Strodes Creek Member (Upper Ordovician)-- A New Map Unit in the Lexington Limestone of North-Central Kentucky

By DOUGLAS F. B. BLACK *and* NORMAN P. CUPPELS

CONTRIBUTIONS TO STRATIGRAPHY

GEOLOGICAL SURVEY BULLETIN 1372-C

Prepared in cooperation with the Kentucky Geological Survey

Description of a body of distinctive micrograined limestone in the upper part of the Lexington Limestone

UNITED STATES DEPARTMENT OF THE INTERIOR

ROGERS C. B. MORTON, *Secretary*

GEOLOGICAL SURVEY

V. E. McKelvey, *Director*

Library of Congress catalog-card No. 72-600315

UNITED STATES GOVERNMENT PRINTING OFFICE, WASHINGTON : 1973

For sale by the Superintendent of Documents, U.S. Government Printing Office
Washington, D. C. 20402
Stock Number 2401-00290

CONTENTS

ILLUSTRATIONS

CONTRIBUTIONS TO STRATIGRAPHY

STRODES CREEK MEMBER (UPPER ORDOVICIAN)—A NEW MAP UNIT IN THE LEXINGTON LIMESTONE OF NORTH-CENTRAL KENTUCKY

By DOUGLAS F. B. BLACK and NORMAN P. CUPPELS

ABSTRACT

The Strodes Creek Member, a body of distinctive micrograined limestone in beds of bouldery aspect, was defined in the course of mapping the complex relations among members of the upper Lexington Limestone and the Clays Ferry Formation in the northeast part of the inner Bluegrass region of Kentucky. It consists chiefly of brownish-gray dense lime mudstone, characteristically containing abundant stromatoporoids and sparse but conspicuous ostracodes. The member is a lens, or possibly a tongue, in the easterly thickening upper part of the Lexington Limestone and is lithologically similar to parts of the Perryville Limestone Member and Devils Hollow Member of the Lexington of the western Bluegrass. The western edge of the new member trends north-northwest between Winchester and Cynthiana. Fossils identified from these rocks indicate an early Edenian age.

INTRODUCTION

Recent geologic mapping in north-central Kentucky, done as part of the current U.S. Geological Survey-Kentucky Geological Survey cooperative program, has resulted in the recognition of a previously undetected mappable rock-stratigraphic unit in the upper part of the Lexington Limestone. This new unit is here named the Strodes Creek Member of the Lexington for Strodes Creek in the Austerlitz quadrangle, Kentucky.

The Strodes Creek is chiefly brownish-gray dense lime mudstone, characteristically containing abundant reddish-brown and light-pinkish-gray stromatoporoids and sparse but conspicuous ostracodes. The member is a lens, or possibly a tongue, within the Millersburg Member of the Lexington. Its western edge trends north-northwest between Winchester and Cynthiana, Ky., and has been traced for 28 miles in this area (fig. 1). Near Winchester, the Strodes Creek is no more than 10 feet thick (fig. 2, loc. 6) but it is as much as 30 feet thick in the eastern outskirts

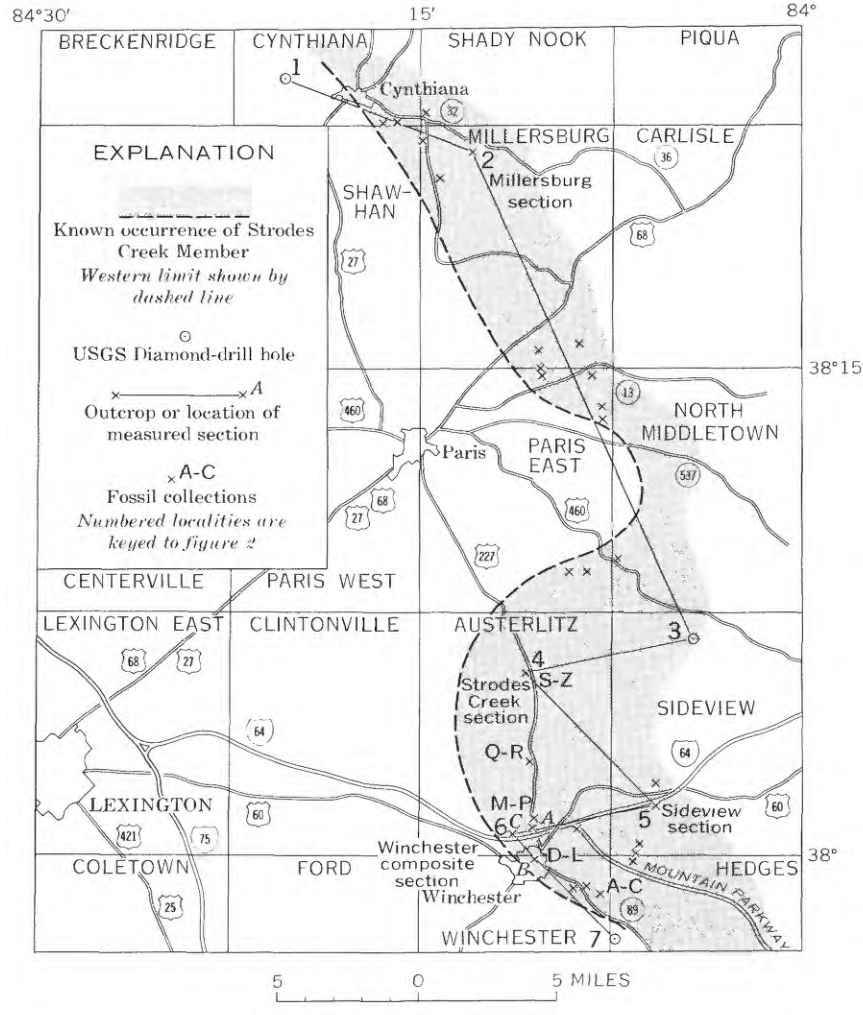

FIGURE 1.—Index map of report area, north-central Kentucky, showing 7½-minute quadrangles.

of Cynthiana. The eastern extent of the member has not been determined.

