# Measured Sections of Ordovician Strata in South-Central Kentucky



by

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This document has not been edited or reviewed for conformity with U.S. Geological Survey standards.

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# INTRODUCTION

The following sections in south-central Kentucky are part of the data used in our studies of the Upper Ordovician rocks of Kentucky. The studies were part of a geologic mapping program by the U.S. Geological Survey in cooperation with the Kentucky Geological Survey.

Most sections were measured in the field with Jacob staff and tape. Color names with numbers are based on comparison with the rock chart by Goddard and others (1948). The cores described are on file at the core library of the Kentucky Geological Survey in Lexington, Ky.

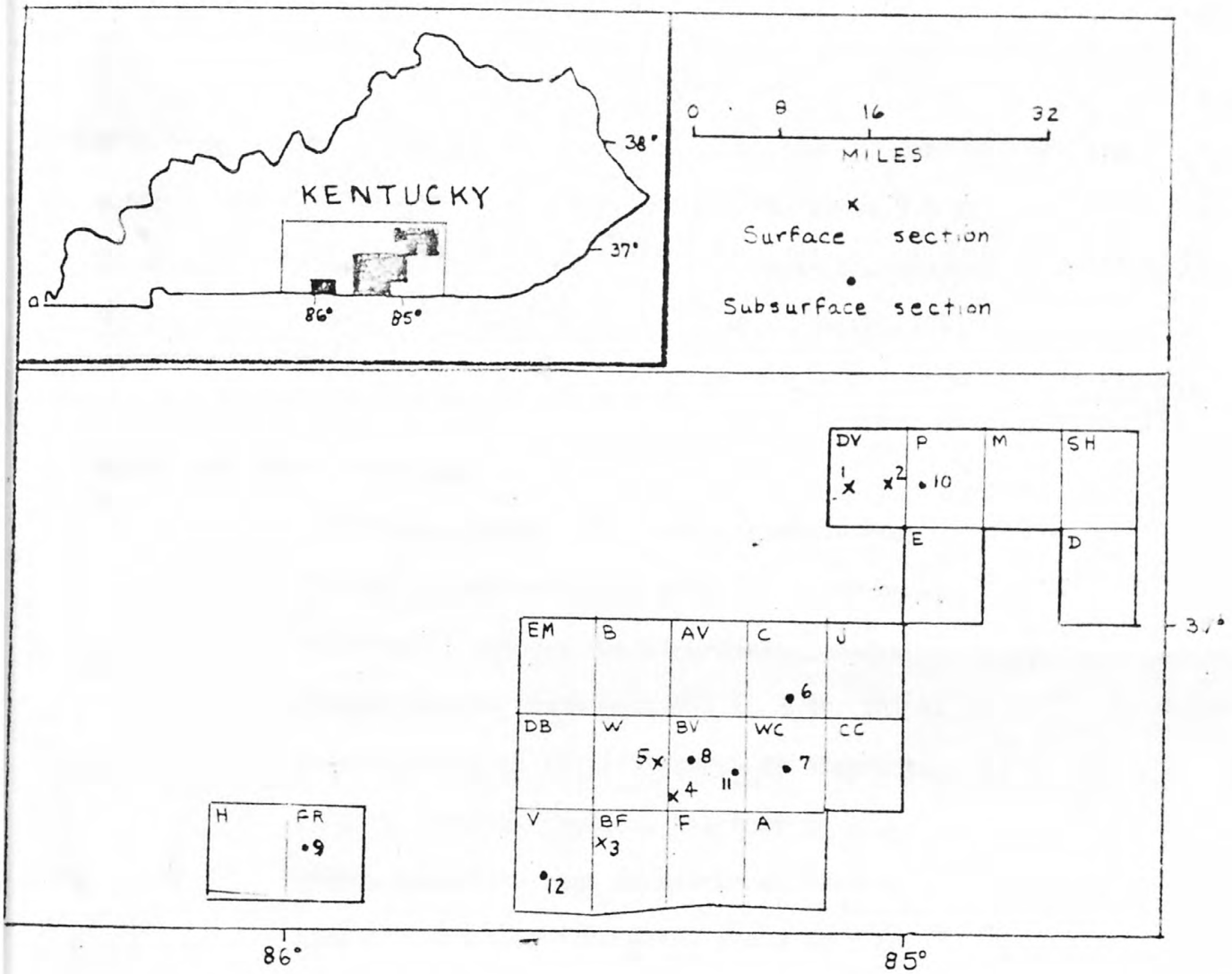


Figure 1.--Map of south-central Kentucky showing localities of measured sections of Ordovician rocks. Quadrangles containing outcrops of Ordovician rocks: A, Albany; AV, Amandaville; B, Breeding; BF, Blacks Ferry; BV, Burkesville; C, Creelsboro; CC, Cumberland City; D, Delmer; DB, Dubre; DV, Dunnville; E, Eli; EM, Edmonton; F, Frogue; FR, Fountain Run; H, Holland; J, Jamestown; M, Mintonville; P, Phil; SH, Science Hill; V, Vernon; W, Waterview; WC, Wolf Creek Dam. Measured sections: [SC-] 1, Damron Creek; 2, Dunnville South; 3, Judio North; 4, Burkesville; 5, Grider Southeast; 6, Temple Hill Church No. 1 core; 7, William A. Conner No. 1 core; 8, Herman Booher No. 1 core; 9, St. Joseph Lead and Zinc Co. core C275; 10, Thomas Ridge Church core; 11, Cominco 12-D-51 core C298; 12, Fred Thompson No. 1 core.

Section SC-1 Damron Creek

[Described from scattered exposures along east side of Damron Creek about 3,000 to 4,500 ft. south of Kentucky Highway 76, about 4.5 mi. southwest of Dunnville, Ky. (Dunnville quadrangle); Kentucky coordinates E. 2,194,000, N. 390,400, south zone. Measured by G. W. Weir, March 1965]

| | | Thickness (feet) |
|---|---|---|
| Boyle Limestone (Devonian): | | |
| N. | Limestone, cherty, very light brownish gray (5YR 6/1), weathers very pale yellowish brown (10YR 6/2); chiefly medium-grained, sparse glauconite; in rough beds 0.5 to 3 in. thick; crudely fissile; fossils sparse to abundant, chiefly crinoid fragments and horn corals. Chert, brownish-gray, in discoidal masses, commonly about an inch thick and 3 to 6 in. across; contains unidentified fossil debris; makes up about 10 percent of unit. Overlain by black shale; thickness estimated. . . . . | 10 |
| M. | Mudstone, pale-brown (5YR 5/2); crude curving laminae in a wavy seam; continuity uncertain . . . . . | 0.3 |
| L. | Dolomite, calcitic, medium-light-gray (N6), weathers light olive gray (5Y 6/1), chiefly very fine-grained to fine-grained, in part silty and micrograined; sparse fine grains of quartz; a single rough-surfaced bed. Contains nodules and fragments of black chert. Forms ledge. Base | |

Boyle Limestone (continued) — Thickness (feet)

rough, an unconformity. . . . . 2

Estimated Boyle Limestone. . . . . 12.3

Cumberland Formation (incomplete; Ordovician):

K. Mudstone, dolomitic, pale-brown (5YR 5/2), weathers pale yellowish brown; laminated; fissile; forms recess. Contains chert nodules, medium-dark-gray (N4), pyritic, mostly in crude spheres about an inch in diameter, less commonly as irregular discoidal forms, parallel to bedding, as much as 4 in. across and 1 in. thick; scattered irregularly through unit, make up about 5 percent of unit. [Possibly equivalent to Rowland Member of Drakes Formation of east-central Kentucky]. . . . . 1.1

J. Limestone, muddy, fossil-fragmental, medium-light-gray (N6), mostly weathered yellowish gray (5Y 7/2); muddy and micrograined containing abundant fine to very coarse fossil fragments; sparse pyrite. Bedding obscure, in part in crude nodular beds, 0.5-1.5 in. thick; forms rough, somewhat rounded ledge. Fossils abundant, mostly abraded brachiopods, bryozoans, gastropods, and ostracods. . . . . 3.5

