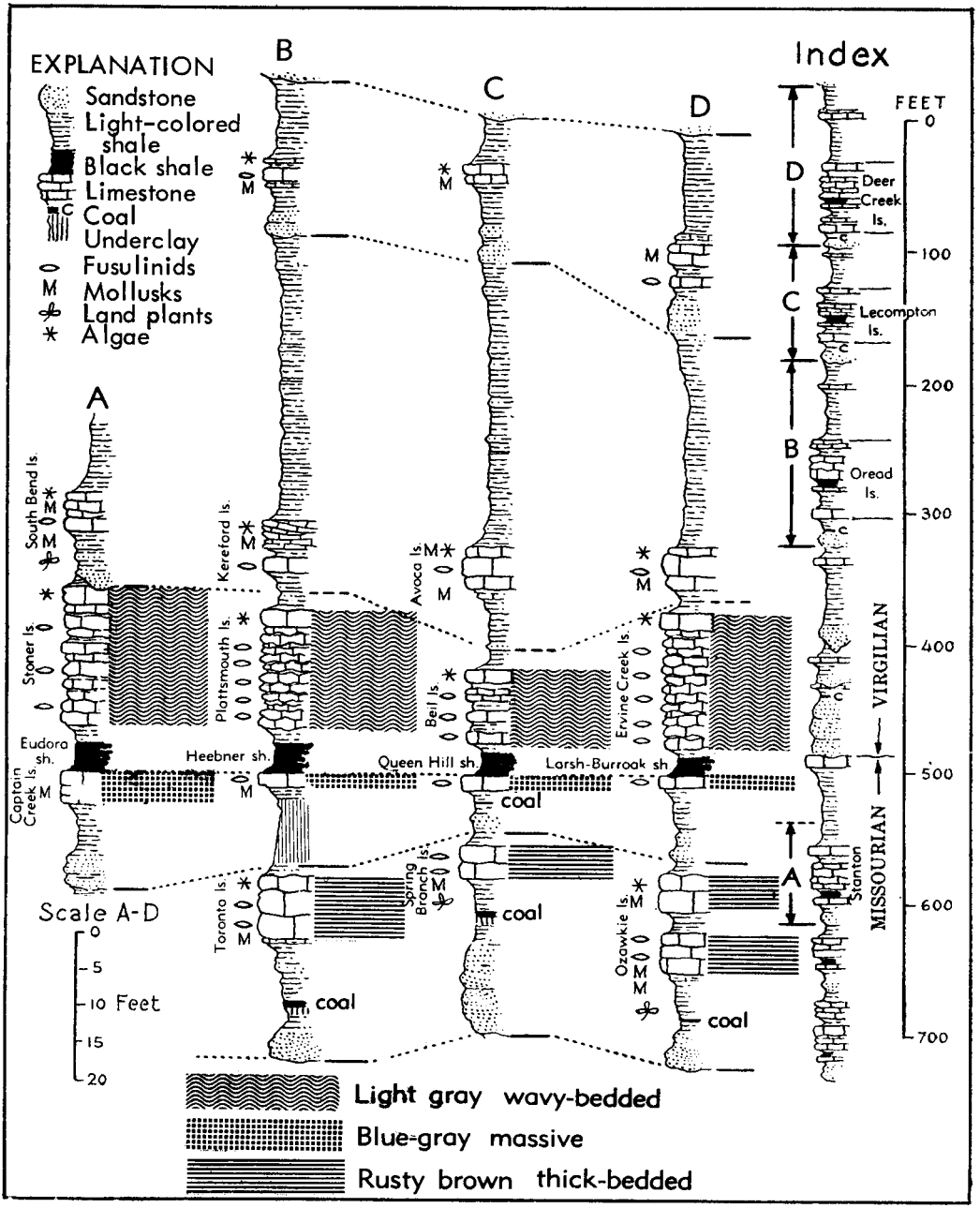


FIGURE 2.—Cyclothems grouped in megacyclothems, as observed in late Missourian and early Virgilian deposits of central Kansas. Diagram emphasizes repetition of strikingly dissimilar cyclothems in constant sequence. (Moore).

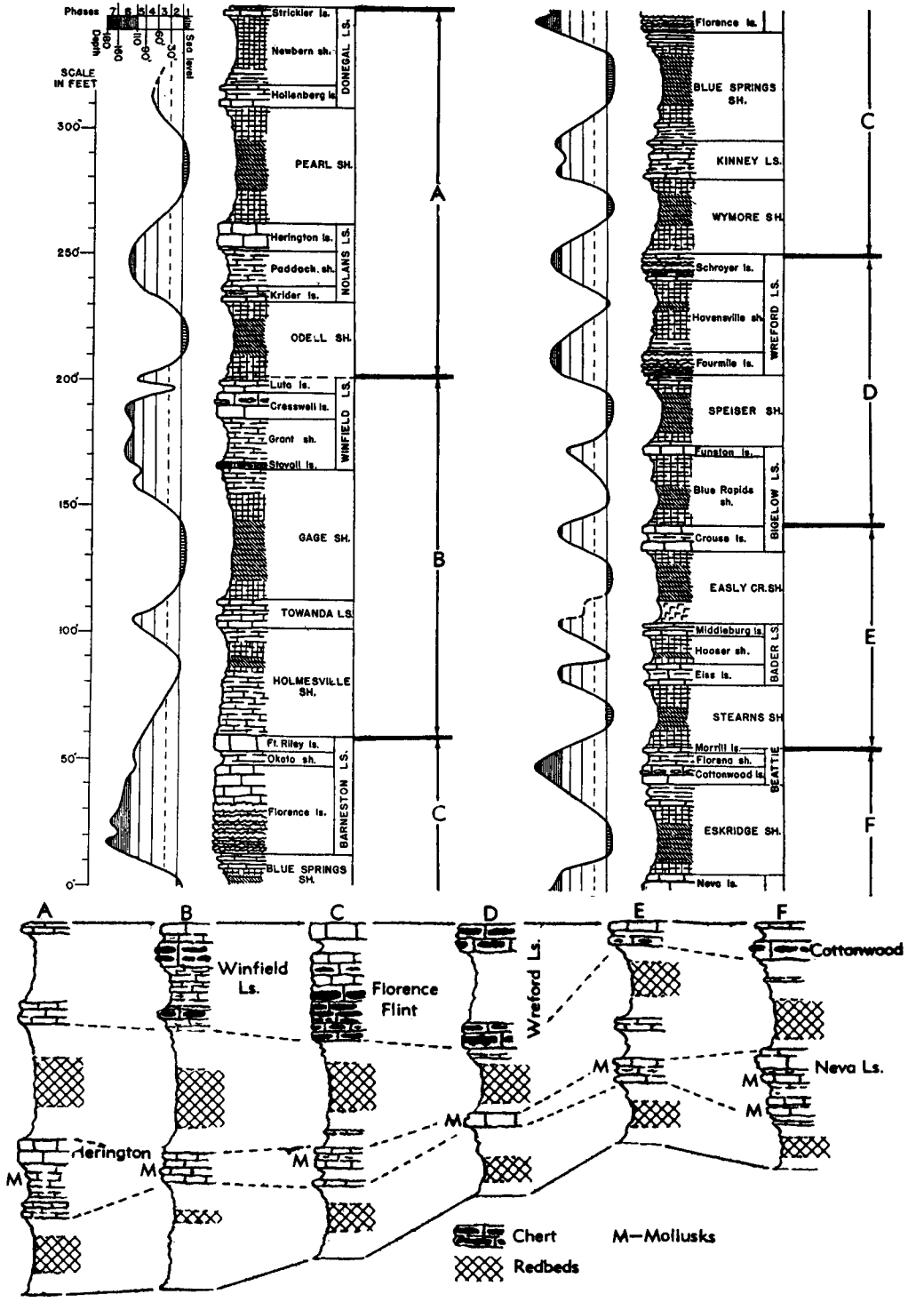


FIGURE 3.—Cyclothems and megacyclothems in Lower Permian rock succession of Kansas. Upper sections are accompanied by graphic representation of inferred marine transgressions (culminating phases indicated by parts of curve reaching farthest left) interrupted by sea withdrawls when sedimentation of terrestrial type prevailed (modified from Elias by notation of inferred megacyclothems, A-F). Lower part of diagram shows correlation of cyclothem elements belonging to megacyclothems A-F (Moore *in* Moore and Merriam).

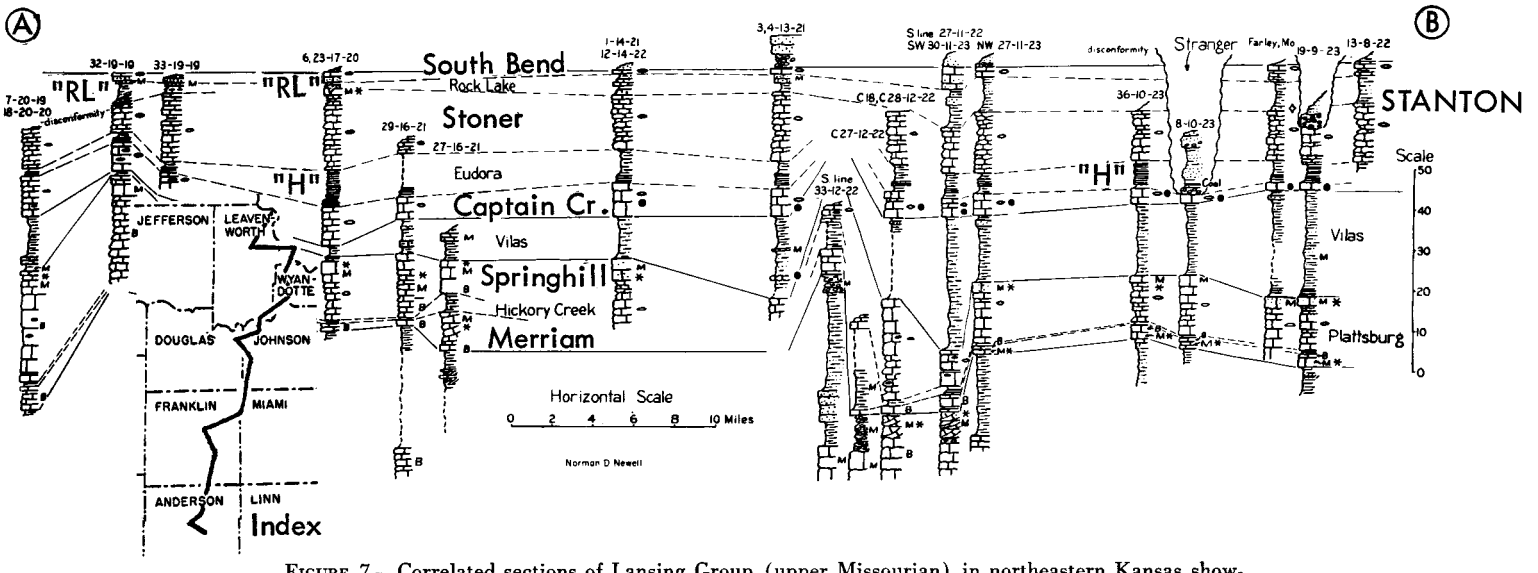


FIGURE 7.—Correlated sections of Lansing Group (upper Missourian) in northeastern Kansas showing stratigraphic occurrence of Rock Lake (*Garnettius*) ecosystem ("RL"), also example of Heebner-type (*Listracanthus*) paleobiotope (Moore, sections measured by N. D. Newell).

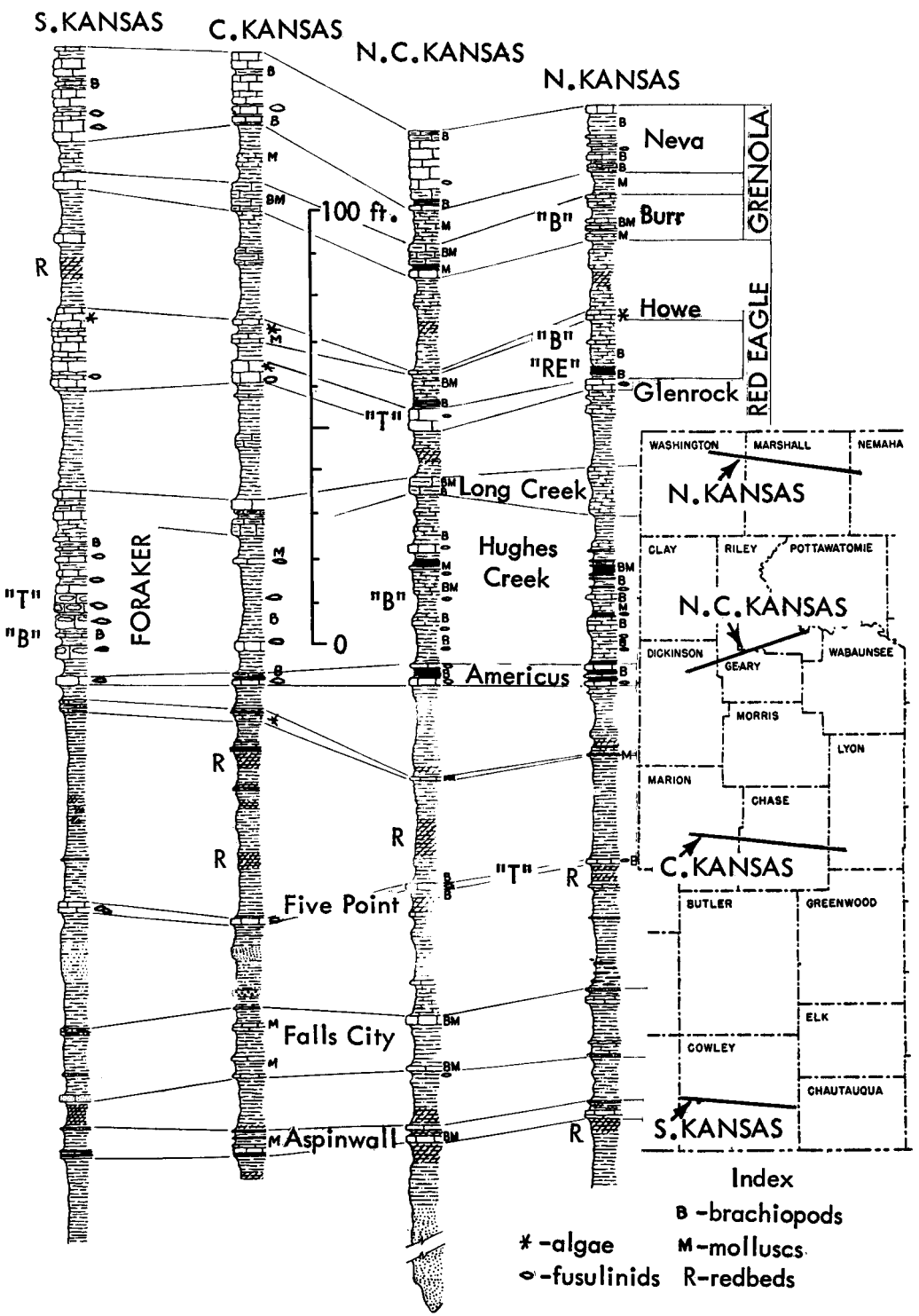


FIGURE 9.—Generalized sections of lowermost Permian deposits in four parts of Kansas region, showing stratigraphic occurrences of some ecosystems ("B," Beil-type; "RE," Red Eagle-type; "T," Tarkio-type) (Moore).

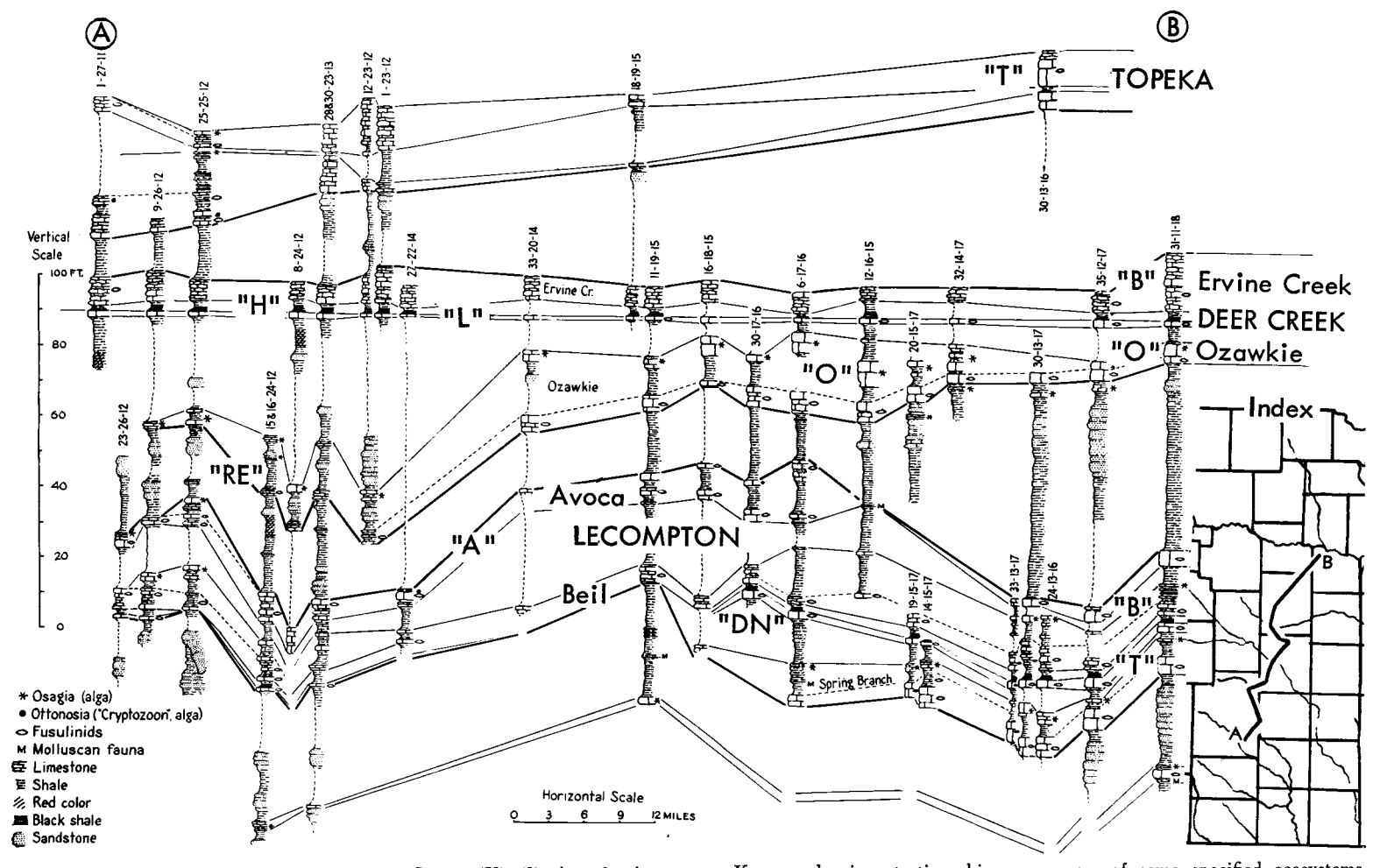


FIGURE 10.—Correlated sections of Shawnee Group (Virgilian) units in eastern Kansas, showing stratigraphic occurrences of some specified ecosystems ("A," Avoca-type; "B," Beil-type; "DN," Doniphan-type; "H," Heebner-type; "L," Leavenworth-type; "O," Ozawkie-type; "T," Tarkio-type) (Moore).