Two units of similar lithology lower in the Lexington Limestone to the west and southwest are: (1) part of the Devils Hollow Member, a lens in the middle Lexington of the Frankfort-Versailles area, Kentucky (Black and others, 1965); and (2) still lower stratigraphically, the Faulconer Bed of the Perryville Limestone Member near Danville, Ky. (Cressman, 1972).

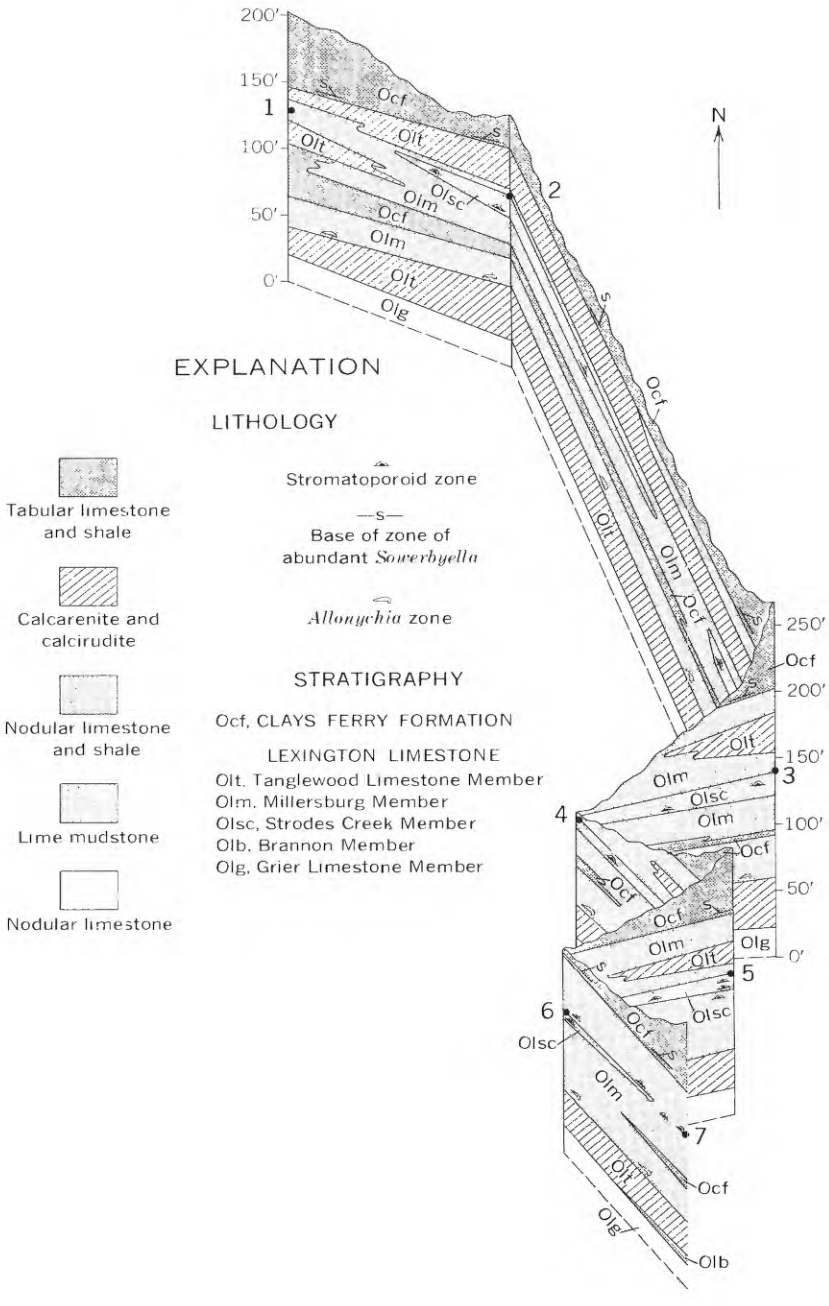

FIGURE 2.—Isometric diagram showing relation of the Strodes Creek Member to other members of the Lexington Limestone and to the Clays Ferry Formation. Line of section shown in figure 1.

The Strodes Creek section (figs. 1 and 3), measured from road-cuts along U.S. Route 227 south of the Strodes Creek crossing in

