UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY



# Measured Sections of Ordovician Strata in Northeast Kentucky

Edited by

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This report is preliminary and has not been edited or reviewed for conformity with U.S. Geological Survey standards.

Contents



Illustrations

# INTRODUCTION

The sections described in this report are part of the data used in 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. Formations of Late Ordovician age described in this report are the Drakes, Bull Fork, Grant Lake, Fairview, and Kope.

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 core described is on file at the core library of the Kentucky Geological Survey in Lexington, Kentucky.

The following sections in this part of Kentucky have been previously published:

NE-1 Sleepy Hollow (Peck, 1966, p. B22-B26).

NE-2 County Line (Peck, 1966, p. B26-B29).

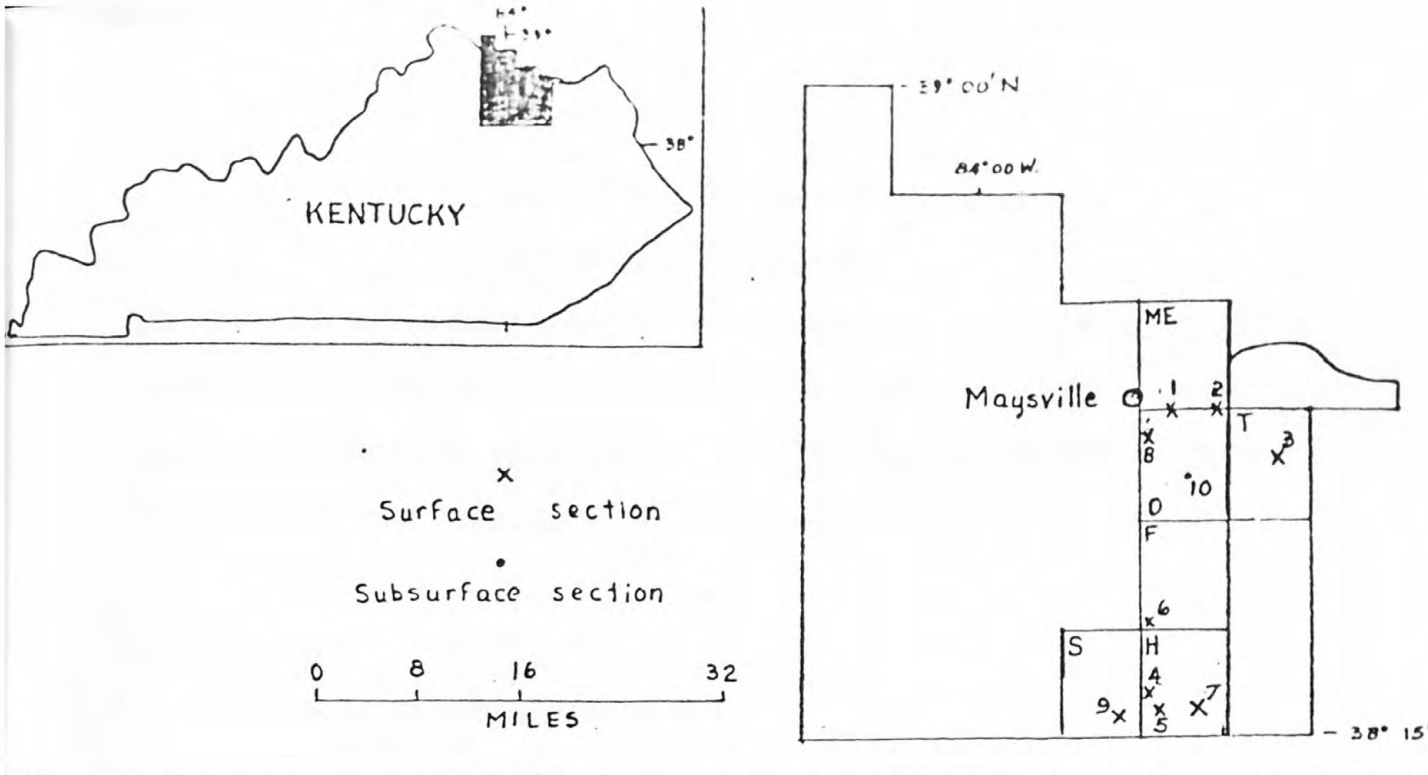


Figure 1. Map of part of northeast Kentucky showing location of measured secions of Ordovician rocks.