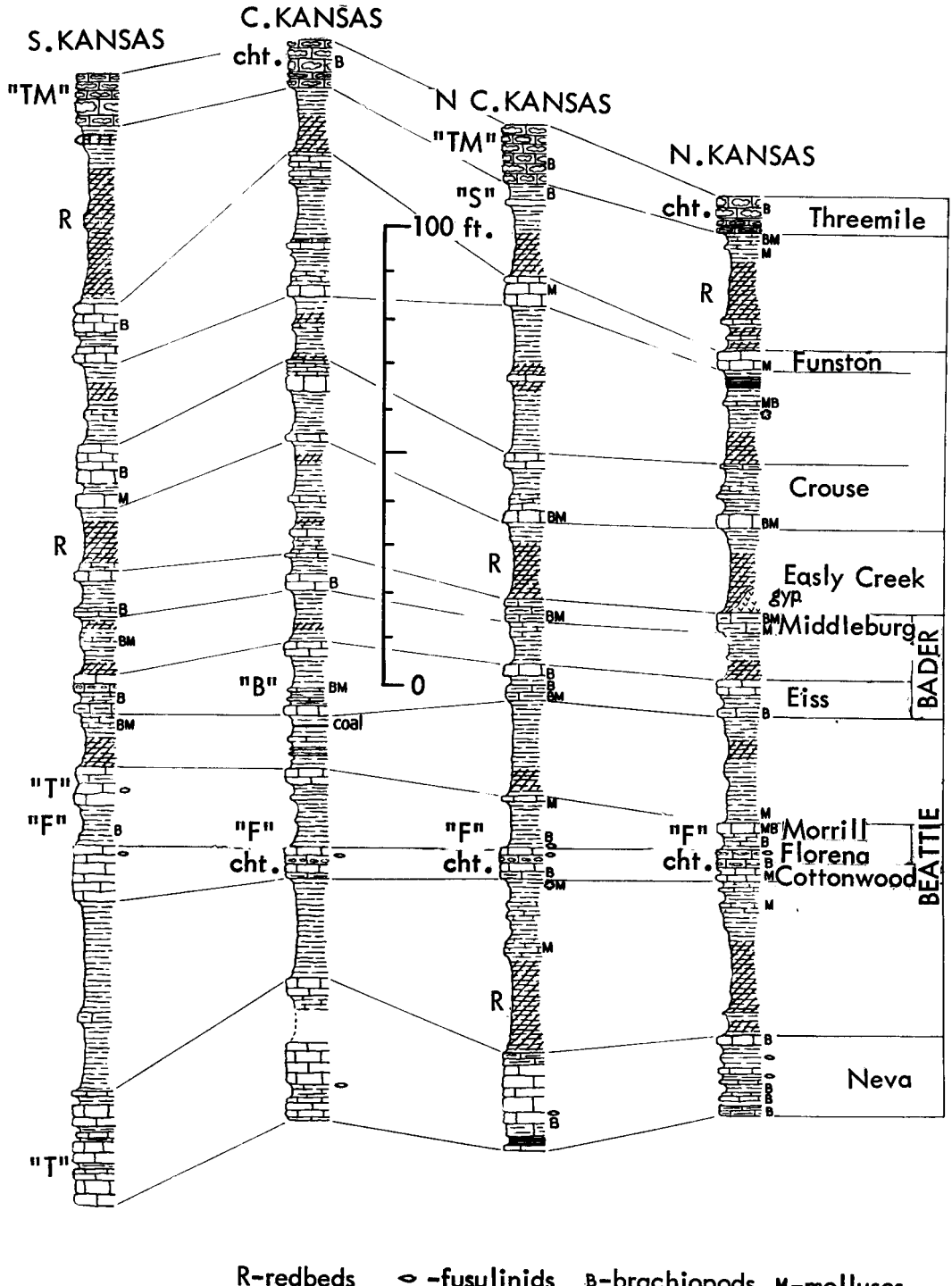


FIGURE 11.—Generalized sections of Lower Permian rocks extending upward from those shown in Figure 9, with examples of some ecosystems ("F," Florena-type; "S," Speiser-type; "T," Tarkio-type; "TM," Threemile-type) (Moore).

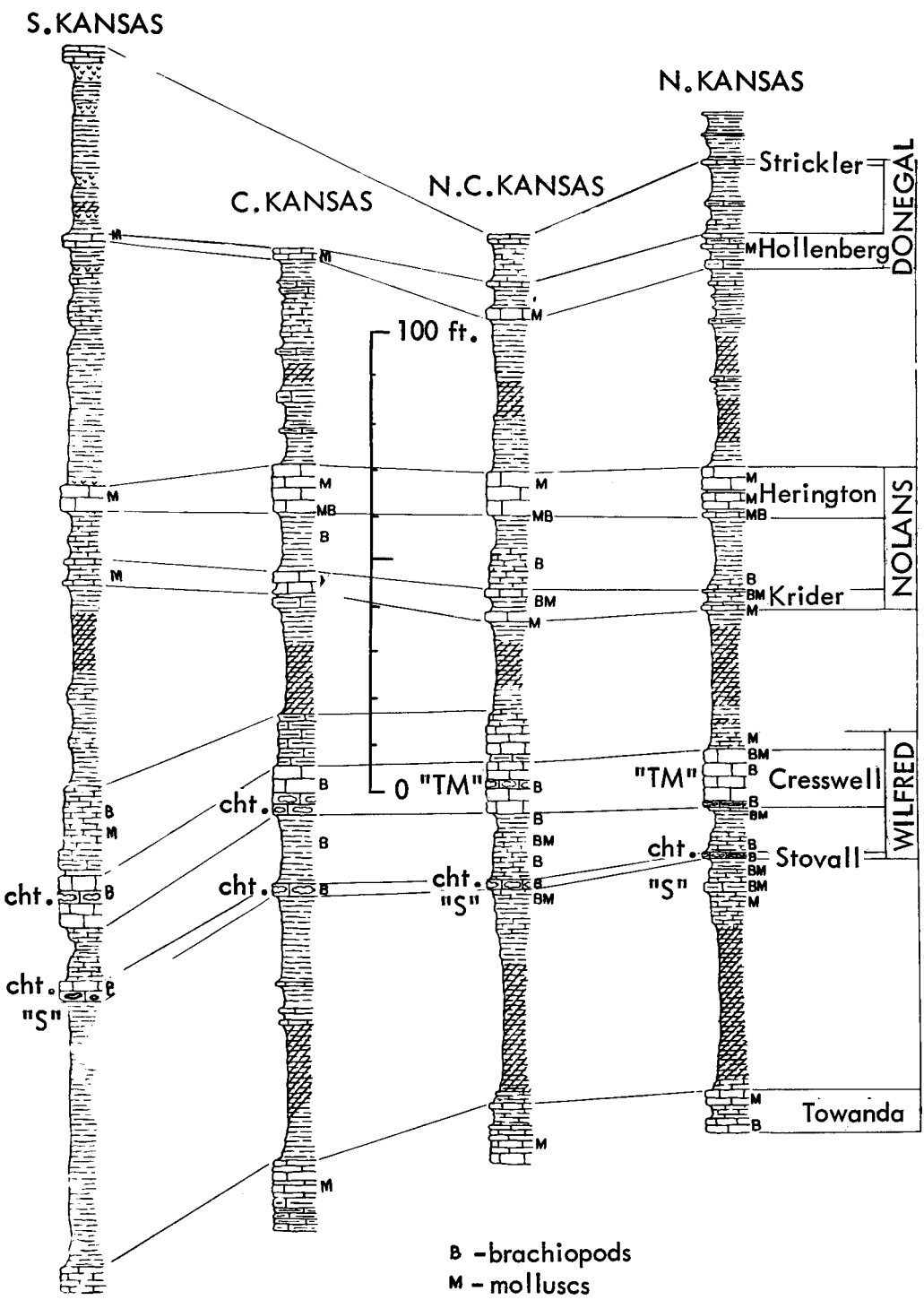
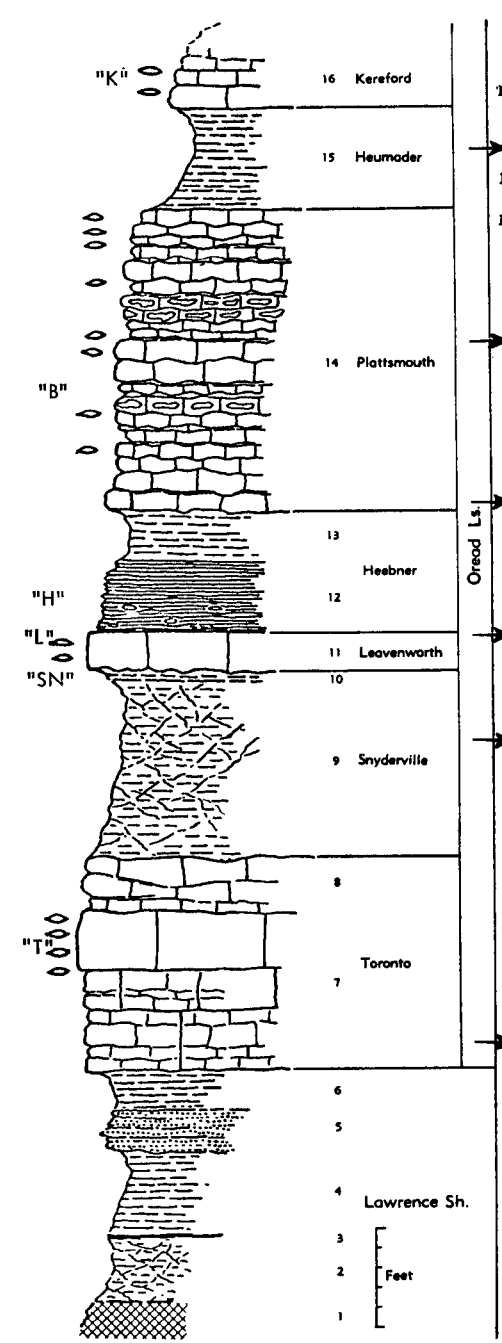


FIGURE 12.—Generalized sections of Lower Permian rocks extending upward from those shown in Figure 11, with examples of some ecosystems ("T," Tarkio-type; "TM," Threemile-type) (Moore).



SECTION AT STOP 1 (KANSAS TURNPIKE 3 MILES WEST OF WEST LAWRENCE INTERCHANGE, NW SEC. 21, T. 12 S., R. 19 E.)

16. Limestone (Kereford), bluish gray, medium fine-grained, rather evenly bedded; common fusulinids, brachiopods, mollusks, crinoid fragments . . . . . 1+

"K"- Kereford-type assemblage

15. Shale (Heumader), gray to yellowish, clayey; unfossiliferous 5

14. Limestone (Plattsmouth), light gray, weathering creamy tan, wavy-bedded in thin layers with shale partings, fine-grained, persistent zones of dark flinty chert about 6 and 11 feet above base; common fusulinids, crinkly laminar ?algae, brachiopods, corals, bryozoans, crinoid fragments, some mollusks. 15

"B"- Beil-type assemblage

13. Shale (Heebner), gray to yellow, soft, clayey, darker below; unfossiliferous. 2.5

12. Shale (Heebner), black, platy, hard, resistant to weathering, contains common small phosphatic concretions in lower part; common conodonts, fish spines (Lissacanthus), rare thin-shelled pectinoid clams 3.5

"H"-Heebner-type assemblage

11. Limestone (Leavenworth), dark blue, weathering bluish-gray, fine-grained, single vertical-jointed massive bed with plane upper surface and slightly uneven lower surface; fusulinids, thin-shelled mollusks, brachiopods 1.8

"L"- Leavenworth-type assemblage

10. Shale (Snyderville), dark gray, weathering brown, calcareous, well laminated; small brachiopods (Crurithyris), few chonetids, elsewhere characterized by abundance of chonetids 0.5

"SN"- Snyderville-type assemblage

9. Clay (Snyderville), light bluish to greenish-gray, blocky, unlaminated, showing some features of underclay, locally elsewhere with coaly film at top; unfossiliferous 8.9

8. Limestone (Toronto), light gray, weathering yellowish-brown, poorly bedded to somewhat shaly, fine-grained, locally elsewhere distinctly siliceous; unfossiliferous, 2 to 2.5

7. Limestone (Toronto), light gray, weathering yellow-brown, medium fine-grained, upper 3 feet a single massive bed, lower 5 feet also massive but tending to weather in thin, slightly uneven beds; fusulinids abundant in upper part, common in lower part, crinoid fragments and some brachiopods 8

"T"- Tarkio-type assemblage

6. Shale (Lawrence), dark drab-blue, weathering light greenish-gray, clayey, well laminated; common crinoid columnals and inarticulate brachiopods near top 2

5. Sandstone (Lawrence), gray, weathering light tan, shaly, fine-grained, micaceous; unfossiliferous 2

4. Shale (Lawrence), light greenish to bluish-gray, clayey to silty, well laminated; unfossiliferous 4.3

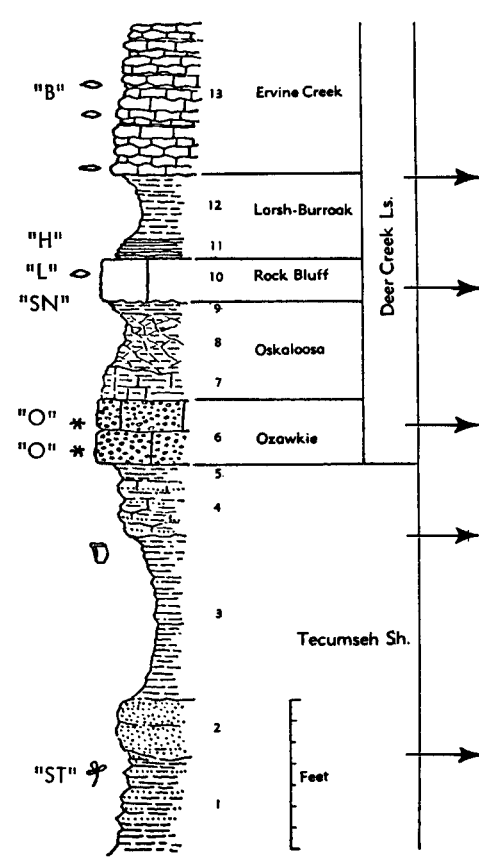
3. Coaly streak (Lawrence), black, shaly, 0.05 to 0.2

2. Clay (Lawrence), drab-blue, blocky, unlaminated, somewhat like underclay 3

1. Clay (Lawrence), maroon, with calcareous nodules, some with septarian veins 2.7

(Section measured by R. C. Moore)

FIGURE 13.—Typical section of uppermost Lawrence Shale and most of Oread Limestone near Lawrence, Kansas, showing stratigraphic occurrences of some ecosystems ("B," Beil-type; "H," Heebner-type; "K," Kereford-type; "L," Leavenworth-type; "SN," Snyderville-type; "T," Tarkio-type) (Modified from Moore and Merriam, 1959).



SECTION AT STOP 3 (KANSAS TURNPIKE 8 MILES WEST OF WEST LAWRENCE INTERCHANGE, NE NW NW SEC. 22, T. 12 S., R. 18 E.)

