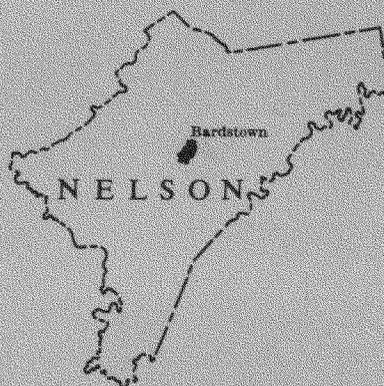


GEOLOGICAL SOCIETY OF KENTUCKY
FIELD TRIP
1959

Stratigraphy of Nelson County and
Adjacent Areas



By
Edmund Nosow



KENTUCKY GEOLOGICAL SURVEY

STRATIGRAPHY OF NELSON COUNTY AND ADJACENT AREAS

by

Edmund Nosow

**Prepared by
Kentucky Geological Survey
Lexington, Kentucky**

**for
Geological Society of Kentucky Field Trip
May 8-9, 1959**

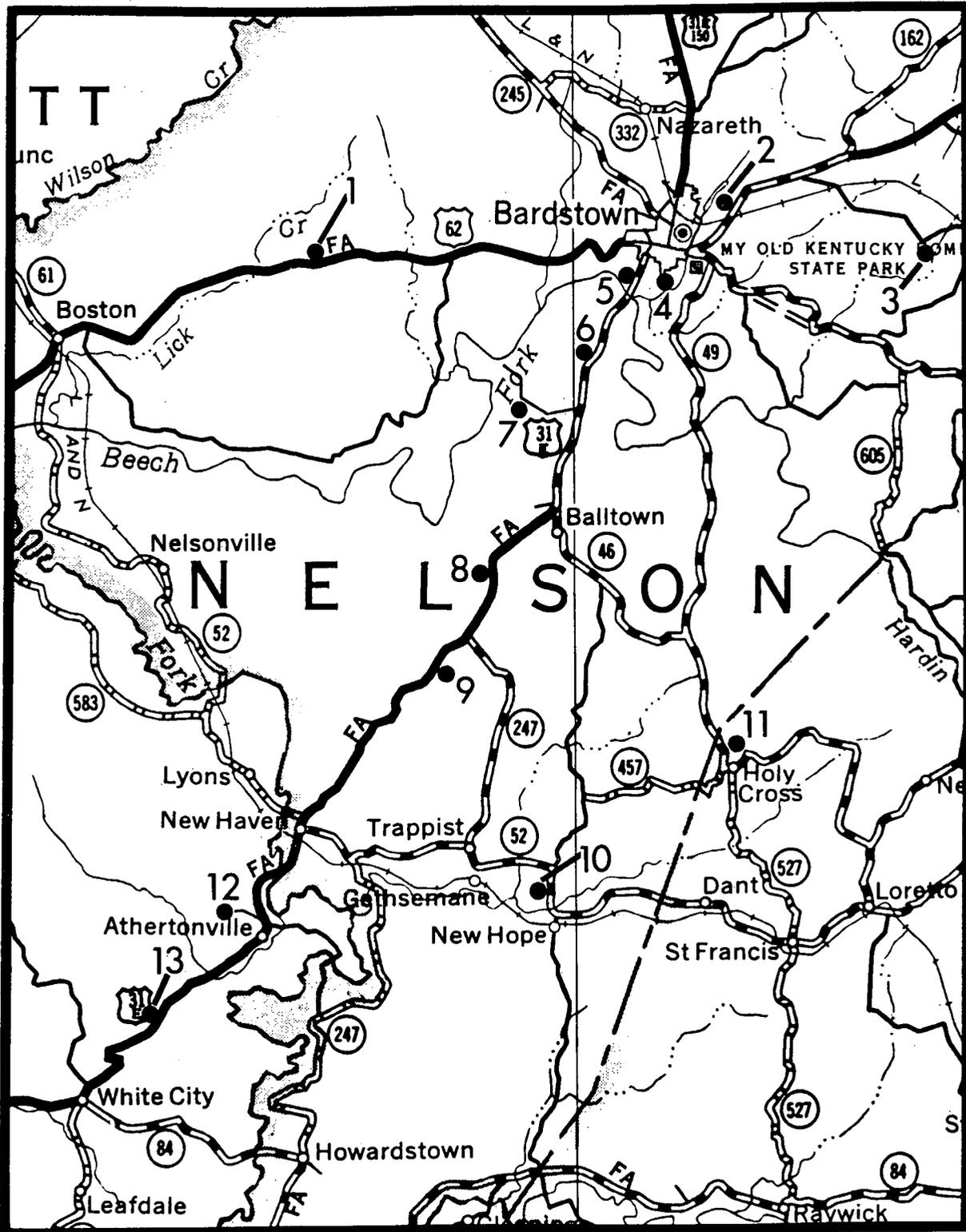
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ROUTE MAP