I. Mudstone, calcitic, light-olive-gray (5Y 6/1); no bedding apparent; contains small bryozoans; forms recess; grades into overlying unit. [Units J and I are possibly equivalent to Reba Member of Ashlock

| | Thickness (feet) |
|---|---|
| Formation of east-central Kentucky.]. . . . . | 1.1 |
| H. Limestone, muddy, medium-light-gray (N6) and yellowish-gray (5Y 7/2); chiefly micrograined, muddy, sparse very fine to medium grains of calcite and fine grains of dark-green glauconite. A single set with inconspicuous beds as much as 1.5 in. thick; forms ledge; no megafossils seen. . . . | 0.7 |
| G. Mudstone, calcitic and dolomitic, light-greenish-gray (5GY 7/1). At top and base in even beds 0.5 to 3 in. thick, fissile; middle one-third obscurely bedded, breaks with rough conchoidal fracture; weathered outcrop yields irregular chunks commonly about 1 in. across. Forms steep slope. . . . . | 8.5 |
| F. Limestone, muddy, to calcitic mudstone, light-greenish-gray (5G 8/1), weathers yellowish gray (5Y 8/1); very fine grained, muddy, sparse fine grains of dark green glauconite. In even beds generally ranging from about 0.5 to 4 in. thick, thicker beds more common at base; fissile. No megafossils; some trace fossils (?) on bedding surfaces. Unit forms ledgy slope; base is stream level . . . . . | 3 |
| E. Covered; a few questionable outcrops suggest that unit is dolomitic and calcitic mudstone. [Thickness determined by difference of exposed section from top of unit D to base of Devonian limestone ] . . . . . | 3 |

Cumberland Formation (continued)

| | Thickness (feet) |
|---|---|
| D. Limestone, muddy, light-brownish-gray (5YR 7/1); abundant grayish-green glauconite in films, spots, and grains. Stratification obscure, a few faint bedding planes 1/2 to 3 in. apart; fissile only at top. Fossils mainly globular bryozoans; sparse brachiopods include a large platystrophid; trace-fossils common. [Section offset downstream about 1,500 ft]. . . . . | 2 |
| C. Mudstone, dark-gray (N3); laminated; fissile, yields small chips. Contains resistant claystone at top. [Units C through G are possibly equivalent to Terrill Member of Ashlock Formation of east-central Kentucky]. . . . . | 0.6 |
| B. Limestone, medium-gray (N5) to medium-light-gray (N6), some reddish stain; chiefly micrograined, in part fine- to medium-grained; sparse fine to coarse fossil debris; in even to irregularly wavy beds 1/4 to 3 in. thick, in top 2 ft. generally less than 1/2 in. thick. Fossils generally absent, except in basal bed 1 to 2 in. thick of brownish-gray (5YR 4/1) muddy limestone which contains brachiopods, bryozoans and gastropods; sparse pelecypods and unidentified fossil debris near top of unit; several micrograined layers contain scolites, cylindrical marks, about 1/10 in. wide and a few inches long. Mudcracks common about | |

Cumberland Formation (continued)

| | Thickness (feet) |
|---|---|
| 1 foot below top of unit. Unit may thin southward. . . . . | 6 |
| A. Limestone, similar to overlying unit but stratification obscure, irregularly knobby top; forms smooth ledge. Contains clusters several inches across of coarse white calcite crystals. Fossils sparse, do not weather out, chiefly high-spired gastropods; unidentified debris. [Units A through D may be equivalent to the Gilbert Member of the Ashlock Formation of east-central Kentucky.]. . . . | 2.2 |
| Total measured Cumberland Formation (incomplete) . . . . . | 31.7 |

Section SC-2 Dunnville South

[Described from exposures at and near abandoned quarry about 1.2 mi south of Dunnville, Ky. (Dunnville quadrangle); Kentucky coordinates: E. 2,216,200, N. 309,600, south zone. Section begins about 900 ft northeast of quarry near junction of minor streams, then continues southwesterly along stream banks to quarry, then up north wall of quarry, then offset southeast to outcrops on north-facing slope below barn. Measured by G. W. Weir, March 1965]

| | Thickness (feet) |
|---|---|
| Boyle Limestone (Devonian): | |
| N. Dolomite, calcitic, very pale yellowish brown (10YR 7/2), weathers light brown 5YR 6-7/4) and dark yellowish orange (10YR 6/6); very fine grained with sparse large clusters of coarsely crystalline calcite; sparse very fine grained pyrite. Poorly exposed mudstone seam at base; basal bed about 2 in. thick, top bed about 9 in. thick; forms rounded ledge. Contains sparse horned crinoid columnals. Overlain by black shale. . . . . | 1 |
| M. Limestone, very light olive gray (5Y 7/1), weathers light gray (N7), fine- to coarse-grained with abundant coarse broken crinoid columnals and round patches as much as 1/2 in. across of coarsely crystalline clear calcite; a single bed. Fossils common, including crinoid stems | |

Boyle Limestone (continued) — Thickness (feet)

as much as 6 in. long, scattered crinoid columnals, branching bryozoans, horn corals and brachiopods. Forms rounded ledge. . . . . 2

Total Boyle Limestone. . . . . 3

Cumberland Formation (incomplete; Ordovician):

L. Mudstone, calcitic, in part dolomitic and containing abundant irregular nodules as much as 1 in. thick and 3 in. long of chertified mudstone; weathered grayish yellow (5Y 7/4) and grayish orange (10YR 7/4) with spots of grayish-green clay mineral (glauconite?); stratification obscure; non-fissile. Fossils sparse to common, chiefly small cylindrical bryozoans and fine unidentified fossil debris. Poorly exposed; forms slope. [This unit may correlate with the Rowland Member of the Drakes Formation of east-central Kentucky]. . . . . 3

K. Limestone, muddy, medium-light-gray (N6), weathers light brownish gray (5YR 6/1), and grayish orange (10YR 7/5); chiefly micrograined to fine-grained but ranging to medium-grained near base and containing fine to very coarse fragments of fossils; sparse clusters, as much as 1 in. across of coarse white calcite crystals; sparsely pyritic. Stratification obscure; at base several

| | | Thickness (feet) |
|---|---|---|
| | uneven beds 3 to 7 in. thick, no apparent bedding planes in top 3 to 4 ft; non-fissile. Forms roughly rounded ledge, upper one-half generally better exposed than lower one-half. Fossils abundant; mostly broken but also abraded whole specimens, locally silicified, include varied brachiopods, bryozoans, pelecypods; trace fossils include curly "worm tracks" on upper surface and "worm tubes" near base. [This unit may correlate with the Reba Member of the Ashlock Formation of east-central Kentucky]. . . . . | 5 |
| J. | Mudstone, dolomitic (50 percent), grading upward to calcitic mudstone (25 percent) interbedded with limestone (15 percent), and at top to limestone. Dolomitic to calcitic mudstone, light-gray (N7) and light-greenish-gray (5GY 7/1) with dusky yellowish-green spots (glauconite?), weathers same and yellowish gray (5Y 7/4); pyritic and glauconitic(?); in even beds 1/4 to 1 in. thick; weathered rock yields plates and irregular chunks; unfossiliferous. Limestone, muddy, light-brownish-gray (5YR 6/1); micrograined; in thin even beds like mudstone; unfossiliferous; mostly in top 2 ft of unit . . . . . | 11 |
| I. | Mudstone, dolomitic; similar to mudstone above; forms rounded ledge. . . . . | 1 |

Cumberland Formation (continued)

| | Thickness (feet) |
|---|---|
| H. Mudstone, calcitic; similar to mudstone above; forms minor recess. . . . . | 2 |
| G. Mudstone, calcitic, probably grading locally to very muddy micrograined limestone; similar to calcitic mudstone in unit J. A single set of very thin beds; forms prominent ledge. Fossils sparse, mostly near base include globular bryozoans, brachiopods, and unidentified fine to coarse fossil debris . . . . . | 2 |
| F. Mudstone, dolomitic(?) containing nodules of calcitic mudstone. Dolomitic(?) mudstone is medium gray (N5), laminated, fissile; contains sparse impressions of small ribbed flat brachiopods. Nodules of calcitic mudstone are light greenish gray (5G 8/1), sparsely pyritic and sparsely glauconitic; mostly irregular discoidal forms about 1 in. thick and 3 to 8 in. across; contain ostracodes, abundant fine fossil debris, and sparse bryozoans, brachiopods, and pelecypods. [Units F, G, H, I, and J may correlate with the Terrill Member of the Ashlock Formation of east-central Kentucky] . . . . . | 0.5 |
| E. Limestone, medium-light-gray (N6) and light-gray (N7), weathers about same; micrograined, muddy(?); sparsely pyritic and glauconitic. Lower half is | |

| | Thickness (feet) |
|---|---|
| made up of slightly uneven sets, 2 to 4 in. thick, of laminae 1/16 to 1/4 in. thick; upper half is fissile. Shelly fossils sparse, mostly near top, include bryozoans, ostracodes; trace fossils include abundant curly "worm tracks" and sparse vertical "worm tubes" at tops of several beds in upper part of unit. Generally resembles unit C. . . . . | 4.1 |
| D. Limestone, medium-light-gray (N6), weathers about same with patches of pale red (5R 6/2); micrograined, in part muddy; contains clusters of coarse white calcite crystals as much as 3 in. across. Stratification obscure, some rough bedding planes 6 to 12 in. apart. Fossils sparse; chiefly fine fossil debris in part made up of fragments of brachiopods and cylindrical bryozoans . . . . . | 3.3 |
| C. Limestone (95 percent) and mudstone. Limestone, muddy, medium-gray (N5) to medium-light-gray (N6), weathers about same with blotches of pale red (5R 6/2) in top few inches; micrograined; contains sparse clusters, about 1 in. across, of white calcite crystals in top 1 ft. Stratification obscure; some uneven bedding planes 6 to 8 inches apart. Shelly fossils absent except in top 1 ft. consist of sparse irregular globular bryozoans | |