Measured sections include the following:

1, Sleepy Hollow; (Peck, 1966), 2, County Line; (Peck, 1966), 3, Tollesboro; 4, Locust South; 5, Indian Creek; 6, Carpenter Quarry; 7, Hillsboro South, 8, Maysville South; 9, Sherburne South; and 10, Dorcus Cooper No. 1.

Quadrangles containing measured sections include: F, Flemingsburg; H, Hillsboro; ME., Maysville East; O, Orangeburg; S, Sherburne; and T. Tollesboro.

## DESCRIPTIONS OF SECTIONS

### Section NE-3 Tollesboro

[Described from roadcuts along Kentucky Highway 10 beginning about 500 ft southwest of bridge over Cabin Creek, Lewis County, Kentucky. (Tollesboro quadrangle); Kentucky coordinates: E. 2,202,900; N. 389,500, north zone. Measured with hand level by F. A. Schilling, Jr., and J. H. Peck]

| | Thickness (feet) |
|---|---|
| Silurian: | |
| Brassfield Formation (incomplete): | |
| 3. Dolomite, glauconitic, grayish-green to greenish-gray, fine-grained, pyritic; contains nodules of calcite, some include crystals of sphalerite; in even thick beds. Not measured. . . . . | |
| Ordovician: | |
| Drakes Formation (incomplete): | |
| Preachersville Member (incomplete): | |
| 2. Shale (about 75 percent) interbedded with dolomite and limestone. Clay shale, grayish-red-purple and grayish-blue-green, slightly calcareous. Dolomite and dolomitic limestone, medium-light-gray to grayish-yellow-green and grayish-pink, fine- to coarse-grained, clayey to silty; in very thin to thin, lenticular beds; sparsely fossilifeous. . . | 5 |
| 1. Shale (about 95 percent) interbedded with | |

Drakes Formation (incomplete)--Continued:

Preachersville Member (incomplete)--Continued:

| | Thickness (feet) |
|---|---|
| dolomite and limestone. Shale similar to shale in unit 2 but lacks grayish-red layers. Dolomite and dolomitic limestone similar to dolomite and limestone in unit 2 but lack grayish-pink layers | 12.5 |
| Total measured Preachersville Member of Drakes Formation (incomplete) | 17.5 |

Section NE-4 Locust South

[Described from outcrops along road leading westward from hilltop near benchmark 900 to alluvial plain of Licking River below elevation marker 602, about 1.4 mi south-southeast of Locust, Fleming County, Kentucky. (Hillsboro quadrangle); Kentucky coordinates: E. 2,150,200; N. 284,600 north zone. Measured by F. A. Schilling, Jr. and J. H. Peck, January 1973]

| | Thickness (feet) |
|---|---|
| Bull Fork Formation (incomplete): | |
| Upper member (incomplete): | |
| 9. Shale (about 65 percent) interbedded with limestone; poorly exposed. Limestone is mainly in thin beds but also occurs in a few, relatively resistant, thick beds; well-defined and obscure beds are intermixed. Flat brachiopod shells are common. . . . . | 44 |
| 8. Shale (about 50 percent) interbedded with limestone. Limestone is in indistinct thin beds. . . . . | 6 |
| Measured upper member (incomplete): . . . . . | 50 |
| Sunset Member: | |
| 7. Limestone (about 60 percent) interbedded with shale. Limestone, micrograined; in prominent, wavy to nodular medium beds . . . . . | 20 |
| Total Sunset Member . . . . . | 20 |
| Measured Bull Fork Formation (incomplete) . . . . . | 70 |
| Grant Lake Limestone: | |
| 6. Limestone (about 90 percent) interbedded with shale. | |

Grant Lake Limestone--Continued:

| | Thickness (feet) |
|---|---|
| Limestone, more microgranular than below; in poorly defined, very thin to thin irregular beds; contains abundant large platystrophid brachiopod . . . . . | 19 |
| 5. Limestone, medium- to coarse-grained; in medium-scale sets of crossbeds; more resistant than overlying and underlying units . . . . . | 3 |
| 4. Limestone (about 80 percent) interbedded with shale. Limestone is dominantly in poorly defined, irregular, very thin to thin beds; partly in conspicuous, well-defined, medium beds; contains abundant large platystrophid brachiopods throughout . . | 80 |
| Tate Member: | |
| 3. Limestone (about 75 percent) interbedded with shale. Limestone, micrograined; in irregular, nodular medium beds . . . . . | 8 |
| Total Tate Member . . . . . | 8 |
| 2. Limestone (about 70 percent) interbedded with shale. Limestone in poorly defined, irregular thin beds; contains large platystrophid brachiopods, common to abundant throughout . . . . . | 8 |
| Total Grant Lake Limestone . . . . . | 118 |
| Fairview Formation (incomplete): | |
| 1. Limestone (about 70 percent) regularly and closely interbedded with shale. Limestone is mostly in | |