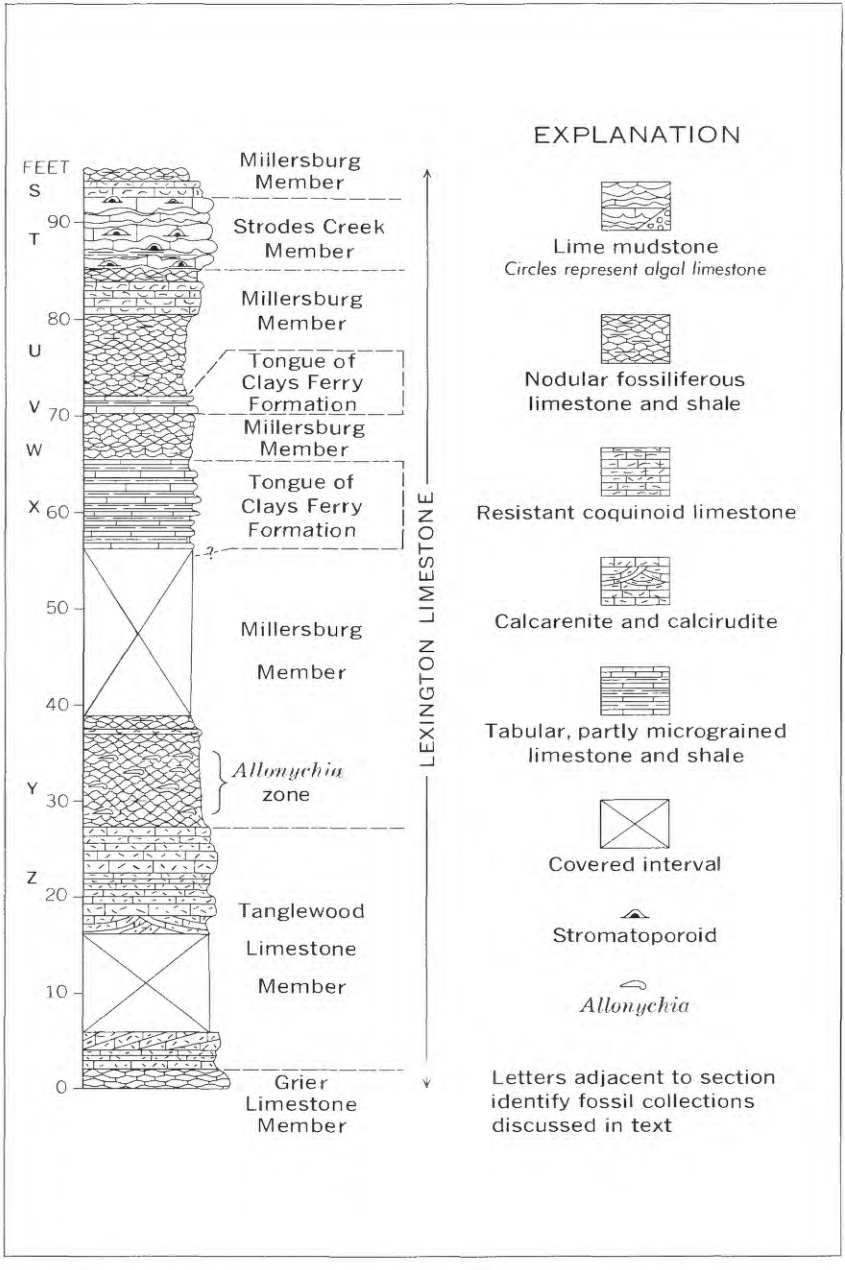

FIGURE 3.—Strodes Creek section and explanation for this figure and figures 5–7. Location of section shown in figure 1.

the north-central part of the Austerlitz quadrangle, is the type section; exposures at localities A, B, and C (figs. 1 and 5) constitute the Winchester composite reference section.

GEOLOGIC SETTING

The Lexington Limestone (Black and others, 1965) is a body of fairly coarse bioclastic generally fossiliferous limestone overlying cryptograined (micritic) limestone and finely crystalline dolomite of the High Bridge Group. Tabular micrograined (calcisiltitic) to coquinoid limestone and interbedded shale of the Clays Ferry Formation (Weir and Greene, 1965) overlie and interfinger with the upper part of the Lexington.

In the report area, beds of the upper Lexington dip gently eastward and are capped on some of the higher hills by the Clays Ferry. The lowest rocks exposed (fig. 2) are nodular fossiliferous beds of the Grier Limestone Member. Above the Grier is an intertonguing sequence of micrograined limestone and shale of the Brannon Member of the Lexington and the Clays Ferry Formation, calcarenite and calcirudite of the Tanglewood Limestone Member of the Lexington, and nodular fossiliferous limestone and shale of the Millersburg Member of the Lexington. Micrograined limestone and shale of the Brannon Member, a lens within the Lexington, occurs only in the southern part of the area. Tongues of similar lithology, traceable into the Clays Ferry Formation, occur higher in the section and extend into the Lexington from the north and south.

Calcarenite and calcirudite of the Tanglewood Limestone Member, which constitutes most of the upper Lexington near Frankfort, Ky., are present in the report area as three tongues, two of which pinch out, as shown in figure 2. Nodular fossiliferous limestone and shale of the Millersburg Member are thickest in the southern part of the area and intertongue with other units of the upper Lexington and with the Clays Ferry.

Within this intertonguing sequence of repetitive lithologic types, several widely persistent fossil marker zones are useful for stratigraphic correlation (figs. 2, 3, and 5). The highest zone is in the Clays Ferry Formation within a few feet of the top of the Lexington and consists of abundant plectambonitid brachiopods commonly identified as *Sowerbyella rugosa*. Stromatoporoids in the Strodes Creek Member are part of a zone that extends southwestward, far beyond the limits of the Strodes Creek, into the Millersburg Member. Internal molds of the large pelecypod *Allonychia flanaganensis* are locally abundant in a zone in the lower 10 feet of the Millersburg Member.

GENERAL DESCRIPTION OF STRODES CREEK MEMBER

The Strodes Creek Member is well exposed in many roadcuts along U.S. Route 227 and Interstate Highway 64 between the type locality and locality B of the Winchester reference section (fig. 1). The member is readily recognized by its bouldery aspect (fig. 4) attributable to a combination of pinch-and-swell bedding, ball-and-pillow structure, and bulbous stromatoporoids. Some stromatoporoids are large (as much as 2 ft across), light pinkish gray, and sugary textured, but most are smaller, reddish brown, vitreous, and commonly fractured.

The rock is chiefly limestone with minor amounts of gray to reddish-brown fissile shaly argillaceous calcisiltite as partings and in places as beds. The dominant limestone type is moderate-grayish-brown to gray dense nonfissile rock having the textural characteristics of a mudstone. It is composed mostly of clay- and silt-sized calcite particles and commonly contains disseminated rounded medium- to coarse-sand-sized fossil fragments. The rock is difficult to break; fractured surfaces are smooth and subconchoidal.

The lime mudstone commonly occurs as a disturbed matrix through which irregular fragments and deformed masses of brown vitreous stromatoporoidal material are distributed. It also contains sparsely disseminated but conspicuous smooth ostracodes generally less than 2 mm (millimeters) across. Cephalopods, corals, gastropods, algal lumps, and brachiopods also occur in the member but are not everywhere present.

In some places, notably west of locality 2 of figures 1 and 2, the member includes bedding sets as much as 4 feet thick of grayish-brown very fine grained even-bedded calcarenite that weathers to smooth surfaces. This very fine grained calcarenite may become coarser to the west and grade into the middle tongue of the Tanglewood Limestone Member at locality 1 of figure 2, or the Tanglewood and Strodes Creek may be separated by nodular limestone of the Millersburg Member as shown.