Thickness (feet)

and unidentified fine debris; trace fossils include dark-gray, vertical "worm tubes", at tops of a few beds. Mudstone, calcitic, olive-gray (5Y 6/2), weathers somewhat lighter; in rough laminae 1/16 to 1/4 in. thick; irregularly fissile; less resistant layer, a few inches thick at base of unit. Unit is transitional between units B and D. [Units C, D, and E may correlate with the Gilbert Member of the Ashlock Formation of east-central Kentucky]. . . . . 4.8

B. Mudstone (90 percent), grading at top to limestone. Mudstone, calcitic, medium-light-gray (N6) to light-gray (N7), weathers about same and yellowish gray (5Y 8/1); in even beds, 1/2 to 1 in. thick, grouped in sets 8 to 24 in. thick, faintly laminated. Limestone, muddy(?), micrograined, in top few inches of unit; not sharply separable from mudstone. No shelly fossils; trace fossils (curly "worm" marks) common. Forms lowest outcrop of quarry. . . . . 3.3

A. Mudstone, dolomitic, light-gray (5Y 7/1). In smooth even to slightly uneven sets (1/2 to 3 in. thick) of even laminae; fissile; weathered rock yields abundant platy fragments. Contains sparse mudcracks and ripple marks. Base is base of local exposure in stream bank. [Units A and B may correlate with the

| Cumberland Formation (continued) | Thickness (feet) |
|---|---|
| upper part of the Tate Member of the Ashlock Formation of east-central Kentucky]. . . . . | 23 |
| Total measured Cumberland Formation (incomplete) . . . . . | 63 |

Section SC-3 Judio North

[Described from outcrops on and near farm about 1.2 mi north-northeast of Judio, Cumberland County, Ky. (Blacks Ferry quadrangle); Kentucky coordinates: E. 2,080,000, N. 137,500, south zone. Section begins near junction of farm access roads near mouth of Perry Cary Hollow northerly up nose of hill, thence offset about 600 ft to south and continued easterly up hillslope east of farm. Measured by G. W. Weir, December 1965]

| | Thickness (feet) |
|---|---|
| Chattanooga Shale (incomplete; Devonian): | |
| N. Shale, carbonaceous, grayish-black (N2) to brownish-black (5YR 2/1), silty, laminated, fissile; limonite-stained at base. Mostly covered by float of light-gray, fine-grained crinoidal limestone containing irregular dark-gray chert concretions; derived from lower part of Fort Payne Formation. Incomplete; base is regional unconformity. Not measured; probably about 2 ft exposed. . . . . | |
| Cumberland Formation (Ordovician): | |
| M. Mudstone, dolomitic, probably grading to silty micrograined dolomite in some layers, light-grayish-yellow-green (5GY 7/2) and light-brownish-gray (5YR 6/1), weathers yellowish gray (5Y 7/2) to greenish-yellow (10Y 7/2); top 1 to 2 ft is weathered dark yellowish orange with moderate-brown bands of limonite, punky, less resistant | |

Cumberland Formation (continued)

| | Thickness (feet) |
|---|---|
| than rest of unit. In even to slightly uneven beds, commonly about 1/8 to 1/2 in. thick or 1 to 2 in. thick. Unfossiliferous. Poorly exposed; forms moderate slope covered with chips and plates of dolomitic mudstone. . . . . | 35 |
| L. Mudstone, dolomitic, similar to unit M, but in part light-greenish-gray (5GY 7/1), and in part in ledge-forming sets, 1 to 4 ft thick, of obscure thin beds. Forms ledgy slope, minor bench at top . . . . | 12 |
| K. Limestone, medium-gray (N5), weathers same and light olive gray (5Y 6/1); micrograined, in part very fine grained; locally contains sparse cloudy patches and chips of very light gray and yellowish-gray mudstone; common flecks of dark-brown calcite. Single bed forming minor but conspicuous ledge because of contrast in color and composition. Unfossiliferous except for arc-shaped trace fossil. . . . . | 3.5 |
| J. Mudstone, dolomitic, light-greenish-gray (5GY 7/1) streaked with light brownish gray (5YR 6/1); similar to unit M at top. Basal 8 ft poorly exposed. . . | 28 |
| Total Cumberland Formation. . . . . | 75.5 |

Leipers Limestone (Ordovician):

Upper Member:

I. Limestone, medium-light-gray (N6); chiefly

| | Thickness (feet) |
|---|---|
| Leipers Limestone (continued) | |
| Upper Member (continued) | |
| micrograined but in part micrograined and coarse-grained; locally contains chips and films of greenish-gray (5G 6/1) mudstone and sparse greenish-gray discoidal nodules less than 1 in. across. A set of two beds; upper bed is 0.7 ft thick (micrograined and in part laminated; lower bed is 0.3 ft thick (micrograined and coarse grained). Common large ostracodes, and sparse fragments of brachiopods and unidentified debris; mostly in basal 0.3 ft. . . . . | 1 |
| H. Limestone, muddy (90 percent) and limestone. Muddy limestone, probably dolomitic in part, very light olive gray (5Y 7/1) to greenish-gray (5GY 6/1), mostly weathers pale olive gray (5Y 6/4), generally more brownish or darker gray than Cumberland Formation; bedding obscure, perhaps nodular. Limestone, medium-light-gray (N6), weathers same or pale olive gray to yellowish gray (5Y 7/2); micrograined to medium-grained with patches of coarse grains, slightly to very muddy; interstratified as thin layers, less than an inch thick, in muddy limestone, mostly in lower half of | |

Leipers Limestone (continued)

Thickness (feet)

Upper Member (continued)

unit; seems to grade into muddy limestone both vertically and laterally. Chertified discoidal clay nodules, about 1/4 in. thick and 2 to 4 inches across, occur sparsely in top few feet of unit. Fossils sparse to abundant; only sparse bryozoans in top 10 ft; about 10 ft below top bryozoans are abundant, finely ribbed brachiopods are sparse; from about 15 ft below top to base brachiopods, including a large platystrophid commonly silicified, are generally dominant though bryozoans are common. Unit forms slope with minor rounded ledges and patches of rock. . . . . 35.5

G. Limestone, muddy but less muddy than in overlying unit, chiefly medium-light-gray (N6), with muddy patches of yellowish gray (5YR 7/2), weathers about same; micrograined to medium grained, sparse recrystallized coarse grains, mud makes up 5 to 35 percent of rock. Bedding obscure, probably nodular. Fossils common to abundant, brachiopods including strophomenids(?) and in lower 8 ft of unit abundant large platystrophids. Forms rubbly slope with many small rounded ledges. . . . . 23

F. Limestone, generally as in overlying unit, but only slightly muddy, more coarsely grained (micrograined

Leipers Limestone (continued)

| | Thickness (feet) |
|---|---|
| Upper Member (continued) | |
| to coarse-grained, probably averaging medium-grained) and more conspicuously fossil fragmental; in part in fairly distinct uneven beds, 2 to 4 in. thick, and in part in ledge-forming sets, a few feet thick, of obscure nodular(?) beds as in overlying unit. Fossiliferous as above but bryozoans are more abundant and are dominant in many beds; brachiopods of several kinds common to abundant but large platystrophid is sparse or absent in lower one-third of unit. Lower half of unit poorly exposed. (Upper and lower members are informal units used here to separate an upper sequence of generally muddier limestone from a lower sequence of limestone that contains conspicuous ledge-forming layers of coarse-grained, fossil-fragmental limestone). . . . . | 23 |
| Total upper member, Leipers Limestone. . . . . | 82.5 |
| Lower Member: | |
| E. Limestone, muddy (70 percent) and limestone. Muddy limestone, yellowish-gray (5Y 7/2-3), medium-light-gray (N6); weathers about same; consists of 20 to 50 percent calcitic mudstone and 80 to 50 percent micrograined to coarse-grained calcite and fossil fragments; partly in obscure nodular(?) beds, partly in irregular wavy beds, 1/2 to 2 in. thick, | |

