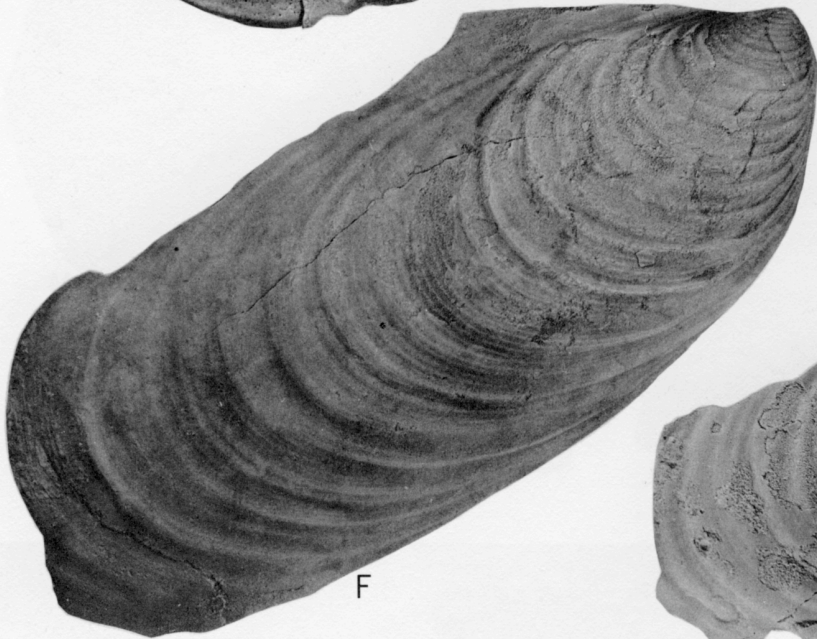
C



D



E



F



G

PLATE 7

Explanation of Plate 8

Mollusks and a brachiopod from the Jetmore Member

- A, E**, *Pycnodonte* sp. A: A, view of two articulated specimens, X2, KU82166, middle part of Jetmore Member at Locality 38; E, cluster of articulated valves, X1, KU82167, middle part of Jetmore Member at Locality 38.
- B**, *Anomia* sp. A: left valve, X2, KU82169, uppermost bed of Jetmore Member at Locality 50.
- C**, *Discinisca* sp.: largely exfoliated brachial valve, X2, KU82158, middle part of Jetmore Member at Locality 50.
- D, I, J**, *Watinoceras reesidei* Warren: D, latex cast of external mold, X1, KU82150, basal bed of Jetmore Member at Locality 66; I, internal mold, X2, KU82148, basal bed of Jetmore Member at Locality 43; J, latex cast of external mold, X1, KU82149, middle part of Jetmore Member at Locality 35.
- F, G, H**, *Baculites* cf. *B. yokoyamai* Tokunaga & Shizimu: F,G, internal molds, both X1, KU82168, KU82154, lower part of Jetmore Member at Locality 38; H, internal mold, X1, KU82155, middle part of Jetmore Member at Locality 28.
- K, L, M**, *Mammites nodosoides wingi* (Morrow): K,L, lateral and ventral views of internal mold fragment, X1/2, KU82157, lower part of Jetmore Member at Locality 20; M, ventral view of internal mold fragment, X1/2, KU82156, middle part of Jetmore Member at Locality 6.
- N**, *Vascoceras birchbyi* Cobban & Scott: lateral view of incomplete internal mold X1, KU82142 basal bed of Jetmore equivalent of Bridge Creek Member at Locality 14.