The Strodes Creek float is generally distinctive but sparse. It consists largely of smooth rounded boulders, stromatoporoids, and coral heads which weather out on slopes where soil is thin. Contacts are rarely seen, but in roadcuts where the unit is best exposed, the contact with the underlying Millersburg Member is sharp, whereas the upper contact is gradational through an interval of several feet in which beds of nodular fossiliferous limestone, characteristic of the Millersburg, are intercalated with beds of the Strodes Creek. A lens of limestone conglomerate 0 to 42 inches thick, composed chiefly of algal lumps 0.1 to 0.4 foot

across, is the basal stratum of the member at locality B of the Winchester reference section. Anomalously abundant bryozoans in a zone of shaly limestone several feet thick directly underlie the Strodes Creek at several places in the Hedges, Sideview, and Millersburg quadrangles.

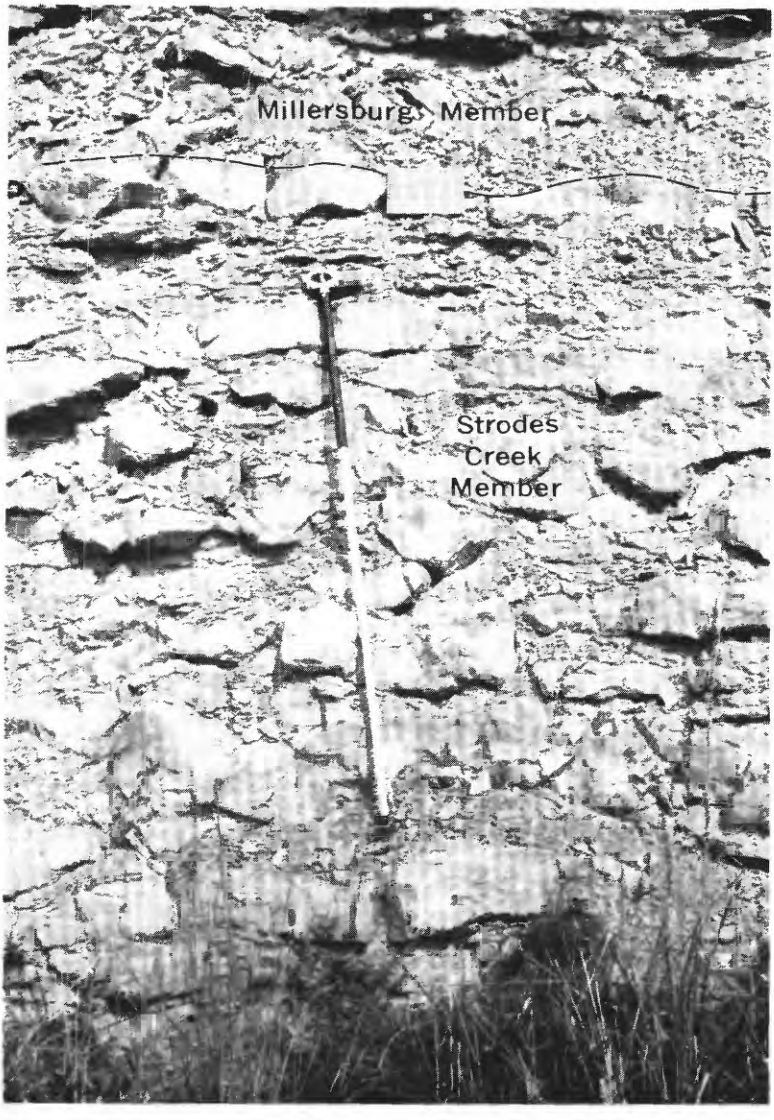

FIGURE 4.—Bedding characteristics of the Strodes Creek Member. Roadcut at Paris-Winchester exit from westbound lane of Interstate Highway 64, locality A, Winchester composite section. Location of section shown in figure 1. Abney-level staff is 5 feet long.

FOSSIL COLLECTIONS

Fossil collections made at localities shown on the index map and columnar sections (figs. 1, 3, and 5) are described below. Fossil identifications were by R. B. Neuman, brachiopods; O. L. Karklins, bryozoans; J. W. Huddle, conodonts; W. A. Oliver, Jr., corals, stromatoporoids, and stromatolites; E. L. Yochelson, gastropods; J. M. Berdan, ostracodes; John Pojeta, Jr., pelecypods; and R. J. Ross, Jr., trilobites.

Species of brachiopod genera shown are currently under review, according to R. B. Neuman (written commun., 1972). Species names generally applicable to these genera are: *Hebertella parkensis* Foerste, *Orthorhynchula linneyi* (James), *Platystrophia colbiensis* Foerste, *Rafinesquina winchesterensis* Foerste, and *Zygospira modesta* (Hall).

O. L. Karklins reports that, in general, the bryozoan faunule is similar to that in the upper part of the Lexington Limestone and the Clays Ferry Formation. (See also Cressman and Karklins (1970).) Several specimens found in these collections show close relationship to forms and species present in the lower part of the Edenian strata near Cincinnati, Ohio, and probably in strata of Edenian Age at Tanner's Creek, Ind.

The general aspect of the ostracodal assemblage also suggests that these rocks are very early Edenian in age, according to J. M. Berdan.

John Pojeta (written commun., 1972) reported that the coarsely ribbed ambonychiid species *Ambonychia byrnesi* (Ulrich) is known only from rocks which are currently regarded as Late Ordovician in age. This species was previously identified in collections from the Point Pleasant Formation near Falmouth, Ky., and from the Clays Ferry Formation near Kirksville, Ky. *Allonychia flanaganensis* Foerste consistently has been identified in collections from the Millersburg Member of the Lexington Limestone from Frankfort, Ky., eastward.

Fossil-collecting localities shown on illustrations by capital letters are keyed to U.S. Geological Survey fossil-collection numbers below. Stratigraphic units from which fossil collections were made are designated by letter symbols in parentheses as follows: Ocf, Clays Ferry Formation; Olm, Millersburg Member of Lexington Limestone; Olsc, Strodes Creek Member of Lexington Limestone; Olt, Tanglewood Limestone Member of Lexington Limestone.