Leipers Limestone (continued)

Thickness (feet)

Lower Member (continued)

less resistant than interbedded limestone. Limestone, similar to more calcitic portions of muddy limestone; poor to fair sorted; fine-grained; fossil-fragmental; mostly in uneven beds about an inch thick grouped in ledge-forming sets 3 to 12 in. thick; irregularly interstratified with muddy limestone. Ledge-forming bed of equi-granular fine-grained limestone, several inches thick, has small mud-filled channels on top surface, less than an inch wide and several inches long. Fossils abundant in muddy limestone and limestone; bryozoans dominant; brachiopods common but large platystrophids absent. Unit forms moderate rubbly slope with many small ledges; top placed at highest persistent ledge, about 3 in. thick, of fine- to coarse-grained, fossil-fragmental limestone; a more conspicuous ledge, about 10 in. thick, is 6 ft below top. . . . . 32

D. Limestone, muddy (90 percent) and limestone, generally similar to overlying unit but partly in thicker ledge-forming sets of beds and crossbeds. Muddy limestone consists of 5 to 50 percent yellowish-gray (5Y 7/3) mud irregularly intermixed with medium- to light-gray (N5-7), micrograined to coarse-grained

| | Thickness (feet) |
|---|---|
| Leipers Limestone (continued) | |
| Lower Member (continued) | |
| but chiefly fine-grained calcite containing fine to coarse fossil fragments. Limestone is light gray (N7) and light brownish gray (5YR 6/1), chiefly fine and medium grained; contains interstitial reddish- and grayish-orange phosphatic(?) material; irregularly interstratified in thin beds with muddy limestone and probably gradational both laterally and vertically into muddy limestone. Unit characterized by ledge-forming sets, mostly 1 to 4 ft thick and a few tens to several hundred feet long, partly of wavy or obscure nodular(?) thin beds, partly of thin low-angle crossbeds; beds between ledge-forming sets mostly made up of nodular-bedded, more muddy limestone. Fossils, mostly broken, are common to abundant throughout; bryozoans are dominant, but brachiopods are common, chiefly flat forms but including fragments of a large platystrophid near top of unit. . . . | 27 |
| Total lower member, Leipers Limestone. . . . . | 59 |
| Total Leipers Limestone. . . . . | 141.5 |
| Catheys(?) Formation (incomplete; Ordovician): | |
| C. Limestone (75 percent) and mudstone (25 percent). Limestone is light olive gray (5Y 6/1), weathers grayish orange (10Y 7/4) or yellowish gray (5Y 7/2); very to slightly silty, micrograined to fine grained | |

Catheys(?) Formation (continued)

| | Thickness (feet) |
|---|---|
| and medium grained with coarse-grained streaks and patches, locally contains sparse flakes of mudstone; generally fair sorted. Mostly in fairly even thin beds about 1 to 9 in. thick, some beds show faint internal lamination, some beds obscurely cross-laminated; near base very silty, micrograined to fine-grained limestone are mostly in uneven, planar cross-bedded lenses, as much as 18 in. thick, forming conspicuous smooth-faced minor ledges; near top some uneven, medium beds in ledge-forming sets, about 3 ft thick. Fossils sparse (in micrograined and fine-grained beds) to abundant (in medium- and coarse-grained beds, include abundant bryozoans and sparse to common brachiopods; limestone in lower part of unit is generally finer grained and less fossiliferous than upper part of unit. Mudstone ranges from very clayey to very silty and is calcitic; where very clayey it is grayish yellow green (5GY 7/2) and obscurely laminated, irregularly cleaving; where very clayey it is olive gray (5Y 5/3), in even thin laminae and cleaving smoothly along partings; inter-bedded with limestone as partings, seams and sets as much as 18 in. thick. Unit forms steep slope with minor smooth ledges; in part poorly exposed. . . . . | 21 |

Catheys(?) Formation (continued)

| | Thickness (feet) |
|---|---|
| B. Covered, low-angle slope. . . . . | 6 |
| A. Mudstone (80 percent) and limestone. Mudstone is chiefly a calcitic, silty claystone, in part a calcitic, clayey siltstone, dark-yellowish-brown (10YR 6/2), weathers moderate yellowish brown (10YR 5/4); stratification obscure, partly in laminae 2 to 4 mm thick, weathers to yield small chips; cleaves irregularly; nonresistant; no fossils seen. Limestone is light olive gray (5Y 6/1), weathers grayish orange (10YR 7/4) to pale yellowish brown (10YR 6/4), silty, micrograined to very fine grained, well-sorted; in thin lensing beds, as much as 3 in. thick, some obscurely laminated; moderately resistant, forms ribs in outcrop; fossils sparse, chiefly fine debris of brachiopod shells, a few whole zygosphirid brachiopods, crinoid columnals, and sparse unidentified dark-gray plates about 2 mm across . . . . . | 6 |
| Measured Catheys(?) Formation (incomplete). . . . . | 33 |

Section SC-4 Burkesville

[Described from outcrops near junction of Kentucky Highways 61 and 90 in Burkesville, Cumberland County, Ky. (Burkesville and Waterview quadrangles): Kentucky coordinates: E. 2,109,800, N. 164,200, south zone. Section begins near culvert about 1,800 ft south of highway intersection, thence offset to east-facing hillslope about 500 ft south of intersection. Measured by G. W. Weir, December 1965]

| | Thickness (feet) |
|---|---|
| Chattanooga Shale (incomplete; Devonian): | |
| 9. Shale, brownish-black (5YR 2/1), laminated, fissile; conspicuous joints. Veinlets of limonite extend into underlying Cumberland Formation. Regional unconformity at base. Estimated thickness of exposure. . . . . | 20 |
| Cumberland Formation (incomplete; Ordovician): | |
| 8. Mudstone and muddy limestone. Mudstone, light-greenish-gray (5G 8/1), mostly weathered light brownish gray (5YR 6/1), partly iron-stained especially at top; crudely laminated; upper 2 ft of unit. Muddy limestone, deeply weathered, has pervasive limonite stain, moderate brown (5YR 4/4) to moderate reddish brown (10R 4/6); leached, punky; bedding obscure, single fragment of small, ribbed brachiopod; forms base of unit . . . . . | 2.8 |

Cumberland Formation (continued)

| | Thickness (feet) |
|---|---|
| 7. Limestone, dolomitic and muddy, light-greenish-gray (5G 8/1), weathers light brownish gray (5YR 7/1) to grayish yellow (5Y 7/4); sparse greenish-gray clay mineral (glauconite?). Calcite nodules, in part geoidal, commonly 1 to 2 in. across, sparse to common 25 to 30 ft above base; irregular blebs and veinlets of calcite in top 2 ft. Bedding obscure but laminated in part; contains mud cracks, irregular polygons 1 to 3 in. across. Forms stepped benches; highest is 30 ft above base; well exposed. . . . . | 33 |
| 6. Limestone, muddy (65 percent) intergrading and interbedded with calcitic mudstone. Limestone is very muddy, micrograined, weathered yellowish gray (5Y 7/3) to grayish orange (10Y 7/5), partly in irregular beds less than 0.5 in. thick, partly in ledge-forming beds 2 to 3 ft thick. Calcitic mudstone was probably originally greenish gray (5G 6/1) as in a few streaks but now is almost wholly weathered grayish yellow (5Y 7/4), in even and irregular laminae, less than 1/2 in. thick. Unit forms series of ledges with recesses and benches in mudstone and thin-bedded limestone. Top placed at base of continuous outcrop of limestone. . . . . | 13.5 |