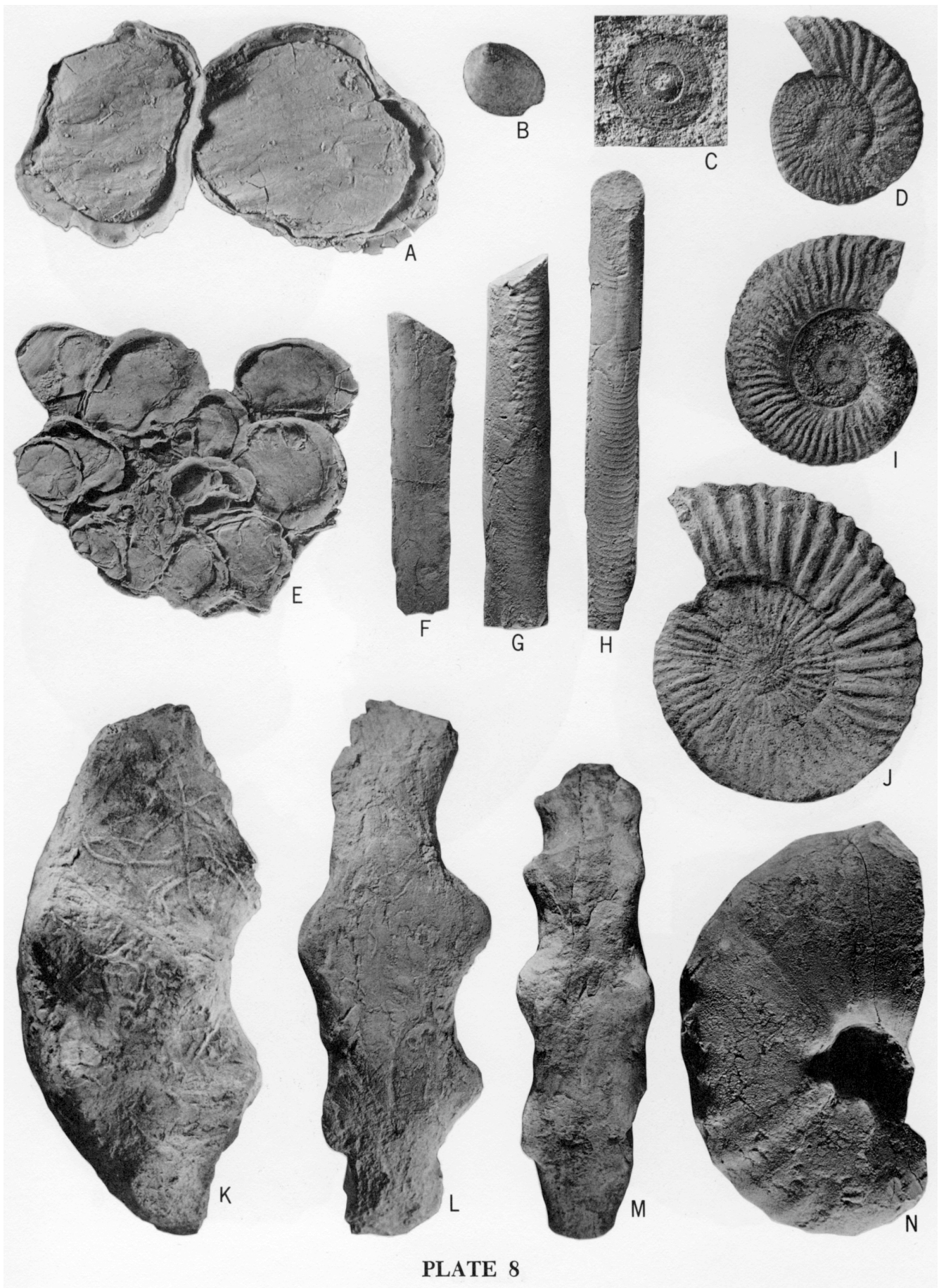
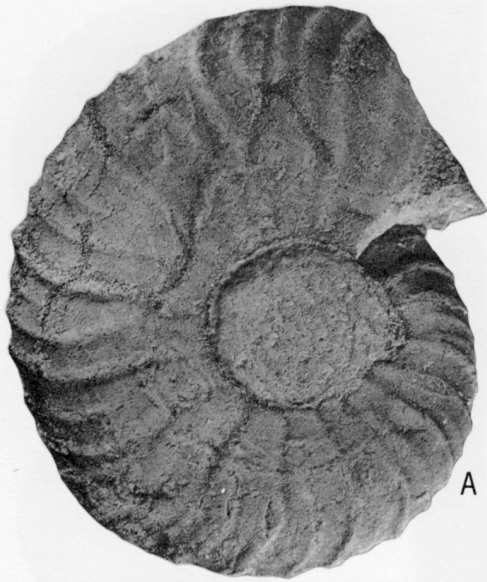