A 7310–CO (Olsc):

Bryozoans: *Constellaria teres* Ulrich and Bassler, trepostome(?) indet.
Pelecypods: *Ambonychia* spp. indet., *Modiolopsis* aff. *M. simulatrix* Ulrich.

A 7310–CO—Continued:
Stromatolite indet.
B 7311–CO (Olsc):
Gastropods: Bellerophontaceans, probably *Bucania* and *Tropidodiscus*, *Loxoplocus* (*Lophospira*) sp., *Murchisonia* sp.
C 7312–CO (Olsc):
Coral: *Favistina* sp.
Ostracodes: *Ceratopsis* sp. indet., *Ctenobolbina* sp. aff. *C. ciliata* (Emmons), *Cystomatochilina* sp. aff. *C. tiara* (Henningsmoen), *Ectoprimitia*? sp., "*Bollia*" sp. aff. "*B.*" *persulcata* (Ulrich), *Milleratia*? sp., *Leperditella* sp., leperditellid indet., *Pseudoaparchites* sp., *Pseudobythocypris*? sp., *Shenandoia* sp., "*Bythocypris*" sp. aff. "*B.*" *cylindrica* (Hall).
A–C 7313–CO (Olsc):
Brachiopods: *Hebertella* sp., *Platystrophia* sp.
D 7314–CO (Olm):
Brachiopods: *Hebertella* sp., *Platystrophia* sp., *Rafinesquina* sp.
Bryozoans: *Constellaria teres* Ulrich and Bassler, *Escharopora* sp. form b.
Pelecypod: Modiomorphid genus and sp. indet.
Fingerlike organic structure, probably an algal stromatolite.
Trilobite: *Gravicalymene* cf. *G. hagani* Ross.
E 7315–CO (Olsc):
Fingerlike organic structure, probably an algal stromatolite.
F 7316–CO (Olsc):
Conodonts: *Rhipidognathus symmetrica descreta* Bergstrom and Sweet, cordylodian element of unknown species.
G 7317–CO (Olsc):
Brachiopods: *Hebertella* sp., *Platystrophia* sp., *Rafinesquina* sp.
Gastropods: *Cyclonema varicostatum* (Hall), steinkerns indet. possibly *Loxoplocus* (*Lophospira*).
H 7318–CO (Olsc):
Ostracodes: *Ceratopsis* sp. indet., *Ctenobolbina* sp. aff. *C. ciliata* (Emmons), *Cystomatochilina* sp. aff. *C. tiara* (Henningsmoen), *Leperditella* sp., *Pseudoaparchites* sp., *Pseudobythocypris*? sp., *Shenandoia* sp. *Krausella*? sp., smooth ostracodes indet.
Stromatoporoid: *Labechia* sp.
I 7319–CO (Olm):
Brachiopods: *Hebertella* sp., *Platystrophia* sp., *Rafinesquina* sp.
Bryozoans: *Ceramoporella* sp., *Constellaria teres* Ulrich and Bassler, *Peronopora* sp. form c, *Heterotrypa* sp. form g, *Ceramoporella distincta* Ulrich.
Gastropods: *Cyclonema varicostatum* (Hall), steinkern indet. doubtfully *Cyclonema*.
Pelecypods: *Allonychia flanaganensis* Foerste, *Ambonychia byrnesi* (Ulrich), *Ambonychia* cf. *A. ulrichi* (Pojeta), modiomorphid genus and sp. indet.
Sponge: *Hindia*? sp.
J 7320–CO (Olm):
Brachiopod: *Hebertella* sp.
Bryozoans: *Constellaria teres* Ulrich and Bassler, *Peronopora* sp. form c, *Dekayia*? sp., *Hallopora* sp. form d.
Gastropod: *Cyclonema* sp. indet.

J 7320–CO—Continued
Sponge: *Hindia*? sp.
K 7321–CO (Olm):
Brachiopods: *Hebertella* sp., *Platystrophia* sp., *Rafinesquina* sp.
Bryozoans: *Constellaria teres* Ulrich and Bassler, *Heterotrypa* sp. form g.
L 7322–CO (Olm):
Brachiopods: *Hebertella* sp., *Platystrophia* sp., *Rafinesquina* sp., *Zygospira* sp.
Bryozoans: *Ceramoporella* sp., *Constellaria teres* Ulrich and Bassler, *Peronopora* sp. form c, *Atactoporella*? sp., *Homotrypella*? sp.
Pelecypod: Modiomorphid genus and sp. indet.
M 7323–CO (Olsc):
Fossils unreported.
N 7324–CO (Olsc):
Brachiopods: *Hebertella* sp., *Platystrophia* sp., *Zygospira* sp.
Coral: *Favistina* sp.
Gastropod: *Cyclonema varicostatum* (Hall).
O 7325–CO (Olsc):
Brachiopod: *Hebertella* sp.
Gastropod: *Cyclonema* sp. indet.
Ostracodes: *Ceratopsis* sp. indet., *Ctenobolbina* sp. aff. *C. ciliata* (Emmons), *Cystomatochilina* sp. aff. *C. tiara* (Henningsmoen), "*Bollia*" sp. aff. "*B.*" *persulcata* (Ulrich), *Milleratia*? sp., *Leperditella* sp., leperditellid indet., *Pseudobythocypris*? sp., *Shenandoia* sp., "*Bythocypris*" sp. aff. "*B.*" *cylindrica* (Hall), smooth ostracodes indet.
Pelecypod: Ambonychiid genus and sp. indet.
P 7326–CO (Olsc):
Fossils unreported.
Q 7327–CO (Olsc):
Brachiopods: *Hebertella* sp., *Platystrophia* sp.
Gastropods: *Cyclonema* sp. indet., gastropod indet., possibly *Liospira*.
Stromatoporoid: *Labechia* sp.
Trilobite: Calymenid indet.
R 7328–CO (Olsc):
Brachiopods: *Hebertella* sp., *Platystrophia* sp.
Coral: *Favistina* sp.
Gastropods: *Cyclonema* sp. indet., steinkern possibly *Cyclonema*.
Fingerlike organic structure, probably an algal stromatolite.
Stromatoporoid: *Labechia* sp.
S 7330–CO (Olm):
Brachiopods: *Hebertella* sp., *Platystrophia* sp., *Rafinesquina* sp., *Zygospira* sp.
Bryozoans: *Constellaria teres* Ulrich and Bassler, *Homotrypa* sp. form g(?), *Ceramoporella* sp., *Dekayia*? sp.
Gastropod: *Cyclonema* cf. *C. varicostatum* (Hall).
T 7331–CO (Olsc):
Brachiopods: *Hebertella* sp., *Orthorhynchula* sp., *Zygospira* sp.
Bryozoans: *Constellaria* cf. *C. emaciata* Ulrich and Bassler, *Hallopora* sp. form d, "eridotrypid"(?), trepostome(?) indet.
Stromatoporoid: *Labechia* sp.
U 7332–CO (Olm):
Brachiopods: *Hebertella* sp., *Platystrophia* sp.