Cumberland Formation (continued)

| | Thickness (feet) |
|---|---|
| 5. Mudstone, calcitic (60 percent), interbedded and intergrading with limestone. Mudstone is similar to mudstone in unit 6. Limestone is very muddy, similar to limestone in unit 6; in obscure beds, 1 to 3 in. thick. Top 3 ft of unit forms ledge; lower part is poorly exposed. . . . . | 11 |
| 4. Mudstone, similar to calcitic mudstone in units 5 and 6. Benches at 6, 12, and 17 ft above base. Top 2 ft mostly covered. . . . . | 18 |
| 3. Limestone (75 percent) and calcitic mudstone, fossiliferous. Limestone, greenish-gray (5GY 5-6/1), micrograined, in part very fine grained, irregularly muddy; some layers near base contain flakes of light-greenish-gray (5GY 7/1) mudstone and sparse grains of grayish green clay mineral. Calcitic mudstone, greenish-gray (5GY 5-6/1) in crude laminae less than 1/4 in. thick. Unit comprises basal ledge of limestone, 1.4 ft thick; overlain by 0.5 ft mudstone; 1.3 ft mudstone with 30 percent lensing interbeds of limestone that contain irregular nodules, as much as 3 in. across, of calcitic mudstone containing abundant grayish-green clay mineral; overlain by 0.3 ft mudstone, and at top 0.7 ft limestone. | |

| | Thickness (feet) |
|---|---|
| Limestone forms rounded ledges; mudstone forms recesses; bench 1 ft below top. Fossils sparse to common in both mudstone and limestone, most common in limestone lenses interbedded with mudstone 1.9 to 3.2 ft above base; small brachiopods and small cylindrical bryozoans common, small pelecypods sparse; trace fossils(?), indeterminate markings about 1/10 in. wide and as much as 1/2 in. long on some surfaces. [Unit is probably the Fowler Limestone of Foerste (1901) and the Burkesville Limestone of Jillson (1951)]. . . . . | 4.2 |
| 2. Mudstone, calcitic (70 percent) and interbedded and intergrading with muddy limestone. Calcitic mudstone is similar to mudstone in unit 3. Muddy limestone, greenish-gray (5GY 6/1), weathers yellowish gray (5Y 7/2), micrograined to very fine grained; many layers contain abundant flakes, mostly less than 1 in. across, of greenish-yellow (10Y 7/2) calcitic mudstone; in thin beds mostly less than 1 in. thick. Unit mostly non-resistant, forms slope; with ledge of muddy limestone about 6 ft above base; poorly exposed in basal 5 ft . . . . . | 14 |
| 1. Limestone (80 percent) and calcitic mudstone: Limestone, about equally divided between two types: | |

| | Thickness (feet) |
|---|---|
| (type A), light-olive-gray (5Y 6/1) to light-brownish-gray (5YR 6/1), weathers yellowish gray (5Y 7/2); micrograined, some admixed mud, sparse grayish-green (5G 5/2) clay mineral as minute pods, and flakes; irregular nodules, as much as 5 in. across, of dark-greenish-gray chert, weathers greenish gray, in top ledge; mainly in beds 2 to 5 in. thick in ledge-forming sets as much as 8 in. thick; ledge-forming top set of beds contains mud cracks, irregular polygons, less than 2 in. across; no megafossils, trace fossils(?) are gray irregular markings about 2 mm wide and as much as 10 mm long. Limestone (type B), differs from type A in being muddier and in thinner beds less than 1/2 in. thick; grains of grayish-green clay mineral more common; some beds contain abundant flakes as much as an inch across of very muddy limestone. Mudstone, calcitic, light-olive-gray (5Y 6/1); in partings and seams as much as an inch thick; nonresistant, poorly exposed. Base of section is base of exposure in drain on west side of road about 1,300 ft south of main line of section. . . . . | 4 |
| Measured Cumberland Formation (incomplete) . . . . . | 100.5 |

Section SC-5 Grider Southeast

[Described from roadcuts and outcrops on adjacent hillslopes along Kentucky Highway 90 and 0.8 mi southeast of Grider, Ky. (Waterview quadrangle); Kentucky coordinates: E. 2,099,600, N. 169,200, south zone. Measured by G. W. Weir, December 1965]

| | Thickness (feet) |
|---|---|
| Chattanooga Shale (incomplete; Devonian): | |
| 11. Shale, carbonaceous, black (N1), weathers brownish black (5YR 2/1); laminated, fissile; generally poorly exposed. At base about 1 inch of limonite-stained, moderate-brown (5YR 3/4), very fine and fine-grained sand with patches of dark-yellowish-orange mudstone. Base is regional unconformity. Not measured. . . . . | |
| Cumberland Formation (Ordovician): | |
| 10. Mudstone, dolomitic, grading in some beds to muddy, micrograined dolomite; chiefly greenish-gray (5G 6/1), and where mostly micrograined dolomite, light-brownish-gray (5YR 7/1); weathers yellowish gray (5Y 7/2) and pale olive (10Y 6/2); sparse flecks of grayish-green clay mineral and white to colorless calcite. Obscurely bedded in ledge-forming sets about 1/2 to 2 1/2 ft thick. Forms ledgy slope; about 65 percent exposed. Top of unit marked by a few inches of dark-yellowish-orange (10YR 6/6) dolomitic mudstone; | |

| | Thickness (feet) |
|---|---|
| contains a few small platy fragments of white chert, moderate decrease in slope at contact. . . . . | 20 |
| 9. Limestone (60 percent) interbedded with calcitic mudstone. Limestone, medium-gray (N5) and light-olive-gray (5Y 6/1), mostly weathers yellowish gray (5Y 7-6/3); chiefly micrograined with sparse fine to coarse calcite crystals; some beds contain patches and streaks of grayish-yellow (5Y 7/4) mudstone; a few beds made up largely of fine to coarse fossil debris; apparently in thin uneven beds 1 to 5 in. thick; sparse clusters of light-yellowish-gray bladed barite. Interstratified calcitic mudstone is grayish-yellow (5Y 7/4); very poorly exposed. Fossiliferous throughout; contains heads of colonial corals chiefly in top 1 ft of unit, fragments of small brachiopods and bryozoans abundant in a few layers; most beds lack shelly fossils though trace fossils(?), irregular markings suggestive of "worm " borings, are common, Forms slope above top of highway cut; poorly exposed. [Units 9 and 10 are probably the Haggard Limestone of Jillson (1953)]. . . . . | 7 |
| 8. Mudstone, calcitic, greenish-gray (5GY 6/1), weathers same and yellowish gray (5Y 7/2); obscurely bedded, in part in beds or sets, 6 to 12 in. thick, | |

| | Thickness (feet) |
|---|---|
| of laminae; weathered outcrop yields blocky and platy fragments; moderately resistant, forms steep slope, fairly smooth face in highway cut. . . . . | 50 |
| 7. Mudstone, calcitic, greenish-gray (5G 6/1) to light-greenish-gray (5G 7/1) with streaks of grayish-green clay mineral, weathers light greenish gray; contains a few streaks of fine-grained calcite; texture suggests reworking by animals. A homogeneous unit with obscure layers about 6 in. apart. Forms uniform smooth-faced ledge. Sparsely fossiliferous, contains large ostracodes, sparse cylindrical and globular bryozoans and sparse brachiopods . . . . . | 2 |
| 6. Limestone, muddy, micrograined (55 percent) and shaly-weathering, calcitic mudstone, medium-gray (N5) to greenish-gray (5GY 6/1). Unit consists of three intergrading layers: at base 0.3 to 0.5 ft of laminated mudstone with partings and lenticles of limestone, overlain by 0.6 to 0.8 ft of limestone with partings of mudstone, overlain by 0.7 to 0.9 ft of laminated mudstone with partings of limestone. Sparse grayish-brown chert stringers in limestone. Some small irregular ball-like masses of fine-grained calcite in limestone; general texture suggests reworking by animals. Forms part of a ledgy | |

| | Thickness (feet) |
|---|---|
| outcrop. Fossils common, mostly abraded, small cylindrical bryozoans and brachiopods. [Units 7 and 8 are probably the Fowler Limestone of Foerste (1901) and the Burkesville Limestone of Jillson (1951)]. . . . . | 2 |
| 5. Limestone, muddy, micrograined, medium-gray (N5), contains chips of light-gray (N7) to pale-olive (10Y 6/2) mudstone. Muddy limestone not sharply separable from calcitic mudstone below. Chips (rip-up clasts) of olive-gray mudstone are mostly only 1/100 to 1/20 in. thick and a fraction of an inch to several inches across; many chips are imbricated toward north or south in closely spaced layers. Forms base of ledgy outcrop. . . . . | 0.7 |
| 4. Mudstone, calcitic, locally grading to very muddy, micrograined limestone, greenish-gray (5GY 6/1), weathering light olive gray (5Y 6/1) with streaks of yellowish gray (5Y 7/2). Contains about 10 percent greenish-gray (5GY 6/1) micrograined to very fine grained limestone flecked with grayish-green clay mineral; in thin beds grouped in ledge-forming set about 1 ft thick about 2 ft above base. Gradational above: upper few feet contains some inconspicuous chips of greenish-gray | |

| | Thickness (feet) |
|---|---|
| mudstone in brownish-gray mudstone. . . . . | 16.3 |
| 3. Mudstone, calcitic, locally grading to very muddy micrograined limestone, generally similar to overlying unit but more resistant; top few feet more calcitic. Upper 5 ft contains conspicuous zones of medium-light-gray (N6) to greenish-gray (5GY 6/1) chert in irregular patchy and nodular concretions, commonly 1 to 3 in. thick and 2 to 6 in. long; some nodules preserve a faint fine lamination of the original rock. Sparse irregular nodules, 1 to 2 in. across, of coarse crystals of white calcite. Mostly finely laminated in sets 1 to 3 in. thick; sets 10 to 24 in. thick in top 5 ft. Splits along planes 1/4 to 1 in. apart; weathered outcrop yields platy fragments; outcrop face fairly smooth . . . . . | 15 |
| 2. Limestone, very muddy grading upward to calcitic mudstone, medium-gray (N5) grading upward to greenish-gray (5GY 5-6/1), weathers same and light greenish gray (5GY 7-8/1); calcite is micrograined to fine-grained; much irregular mixing of limestone and mudstone suggestive of reworking by animals; unfossiliferous. Contains irregular concretions of greenish-gray chertified | |