13. Limestone (Ervine Creek), light gray, weathering brown mottled with gray, thin wavy beds; fusulinids, brachiopods, bryozoans, corals, crinoid fragments, mollusks. . . . . 7.5+

"B"- Beil-type assemblage

12. Shale (Larsh-Burroak), gray to olive-drab, weathering brownish, clayey, soft; unfossiliferous 3.5

11. Shale (Larsh-Burroak), black, platy, hard; contains conodonts and fish spines 1.1

"H"-Heebner-type assemblage

10. Limestone, (Rock Bluff), dark bluish, weathers light blue-gray to brownish, fine-grained, single massive vertical-jointed bed with plane upper surface and uneven base; fusulinids common, thin-shelled mollusks, crinoid fragments 2

"L"- Leavenworth-type assemblage

9. Shale (Oskaloosa), dark bluish to nearly black, clayey, well laminated, soft; contains numerous Chonetes, Juresania, Derbyia, and some clams (Aviculopecten, etc.) 0.5

"SN"- Snyderville-type assemblage

8. Clay (Oskaloosa), light bluish-gray, blocky, unlaminated; unfossiliferous, 2 to 3

7. Limestone (?Oskaloosa), nearly white to yellowish, soft, earthy to shaly, seemingly local and variable; unfossiliferous, 1 to. 2

6. Limestone (Ozawkie), light gray, weathers light yellowish-brown, oolitic, massive, hard; mollusks (Bellerophon, etc.), few brachiopods . 3

"O"- Ozawkie-type assemblage

5. Shale (Tecumseh), greenish-gray, calcareous; unfossiliferous. 1

4. Limestone (Tecumseh), very impure, shaly, grading to micaceous sandy rock, locally fairly hard; unfossiliferous 2.5

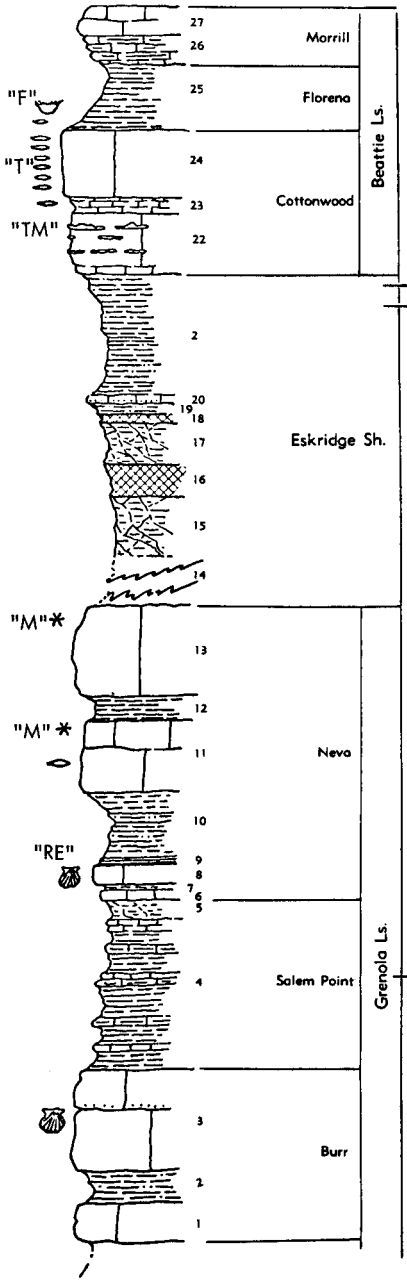
3. Shale (Tecumseh), dark bluish, weathers greenish-gray, clayey, well laminated; contains pelecypods . . . 7.4

2. Sandstone (Tecumseh), light bluish-gray, weathers gray, soft, friable, micaceous; unfossiliferous, 2 to . . 3

1. Shale (Tecumseh), drab-blue to blue-gray, sandy, soft; contains numerous coaly to carbonized land plant fragments . . . . . 5 +

(Section measured by R. C. Moore)

FIGURE 14.—Typical section of uppermost Tecumseh Shale and most of Deer Creek Limestone south of Lecompton, Kansas, showing stratigraphic occurrence of some ecosystems ("B," Beil-type; "H," Heebner-type; "L," Leavenworth-type; "O," Ozawkie-type; "SN," Snyderville-type; "ST," Stranger-type) (Modified from Moore and Merriam, 1959).



SECTION AT STOP 10 (U. S. 40, APPROX. 1.5 MILE WEST OF MANHATTAN; NW 1/4 SE 1/4 SEC. 23, T. 10 S., R. 7 E.)

27. Limestone (Morrill), tan to brown on fresh surface, weathers brown, thick-bedded, slightly silty, medium dense; common brachiopod and crinoid fragments . . . . . 1.5+
26. Limestone (Morrill), tan, shaly, fossil fragments common . . . 1.6
25. Shale (Florena), tan to gray-green, flaky-bedded, calcareous, abundantly fossiliferous with Chonetes, Derbyia, Dictyoclostus, Juresania, Linoproductus, crinoid remains, echinoid spines, and bryozoans 3.3

"F"- Florena-type assemblage

24. Limestone (Cottonwood), same physical and biologic aspects of lithology as units 22 and 23, but with profusely abundant slender fusulinids, many of which weather from rock to give it a pitted surface. 3.5

"T"- Tarkio-type assemblage

"TM"- Threemile-type assemblage

23. Limestone (Cottonwood), same physical and biologic aspects of lithology as unit 22, but less resistant to weathering; contains abundant slender fusulinids 0.8
22. Limestone (Cottonwood), tan to gray on fresh surface, weathers tan, massive-bedded, contains nodular chert with silicified fossils; brachiopods, crinoid remains, echinoid spines; impure silty in lowermost 0.5 foot 3
21. Siltstone and shale (Eskridge), gray to tan upward; bedding indistinct, lower 2.3 feet a calcareous siltstone; sparse Juresania and other shell fragments in central part 6
20. Limestone (Eskridge), gray on both fresh and weathered surfaces, indistinct bedding, silty; common minute shell fragments seen on fresh surface; clay-pebble bands in upper 0.3 foot 0.7
19. Shale (Eskridge), gray-green to tan upward, not bedded, slightly silty 0.7
18. Shale (Eskridge), red, not bedded, silty 0.6
17. Shale (Eskridge), drab to gray, not bedded, clayey to slightly silty 1.9
16. Shale (Eskridge), red, not bedded, clayey to silty 1.7
15. Shale (Eskridge), brown to gray upward, not bedded, clayey . . 3 +
14. Covered, probably shale 19
13. Limestone (Neva), light gray on fresh surface, weathers tan, massive-bedded, medium dense; algal in upper part, with Chonetes, crinoids, gastropods, and pelecypods 4.5
12. Shale (Neva), tan, flaky-bedded. 1.3
11. Limestone (Neva), brown on both fresh and weathered surfaces, thick-bedded, impure, silty, almost earthy; contains algae, crinoids, echinoid spines, and fusulinids 3.5
10. Shale (Neva), tan, clayey and unbedded in upper 1 foot, silty and indistinctly bedded in lower 2.2 feet, not bedded and clayey in upper 1 foot; unfossiliferous. 3.2
9. Shale (Neva), black, flaky-bedded: scattered Orbiculoidea . . . 0.4

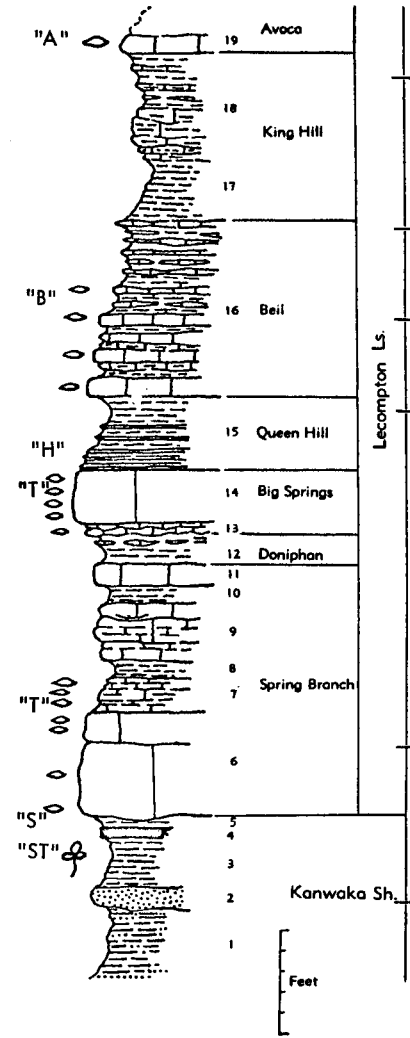
"RE"- Red Eagle-type assemblage

8. Limestone (Neva), light gray on fresh surface, weathers tan, massive, medium dense; algal in part, sparse pelecypods and other shell fragments 1
7. Shale (Neva), light gray to tan, calcareous; sparse shell fragments 0.3
6. Limestone (Neva), light gray, single thin bed, argillaceous; sparse shell fragments 0.5
5. Clay (Salem Point), light gray, not bedded; unfossiliferous . . . 1
4. Shale and limestone (Salem Point), gray to tan on both fresh and weathered surfaces, flaky-bedded calcareous shale and thin-bedded shaly limestone 7
3. Limestone (Burr), tan on both fresh and weathered surfaces, massive, impure, silty; sparse pelecypods and other shell fragments 5
2. Shale (Burr), dark brown, flaky-bedded, clayey. 1.5
1. Limestone (Burr), gray-white on fresh surface, weathers tan, massive-bedded, shell fragments common 2.2

(Section measured by S. M. Ball and M. M. Ball)

FIGURE 15—.Typical section of Grenola, Eskridge, and Beattie strata just west of Manhattan, Kansas, showing stratigraphic occurrence of some ecosystems ("F," Florena-type; "M," Morrill-type; "RE," Red Eagle-type; "T," Tarkio-type; "TM," Threemile-type) (Modified from Moore and Merriam, 1959).

SECTION AT STOP 2 (KANSAS TURNPIKE 6 MILES WEST OF WEST LAWRENCE INTERCHANGE, NW NW SEC. 24, T. 12 S., R. 18 E.)
(STRATA BELOW DONIPHAN SHALE MEASURED AT EXPOSURE 0.3 MILE EAST OF STOP 2)



19. Limestone (Avoca), bluish-gray, weathers brown, medium fine-grained, hard, massive; large fusulinids common, crinoid columnals, brachiopods, moderately large incrusting algae (Ottonosia), and some clams (Myalina) . . . . . 0.5+

"A"- Avoca-type assemblage

18. Shale and earthy limestone (King Hill), gray, limestone weathering "punky" yellow-brown, contains small irregular calcite-filled spaces; unfossiliferous 5
17. Shale (King Hill), gray, weathers tan, clayey, laminated 3
16. Limestone (Beil), very shaly in upper part, bluish-gray, weathers brownish, medium- to thin-bedded; highly fossiliferous . . 8.6

"B"- Beil-type assemblage

15. Shale (Queen Hill), blue-gray in upper part, black and fissile below, with two thin streaks of hard black shale in middle; black shale with conodonts 3.5

"H"-Heebner-type assemblage

14. Limestone (Big Springs), gray-blue, weathering light gray, fine-grained, massive, vertical-jointed, top surface plane; abundant small fusulinids, some brachiopods 2.5

"T"- Tarkio-type assemblage

13. Limestone (Big Springs), like bed above but thin wavy-bedded, grading downward to limestone nodules and shale; fusulinids sparse 0.8
12. Shale (Doniphan), olive-green above, bluish-drab below, clayey; fossiliferous above, unfossiliferous below 1.2
11. Limestone (Spring Branch), gray, weathering nearly white, fine-grained, earthy, massive; unfossiliferous 0.9 to 1.1
10. Shale (Spring Branch), dark bluish, clayey, well laminated; unfossiliferous 0.8
9. Limestone (Spring Branch), like bed 11 but softer and irregularly bedded to shaly, upper surface even; unfossiliferous. . . 2.6
8. Shale (Spring Branch), bluish-gray, well laminated; upper half unfossiliferous, lower half crowded with fusulinids 1
7. Limestone (Spring Branch), light gray, soft, shaly, weathers brownish; crowded with fusulinids 1.6

"T"- Tarkio-type assemblage

6. Limestone (Spring Branch), bluish-gray, weathers rich brown, medium fine-grained, hard, massive; fusulinids scattered to common, crinoid columnals, few brachiopods 5
5. Shale (Kanwaka), tan, clayey, laminated; abundant compressed brachiopods (especially Chonetes, Juresania, Derbyia) and pelecypods (Myalina, Aviculopecten, Edmondia) 0.5

"S"- Speiser-type assemblage

4. Coal and coaly shale (Kanwaka), black, soft 0.6
3. Shale (Kanwaka), bluish-gray, clayey above to sandy below, in part crowded with well-preserved land plants (Cordaites, Alethopteris, etc.) 2.5
2. Sandstone (Kanwaka), bluish-gray, weathers tan-brown, soft, micaceous 1
1. Shale (Kanwaka), very sandy, bluish-gray; unfossiliferous 3 +

(Section measured by R. C. Moore)

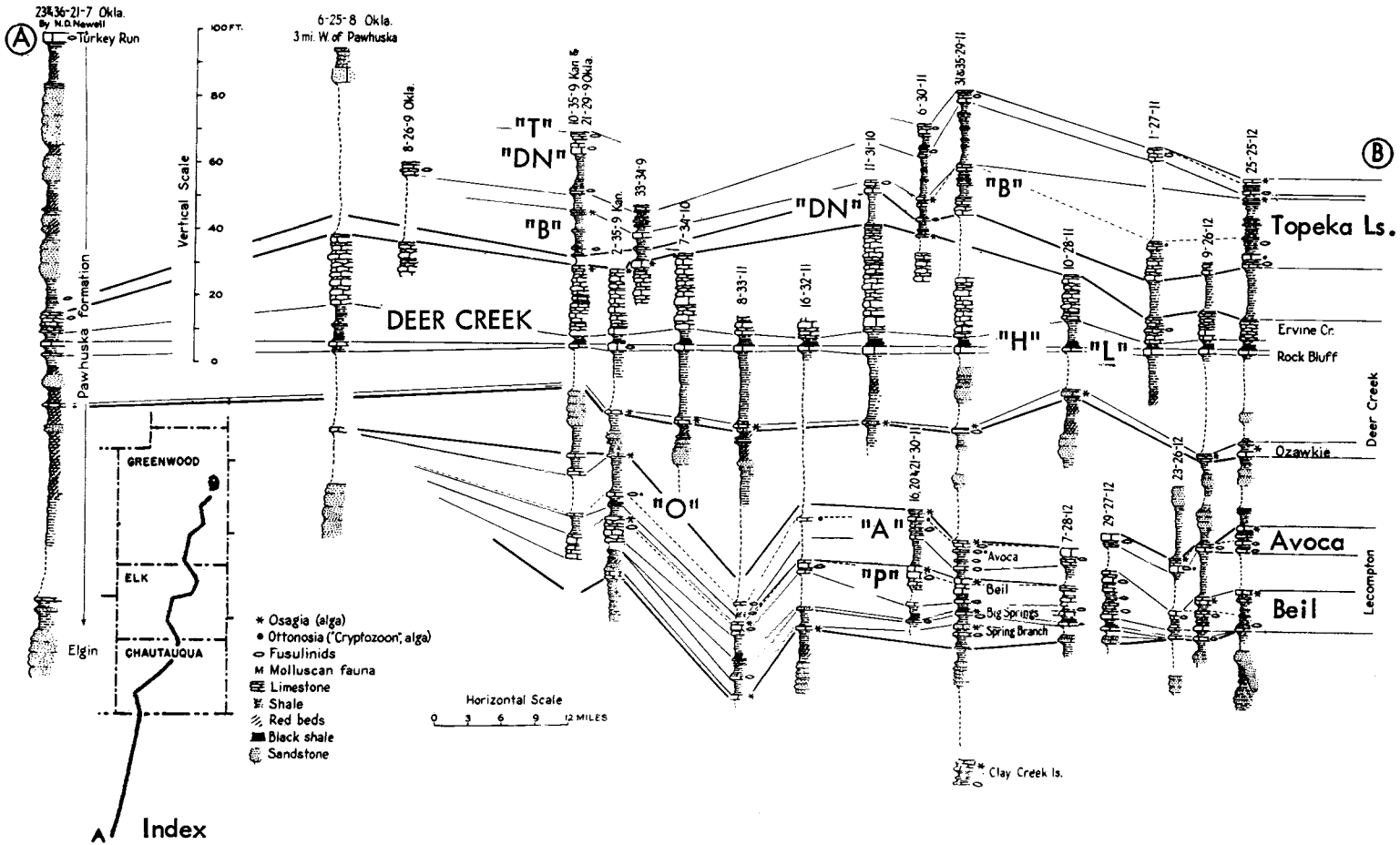


FIGURE 17.—Correlated sections of Shawnee Group (Virgilian) units in southeastern Kansas and northern Oklahoma, showing stratigraphic occurrence of some ecosystems ("A," Avoca-type; "B," Beil-type; "DN," Doniphan-type; "H," Heebner-type; "L," Leavenworth-type; "O," Ozawkie-type; "P," Plattsmouth-type; "T," Tarkio-type) (Moore).