Fairview Formation (Incomplete)--Continued:

| | Thickness (feet) |
|---|---|
| well-defined medium beds; in part in conspicuous medium sets of crossbeds. Less fossiliferous than above; flat brachiopods are sporadic; large platystrophid brachiopods are present in upper part. . | 35 |
| Total measured Fairview Formation (incomplete) . . . . . | 35 |

Section NE-5 Indian Creek

[Described from outcrops along road to Indian Creek about 3.4 mi southeast of Sunset, Fleming County, Kentucky (Hillsboro quadrangle): Kentucky coordinates: E. 2,148,400; N. 273,950, north zone. Measured by F. A. Schilling, Jr. and J. H. Peck, January 1963]

| | Thickness (feet) |
|---|---|
| Bull Fork Formation (incomplete): | |
| Upper member (incomplete): | |
| 8. Shale (about 75 percent) and limestone. Limestone is in well-defined, smooth, thin to medium beds; contains abundant fossils, chiefly rafinesquinid and strophomenid brachiopods; colonial corals in lower part | 60 |
| 7. Covered | 25 |
| 6. Shale (about 65 percent) and limestone. Limestone, argillaceous; in poorly defined, irregular thin beds; contains abundant fossils, chiefly hebertellid brachiopods | 53 |
| Measured upper member (incomplete) | 138 |
| Sunset Member: | |
| 5. Limestone (about 55 percent) and shale. Limestone, micrograined; mostly in resistant, irregular wavy to nodular medium beds; unfossiliferous. Some limestone in lower half of unit is in irregular, thin to medium beds similar to those in units 2 and 4; contains abundant large platystrophid brachiopods. | 27 |

Bull Fork Formation (incomplete)--Continued:

Sunset Member--Continued:

| | Thickness (feet) |
|---|---|
| Total Sunset Member | 27 |
| Measured Bull Fork Formation (incomplete) | 165 |

Grant Lake Limestone (incomplete):

| | |
|---|---|
| 4. Limestone (about 75 percent) and shale. Limestone is in poorly defined, discontinuous, irregularly nodular, very thin to thin beds; contains abundant large platystrophid brachiopods | 8 |
| 3. Limestone, medium-grained; a single bed; relatively unfossiliferous | 2 |
| 2. Limestone (about 75 percent) and shale. Limestone, as in unit 3 but also rarely in medium beds | 72 |

Tate Member (incomplete):

| | |
|---|---|
| 1. Limestone (about 75 percent) and shale. Limestone, dominantly micrograined, greenish-gray, interlayered with a few thin beds of limestone and shale similar to unit 2 | 3 |
| Measured Tate Member (incomplete) | 3 |
| Measured Grant Lake Limestone (incomplete) | 85 |

Section NE-6 Carpenter Quarry

[Described from exposures in Carpenter Quarry about 3 mi south of the center of Flemingsburg, Fleming County, Kentucky (Flemingsburg quadrangle); Kentucky coordinates: E. 2,146,400; N. 320,450, north zone. Measured by F. A. Schilling, Jr., and J. H. Peck, January 1963]

| | Thickness (feet) |
|---|---|
| Bull Fork Formation (incomplete): | |
| 5. Shale (about 75 percent) interbedded with limestone. Limestone is in even to uneven, thin beds; contains abundant brachiopods, chiefly hebertellids and small platystrophids | 20 |
| Measured Bull Fork Formation (incomplete) | 20 |
| Grant Lake Limestone (incomplete): | |
| 4. Limestone (about 60 percent) and shale. Limestone is in in irregular thin beds; probably bioturbated, contains hebertellid brachiopods | 10 |
| 3. Limestone, fine-to medium-grained, in even beds about 1.5 ft thick; apparently unfossiliferous; more resistant than overlying and underlying units | 6 |
| 2. Limestone (grading from about 80 percent at base to about 60 percent at top) and shale. Limestone is mostly in irregular, very thin to thin beds but also in even, medium beds | 15 |
| 1. Limestone (about 90 percent) and shale. Limestone, medium- to coarse-grained; in even beds 2 to 2.5 ft thick; | |

Grant Lake Limestone (incomplete)--Continued:

| | Thickness (feet) |
|---|---|
| contains abundant large platystrophid brachiopods; constitutes quarry rock. Base is floor of quarry . . . . | 18 |
| Total measured Grant Lake Limestone (incomplete) . . . . . | 49 |