Cumberland Formation (continued)

| | Thickness (feet) |
|---|---|
| mudstone, commonly 1 to 3 in. and 1 to 6 in. long; form nodular and rib-like projections. In fairly even beds, 1 to 6 in. thick; lowest unit with conspicuous bedding planes. Unfossiliferous. Gradational above and below; top placed at level of highest chert concretion; base placed so as to exclude fossiliferous, nodular- and wavy-bedded muddy limestone. . . . . | 3 |
| Total Cumberland Formation. . . . . | 116 |

Leipers Limestone (incomplete; Ordovician):

1. Muddy limestone (50 percent) intimately intermixed with calcitic mudstone, light-olive-gray (5Y 6/1), weathers same; micrograined to fine-grained with abundant fine to coarse fossil fragments; much limestone is in irregular spindly pods a few inches across in mudstone. Stratification obscure; much of unit probably reworked by animals; some indistinct wavy to nodular beds, a few inches thick; apparently in sets, 1 1/2 to 4 ft thick, that weather to form rounded ledges. Sparse pockets of coarse white calcite, commonly about 1 in. across. Fossils common to abundant, mostly abraded, dominantly bryozoans and brachiopods, including a large platystrophid; gastropods sparse to common. Top

Leipers Limestone (continued)

| | Thickness (feet) |
|---|---|
| 10 ft is generally more muddy, less fossiliferous and characterized by irregular beds, 1 to 6 in. thick; some beds of limestone are micrograined, unfossiliferous, greenish-gray (5GY 6/1). Top 0.7 ft transitional with overlying unit, forms recess. Thickness is maximum exposure up bank from Marrowbone Creek; exposure along highway is about 15 ft less. . . . . | 45 |
| Measured Leipers Limestone (incomplete). . . . . | 45 |

Section SC-6 Temple Hill Church No. 1 core

[Described from Temple Hill Church No. 1 core, no. C-303 in core library of the Kentucky Geological Survey, footage: 40 to 1262 ft; Russell County, Ky. (Creelsboro quadrangle); Kentucky coordinates: E. 2,178,900, N. 205,500, south zone; Carter coordinates: 7-E-53. Logged by G. W. Weir, W. L Peterson, and W C Swadley, 1977]

| Footage at base | Unit | Description | Thickness (feet) |
|---|---|---|---|
| 62.6 | A. | Limestone and shale, nodular bedded. Limestone, light-gray; consists of coarse fossil fragments in micrograined matrix. Shale, dark-gray. [Unit is probably basal part of Leipers Limestone]. . . . . | 22.6 + |
| 77 | B. | Limestone (90 percent) and shale. Limestone, micrograined to medium-grained, locally with coarse fossil fragments; mostly laminated, minor nodular beds; fossils sparse to abundant, less conspicuous in laminated limestone that makes up about half of unit . . . . . | 14.4 |
| 118 | C. | Limestone and shale. Limestone (40 percent), light-gray, two types: medium-grained and micrograined to coarse-grained; in part obscurely laminated. Shale, grayish-green, calcitic, laminated in sets 2 to 48 in. thick . . . . . | 41 |

| Footage at base | Unit | Description | Thickness (feet) |
|---|---|---|---|
| 141 | D. | Limestone (60 percent) and shale, similar to unit 3 but shale layers thinner. Limestone, mostly made up of fossil fragments in fine-grained matrix. Irregular fragments, up to 2.5 in. of limestone in shale and shale in limestone. [Units B, C, D, (totaling 78.4 ft) probably constitute unit of formational rank, possibly the (Ordovician) Clays Ferry Formation]. . . . . | 23 |
| 193 | E. | Limestone (90 percent) and shale. Limestone is ot two types: fine grained and fine to coarse grained. Fossils abundant in coarser grained layers. Fine-grained layers are commonly laminated; coarser grained layers are in part in obscure crude laminae; stylolites are common. Shale is in layers as much as 2 in. thick. . . . . | 52 |
| 212 | F. | Limestone (70 percent) and shale. Limestone is of two types: fine grained and medium to coarse grained; coarser grained type dominant, mostly nodular-bedded, abundantly fossiliferous; fine-grained limestone is mostly laminated. [Units E and F may be assignable to the Lexington Limestone (Ordovician).]. . . . . | 19 |

| Footage at base | Unit | Description | Thickness |
|---|---|---|---|
| | | Note: End of log not base of core. | |
| | | Top of Tyrone Limestone (Ordovician), | |
| | | 3 ft above bentonite seam, is 526 ft. | |

Section SC-7 William A. Conner No. 1 core

[Described from Cominco No. 1 William A. Conner core, no. C302 in core library of the Kentucky Geological Survey, footage: 47 to 1790 ft; Clinton County, Ky. (Wolf Creek Dam quadrangle); Kentucky coordinates: E. 2,151,100, N. 161,200, south zone; Carter coordinates 16-D-53. Logged by G. W. Weir, W. L. Peterson, and W C Swadley, 1977]

| Footage at base | Unit | Description | Thickness |
|---|---|---|---|
| 434.2 | A. | Black shale. [Chattanooga Shale (Devonian)]. Base is regional unconformity. . . . . | |
| 475.6 | B. | Limestone and dolomite, greenish-gray; laminated, many disrupted laminae. Sparse fossil fragments, mostly in a zone from 469 to 473 ft. Unit is Cumberland Formation (Ordovician). . . . . | 41.4 |
| 593.5 | C. | Limestone (70 percent) and shale. Limestone, micrograined to coarse-grained; in nodular beds interlayered and intermixed with shale; contains abundant brachiopods and bryozoans. . . . . | 117.9 |
| 606 | D. | Limestone (90 percent) and shale. Limestone is mostly coarse grained; obscurely laminated where fair sorted; stylolites common. Contains abundant large fossil fragments, chiefly brachiopods and bryozoans. Algal(?) structures and coated lumps (oncolites?) common. [Units C and D (totaling 130.4 ft) probably constitute | |

| Footage at base | Unit | Description | Thickness |
|---|---|---|---|
| | D. (Cont) | the Ordovician Leipers Limestone]. . . . . | 12.5 |
| 613.5 | E. | Shale (70 percent) and limestone. Shale, dark-greenish-gray; in layers 1/2 to 5 in. thick. Limestone, similar to limestone in unit C, but in thinner layers, 1 to 3 in. thick. . | 7.5 |
| 622.1 | F. | Limestone, medium-grained, well-sorted; crudely laminated, many small stylolites. Minor shale, dark-gray, as rare partings and seams as much as 2 in. thick . . . . . | 8.6 |
| 641 | G. | Shale (60 percent) and limestone. Shale, very calcitic, medium-gray; obscurely stratified, in part laminated. Limestone, similar to limestone in unit D but generally finer grained; in part nodular-bedded. [Units E, F, and G (totaling 35 ft) may constitute Clays Ferry Formation (Ordovician)]. . . . . | 18.9 |
| 686 | H. | Limestone (90 percent) and shale. Limestone is of two types: type A, coarsely fossil fragmental with micrograined matrix; and type B, fine to medium grained, well sorted, containing fewer fossils. Bedding obscure, in part laminated; abundant stylolites. Shale, dark-greenish-gray, in part laminated. . . . . | 45 |

| Footage at base | Unit | Description | Thickness (feet) |
|---|---|---|---|
| 904 | I. | Limestone (80 percent) and shale. Limestone, fine- to coarse-grained; in part nodular bedded, in part obscurely laminated; abundant stylolites; coarser grained limestone contains abundant fossil fragments. Shale, greenish-gray; obscurely laminated in irregular layers 1 to 3 in. thick interlayered with nodular limestone. [Units G, H, and I (totaling 281.9 ft) may be assignable to the Lexington Limestone (Ordovician)]. . . . . | 218 |
| | J. | Limestone, light- to medium-gray, micrograined; in obscure nodular(?) beds. Not measured . . . . . | |

Note: End of log not base of core. Top of Tyrone Limestone (Ordovician) is at 1077.5 ft.