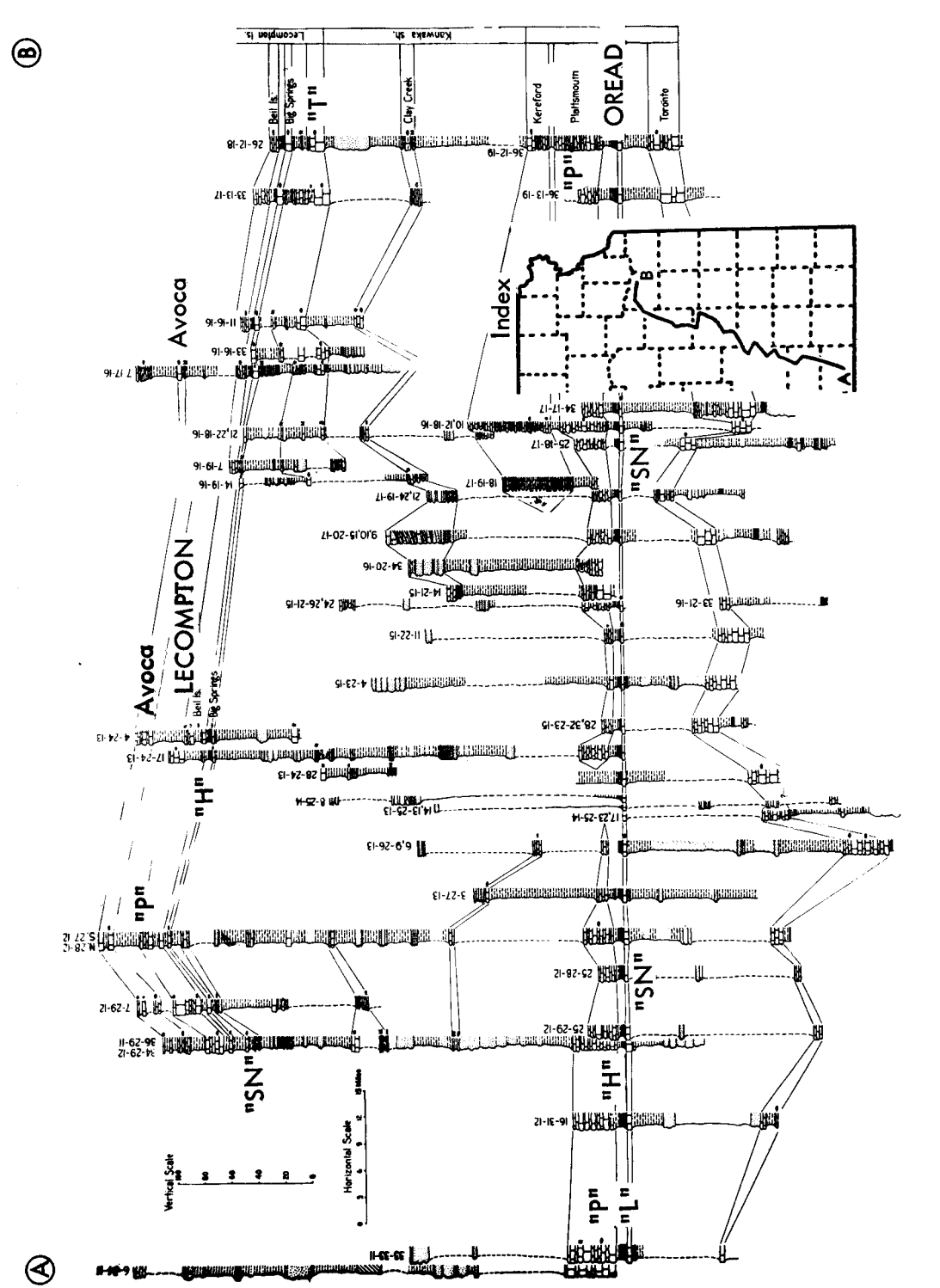


FIGURE 18.—Correlated sections of lower Shawnee (Virgilian) units in eastern Kansas, showing stratigraphic occurrences of some ecosystems ("H," Heebner-type; "L," Leavenworth-type; "P," Plattsmouth-type; "SN," Snyderville-type; "T," Tarkio-type) (Moore).

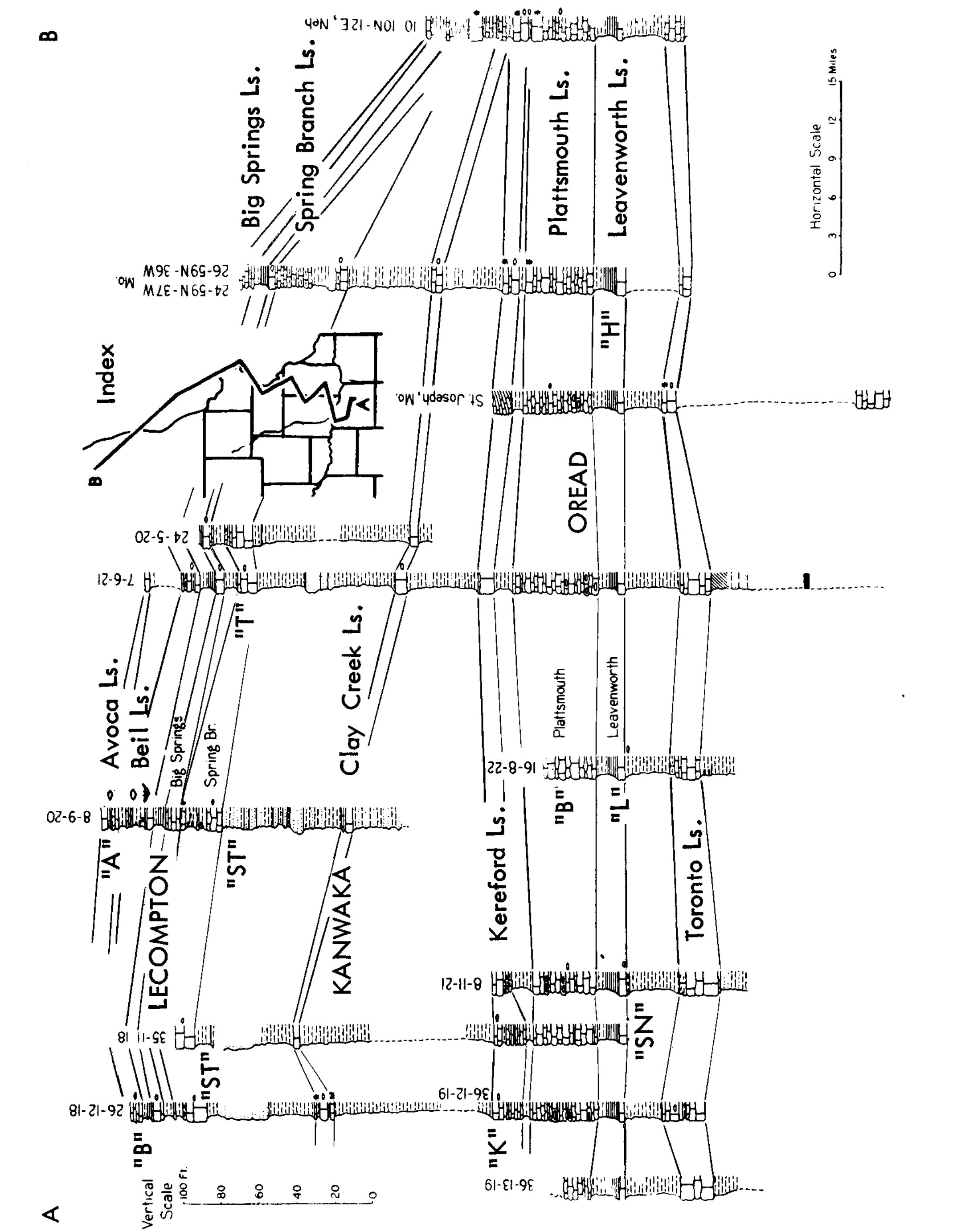


FIGURE 19.—Correlated sections of lower Shawnee (Virgilian) units in northeastern Kansas and adjacent parts of Missouri and Nebraska, showing stratigraphic occurrences of some specified ecosystems ("A," Avoca-type; "B," Beil-type; "H," Heebner-type; "K," Kereford-type; "L," Leavenworth-type; "SN," Snyderville-type; "ST," Stranger-type; "T," Tarkio-type) (Moore).

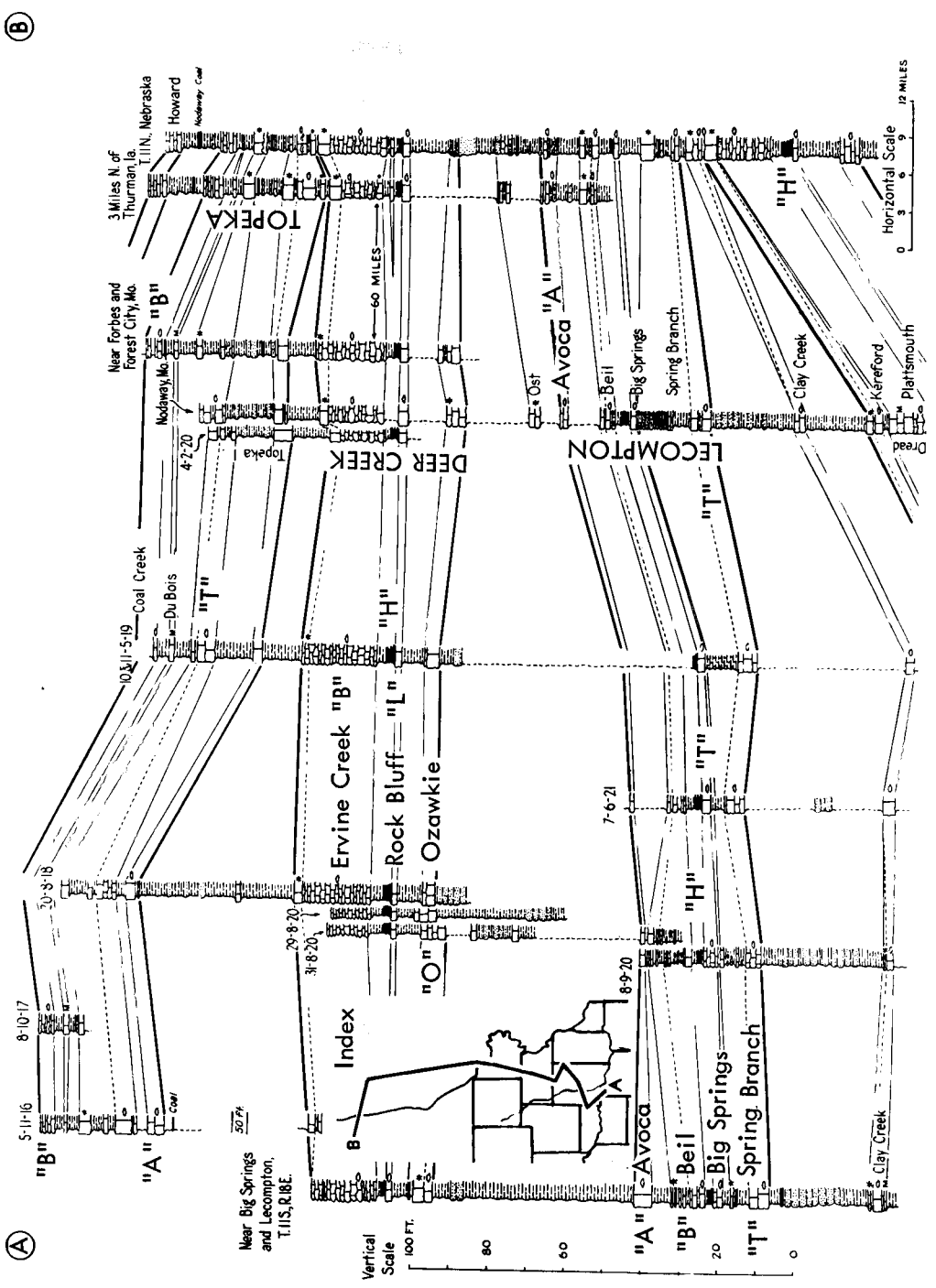


FIGURE 20.—Correlated sections of Shawnee (Virgilian) units in northeastern Kansas and adjacent parts of Missouri, Iowa, and Nebraska, showing stratigraphic occurrences of some specified ecosystems ("A," Avoca-type; "B," Beil-type; "H," Heebner-type; "L," Leavenworth-type; "O," Ozawkie-type; "T," Tarkio-type) (Moore).

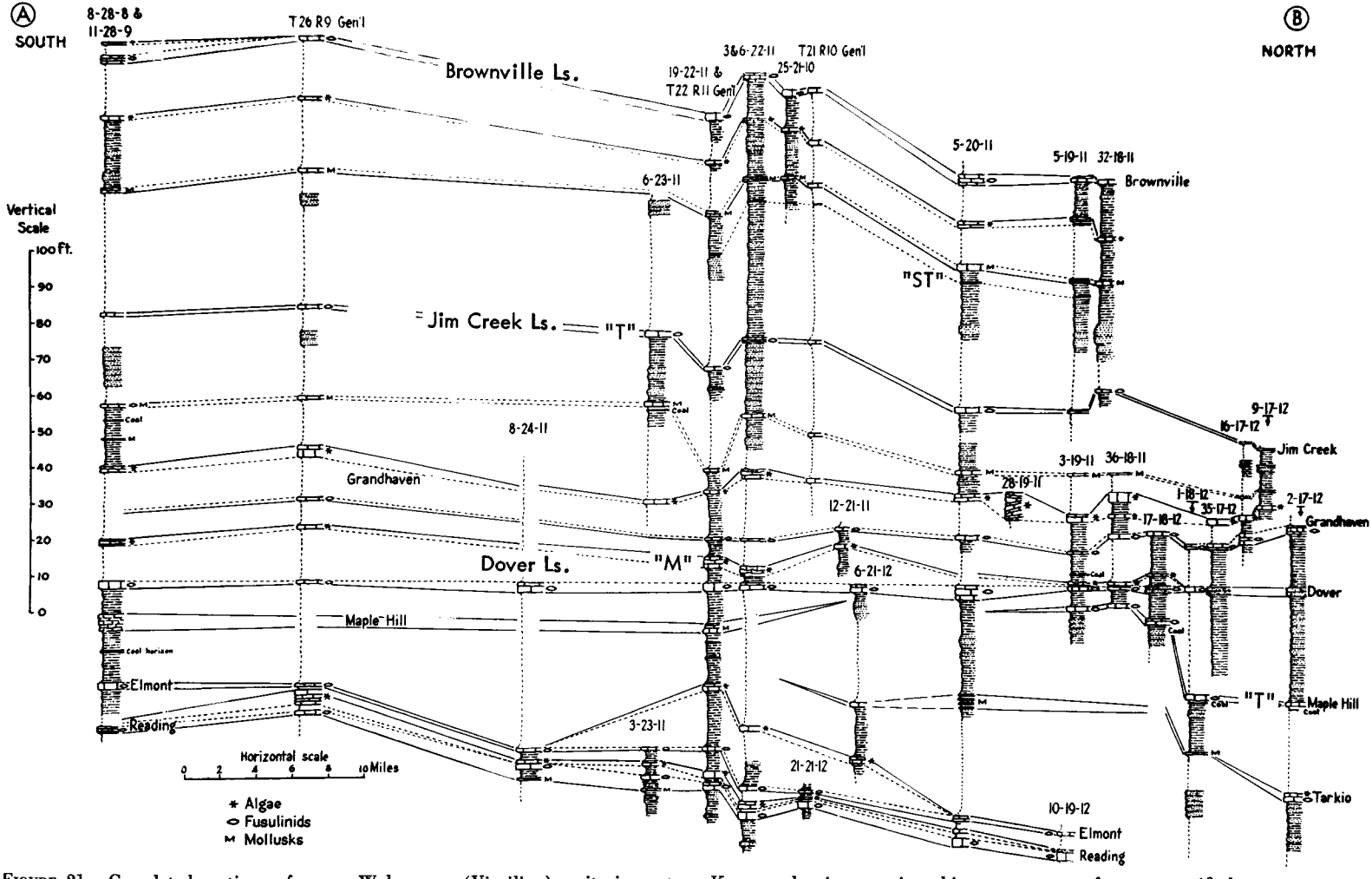


FIGURE 21.—Correlated sections of upper Wabaunsee (Virgilian) units in eastern Kansas, showing stratigraphic occurrences of some specified ecosystems (location in Greenwood and Lyon Counties shown on index map, Figure 22) ("M," Morrill-type; "ST," Stranger-type; "T," Tarkio-type) (Moore).