Section Ne-7 Hillsboro South

[Described from temporary exposure in pipeline ditch on hill east of Kentucky Highway 111, about 1.5 mi south of Hillsboro, Fleming County, Kentucky (Hillsboro quadrangle): Kentucky coordinates: E. 2,166,700; N. 281,600, north zone. Measured by J. H. Peck and G. W. Weir, June 1965]

| | Thickness (feet) |
|---|---|
| Silurian: | |
| Brassfield Formation (incomplete): | |
| Dolomite, orangish-brown, mostly weathered to dark-red soil; fine to medium grained; some beds contain patches of white chert. Not measured . . . . . | |
| Ordovician: | |
| Drakes Formation: | |
| Preachersville Member: | |
| Mudstone (90 percent), bluish- to greenish-gray, weathers yellowish gray; stratification obscure; unfossilferous. Limestone, dolomitic and somewhat muddy, weathered yellowish gray and grayish orange; fine grained; in thin beds, mostly near top of unit; sparse molds of bryozoans(?) and fucoidal markings. Top placedat change in soil color from yellowish orange to dark red . . . . . | 73 |
| Bull Fork Formation (incomplete): | |
| Mudstone (60 percent) and limestone. Mudstone, greenish-gray. Limestone, fine- to medium-grained, in fairly even beds, several inches thick; abraded | |

Bull Fork Formation (incomplete)--Continued:

| | Thickness (feet) |
|---|---|
| fossils common. Top is transitional and arbitrary within a few feet. Several tens of feet temporarily exposed. Not measured. | |

Section NE-8 Maysville South

[Described from outcrops along and near Louisville and Nashville Railroad tracks about 3 mi south of Maysville, Mason County, Kentucky. (Orangeburg quadrangle): Kentucky coordinates: E. 2,146,400; N. 403,500, north zone. Measured by G. W. Weir and J. H. Peck, May 1964. Section previously described by Foerste (1912, p. 443)]

| | Thickness (feet) |
|---|---|
| Bull Fork Formation (incomplete): | |
| 3. Limestone (60 percent) and mudstone. Limestone, medium-light-gray (N6) to light-gray (N7); poorly to fairly well sorted; argillaceous, micrograined to very coarse grained but chiefly fine and medium grained with sparse to common coarse fragments of thin, flat shells of brachiopods and fragments of light-olive-gray, micrograined or argillaceous limestone; mostly in fairly even beds 1 to 3 in. thick; at top of unit is a conspicuous bed, 8 in. thick; common fragments of brachiopods and bryozoans, sparse whole thin flat brachiopods, including a strophomenid form, mostly in upper part of unit. Mudstone, greenish-gray (5GY6/1), crudely layered in sets, commonly 6 to 10 in. thick, which include some partings and lenticles of limestone. Basal set of beds of unit resistant, forms overhang. [Top of unit is top of exposure in minor gully in cut on west side of railroad tracks.] . . . . . | 13.5 |
| 2. Limestone (75 percent) and mudstone. Limestone of several types: Type A limestone (40 percent of unit), | |

Bull Fork Formation (incomplete)--Continued:

| | Thickness (feet) |
|---|---|
| light-greenish-gray (5G5/1), poorly sorted, micro-grained to medium-grained, averages fine-grained with coarse fossil fragments; contains fragmented and whole flat brachiopods, abraded cylindrical bryozoans, and dark-gray fragments of trilobites. Type B limestone (35 percent), medium-gray (N5) to medium-light-gray (N6), poorly sorted, very fine to very coarse grained, averaging about medium grained with many coarse fragments of fossils and patches of greenish-gray mudstone; fossils common, chiefly brachiopods (including abundant leptaenid brachiopods in limestone 10 to 11 ft above base), bryozoans, and gastropods. Limestone is in fairly even to rough-surfaced beds, 1 to 6 in. thick, alternating with seams of mudstone. Mudstone, greenish-gray (5G6/1); in seams and thin beds as much as 3 in. thick containing partings and lenticles of limestone; at top of unit is a mudstone set, about 8 in. thick, which forms recess . . . . . | 17.5 |
| 1. Limestone (50 percent) and mudstone; about 20 percent covered. Limestone of several types; Type A limestone (30 percent of unit), very light brownish gray (5YR7/1) to light-gray (N7); fine to very coarse grained, chiefly medium or coarse grained, fossil-fragmental; contains sparse irregular patches of grayish-yellow | |