● — | Scheduled Stops



Fig. 1

INTRODUCTION

The main objective of the present field trip is to acquaint the participants with the stratigraphic section from Upper Ordovician through Lower Mississippian in Nelson County. Included are those formations which are yielding large amounts of oil and gas and which are being restudied of late for additional oil and gas possibilities in Central Kentucky. Silurian strata exposed on the west side of the Cincinnati Arch can best be seen in Oldham, Jefferson, Bullitt, and Nelson Counties, and can be traced into the subsurface to the west and south. Excellent exposures east and south of Bardstown influenced the selection of the headquarters site. Bardstown proper is located on the Laurel and Waldron formations, and the east, west, and south edges of town are drained by Beech Fork River and its tributaries Buffalo Creek and Stewarts Creek which expose essentially the same sequence of beds from the Silurian Laurel formation down to the Upper Saluda formation.

A short distance west and south of town Lower Mississippian beds can be seen. Ordovician, Silurian, Devonian, and Lower Mississippian strata have been of prime interest to the oil prospector in the area just west of the Cincinnati Arch, and it is hoped that some benefit will be derived from viewing these beds in an area close to where they produce oil and gas at shallow depths.

PHYSIOGRAPHIC SETTING

The field trip area lies between two major physiographic provinces and has affinities, in part, with both the Lexington Plain and the Highland Rim. The latter has been described as a young to mature plateau of moderate relief, whereas the former has been characterized as a mature to old plain on weak rocks which is trenched by its main rivers.

Northward in Indiana the area which is underlain by beds of Silurian and Devonian age makes up the Muscatatuck Regional Slope and extends from Ordovician limestones and shales westward to the Knobstone Escarpment. This is comparable to the physiographic setting of northern Kentucky and the Indiana nomenclature has been used to describe Jefferson County and areas to the south.

It has been argued that the similarity is superficial and that the Indiana and Kentucky areas are too dissimilar to include them in the same province, the Indiana area having been subjected to an erosional cycle which altered the appearance of a young till plain, and changed the drainage completely.

If we must describe the area between the Lexington Plain and the Highland Rim in Kentucky it might be advisable to coin a new descriptive term suitable to this unique setting.

Generalized Stratigraphic
Section of Jefferson County
by Butts (1914)

Stratigraphic Section of
This Report, Stockdale (1939),
and Others

Meramec	Spergen ('Salem')	Salem
	Warsaw ('Harrodsburg')	Harrodsburg
	Holtsclaw	Muldraugh Floyds Knob
MISSISSIPPIAN		
Osage	Rosewood	Brodhead
	Kenwood	
	New Providence	New Providence (restricted)
Upper	New Albany	New Albany
DEVONIAN		
Middle	Sellersburg	Silver Creek
	Jeffersonville	Beechwood
	Louisville	Jeffersonville
SILURIAN	Waldron	Louisville
	Laurel	Waldron
	Osgood	Laurel
	Brassfield	Osgood
		Brassfield
ORDOVICIAN	Saluda	Upper Whitewater (Hitz) Saluda Lower Whitewater
	Liberty	Liberty
	Richmond	Blanchester Clarksville Ft. Ancient
	Waynesville	
	Arnheim	Oregonia Sunset

FORMATIONAL CHARACTERISTICS

The principal formations to be seen will encompass the interval from the Upper Ordovician Waynesville to the Lower Mississippian St. Louis, but our main attention will be focused on the Silurian-Devonian strata which outcrop in roadcuts and quarries within a six or seven mile radius of Bardstown. Approximately two miles north of Bardstown Ordovician strata appear on the surface; on the east, the Washington-Nelson County line is near the contact of the Ordovician and Silurian. The western edge of Nelson County lies in the Knobs region and exposes Upper Devonian and Lower Mississippian beds as does the southern third of the county.

Bardstown is situated on the Laurel dolomite and the exposures seen along the principal drainage lines west, south, and east of town are essentially the same.

ORDOVICIAN: The Saluda limestone is exposed at stream level in several of the exposures studied and consists of massive greenish to bluish earthy limestone, which usually has a 4 to 5 foot mudstone layer at the top which carries abundant Tetradium corallites. The uppermost 6 inches to 1 foot consists of a streaked earthy limestone which is identified as the Hitz member of the Saluda, according to the terminology of Butts (1914). Present day terminology places the Saluda as the middle member of the Whitewater formation and the Hitz member is considered to be in the Upper Whitewater. The Hitz member is a fairly consistent horizon from Jefferson County southward, and carries an interesting molluscan fauna, peculiar to it. The complete section of the Saluda is

not observed on the field trip, but the maximum thickness seen is 25 feet.