U 7332–CO—Continued
Fingerlike organic structure, probably an algal stromatolite.
V 7333–CO (Ocf):
Brachiopods: *Hebertella* sp., *Platystrophia* sp., *Rafinesquina* sp., *Zygospira* sp.
Bryozoans: *Constellaria teres* Ulrich and Bassler, *Escharopora* sp. form b, *Homotrypa* sp. form g(?).
W 7334–CO (Olm):
Brachiopods: *Hebertella* sp., *Platystrophia* sp., *Rafinesquina* sp., *Zygospira* sp.
Bryozoans: *Constellaria teres* Ulrich and Bassler, *Eridotrypa* sp. form c–1.
Coral: *Favistina* sp.
Gastropod: Steinkern possibly *Cyclonema*.
Pelecypod: *Ambonychia* sp. indet.
X 7335–CO (Ocf):
Brachiopods: *Hebertella* sp., *Platystrophia* sp., *Rafinesquina* sp., *Zygospira* sp.
Gastropods: *Sphaenosphera* sp., *Loxoplocus* (*Lophospira*) sp., indet., *Hormotoma* cf. *H. subangulata* Ulrich in Ulrich and Scofield.
Pelecypods: *Ambonychia* sp. indet., *Lyrodesma subplanum* Ulrich, *Modiolopsis*(?) sp. indet., *Whiteavesia* sp.
Trilobite: *Isotelus* sp.
Y 7336–CO (Olm):
Brachiopods: *Platystrophia* sp., *Rafinesquina* sp., *Zygospira* sp.
Bryozoans: *Constellaria teres* Ulrich and Bassler, *Peronopora* sp. form c.
Gastropods: Steinkerns possibly *Cyclonema* and another indet.
Pelecypod: *Allonychia flanaganensis* Foerste.
Z 7337–CO (Olt):
Brachiopods: *Platystrophia* sp., *Rafinesquina* sp., *Zygospira* sp.
Bryozoans: *Constellaria teres* Ulrich and Bassler, *Peronopora* sp. form c, *Heterotrypa* sp. form g.

TYPE SECTION

[Measured from a series of roadcuts beginning at hillcrest at Kentucky coordinates 2,021,200 ft E., 215,450 ft N., north zone, in the north-central part of the Austerlitz quadrangle, Clark County, Ky., and extending northward along U.S. Route 227 to its crossing of Strodes Creek. (See fig. 3 and loc. 4, fig. 1.)]

Lexington Limestone:	*Thickness (feet)*
Millersburg Member (incomplete):	
13. Limestone and minor shale; nodules of gray to brown fine- to medium-grained bioclastic limestone with dark-gray shale as partings and as thin irregular beds; fossiliferous, brachiopods dominant (USGS loc. 7330–CO); ledge-forming brachiopodal calcirudite at base -------	3.5
Strodes Creek Member:	
12. Limestone and shale: Limestone is moderate-grayish-brown to gray dense lime mudstone chiefly composed of silt- and clay-sized calcite particles with scattered medium to coarse fossil fragments in undulatory pinch-and-swell smooth-surfaced beds 0.2 to 0.5 ft thick, the bottoms of which commonly have lobate structure, con-	

Lexington Limestone—Continued

	Thickness (feet)
Strodes Creek Member—Continued	
vex downward, resembling load casts; some beds have ball-and-pillow structure; beds and partings of gray to reddish-brown argillaceous fissile calcisiltite correspondingly show pinch-and-swell structure, fissility paralleling swells in overlying beds of lime mudstone; contains abundant stromatoporoids, either whole or as irregular fragments churned and rolled into enclosing matrix; brown vitreous stromatoporoids predominate, but a larger light-pinkish-gray variety also occurs; unornamented ostracodes are thinly but conspicuously scattered through the lime mudstone (USGS loc. 7331–CO)	7.2
Millersburg Member:	
11. Limestone, gray, fine- to medium-grained, fossiliferous, unevenly bedded, ledge-forming	4.0
10. Limestone and shale: Limestone (60 percent), gray to brown, fine-grained, nodular; contains an abundant and varied fauna (USGS loc. 7332–CO). Shale, dark-gray, fissile, poorly exposed	9.0
Tongue of Clays Ferry Formation:	
9. Limestone and shale: Limestone (55 percent), dominantly micrograined, light-brown, partly fossiliferous (USGS loc. 7333–CO); in tabular beds 0.1 to 0.3 ft thick; yields smooth tablets where weathered. Shale, dark-gray, fissile, poorly exposed; weathers light yellowish brown	2.0
Millersburg Member:	
8. Limestone (50 percent) and shale; nodules of medium-gray fine- to medium-grained bioclastic limestone in matrix of dark-gray shale; fossiliferous (USGS loc. 7334–CO); weathers to limonite-stained nodular rubble	4.5
Tongue of Clays Ferry Formation:	
7. Limestone and shale: Limestone (50 percent), light gray to light-brown, micrograined, partly fossiliferous (USGS loc. 7335–CO); in tabular beds 0.2 to 0.3 ft thick. Shale, brownish-gray; weathers light yellowish brown; fissile; partly exposed as beds 0.1 to 0.3 ft thick. Smooth-surfaced light-gray weathered tablets of limestone conspicuous in float	9.5
6. Covered	17.0
Millersburg Member:	
5. Limestone (60 percent) and shale: Similar to unit 8 but coarser nodular texture; contains abundant internal molds of large pelecypod *Allonychia flanagenensis* (USGS loc. 7336–CO)	12.0
Tanglewood Limestone Member:	
4. Limestone (calcarenite), gray to light-grayish-brown, fine- to medium-grained, bioclastic, slightly phosphatic, sparry-calcite-cemented; in even beds 0.05 to 0.3 ft thick, crossbedded in lower part; some beds contain	