| | Thickness (feet) |
|---|---|
| mudstone a fraction of an inch across; in somewhat irregular beds, mostly 1/2 to 3 in. thick, in sets, a few inches to a few feet thick but commonly about 2.5 ft thick near base; contains common to abundant whole and broken brachiopods including many jumbled large flat forms, common fragmented small cylindrical bryozoans, sparse to common small crinoid columnals; some fossils colored dark red by siderite(?); in some beds fossils weather out leaving molds; beds form thin, discontinuous ledges. Type B limestone (10 percent), poorly sorted, very fine to medium-grained, chiefly fine-grained; mostly in lensing beds, 1/2 to 2 in. thick and 1 to 2 ft long, interbedded with mudstone, also as irregular beds, 1 to 3 in. thick, interbedded with medium- and coarse-grained limestone of type A; fossils common, chiefly brachiopods as in type A. Type C limestone (10 percent), light-greenish-gray (5GY7/1), fairly well sorted, micrograined to fine-grained, chiefly micrograined; in fairly even beds, 1 to 5 in. thick, in part obscurely lamined; fossils sparse except for small ostracodes and trace fossils, which include "turkey tracks" (grooves about 1 in. wide and several inches long); fairly resistant, individual beds form thin ledges. Mudstone, greenish-gray (5G5-6/1), | |

Bull Fork Formation (incomplete)--Continued:

| | Thickness (feet) |
|---|---|
| weathers yellowish-gray (5Y8/1), or less commonly moderate brown (10YR5/2); in crude discontinuous thin laminae in partings and in thin sets, less than 6 in. thick, containing much fine-grained limestone; apparently unfossiliferous except in contained limestone. Top of unit placed at base of ledge. [Base of Bull Fork Formation is a few tens of feet below this exposure. All this exposure was apparently included in the Arnheim Formation of Foerste (1905) by Foerste (1912, p. 443)] . . . | 18 |
| Total measured Bull Fork Formation (incomplete) . . . . . | 49 |

Section NE-9 Sherburne South

[Described from outcrops along and near road to Pebble about 13 mi southeast of Sherburne, Bath County, Kentucky (Sherburne quadrangle); Kentucky coordinates: E. 2,131,750; N. 278,300, north zone. Section begins near junction with Kentucky Highway 1325 and continues northeasterly toward Pebble about 1.2 mi. Measured by J. H. Peck and G. W. Weir, July 1964]

| | Thickness (feet) |
|---|---|
| Bull Fork Formation (incomplete): | |
| Upper member (incomplete): | |
| 17. Limestone (80 percent) and shale. Limestone generally as in unit 16 but in rough-surfaced, wavy, horizontal beds, 1 to 4 in. thick, interlayered with shale; phosphatic; very fossiliferous, chiefly varied brachiopods and bryozoans, also sparse small, low-spired gastropods. Shale, greenish-gray (5G6/1), weathers light greenish gray (5GY7/1), limy; finely laminated in partings and irregular seams as much as 3 in. thick. Unit forms ledgy slope. Thickness estimated; top is top of exposure . . . . . | 10 |
| 16. Limestone, medium-gray (N5), weathers light gray (N7); fairly well sorted, medium and coarse grained with yellowish-gray streaks and blebs of argillaceous material and sparse to abundant fossil fragments. A single planar set of crossbeds, 1/4 to 1-1/2 in. thick, dipping westerly at a | |

Bull Fork Formation (incomplete)--Continued:

Upper member (incomplete)--Continued:

| | Thickness (feet) |
|---|---|
| low angle. Common to abundant abraded byrozoans; sparse brachiopods, mostly broken. Forms ledge . . . . | 1.5 |
| 15. Limestone, light-gray (N7) with abundant medium-gray (N5) fossil fragments, micrograined with coarse fossil fragments, argillaceous in upper part; in rough beds 1/2 to 1 in. thick with shaly partings in upper half of unit; lower part of unit is resistant and forms ledge, upper part rubbly weathering and forms minor recess. Very fossiliferous, chiefly abundant and varied brachiopods including a sparse to common leptaenid form in upper part; abundant varied bryozoans, and near base sparse to common wispy, brownish stromatolites . . . . . | 1.5 |
| Measured upper member (incomplete), approx . . . . . | 13 |
| Sunset Member: | |
| 14. Limestone (80 percent) and shale, poorly exposed in lower few feet. Limestone of two types: Type A (70 percent of unit), light-olive-gray (5Y6/1), light-brownish-gray (5YR6/1), and greenish-gray (5GY7/1), weathers various shades of yellowish brown (10YR6/2 to 10YR5/4); micrograined with streaks of fine grains; in irregular, knobby beds, 1 to 12 in. thick, lenticular in upper 3 ft of unit; contains | |