Section SC-8 Herman Booher No. 1 core

[Described from Cominco No. 1 Herman Booher core, no. C300 in core library of the Kentucky Geological Survey; footage; 0 to 1,652 ft; Cumberland County, Ky. (Burkesville quadrangle); Kentucky coordinates E. 2,122,000; N. 174,100, south zone; Carter coordinates 10-D-50. Logged by G. W. Weir, W. L. Peterson, and W C Swadley, 1977]

| Footage at base | Unit | Description | Thickness (feet) |
|---|---|---|---|
| 226.7 | A. | Black shale. Chattanooga Shale (Devonian). Top is at 198 ft; base is regional unconformity. . . . . | 28.7 |
| 264.5 | B. | Dolomite, light-grayish-green; finely laminated; contains dark-green clay(?) mineral which becomes very abundant near base. Bioturbated layer, 6 in. thick, at base. Seam of sulphur at 258.6 ft. . . . . | 37.8 |
| 267.5 | C. | Dolomite, medium-greenish-gray to brownish-gray; laminated, in part bioturbated. Poorly preserved fossils include brachiopods, pelecypods, and bryozoans. [Unit is probably Fowler Limestone of Foerste (1901) and Burkesville Limestone of Jillson (1951)]. . . . . | 3 |
| 306 | D. | Dolomite, similar to unit B, in part brownish-gray; minor bioturbation; sparse partings of gypsum. Near base calcitic with sparse fossils and a few partings of black shale. | |

| Footage at base | Unit | Description | Thickness (feet) |
|---|---|---|---|
| | D. (Cont.) | Some broken laminae may indicate mud-cracks, possibly bioturbation. [Units B, C, and D (totaling 79.3 ft) constitute Cumberland Formation (Ordovician)]. . . . . | 38.5 |
| 450.2 | E. | Limestone and minor shale. Limestone, chiefly light-gray to medium-gray, muddy, fine- to coarse-grained, finer grained types dominant; nodular-bedded in sets as much as 6 in. thick, contains abundant fossil fragments, chiefly brachiopods and bryozoans. Shale, medium- to dark-gray; occurs mostly as partings but is dominant in basal 5 ft . . . . . | 144.2 |
| 457 | F. | Limestone, light-gray, medium- to coarse-grained, mostly well sorted; in part evenly laminated, in part nodular-bedded; bioturbated; fossils sparse to common. [Units E and F (totaling 151 ft) probably constitute the Leipers Limestone (Ordovician)] . . . . . | 6.8 |
| 544.6 | G. | Limestone (60 percent) and shale. Limestone, light-gray, fine- to medium-grained, locally containing coarse fossil fragments; in part laminated, in part nodular-bedded, interlayered with shale in layers 2 to 12 in. thick. | |

| Footage at base | Unit | Description | Thickness (feet) |
|---|---|---|---|
| | G. (Cont.) | Shale is dark greenish gray. Fossils are chiefly brachiopods and bryozoans; some thin beds are composed almost wholly of jumbled flat brachiopods. [Unit may be assignable to Clays Ferry Formation (Ordovician)]. . . . . | 87.6 |
| 598.8 | H. | Limestone (75 percent) and shale. Limestone, light-gray, medium- and coarse-grained, in part well-sorted, in part obscurely laminated with abundant stylolites, in part nodular-bedded; large fossil fragments locally abundant, chiefly brachiopods and bryozoans. Shale, dark-gray, laminated in irregular layers as much as 3 in. thick. [Unit may be assignable to Lexington Limestone (Ordovician)]. . . . . | 54.2 |

Note: End of log not base of core. Top of Tyrone Limestone (Ordovician) at 900.5 ft.

Section SC-9 St. Joseph Lead and Zinc Co. core

[Described from St. Joseph Lead and Zinc Co. core, no. C291 in the core library of the Kentucky Geological Survey; footage: 0 to 1,585 ft; Allen(?) County, Ky. (Fountain Run quadrangle); Carter coordinates: 18-C-43. Logges by G. W. Weir, W. L. Peterson, and W C Swadley, 1977]

| Footage at base | Unit | Description | Thickness (feet) |
|---|---|---|---|
| 293.7 | A. | Dolomite, grayish-green, obscurely laminated. Some interlayered dolomitic mudstone, medium-greenish-gray to dark-brownish-gray. Sparse thin gypsum seams, 1 to 2 ft apart. No fossils; 235 to 245 ft is zone of bioturbation. Overlain by Silurian limestone, dolomite and shale at 210 ft. . . . . | 83.7 |
| 299 | B. | Limestone, calcarenite, light-gray, medium-grained to very coarse grained; common stylolites; contains abundant fossils, including gastropods and brachiopods. [Unit is probably Fowler Limestone of Foerste (1901) and Burkesville Limestone of Jillson (1951)]. . . . . | 5.3 |
| 315.2 | C. | Limestone and dolomite, interlayered and intergrading; mostly laminated and bioturbated, in part fossil-fragmental (brachiopods) in bioturbated, micrograined matrix. Unidentified dark-green mineral (Glauconite?) in limestone. [Units A, B, and C (totaling 105.2 ft) probably constitute Cumberland Formation (Ordovician)] . . . | 16.2 |

| Footage at base | Unit | Description | Thickness (feet) |
|---|---|---|---|
| 473 | D. | Limestone, medium- to light-gray, coarsely fossil-fragmental in fine-grained matrix; in part laminated; bioturbated. Contains abundant brachiopods and bryozoans. Layers of calcitic shale, 2 to 6 in. thick, in bottom 5 ft. [Probably constitutes Leipers Limestone (Ordovician)]. . . . . | 157.8 |
| 639 | E. | Limestone (60 percent) and shale: Limestone light-gray and medium-gray; light-gray limestone similar to limestone in unit D; fine-grained limestone darker; contains few fossils; grades into shale. Shale, calcitic, probably silty; in layers 1 to 4 in. thick. Less nodular bedding, sets thinner, and more shale than in overlying unit. [Unit may be assignable to Clays Ferry Formation (Ordovician)]. | 166 |
| 776 | F. | Limestone with minor shale. Limestone, medium-gray; consists of fossil fragments in micro-grained to coarse-grained matrix; in nodular beds; stylolites common, bioturbated; contains abundant brachiopods and bryozoans. Shale is dark gray. [Unit may be assignable to Lexington Limestone (Ordovician)]. . . . . | 137 |
| | | Note: End of log not base of core. Top of Tyrone Limestone (Ordovician) at 653.3 ft. | |

Section SC-10 Thomas Ridge Church core

[Described from Thomas Ridge Church core, no. C275 in core library of the Kentucky Geological Survey; footage; 10 to 2,525 ft; Casey County (Phil quadrangle); Kentucky coordinates: E. 2,227,200, N. 305,800, south zone; Carter coordinates: 24-I-55. Logged by G. W. Weir, W. L. Peterson, and W C Swadley, 1977]

| Footage at base | Unit | Description | Thickness (feet) |
|---|---|---|---|
| 275.4 | A. | Black shale. [Chattanooga Shale (Devonian)] Top at 240 ft; base is regional unconformity. . . . . | 35.4 |
| 283 | B. | Dolomite, grayish-green, micrograined, muddy; crudely laminated; streaks and spots of dark-green clay mineral; no fossils. [Unit may correlate with Rowland Member of Drakes Formation (Ordovician) of east-central Kentucky] . | 7.6 |
| 284.6 | C. | Limestone (or calcitic dolomite), brownish-gray to greenish-gray, micrograined. Contains common fragments of brachiopods. Grades to unit below . . . . . | 1.6 |
| 289 | D. | Limestone, micrograined, generally similar to overlying unit but contains thin bed of dolomite at top . . . . . | 4.4 |
| 293 | E. | Limestone, micrograined, similar to unit B; contains abundant brachiopods and bryozoans. [Units C, D, and E (totaling 10 ft) may correlate with Reba Member of the Ashlock Formation (Ordovician) | |