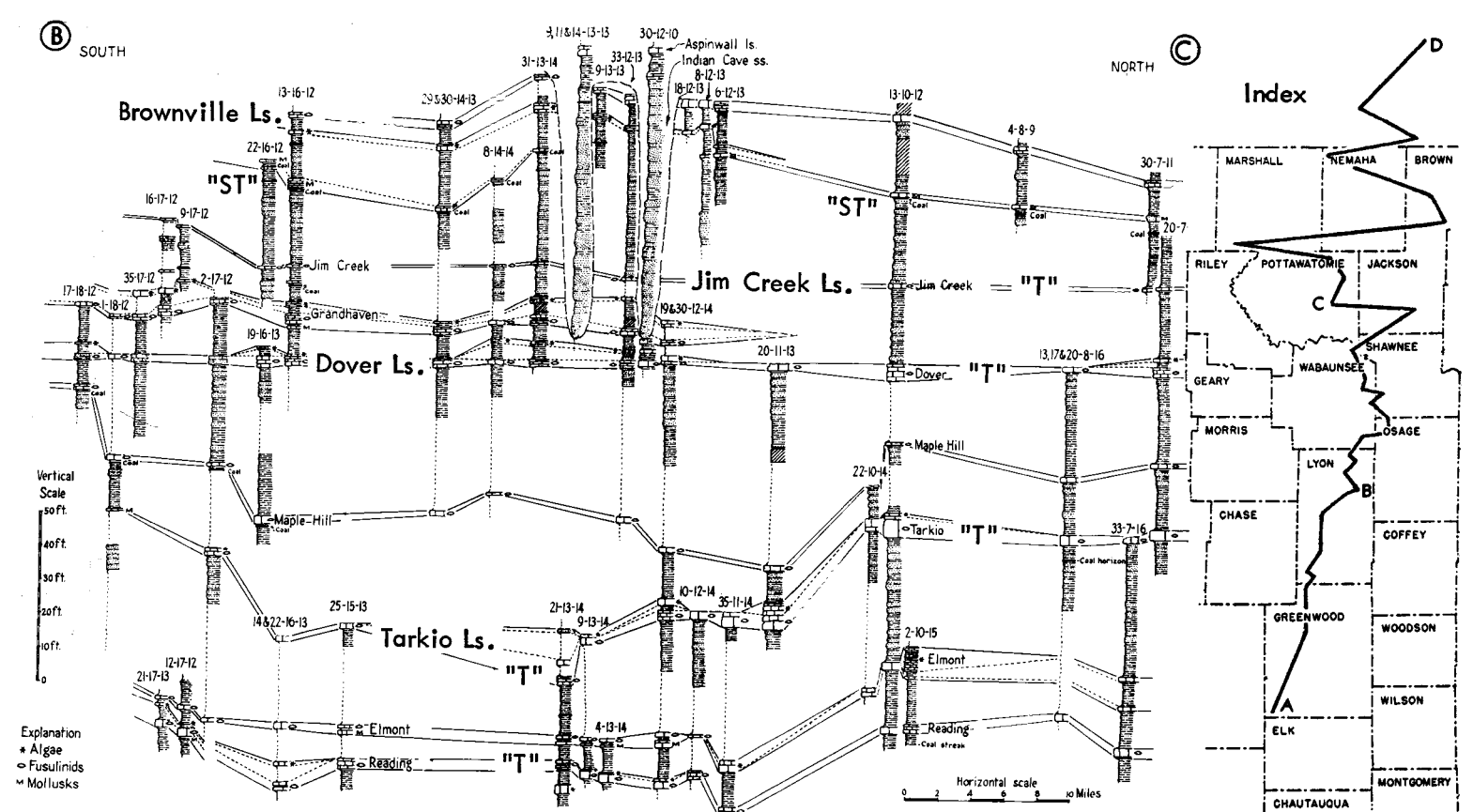


FIGURE 22.—Correlated sections of upper Wabaunsee (Virgilian) units in eastern Kansas, showing stratigraphic occurrences of some ecosystems ("ST," Stranger-type; "T," Tarkio-type) (Moore).

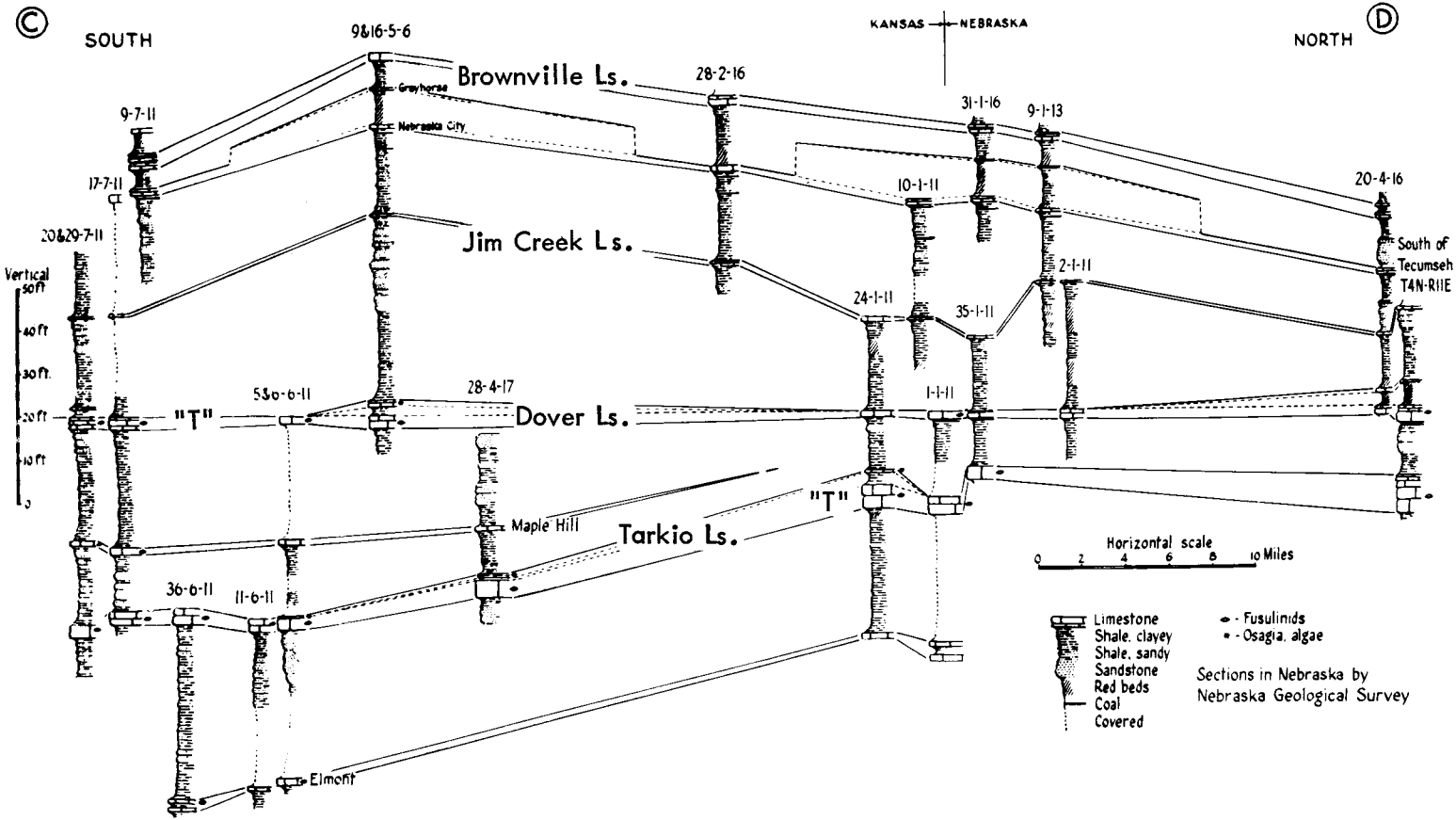


FIGURE 23.—Correlated sections of upper Wabaunsee (Virgilian) units in northeastern Kansas and southeastern Nebraska, showing stratigraphic occurrences of some specified ecosystems (location shown on index map, Figure 22) ("T," Tarkio-type) (Moore).

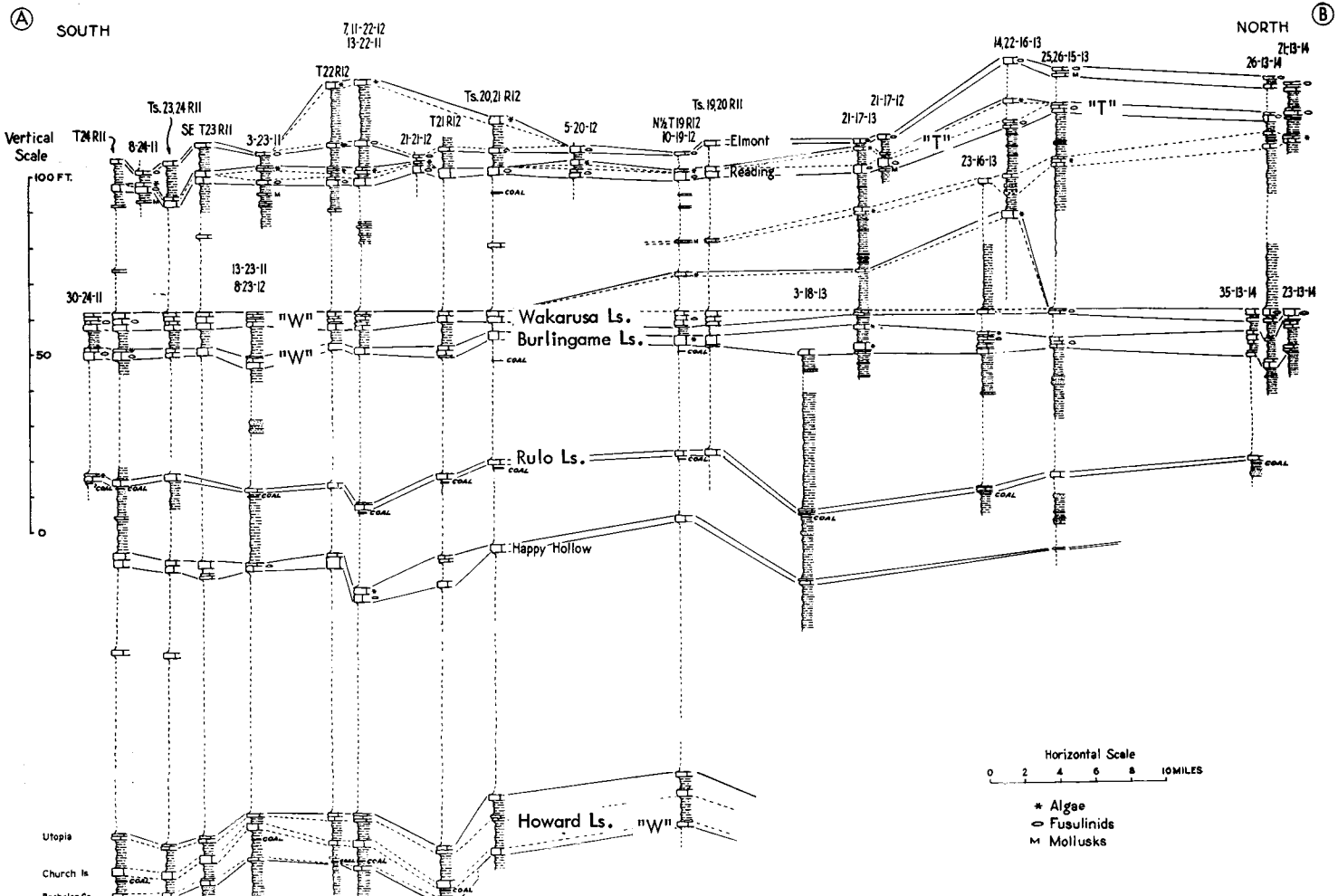


FIGURE 24.—Correlated sections of Wabaunsee (Virgilian) units in northeastern Kansas, showing stratigraphic occurrences of some ecosystems (location indicated on inset map, Figure 25) ("T," Tarkio-type; "W," Wakarusa-type) (Moore).

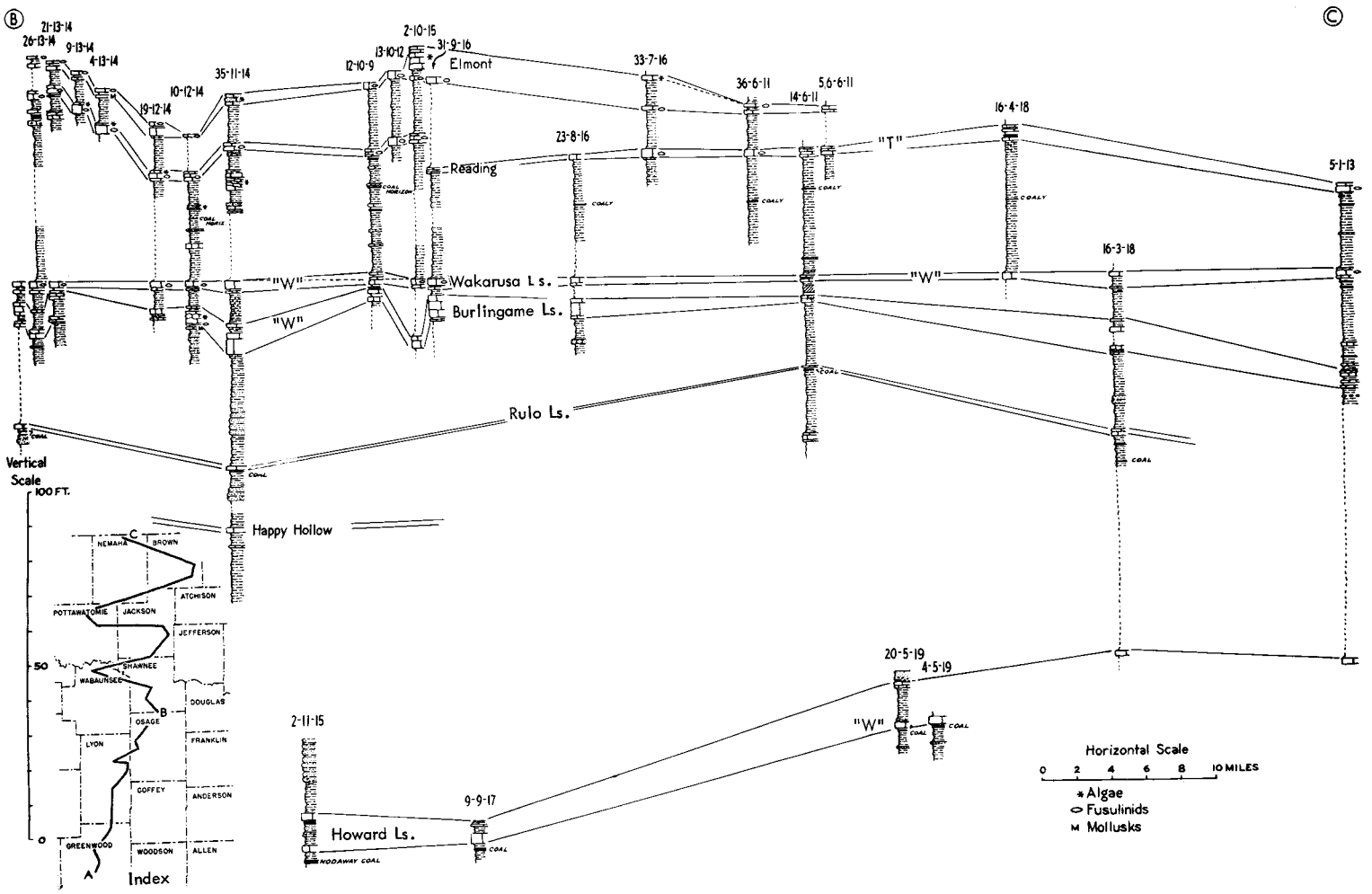


FIGURE 25.—Correlated sections of Wabaunsee (Virgilian) units in northeastern Kansas, showing stratigraphic occurrences of some ecosystems ("T," Tarkio-type; "W," Wakarusa-type) (Moore).

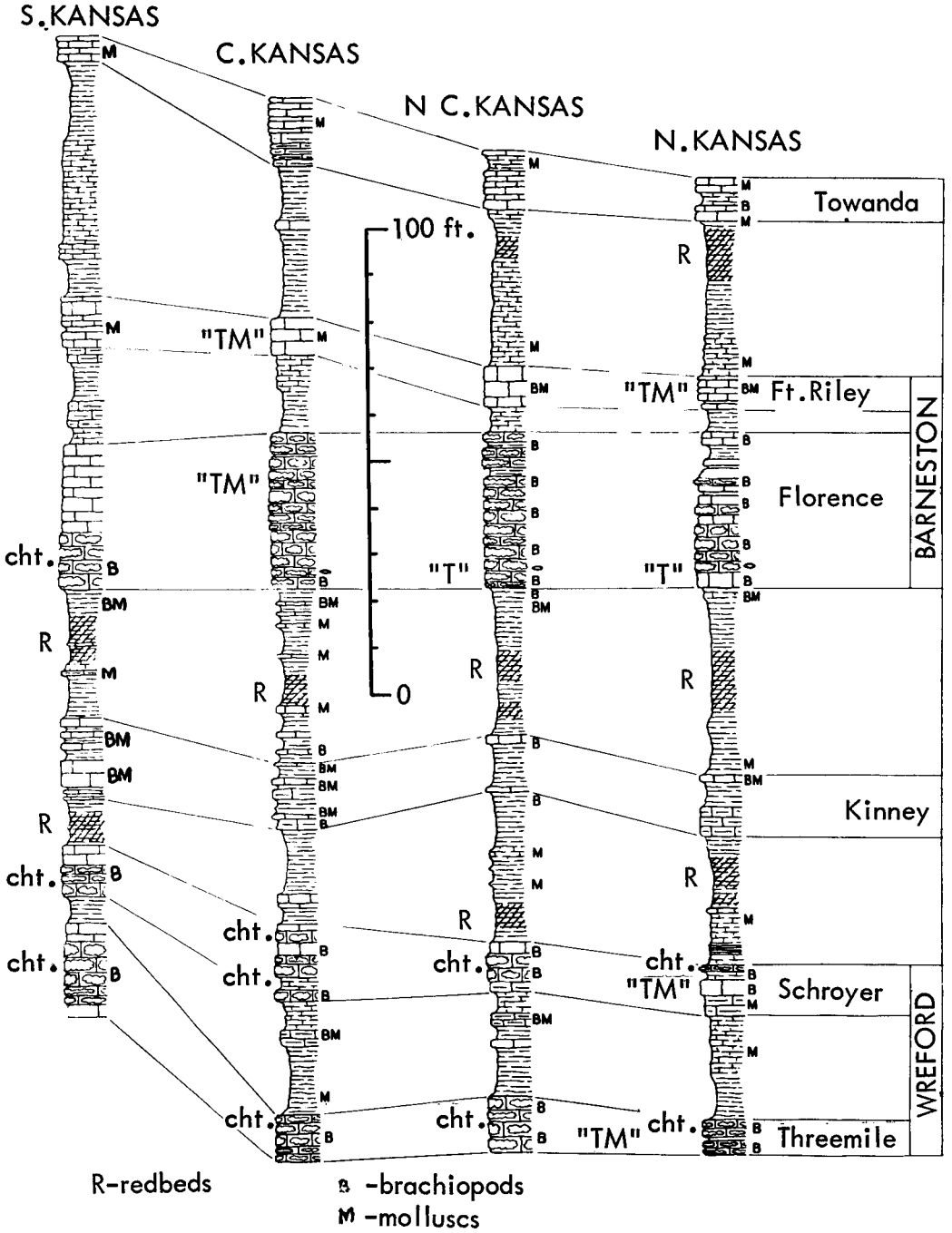


FIGURE 26.—Generalized sections of Lower Permian rocks extending upward from those given in Figure 11, showing stratigraphic occurrence of some ecosystems ("S," Speiser-type; "TM," Threemile-type) (Moore).