Bull Fork Formation (incomplete)--Continued:

Sunset Member--Continued:

| | Thickness (feet) |
|---|---|
| few megafosils but ostracodes and brownish, irregular ovoidal stromatolites, 1 to 3 in. thick and commonly 4 to 8 in. long, are abundant; contains sparse patches and streaks of fine to medium fragments of gastropods, brachiopods, and bryozoans. Type B limestone (10 percent of unit), medium-gray (N5), weathers medium light gray (N6), micrograined, argillaceous; in small lenses and partings interlayered with dark-gray shale in upper part of unit; contains very sparse, fine to medium fragments of brachipods. Shale, grayish-black (N2) to dark-gray (N3); very limy; laminated; in irregular wavy seams a fraction of an inch to a few inches thick, interlayered with lenses of micrograined limestone in upper 4 ft of unit. Shale, greenish-gray similar to that in unit 17, is probably interbedded with micrograined limestone in lower part of this unit. Top of unit forms minor but conspicuous recess . . . . . | 16 |
| Total Sunset Member. . . . . | 16 |
| Total measured Bull Fork Formation (incomplete), approx. . . | 29 |

Grant Lake Limestone:

13. Limestone, medium-bluish-gray (5B5/1), light-brownish-

| | | Thickness (feet) |
|---|---|---|
| | gray (5YR6/1) to light-olive-gray (5Y6/1), weathers same and medium light gray (N6); poorly sorted, fine to coarse grained and micrograined to fine grained, argillaceous; contains large (as much as 12 in. across) ovoidal, brownish stromatolites, some lined with coarse calcite fillings; sparse to common abraded brachiopods, gastropods, bryozoans, and crinoid columnals in a single rough-surfaced bed with no apparent internal lamination or partings; resistant, forms prominent rounded ledge. [Described from outcrop on north side of road on east side of hill toward Pebble.] . . . . . | 1.5 |
| 12. | Mostly covered. About 1 ft of outcrop 1 ft below top of unit is rubbly-weathering, nodular-bedded, micrograined limestone similar to unit 11. . . . . | 11.5 |
| 11. | Limestone, light-bluish-gray (5B7/1) to greenish-gray (5G6/1), weathers yellowish gray (5Y7/2) to light bluish gray, very poorly sorted, micrograined to fine-grained, argillaceous, fossil-fragmental; in nodular beds, 1 to 6 in. thick (common in lower 1/3 of unit), and in irregular beds, as much as 2 in. thick (common in upper 2/3 of unit; weathers to rubble.) Shale, less than 5 percent, is similar to shale below; in partings and very thin seams. Unit | |

| | Thickness (feet) |
|---|---|
| is fossiliferous; chiefly abundant varied brachiopods including large hebertellid, rafinesquinid, and platystrophid forms; also common to abundant are branching and fan-shaped bryozoans, and small, low- and high-spired gastropods. About 23 ft above base of unit is a conspicuous ledge-forming bed, about 1 ft thick, of fine-grained, argillaceous, and coarsely fossil-fragmental limestone; contains abundant bryozoans and brachiopods (including a large platystrophid); weathered outcrop yields slabs. About 60 ft above base of unit is a conspicuous ledge-forming bed, 8 to 18 in. thick, of limestone, medium-bluish-gray (5B6/1), weathers dusky yellow (5Y6/4), medium- to coarse-grained, well-sorted, slightly phosphatic; locally contains small pods of greenish-gray (5G6/1), argillaceous material; contains sparse fragmented brachiopods and bryozoans; weathered outcrop yield slabs. Unit as a whole forms moderate, rubble-covered slope, interrupted by minor ledges. Thickness approximate; adjusted for dip component of about 20 ft along traverse. [Described chiefly from outcrops along south side of road; offset on level line at 170 ft. Excellent exposures of upper 2/3 of unit on north side of road on east side of hill toward Pebble.]. . . . . | 100 |