PLATE 8

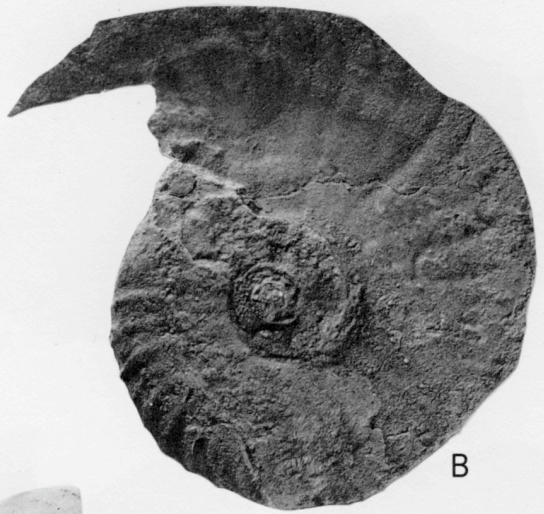
Explanation of Plate 9

Ammonites from the Jetmore Member

- A, B, C, E**, *Tragodesmoceras bassi* Morrow: A, internal mold, X1, specimen from Fort Hays Kansas State College collection, 11847, probably from one of the three hard beds of the Jetmore Member. Locality unknown; B, combination of internal and external mold, X1, KU82146, middle part of Jetmore Member at Locality 66; C, flattened internal mold, X1, KU82144, middle part of Jetmore Member at Locality 67; E, latex cast of external mold, X1, KU82145, middle part of Jetmore Member at Locality 28.
- D**, *Vascoceras birchbyi* Cobban & Scott, fragment of internal mold, X1/2, KU82143, basal bed of Jetmore equivalent of Bridge Creek Member at Locality 14.
- F, G**, *Watinoceras reesidei* Warren: F, latex cast of external mold, X1, KU82147, lower part of Jetmore Member at Locality 20; G, internal mold, X1, KU82151, float from lower part of Jetmore Member at Locality 1.



A



B



C



D



E



F



G

PLATE 9

Explanation of Plate 10

Ammonites and bivalves from the Pfeifer Member

- A, B, G, L**, *Pseudoperma bentonensis* (Logan): A articulated specimen, X1, KU82173, B, pair of articulated specimens, X2, KU82172, A & B from middle part of Pfeifer Member at Locality 25; G, cluster of articulated valves on fragment of *Inoceramus* valve, X1, KU82170, middle part of Pfeifer Member at Locality 4; L, cluster of valves on *Inoceramus* fragment, X1/2, KU82171, middle part of Pfeifer Member at Locality 10.
- C**, Hamitid; compressed mold of juvenile specimen, X2, KU82184, lower part of Pfeifer Member at Locality 44.
- D**, *Anomia* sp. A: left valve, X2, KU82174, lower part of Pfeifer Member at Locality 40.
- E, H**, *Tragodesmoceras bassi* Morrow?: E, fragment of internal mold, X2, KU82183, H, internal mold, X1, KU82188, both from middle part of Pfeifer Member at Locality 49.
- F**, *Watinoceras reesidei* Warren?: fragment of internal mold, X1, KU82185, lower part of Pfeifer Member at Locality 4.
- I, J, K**, *Inoceramus cuvieri* Sowerby: I, left valve, X1, KU82178, upper part of Pfeifer Member at Locality 19; J, right valve, X1, KU82176, upper part of Pfeifer Member at Locality 1; K, internal mold of right valve, X2, KU82177, uppermost bed of Pfeifer Member at Locality 4.
- M, O**, *Mytiloides labiatus* (Schlotheim): M, internal mold of right valve, X1, KU82175, lower part of Pfeifer Member at Locality 4; O, internal mold of left valve, X1, KU82188, uppermost bed of Pfeifer Member at Locality 20.
- N, P, Q, R**, *Collignoniceras woollgari* (Mantel]: N, latex cast of external mold, X1, KU82182, upper part of Pfeifer Member at Locality 38. P, deformed internal mold, X1, KU82180, uppermost bed of Bridge Creek Member (Fencepost bed) at Locality 14; Q, internal mold of juvenile specimen, X1, KU82179, uppermost bed of Pfeifer Member at Locality 3; R, incomplete internal mold, X1, KU82181, uppermost bed of Pfeifer Member at Locality 3.