	Thickness (feet)
Lexington Limestone—Continued	
Tanglewood Limestone Member—Continued	
large brachiopod and bryozoan fragments (USGS loc. 7337–CO)	11.0
3. Covered	10.0
2. Limestone (calcarenite and calcirudite), light-brownish-gray to grayish-brown, medium- to very coarse grained, bioclastic; phosphatic in part; sparry-calcite-cemented; crossbedded in upper part with foreset beds as much as 0.5 ft thick and thinly and evenly bedded in lower part	4.0
Grier Limestone Member (incomplete):	
1. Limestone and minor shale; light-gray to light-brownish-gray nodular to irregularly bedded fine-grained bioclastic limestone and very thin beds of gray shale	2.0
Total section	95.7

REFERENCE SECTION

The Winchester composite reference section (fig. 5) consists of three separate sections measured at localities A, B, and C (fig. 1). Sections are shown graphically in figure 5, and graphic sections at B and C are compared with photographs of the outcrops in figures 6 and 7.

Locality A.—A section (figs. 4 and 5) was measured from roadcuts in the northeast quadrant of the interchange of Interstate Highway 64 and U.S. Route 227 in the south-central part of the Austerlitz quadrangle, Kentucky. The section is not continuous; the lower part was measured from the roadcut along the Paris exit from westbound Interstate Highway 64; the upper part was measured from south-dipping beds in the roadcut along the Winchester entrance to westbound Interstate Highway 64.

Locality B.—The Strodes Creek Member and its contacts with the enclosing Millersburg Member are well exposed in roadcuts along Maple Street, U.S. Route 227, in the northern outskirts of Winchester, Ky. The Millersburg above the Strodes Creek includes several resistant ledge-forming beds which are well exposed in this section. The section (figs. 5 and 6) was measured from the roadcut along northbound lane north and south of the Louisville and Nashville Railroad overpass. U.S. Geological Survey fossil collections from these rocks are identified by letter symbols in figure 5 as follows: D, 7314–CO; E, 7315–CO; F, 7316–CO; G, 7317–CO; H, 7318–CO; I, 7319–CO; J, 7320–CO; K, 7321–CO; L, 7322–CO.

Locality C.—Strata of the Millersburg Member below the Strodes Creek Member are well exposed in the steep roadcut along the westbound lane of Interstate Highway 64 at the eastern overpass of the Louisville and Nashville Railroad in the south-central