Grant Lake Limestone--Continued:

| | Thickness (feet) |
|---|---|
| Tate Member: | |
| 10. Limestone, light-greenish-gray (5G7/1) with streaks of a grayish-green clay mineral; micrograined; a single bed forming a conspicuous ledge; very sparsely fossiliferous, streaks and pockets of fragments of brachiopods(?) and bryozoans. [Described from cut on north side of road at elevation of about 810 ft.] . . . . . | 1.5 |
| Total Tate Member . . . . . | 1.5 |
| 9. Limestone, light-bluish-gray (5B7/1) to medium-bluish-gray (5B5/1) with greenish-gray (5G6/1) streaks, fine-grained, argillaceous, similar to type D limestone of unit 6, grading upward to micrograined about 11 ft above base of unit. In rough, nodular beds, 2 to 4 in. thick, more thinly and less definitely bedded near top; weathers to form rubbly, fossil-strewn slope. Very fossiliferous as in unit 11. [Described from cuts on north side of road.] . . | 26 |
| Total Grant Lake Limestone . . . . . | 140.5 |
| Fairview Formation: | |
| 8. Limestone (75 percent), shale (15 percent), and siltstone. Limestone of diverse types; most distinct are: Type A limestone (40 percent of unit), light-bluish-gray (5B6/1), fine-grained, fossil-fragmental | |

| | Thickness (feet) |
|---|---|
| (chiefly jumbled flat brachiopod shells); contains pods and stringers of greenish-gray (5G6/1), yellowish-gray, weathering, argillaceous material; in resistant, ledge-forming beds, a few inches thick; dominant fossils are abraded brachiopods and crinoid columnals; bryozoans sparse. Type B limestone (20 percent of unit), medium-bluish-gray (5B5/1), weathers moderate yellowish brown (10YR5/4), silty, very fine grained; in lensing beds as much as 6 in. thick, in part laminated; contains sparse bryozoans. Type C limestone (about 15 percent of unit, mostly in upper 10 ft of unit), light-bluish-gray (5B7/1) to pinkish-gray (5YR7/1); medium- to coarse-grained matrix enclosing abundant whole and fragmented fossils; contains greenish-gray (5GY6/1) streaks and pods of argillaceous material. Shale and siltstone, similar to shale and siltstone below, in thin beds and partings. Unit characterized by irregular to even beds, 1/2 to 6 in. thick; moderately resistant, forms ledgy slope. Unit is very fossiliferous: abundant crinoid columnals, bryozoans, and thin flat brachiopods; large platystrophid brachiopods common in top 15 ft of unit in type C limestone. [Described partly from cuts | |

Fairview Formation--Continued:

| | Thickness (feet) |
|---|---|
| on north side of road. Offset to north side of road on level line at 22 ft above base.]. . . . . | 28 |
| 7. Covered . . . . . | 22 |
| 6. Limestone (75 percent) and shale. Limestone of several types: consists chiefly of types A (35 percent of unit); and B (about 15 percent of unit) described in unit 8; also type D limestone (about 15 percent of unit), light-grayish-orange (10YR8/4), weathers yellowish gray (5Y7/2); argillaceous, very fine grained with fine to coarse fossil fragments; contains abundant bryozoans, brachiopods and crinoid columnals; mostly in irregularly lensing beds, 1/2 to 4 in. thick, but partly in rough planar sets, 4 to 6 in. thick, of wavy cross-laminae 1/4 to 1 in. thick; also type E limestone (10 percent of unit); consists of fine-grained matrix and fine to coarse fossil fragments and stringers and pods of argillaceous material; in rough beds 1/2 to 2 in. thick in a ledge-forming set about 2 ft thick, near top of unit. Shale similar to shale described below. [Described from cuts on south side of road.] . . . . . | 15 |
| Total Fairview Formation . . . . . | 65 |

| | Thickness (feet) |
|---|---|
| Kope Formation (incomplete): | |
| 5. Shale (40 percent), siltstone (30 percent), and limestone. Shale, similar to shale below. Siltstone, generally similar to siltstone below, in places grades into fine-grained silty limestone; mostly in uneven beds 2 to 6 in. thick; discontinuous bed with ball-and-pillow structure at 21 ft above base; sparse brachiopods, common to abundant trace fossils on bedding planes. Limestone is about equally divided between types A and B described in unit 8; in lensing beds 1/2 to 6 in. thick. [Described from cuts on south side of road.] . . . | 11 |
| 4. Covered . . . . . | 8 |
| 3. Siltstone (70 percent), shale (20 percent), and limestone. Siltstone, moderate-yellowish-brown (10YR5/4), weathers yellowish gray (5Y7/2); limy; at base in contorted bed as much as 2 ft thick, at top in uneven bed as much as 16 in. thick; forms rounded ledge; no megafossils noted. Shale, similar to shale below; in irregular sets between beds of siltstone and limestone. Limestone, similar to type B limestone described in unit 8; in lensing bed as much as 4 in. thick; contains small, coarsely ribbed brachiopod. [Described from outcrop along stream; offset at top of unit southerly by level line to road.] . | 3 |