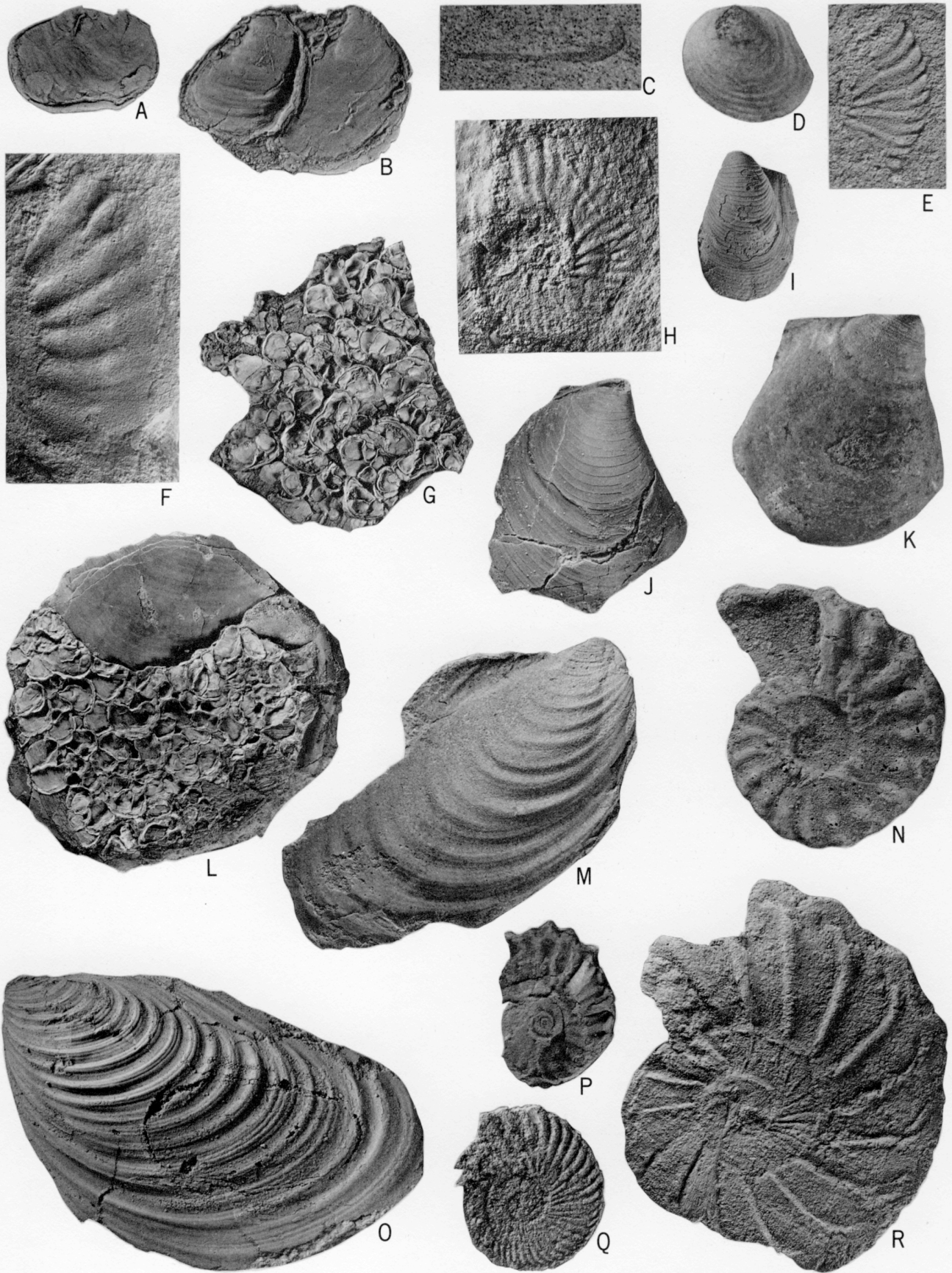


PLATE 10