| Footage at base | Unit | Description | Thickness (feet) |
|---|---|---|---|
| | E. (Cont.) | of east-central Kentucky]. . . . . | 4 |
| 305 | F. | Dolomite, grayish-green; crudely laminated; no fossils. [Unit may correlate with Terrill Member of Ashlock Foramtion of east-central Kentucky]. . . . . | 12 |
| 306 | G. | Limestone, similar to overlying dolomite but obscurely laminated and contains abundant green clay mineral . . . . . | 1 |
| 320.9 | H. | Limestone, gray and greenish-gray; micrograined to very fine grained with sparse coarse grains; in laminae and nodular beds separated by partings of dark-gray shale; contains some nodules of coarsely crystalline calcite. Fossiliferous, chiefly sparse to common brachiopods and bryozoans. [Unit may correlate with Gilbert Member of Ashlock Formation of east-central Kentucky] . . . . . | 14.9 |
| 330.7 | I. | Limestone, gray, micrograined; laminated. Contains sparse ostracodes; no megafossils . . . . | 9.8 |
| 363 | J. | Dolomite, similar to dolomite of unit B but contains less green mineral. Laminae of gypsum and 3 ft above base. [Units I and J (totaling 42.1 ft) may correlate with Tate Member of Ashlock Formation of east-central | |

| Footage at base | Unit | Description | Thickness (feet) |
|---|---|---|---|
| | J. (Cont.) | Kentucky. Units B through J inclusive (totaling 87.6 ft) tentatively assigned to Cumberland Formation (Ordovician). . . . . | 32.3 |
| 461 | K. | Limestone, dark-gray; composed chiefly of coarse fossil fragments in a micrograined to medium-grained matrix; bioturbated; contains abundant brachiopods and bryozoans. Intermixed with minor dark-gray, sparsely fossiliferous micrograined limestone . . . . . | 98 |
| 481.5 | L. | Limestone (85 percent), similar to fossil-fragmental limestone in unit K, Interstratified with dark-greenish shale. . . . . | 20.5 |
| 496.4 | M. | Limestone (60 percent) and shale. Limestone, in part similar to limestone in unit K, in part more coarsely grained; in part nodular-bedded, in part obscurely bedded; fossils common. Shale similar to shale in unit L. [Units K, L, and M (totaling 133.4 ft) tentatively assigned to Leipers Limestone (Ordovician)]. . . . . | 14.9 |
| 555 | N. | Limestone (45 percent), shale (40 percent), and dolomite (15 percent). Limestone, chiefly micrograined to coarse-grained; contains abundant brachiopods and bryozoans; some thin layers composed almost wholly of jumbled flat brachiopods. Some limestone is muddy, very | |

| Footage at base | Unit | Description | Thickness (feet) |
|---|---|---|---|
| | N. (Cont.) | fine grained and contains only sparse fossils. Shale interbedded, in sets as much as 8 in. thick. Dolomite, dark- to light-greenish-gray and gray; obscurely laminated in sets 2 to 24 in. thick. . . . . | 58.6 |
| 726.6 | O. | Limestone (60 percent) and shale. Limestone, of two types: type A fine-grained, containing sparse fossils, and type B fine- to medium-grained, containing abundant fossil fragments. In part crudely laminated, in part nodular-bedded; interlayered with shale in sets 1 to 10 in. thick . . . . . | 171.6 |
| 737 | P. | Limestone with minor shale. Limestone, dark-brownish-gray, medium- to very coarse grained calcarenite with abundant wavy partings of dark-brownish-gray shale . . . . . | 10.4 |
| 817 | Q. | Limestone and shale. Limestone, mostly fine-grained, but in part coarse-grained; nodular-bedded; bioturbated; fossilferous. Rock in interval 747 to 760 ft is similar to unit O. . . . | 80 |
| | | Note: End of log not base of section. Top of Tyrone Limestone (Ordovician) at 957 ft. | |

Section SC-11 Cominco 12-D-51 core C298

[Described from unnamed Cominco core, no. C298 in core library of Kentucky Geological Survey; footage: 12 to 1,484.9 ft; Cumberland County, Ky. (Burkesville quadrangle); Carter coordinates: 12-D-51. Logged by G. W. Weir, W. L. Peterson, and W C Swadley, 1977]

| Footage at base | Unit | Description | Thickness (feet) |
|---|---|---|---|
| 68 | A. | Black shale; about 1 ft of green shale at base. Chattanooga Shale (Devonian). Top at 38 ft; base is regional unconformity. . . . | 30 |
| 139.8 | B. | Dolomite and dolomitic, calcitic mudstone, greenish-gray, laminated; bioturbated in part; dark-greenish mineral common. [Unit is Cumberland Formation (Ordovician)] . . . . . | 71.8 |
| 294 | C. | Limestone (70 percent) and shale. Limestone, chiefly fine- to medium-grained containing coarse fossil fragments, in nodular beds; contains some coated grains (oncolites?) in upper part of unit. In lower 10 feet limestone is mostly well sorted, fine to mediumg rained, and contains sparse to common fossils; in part bioturbated. Shale is intermixed with limestone and interbedded insets as much as 2 in. thick. Brachiopods and bryozoans are dominant fossils. [Unit probably is Leipers Limestone (Ordovician)]. . . . . | 154.2 |

| Footage at base | Unit | Description | Thickness (feet) |
|---|---|---|---|
| 353 | D. | Limestone (50 percent) and shale. Limestone is of two types: type A fine grained, well sorted with sparse to common fossils; and type B poorly sorted fine to medium grained with abundant coarse fossil fragments. In irregular beds, 1 to 18 in. thick. Bryozoans and brachiopods are dominant fossils; some thin beds composed almost wholly of flat brachiopod shells. Shale, grayish-green; laminated in sets commonly about 2 in. thick; bioturbated; sparsely fossiliferous. [Unit is tentatively assigned to Clays Ferry Formation (Ordovician)]. . . . | 59 |
| 742.5 | E. | Limestone (80 percent) and shale. Limestone, mostly fine- to medium-grained with coarse fossil fragments; some coarse-grained limestone; in part well-sorted without fossil fragments; mostly in even beds 4 to 24 in. thick, partly in nodular beds. Shale, greenish-gray to black, laminated, in sets as much as 3 in. thick. [Unit is probably part of Lexington Limestone (Ordovician)]. . . . . | 389.5 |

Note: End of log is not base of core. Top of Tyrone Limestone (Ordovician), placed at top of 6 in. thick bentonite seam, is at 770 feet.

Section SC-12 Fred Thompson No. 1 core

[Described from Cominco No. 1 Fred Thompson core, no. C299 in core library of the Kentucky Geological Survey; footage: 49 to 1,355 ft; Monroe County, Ky. (Vernon quadrangle); Kentucky coordinates: E. 2,042,800, N. 123,000, south zone; CArter coordinates 22-C-47. Logged by G. W. Weir, W. L. Peterson, and W C Swadley, 1977]

| Footage at base | Unit | Description | Thickness (feet) |
|---|---|---|---|
| 63.5 | A. | Mudstone, dolomitic and calcitic, light-gray and light-greenish-gray; laminated; in part bioturbated. A few layers, about 1 in. thick, of limestone in near base. [Unit is lower part of Cumberland Formation (Ordovician)]. . . . . | 14.5 |
| 171.6 | B. | Limestone (70 percent) and shale. Limestone, bluish- to greenish-gray, micrograined to coarse-grained with abundant fossil fragments (bryozoans and brachiopods); nodular-bedded. Shale, very calcitic; contains fossil fragments; intermixed with limestone and in irregular layers as much as 1 in. thick. . . . . | 108.1 |
| 194 | C. | Limestone (70 percent) and shale. Limestone in part similar to limestone in unit B; in part fine-grained. Shale, greenish-gray; laminated in sets as much as 8 [illegible]. thick. [Units B and C (totaling 130.5 ft) probably constitute Leipers Limestone (Ordovician) . . . . . | 22.4 |

| Footage at base | Unit | Description | Thickness (feet) |
|---|---|---|---|
| 338 | D. | Limestone (60 percent) and shale. Limestone, light-gray to light-greenish-gray, of two types: type A well-sorted, fine-grained; and type B poorly sorted, micrograined to medium-grained with abundant coarse fossil fragments. Mostly in irregular layers 1 to 12 in. thick; in part nodular-bedded. Shale, laminated in sets as much as 4 ft thick; bioturbated; contains sparse fossils. [Unit is tentatively assigned to Clays Ferry Formation (Ordovician)] . . . . . | 144 |
| 368 | E. | Limestone (90 percent) and shale. Limestone, dark-brownish-gray, fine- to medium-grained with coarse fossil fragments; in even beds as much as 2 ft thick, in part laminated, in part in irregular beds; stylolites common. Shale, dark-greenish-gray, irregular layers less than 1 in. thick . . . . . | 30 |
| 371 | F. | Shale, greenish-gray. . . . . | 3 |
| 422 | G. | Limestone and shale, nodular-bedded. [Units E, F, and G probably assignable to upper part of Lexington Limestone (Ordovician) . . . . . | 51 |

Note: End of log not base of core. Top of Tyrone Limestone (Ordovician), placed 1 ft above 2 ft thick layer of bentonite, is at 618 ft.

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