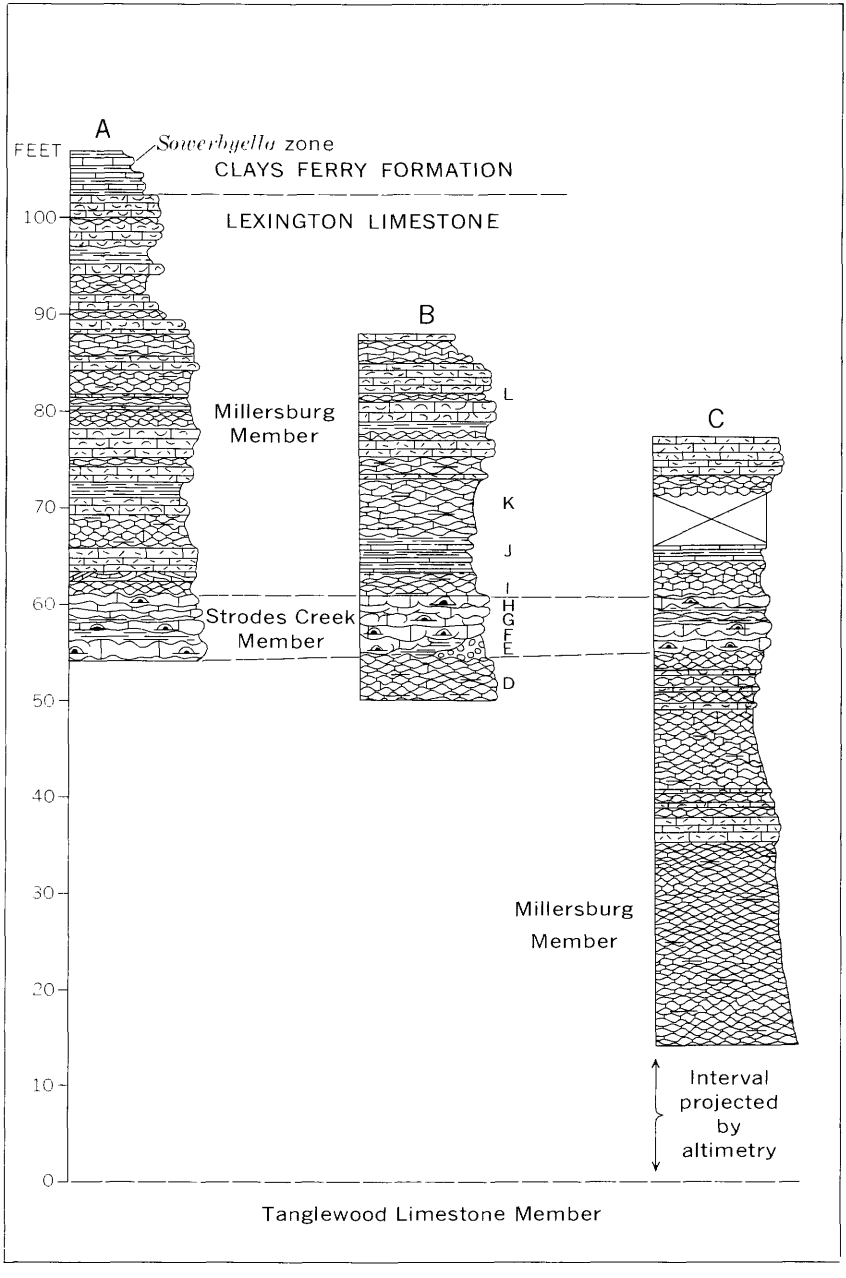

FIGURE 5.—Winchester composite section. Locations of sections shown in figure 1. See figure 3 for explanation.

part of the Austerlitz quadrangle (fig. 7). The Strodes Creek is quite thin at this locality, which is very near its western limit.

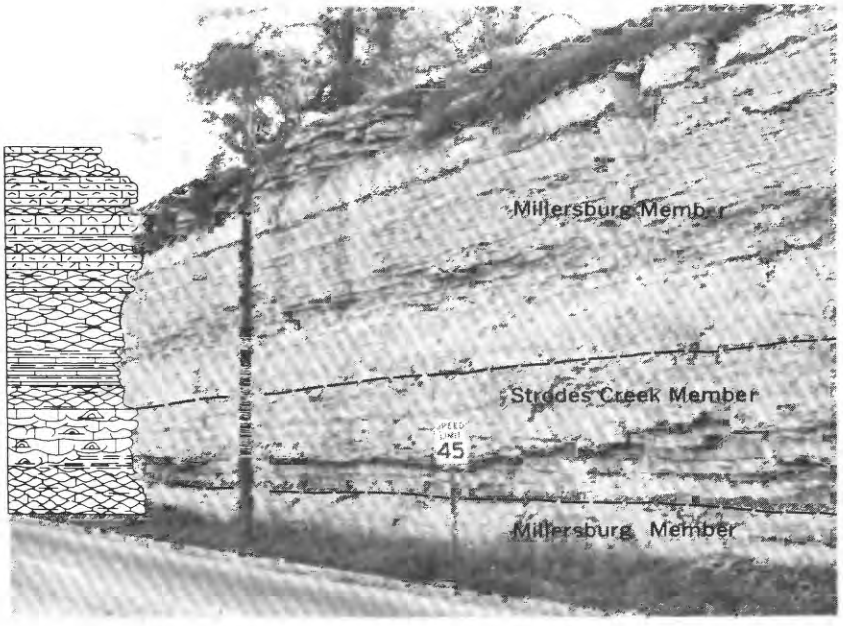

FIGURE 6.—Roadcut and its graphic representation at Maple Street, locality B of Winchester composite section. Location of section shown in figure 1.

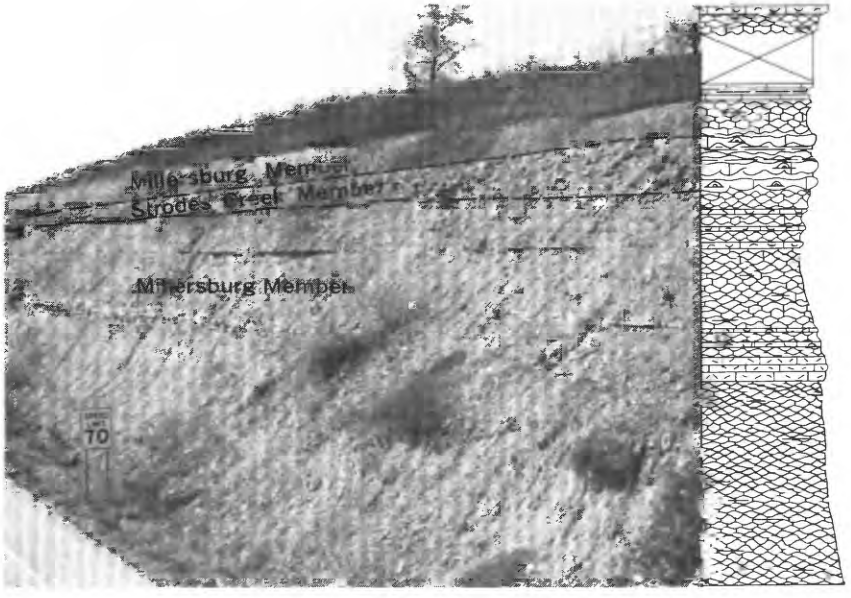

FIGURE 7.—Roadcut and its graphic representation at Louisville and Nashville Roadroad-Interstate Highway 64 overpass, locality C of Winchester composite section. Location of section shown in figure 1.

REFERENCES CITED

Black, D. F. B., Cressman, E. R., and MacQuown, W. C., Jr., 1965, The Lexington Limestone (Middle Ordovician) of central Kentucky: U.S. Geol. Survey Bull. 1224–C, 29 p.

Cressman, E. R., 1972, Geologic map of the Danville quadrangle, Mercer and Boyle Counties, Kentucky: U.S. Geol. Survey Geol. Quad. Map GQ–985.

Cressman, E. R., and Karklins, O. L., 1970, Field trip No. 2, Lithology and fauna of the Lexington Limestone (Ordovician) of central Kentucky, *in* Guidebook for field trips—Geol. Soc. America, Southeastern Sec., 18th Ann. Mtg., Lexington, Ky., 1970: Lexington, Ky., Kentucky Geol. Survey, p. 17–28.

Weir, G. W., and Greene, R. C., 1965, Clays Ferry Formation (Ordovician)—A new map unit in south-central Kentucky: U.S. Geol. Survey Bull. 1224–B, 18 p.