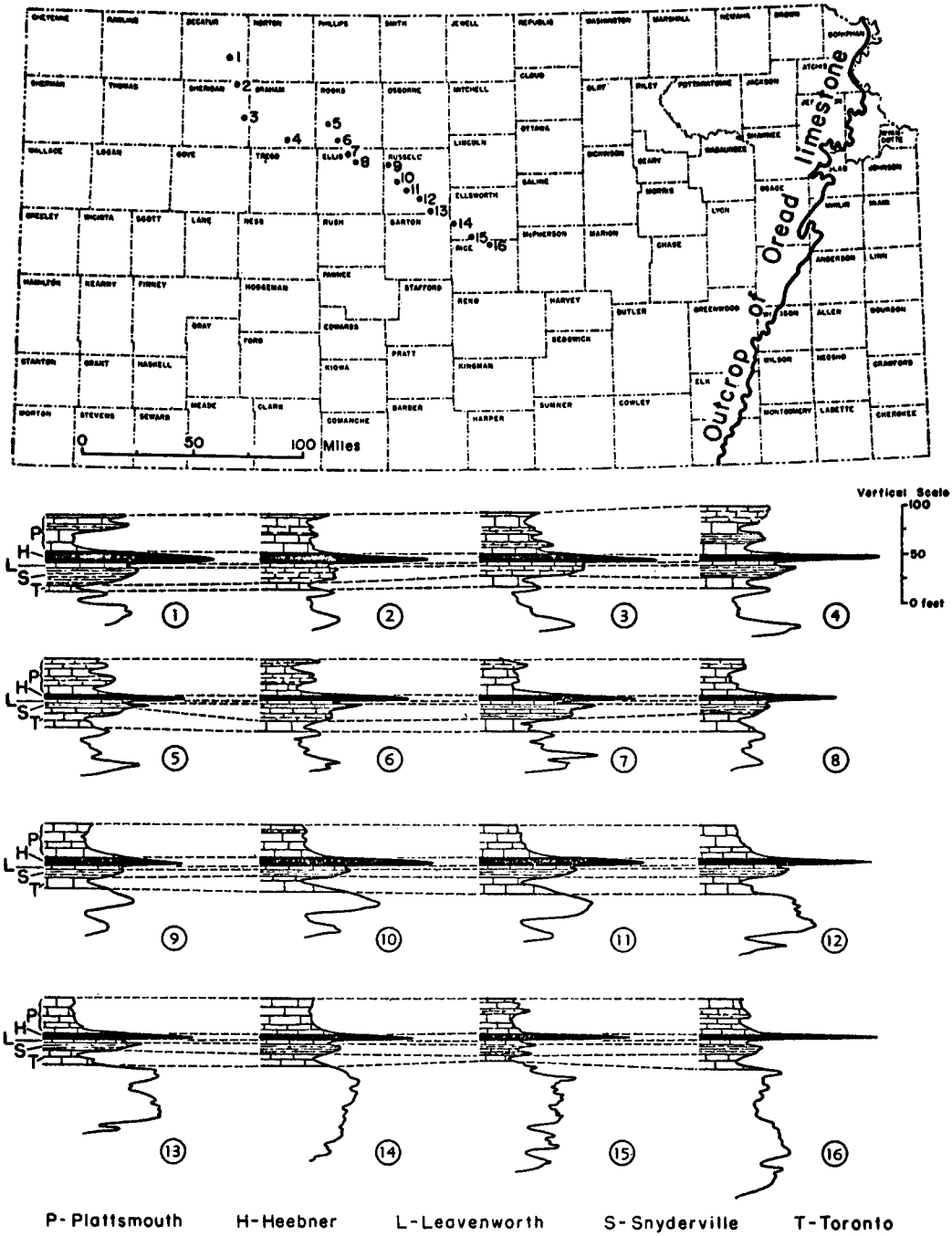


FIGURE 27.—Correlated members of Oread Limestone penetrated in 16 northwestern Kansas wells, based on gamma-ray logs furnished by Lane-Wells Company, Wichita, Kansas. Especially noteworthy is the subsurface persistence of thin units such as Heebner Shale and Leavenworth Limestone (after Moore, 1950).

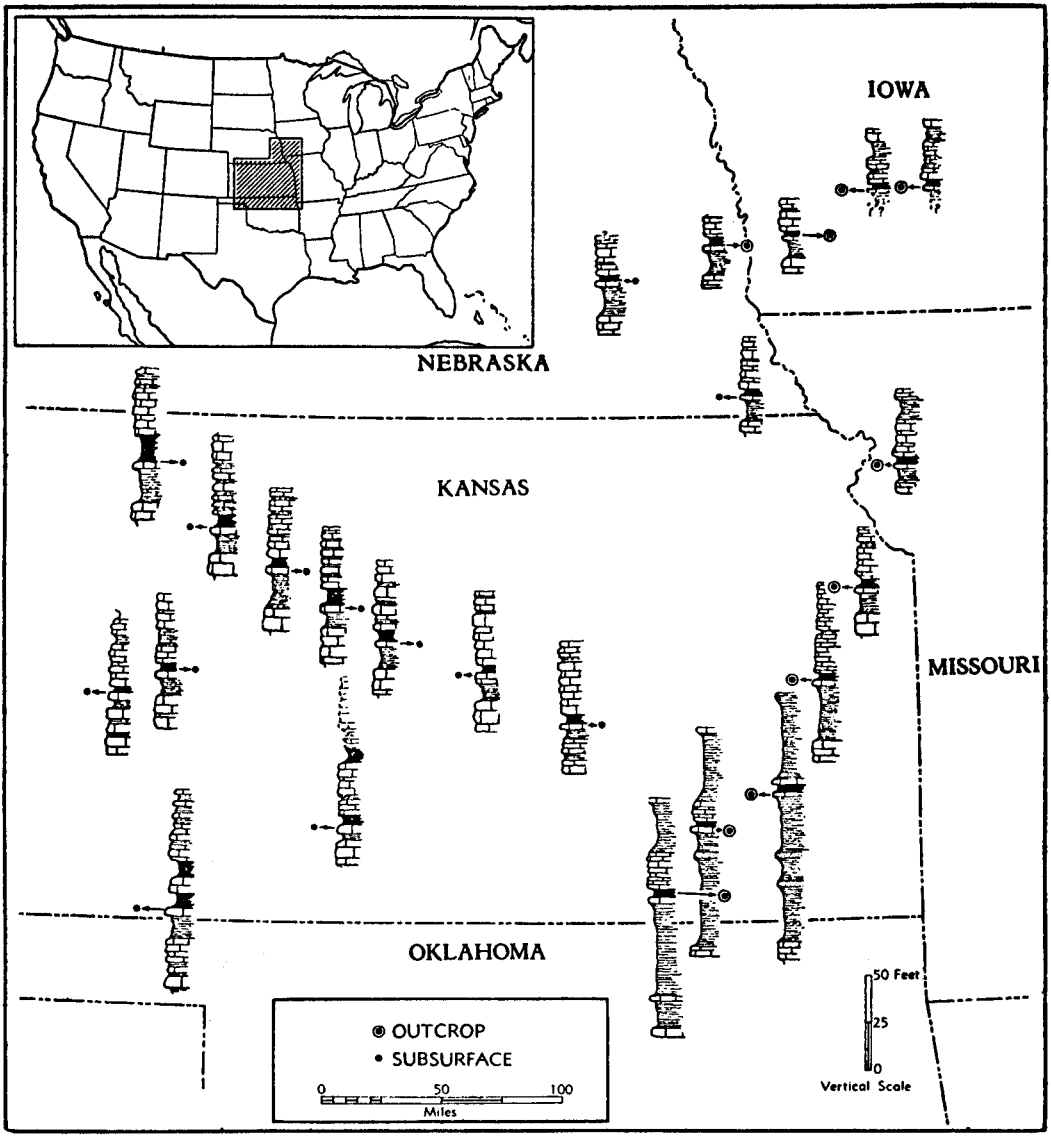


FIGURE 28.—Surface and subsurface sections of major part of Oread megacyclothem in Kansas, Missouri, Nebraska, and Iowa, showing persistence of cyclothem elements (after Moore, 1950).

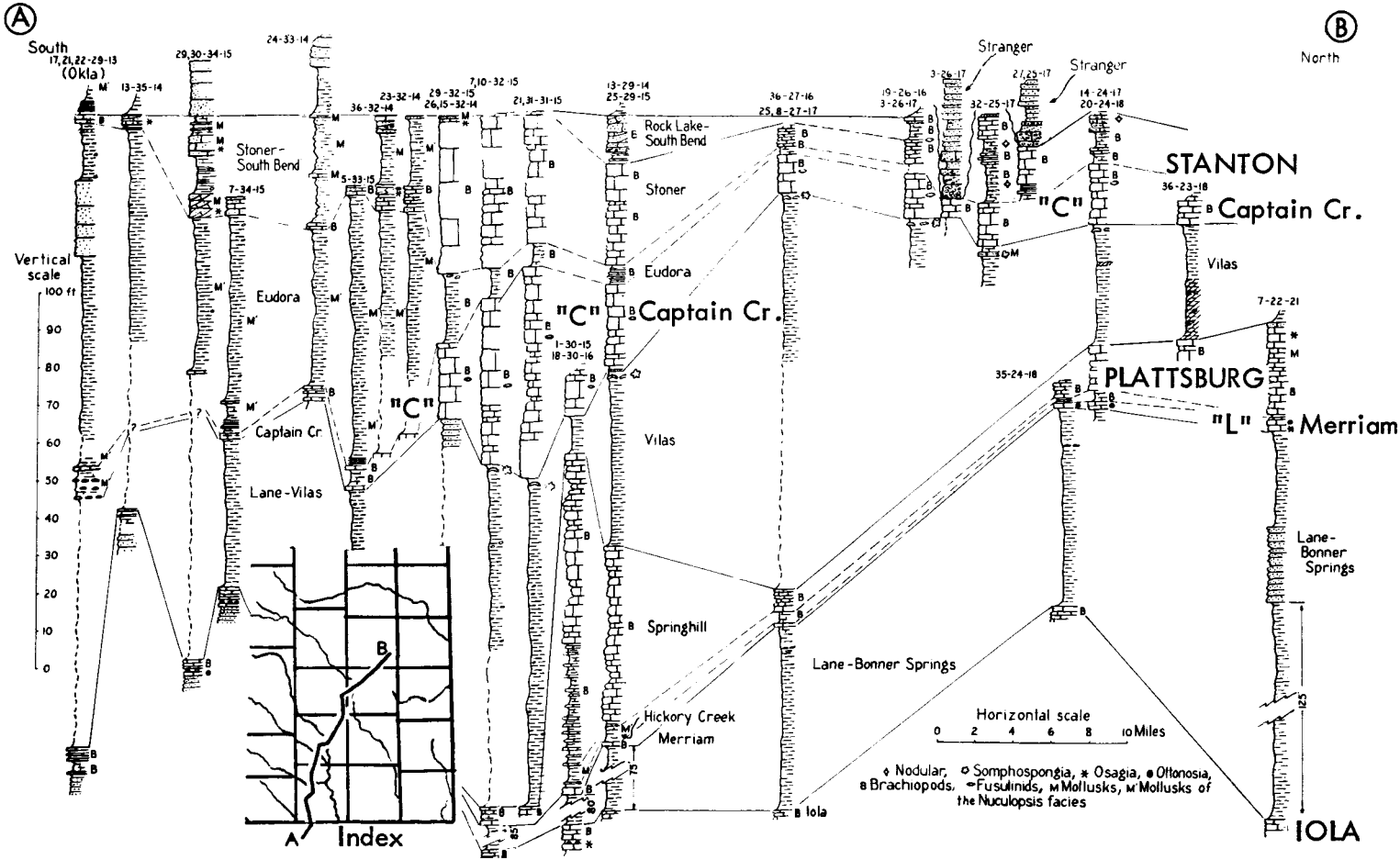


FIGURE 29.—Correlated sections of Lansing (Missourian) strata in southeastern Kansas, showing occurrence of some ecosystems ("C," Captain Creek-type; "L," Leavenworth-type) (Moore, sections mostly measured by N. D. Newell).

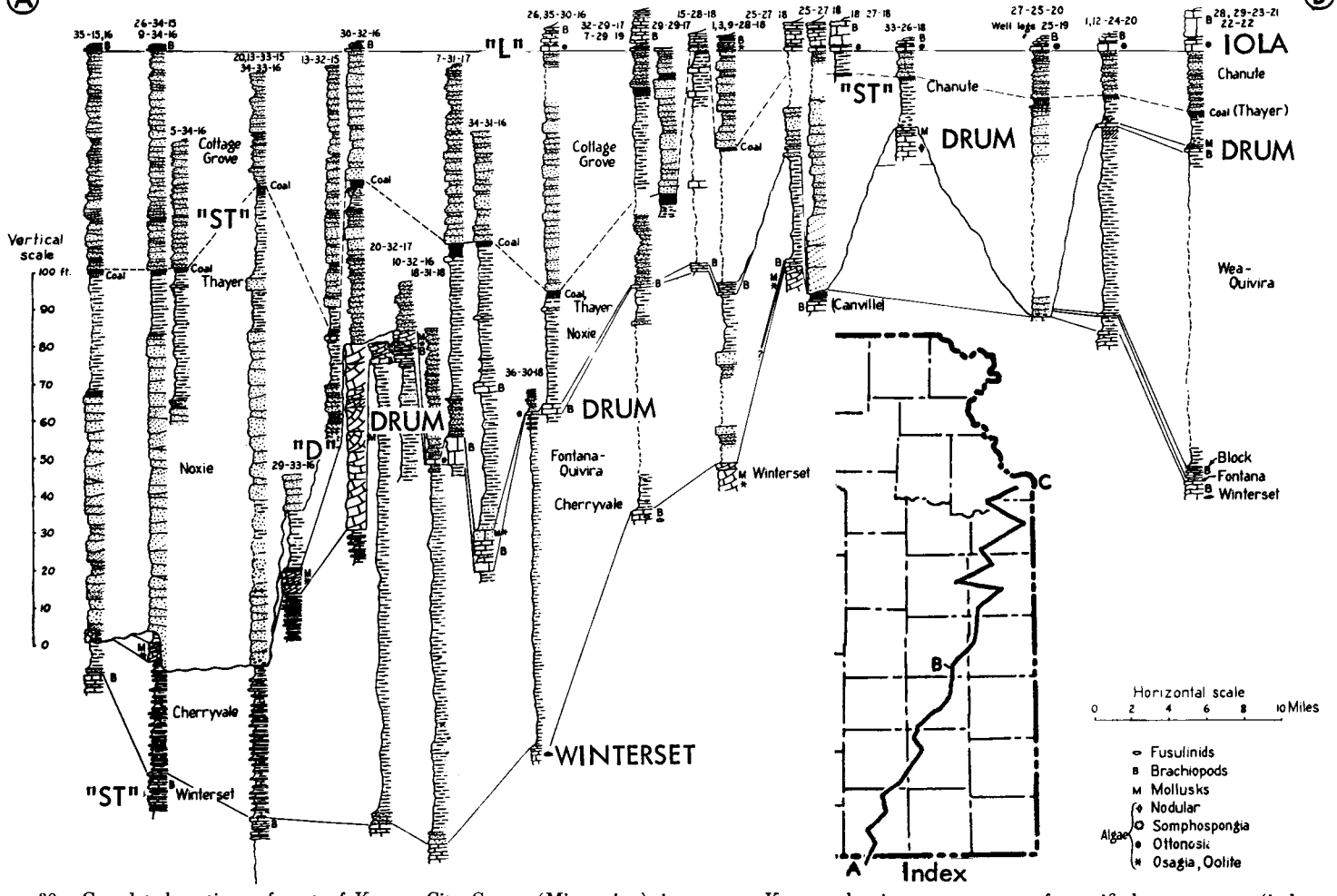


FIGURE 30.—Correlated sections of part of Kansas City Group (Missourian) in eastern Kansas showing occurrences of specified ecosystems (index map serves also for Figure 31) ("D," Drum-type; "L," Leavenworth-type; "ST," Stranger-type) (Moore, sections measured by N. D. Newell).