Kope Formation (incomplete)--Continued:

| | Thickness (feet) |
|---|---|
| 2. Shale (60 percent), mostly covered, and limestone with minor siltstone. Shale, similar to shale in unit 1; mostly covered. Limestone, chiefly types A and B described in unit 8; type A limestone (25 percent of unit) has large oscillation ripple marks with wave lengths of more than 12 in. on beds about 18 ft above base; type B limestone (15 percent of unit) contains sparse flat brachiopods oriented parallel to bedding, and has small current ripple marks on beds in upper part of unit; type D limestone, as described in unit 6, present in minor amounts interbedded with shale in top 3 ft of unit. Siltstone, limy, similar to siltstone below; trace fossils ("worm" tracks) common on bedding surfaces. Unit poorly exposed; most outcrop is thin beds of type A limestone interlayered with partings of shale and thin beds of siltstone; prominent ledge of limestone, 2.5 ft thick, at 17 ft above base of unit. Small platystrophid brachiopod common in float, probably from this unit. [Lower part of unit described from outcrops in cuts on south side of road; at 17 ft above base section offset on level line to outcrops along stream.] . . . . . | 36 |
| 1. Shale (60 percent), limestone (30 percent), and | |

Kope Formation (incomplete)--Continued:

| | Thickness (feet) |
|---|---|
| siltstone. Shale, dusky-olive-brown (5Y5/4), weathers yellowish gray (5Y7/2); limy; roughly laminated ; nonresistant, weathered outcrop yields chips and plates. Siltstone, light-olive-gray (5Y6/1), weathers moderate yellowish brown (10YR5/4); limy; in beds as much as 8 in. thick; punky weathering. Limestone is of several types: type A (about 20 percent of unit) and type B (about 10 percent of unit), as described in unit 8, are dominant; type D limestone, as described in unit 6, is in lens about 6 in. thick in shale near top of unit. Prominent ledge of type A limestone, about 1.5 ft thick, at 10 ft above base. [Described from first roadcut on road to Pebble. Top mostly covered. Offset easterly along road on level line.] . . . . . | 17 |
| Total measured Kope Formation (incomplete) . . . . . | 75 |

Section NE-10 Dorcas Cooper No. 1

[Described from core of Cominco American Co. Dorcus Cooper No. 1 drill hole, core no. C208 in core library of the Kentucky Geological Survey; footage: 20 to 2,901 ft; Mason County, Kentucky (Orangeburg quadrangle): Kentucky coordinates: E. 2,164,800; N. 379,500, north zone; Carter coordinates: 11-Y-70. Logged by G. W. Weir, W. L. Peterson, and W C Swadley, 1977]

| Footage at Base | | Thickness (feet) |
|---|---|---|
| | Grant Lake Limestone (incomplete): | |
| 51 | A. Limestone and shale: Limestone (80 percent), medium- to light-gray, poorly sorted; micrograined to coarse grained; in nodular beds; contains abundant fossils, many whole fossils, chiefly brachiopods, bryozoans, many with algal(?) coatings. Shale, greenish-gray; laminated; intermixed with limestone in irregular layers, 1/4 to 4 in. thick. . . . . | 31 |
| 67 | B. Limestone (90 percent) and shale. Similar to unit A but mostly in even beds, partly in nodular beds; common algal(?) coatings. . . . . | 16 |
| 147.5 | C. Limestone (90 percent) and shale. Similar to unit A except shale is in irregular layers less than 1 in. thick . . . . . | 80.5 |
| | Measured Grant Lake Limestone (incomplete) . . . . . | 127.5 |

| Footage at Base | | Thickness (feet) |
|---|---|---|
| | Fairview Formation: | |
| 217 | D. Limestone (60 percent) and shale. Limestone, light- to medium-gray, very fine to coarse-grained with coarse fossil fragments; mostly in even beds, 4 to 18 in. thick. Shale, light-greenish-gray, calcareous; in laminae and a few nodular thin beds. Brachiopods and bryozoans abundant . . . . . | 69.5 |
| | Total Fairview Formation . . . . . | 69.5 |
| | Kope Formation: | |
| 519.7 | E. Shale (70 percent) and limestone. Shale is in even layers as much as 10 ft thick. Limestone, micrograined and fine grained with abundant coarse fossil fragments; mostly in even beds 1 to 12 in. thick. . . . . | 302.7 |
| | Total Kope Formation . . . . . | 302.7 |
| | [Note: End of log is not end of core. Top of Middle Ordovician Tyrone Limestone is at depth of 802 ft.] | |

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