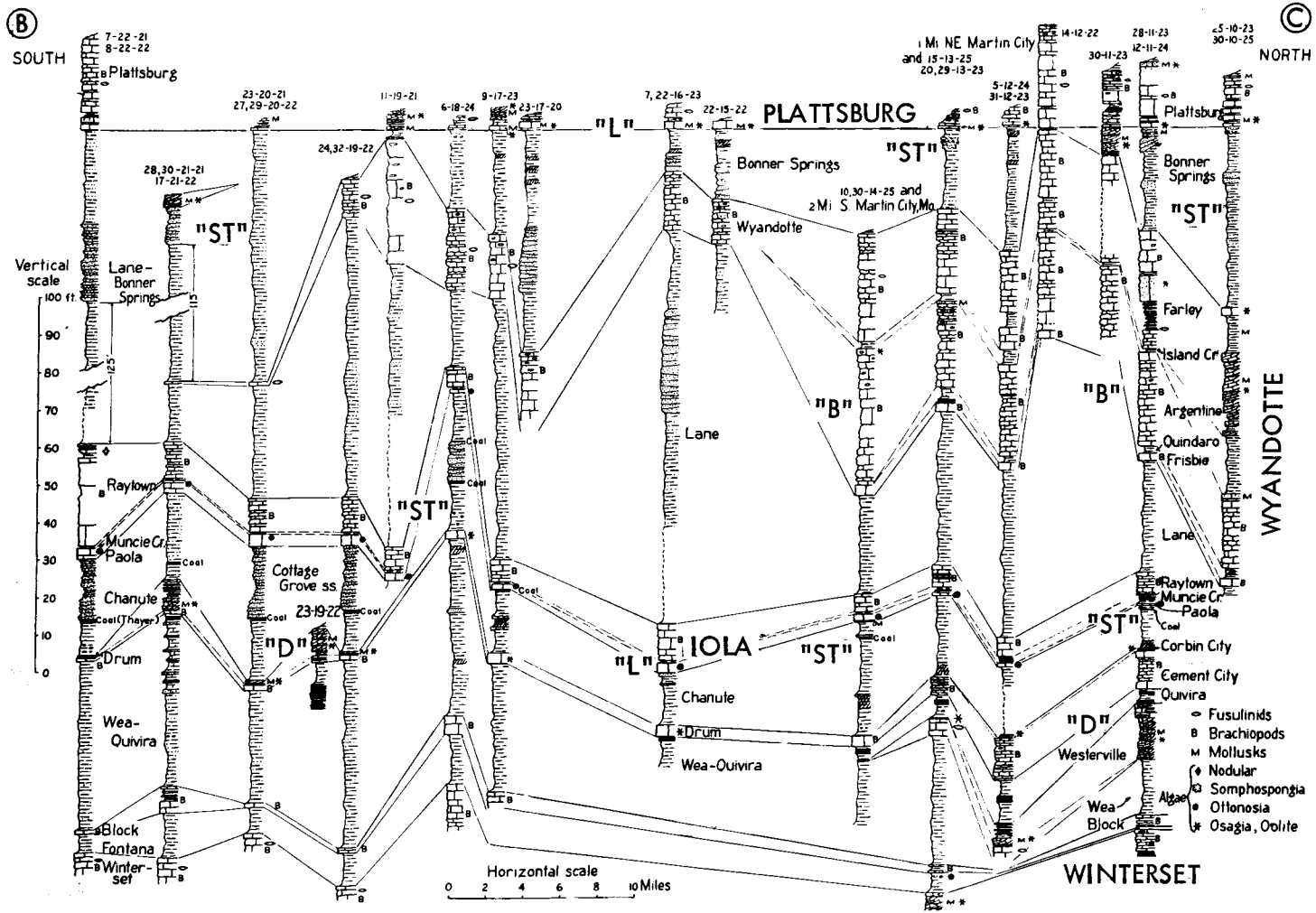


FIGURE 31.—Correlated sections of upper Kansas City and lower Lansing units in eastern Kansas showing occurrences of specified ecosystems (index map included in Figure 30) ("B," Beil-type; "D," Drum-type; "L," Leavenworth-type; "ST," Stranger-type) (Moore, sections measured by N. D. Newell).

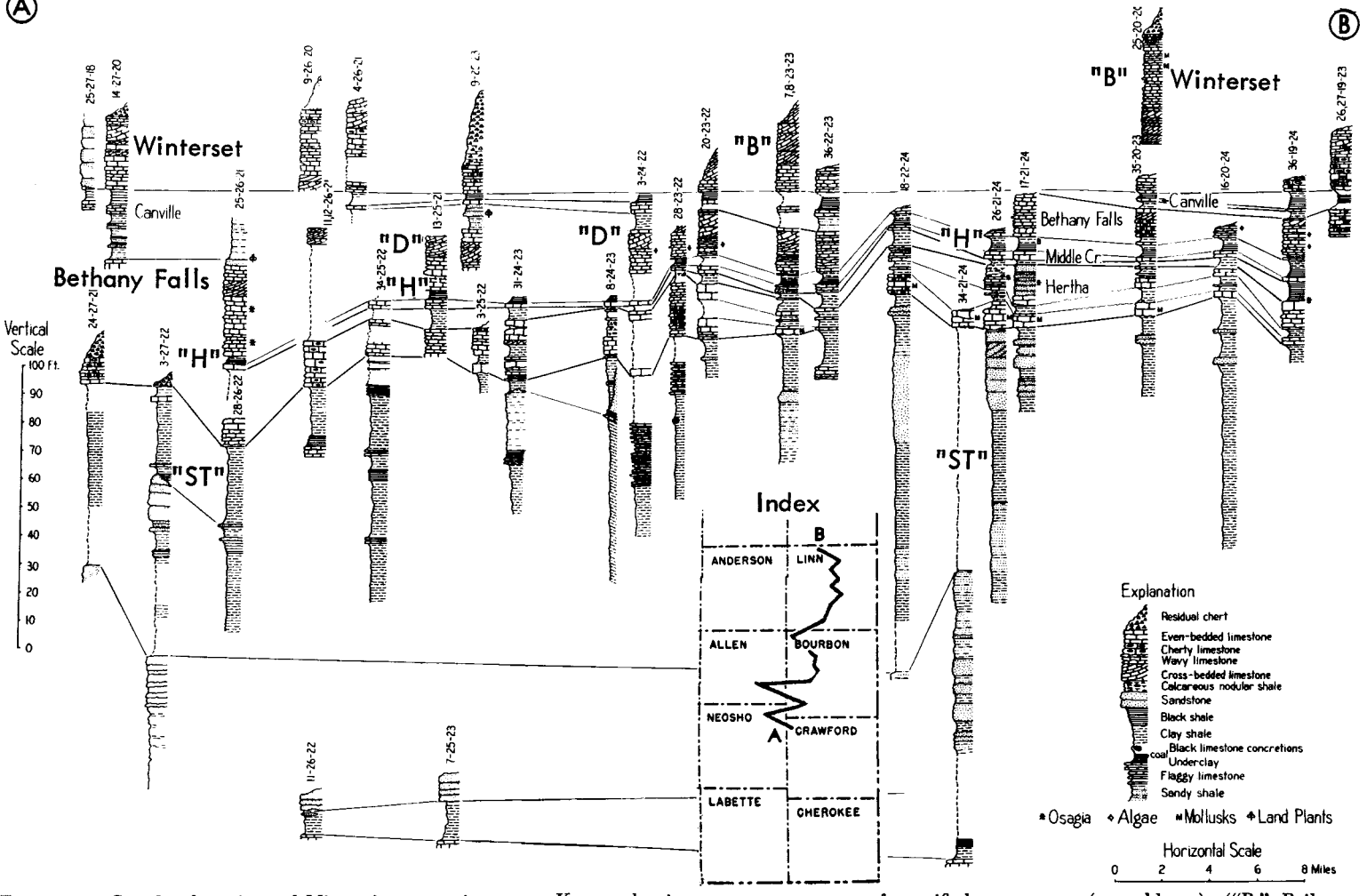


FIGURE 32.—Correlated sections of Missourian strata in eastern Kansas showing some occurrences of specified ecosystems (assemblages) ("B," Beil-type; "D," Drum-type; "H," Heebner-type; "ST," Stranger-type) (Moore, sections mostly measured by N. D. Newell).

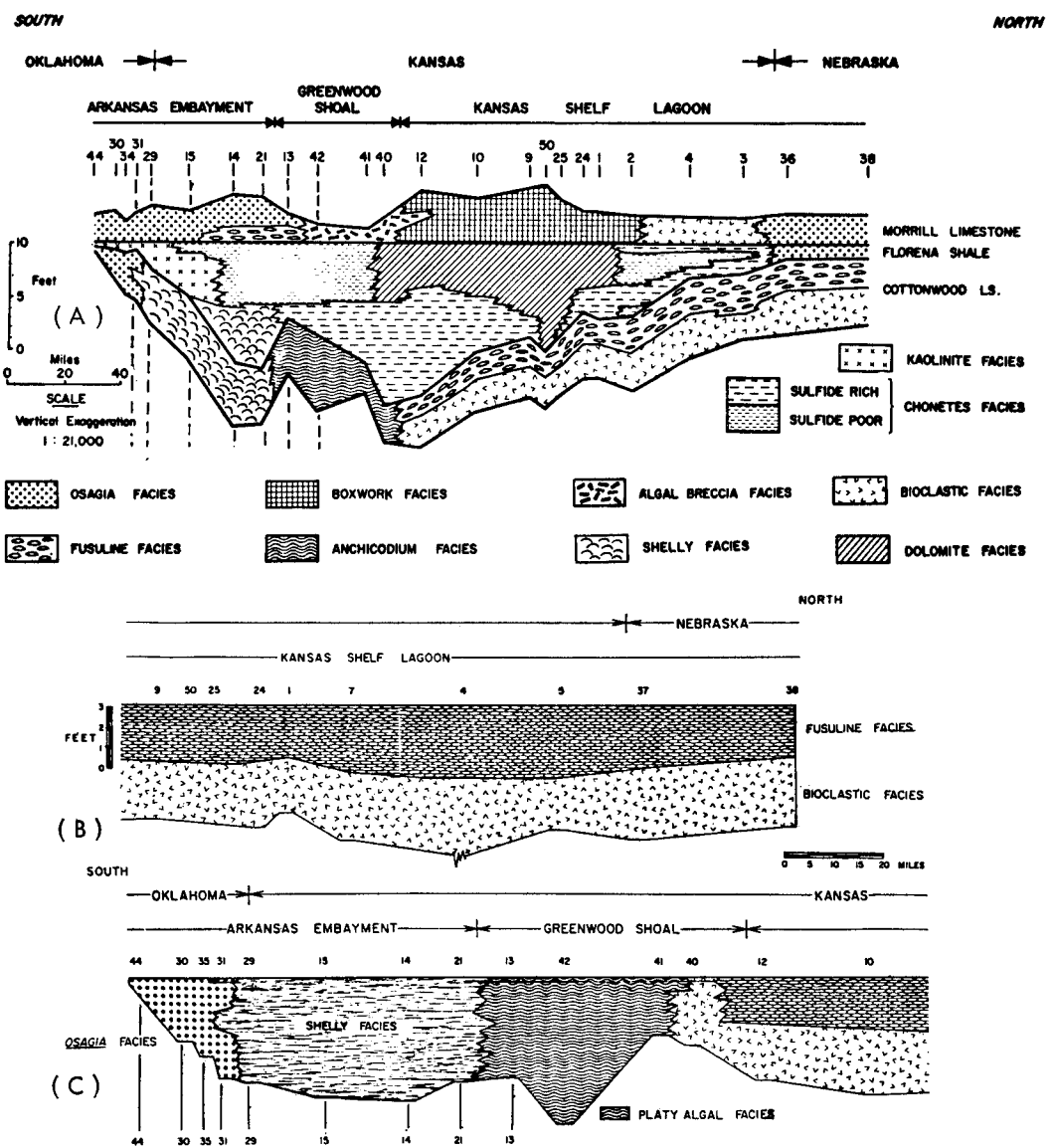


FIGURE 34.—Facies of Beattie Limestone differentiated by studies along outcrop from Oklahoma to Nebraska. *A*, Diagrammatic section of entire Beattie (after Imbrie, Laporte, and Merriam, 1959). *B*, *C*, Diagrammatic section of Cottonwood as determined from sampled exposures (after Laporte, 1962).

(1) Osage County, Okla., on U.S. 60 W of Burbank (SE sec. 28, T. 26 N., R. 5 E.), measured by R. C. Moore.
(2) Osage County, Okla., near Apperson (NE sec. 9, T. 28 N., R. 5 E.), measured by R. C. Moore.
(3) Osage County, Okla., W of Grainola (NE sec. 2, T. 28 N., R. 5 E.), Imbrie's Loc. 31, measured by R. C. Moore and T. E. Jacques.
(4) Osage County, Okla., Murphy Ranch (NE sec. 17, T. 29 N., R. 6 E.), Imbrie's Loc. 29, measured by R. C. Moore and T. E. Jacques.
(5) Cowley County, Kans., on U.S. 166 W of Cedar Vale (NW sec. 12, T. 34 S., R. 7 E.), measured by R. C. Moore and T. E. Jacques.
(6) Cowley County, Kans., near Hooser (NW sec. 36, T. 33 S., R. 7 E.), Imbrie's Loc. 15, measured by R. C. Moore, D. F. Merriam, and T. E. Jacques.
(7) Cowley County, Kans., Jarvis Ranch (SW sec. 19, T. 32 S., R. 8 E.), measured by R. C. Moore, D. F. Merriam, and T. E. Jacques.

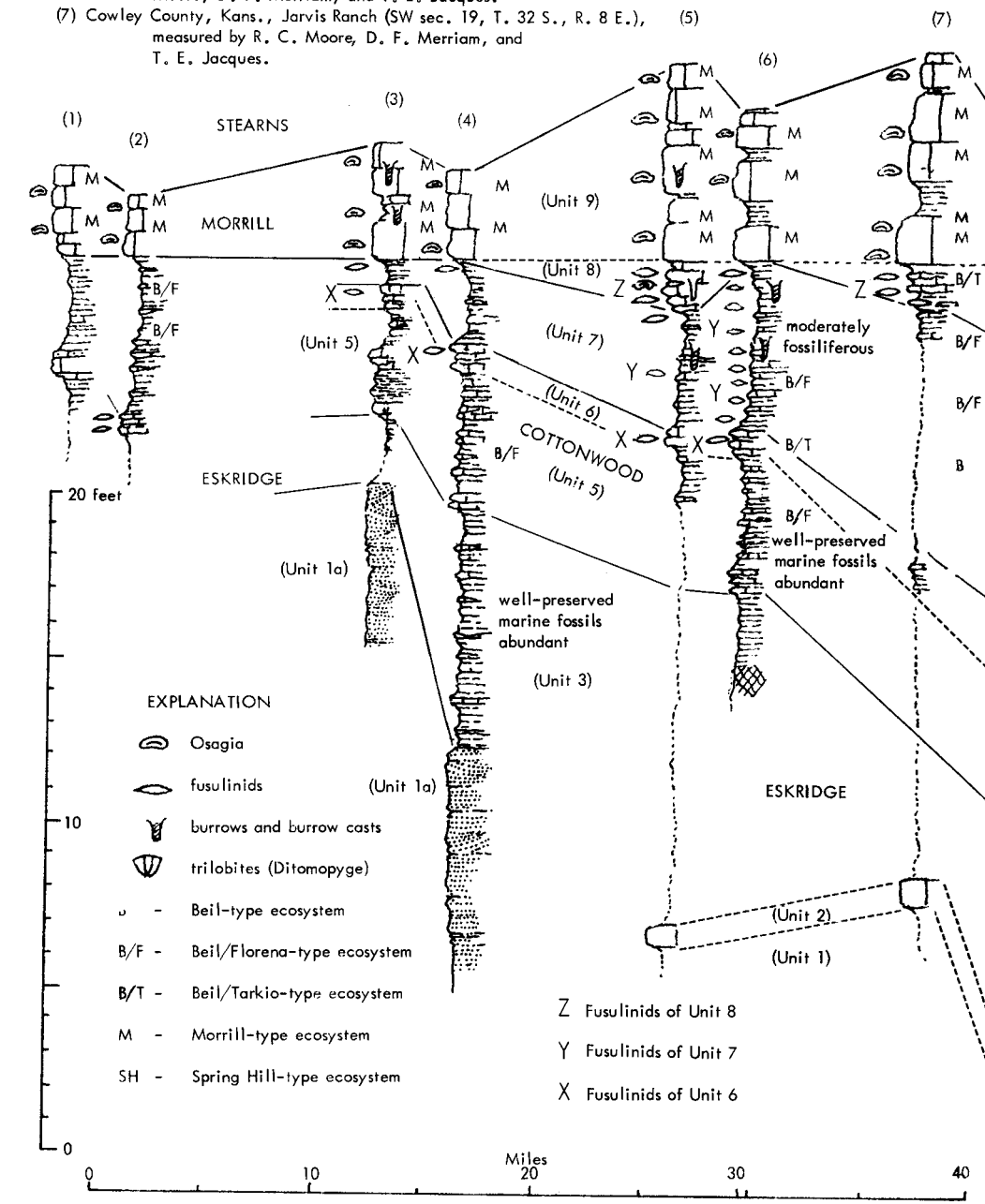
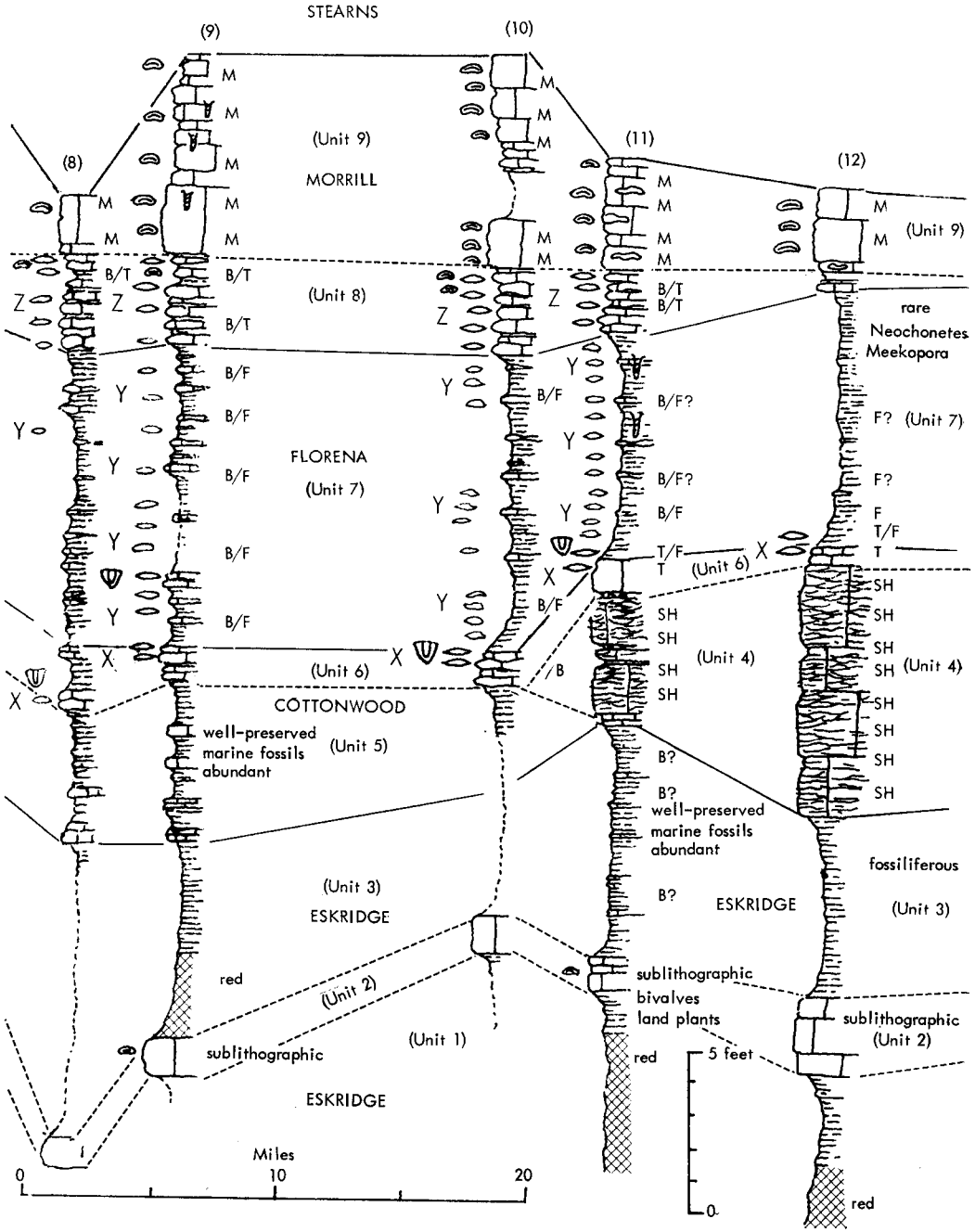


FIGURE 36.—Correlated sections of Beattie and upper Eskridge strata in southern Kansas and northern Oklahoma based on Moore's 1964 field work, supplemented by observations made during field conference with Imbrie, Laporte, Merriam, and Jacques in August, 1964, and data on Florena fusulinids furnished by Imbrie.

(8) Cowley County, Kans., Jarvis Ranch (NW sec. 7, T. 32 S., R. 8 E.), measured by R. C. Moore and T. E. Jacques.
(9) Cowley County, Kans., on U.S. 160 W of Grenola (NW sec. 17, T. 31 S., R. 8 E), Imbrie's Loc. 14, measured by R. C. Moore.
(10) Elk County, Kans., Clear Cr. E of Latham (SW sec. 13, T. 29 S., R. 8 E.), Imbrie's Loc. 21, measured by R. C. Moore, D. F. Merriam, and T. E. Jacques.
(11) Greenwood County, Kans., on Kansas 96 W of Piedmont (SW sec. 35, T. 27 S., R. 8 E.), Imbrie's Loc. 13, measured by R. C. Moore.
(12) Greenwood County, Kans., on U.S. 54 W of Reece (SW sec. 3, T. 26 S., R. 8 E.), Imbrie's Loc. 42, measured by R. C. Moore.



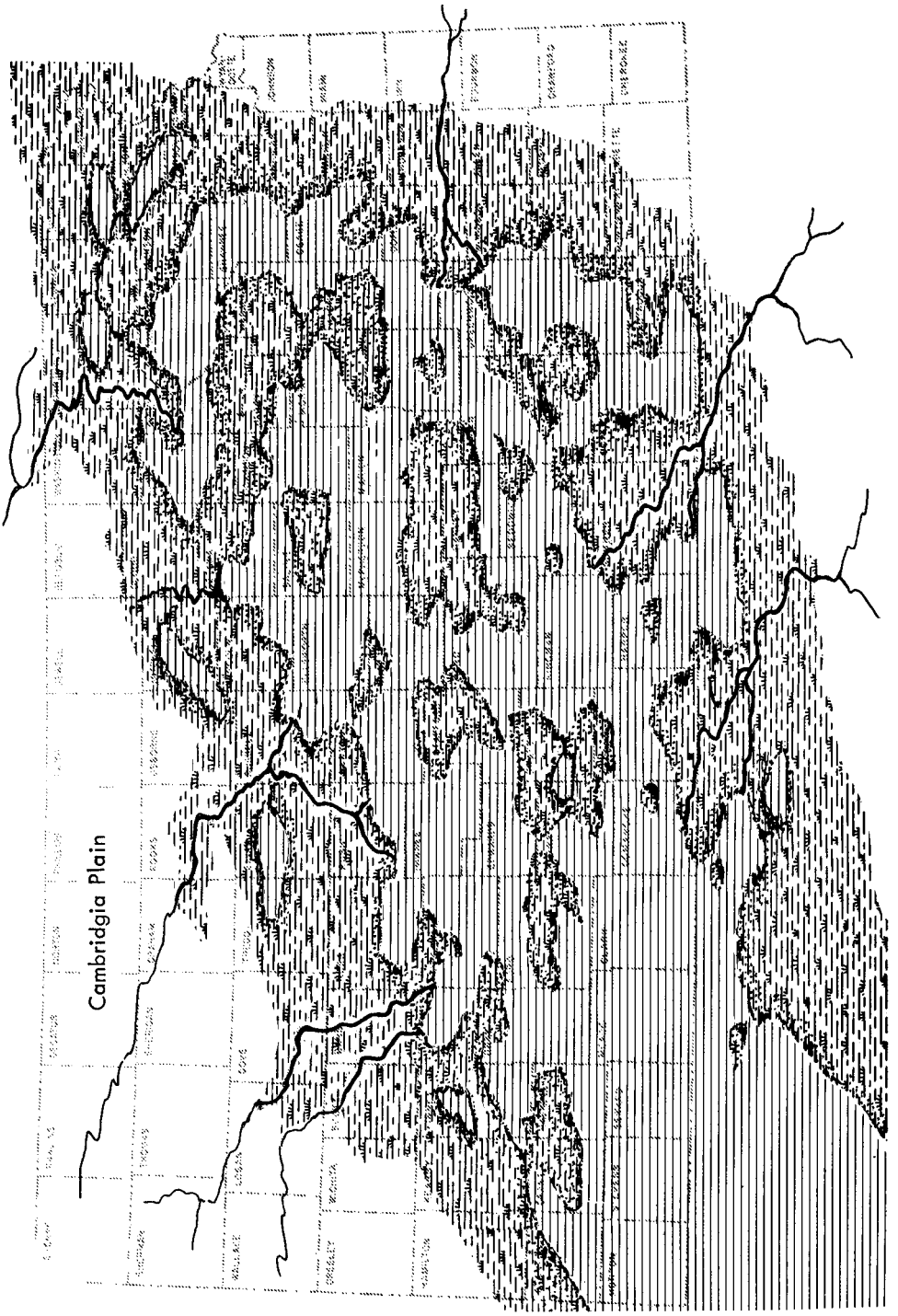


FIGURE 40.—Paleogeography of early part of Beattie cyclothem (late Eskridge) as interpreted by Moore, details entirely subjective and diagrammatic with intent to depict "semimarine" environment of most of Kansas region and presumed shallow but more continuous seaway toward southwest. Sedimentation comparable to parts of Mississippi delta country of present day in southern Louisiana is inferred, with freshwater lakes, brackish-water lagoons, and broad marshy tracts bordering barely submerged territory.

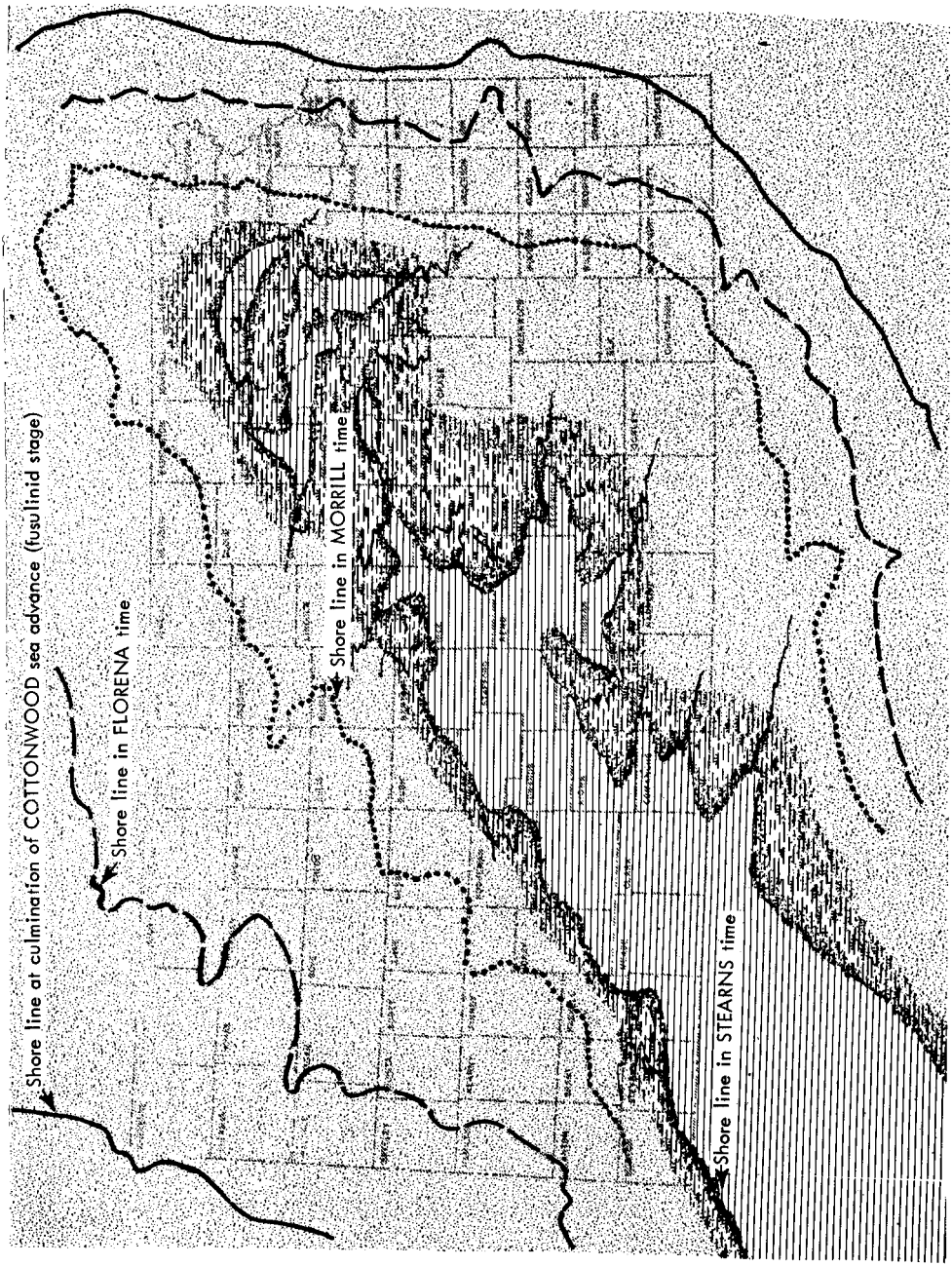


FIGURE 41.—Paleogeography of intermediate and late stages in development of Beattie cyclothem in Kansas region. Map actually depicts postulated distribution of submerged and emergent territory in early Stearns time, when dominantly nonmarine deposits in upper part of Beattie cyclothem were formed, with guessed locations of Cottonwood, Florena, and Morrill shore lines left uncovered by retreating shallow sea. Great fluctuations of sea border are inferred to have accompanied very minor recurrent subsidences in the area of sedimentation, possibly combined with effects of small eustatic changes of sea level.

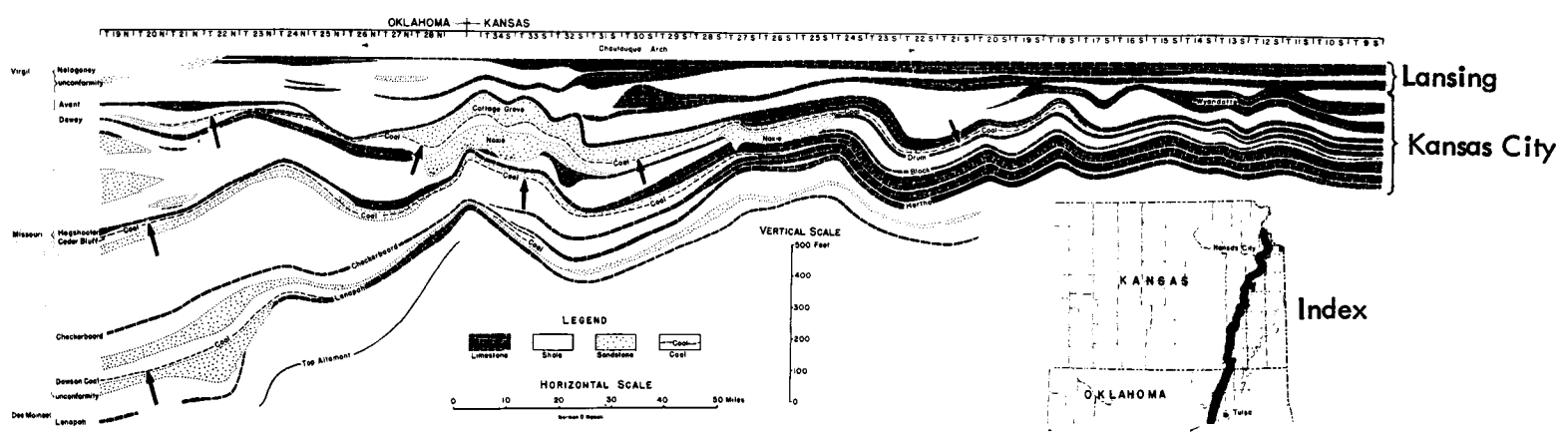


FIGURE 42.—Diagrammatic section of Missourian strata in eastern Kansas and northeastern Oklahoma illustrating southward disappearance of limestones accompanied by thickening of clastic deposits. (Moore, based on sections by N. D. Newell).

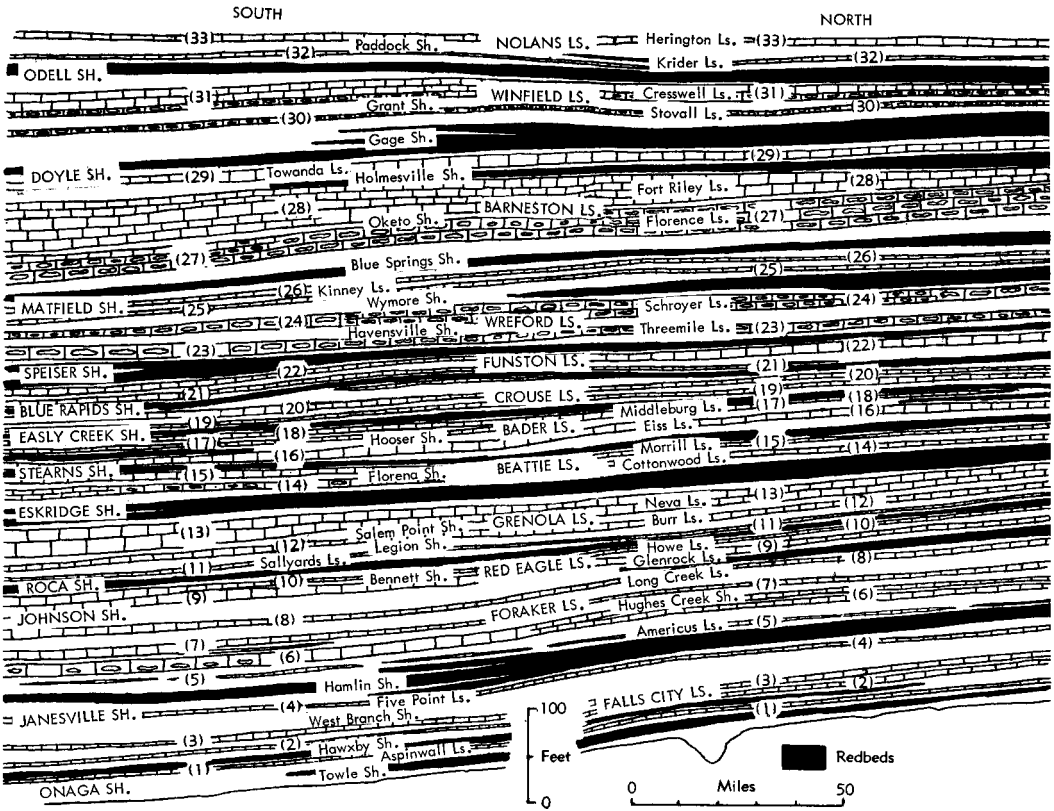


FIGURE 43.—Diagrammatic section of Lower Permian strata extending from northern to southern boundary of Kansas, showing great regularity of "layer-cake" stratigraphy and denoting pulsatory subsidence of almost incredible evenness aggregating approximately 700 feet in north as compared with 800 feet in the south. (Moore *in* Moore and Merriam, 1959).