SILURIAN: The Brassfield overlies the Saluda unconformably and is difficult at times to distinguish from the Upper Saluda, particularly when the Hitz is not clearly discernible. The Brassfield apparently reaches a maximum thickness of 36 feet in Nelson County, and the predominantly massive bedding of this dolomite lends itself to quarrying operations. The abundant glauconite, and other iron-bearing constituents cause it to weather a yellow, brown, or green color, and impart the characteristic color to it which has produced the name "Yellow Cap" in the subsurface. Chert is often abundant, particularly in the lower beds.

The Osgood formation is between 45-50 feet thick and contains thin limestones at its base alternating with shale beds; then in ascending order, some red shale, followed by green shale, with additional thin limestones and shales in contact with the Laurel. The upper limestone-shale zones carry a distinctive Whitfieldella-Spirifer brachiopod fauna. The Osgood in south-central Kentucky has been referred to as the Crab Orchard division of the Niagaran, and consists of the Plum Creek clay, Oldham limestone, Lulbegrud clay, an unnamed limestone, Waco limestone, and Estill clay. It is considered basal Niagaran in age, and is present consistently from southern Indiana to Tennessee.

The Laurel formation is a thick bedded, fairly massive, blue-gray dolomite and is the principal quarry rock in the Bardstown area. The

maximum thickness exposed in the local quarry faces is 23 feet, although the overall thickness is slightly in excess of this. The uppermost zones on exposure dry out, and become crumbly, so their use as a quarrying material is limited. The consistent oolite zone at the top of the Laurel is an excellent marker both in subsurface and surface identification; on outcrop this zone contains abundant Schuchertellas. In at least one quarry in the area Calymene niagarensis is common, but fossils generally are not extensively found here.

The Waldron shale is not well exposed in the area and its position is ordinarily marked by a yellow shale bank. Where observed fresh on outcrop, it is a greenish-gray color, and usually does not exceed 10 feet in thickness. One outcrop on the trip shows the shale wedging out completely within a short lateral distance. Although the shale is abundantly fossiliferous in Indiana, it loses most of its faunal assemblage in Kentucky, but a few occasional fossils are sometimes found in it.

The Louisville limestone which is so well exposed in Jefferson and Bullitt Counties has little representation in that part of Nelson County studied in the itinerary. It is a coarsely crystalline, very fossiliferous limestone which has been identified only at one outcrop in the field trip area. It is fairly thick in southern LaRue County in the subsurface (40 feet), but apparently disappears, in part, somewhere between Bullitt and LaRue Counties and then reappears southward.

DEVONIAN: There is apparently a major unconformity between the uppermost Silurian and the Devonian throughout central Kentucky. Most of the outcrops observed in the field trip area show the Beechwood limestone resting

on the Waldron shale, except for the one outcrop where the Louisville limestone intervenes. The Beechwood is a coarsely crystalline, crinoidal, very fossiliferous formation with a maximum 11 feet being exposed near Bardstown. The common Dolatocrinus calyces and other identifiable coralline and crinoidal material make it extremely easy to identify.

The New Albany black shale which rests on the Beechwood will be observed at several stops. Campbell (1946) described the Devonian-Mississippian shale relationships in detail and 2 charts showing the stratigraphic relationships at New Albany, Indiana, and in Estill County, Kentucky, are presented in detail.

MISSISSIPPIAN: Two Lower Mississippian sections will be studied on the second day of the field trip, and the terminology used by Stockdale (1939) in describing these sections will be adhered to. The Muldraugh Escarpment section and the Athertonville section will demonstrate some of Stockdale's subdivisions which may be found in the Knobs region of Nelson County, beyond the Siluro-Devonian belt.

ROAD LOG

Friday, May 8, 1959

Assembly Point: The group will board busses on the square at Bardstown, near the Old Talbott Tavern.

Mileage

- 0.0 Leave west end of square (Highway 62) and proceed west.
- 0.4 Jones Home Restaurant and Old Kentucky Home Motel.
- 0.8 Start to descend hill; Laurel.
- 0.9 Osgood-Brassfield contact.
- 1.0 Saluda.
- 1.1 Saluda-Brassfield contact.
- 1.5 Sideroad on right.
- 2.1 Descend hill.
- 2.3 Laurel and Osgood.
- 2.6 Buffalo Creek.
- 2.9 Top of hill is Laurel dolomite. Highland Rim can be seen.
- 4.1 Sideroad on right.
- 4.6 Highway 733 on left.
- 4.8 Abandoned quarry on left.
- 4.9 Laurel.
- 5.3 Osgood-Laurel contact.
- 5.4 Cedar Creek
- 5.5 Brassfield outcrop.
- 6.9 Beechwood and Louisville.

Stop 1

7 miles west of Bardstown
on Highway 62

Note:
Beechwood reaches 10.5'
maximum at east end
of section.

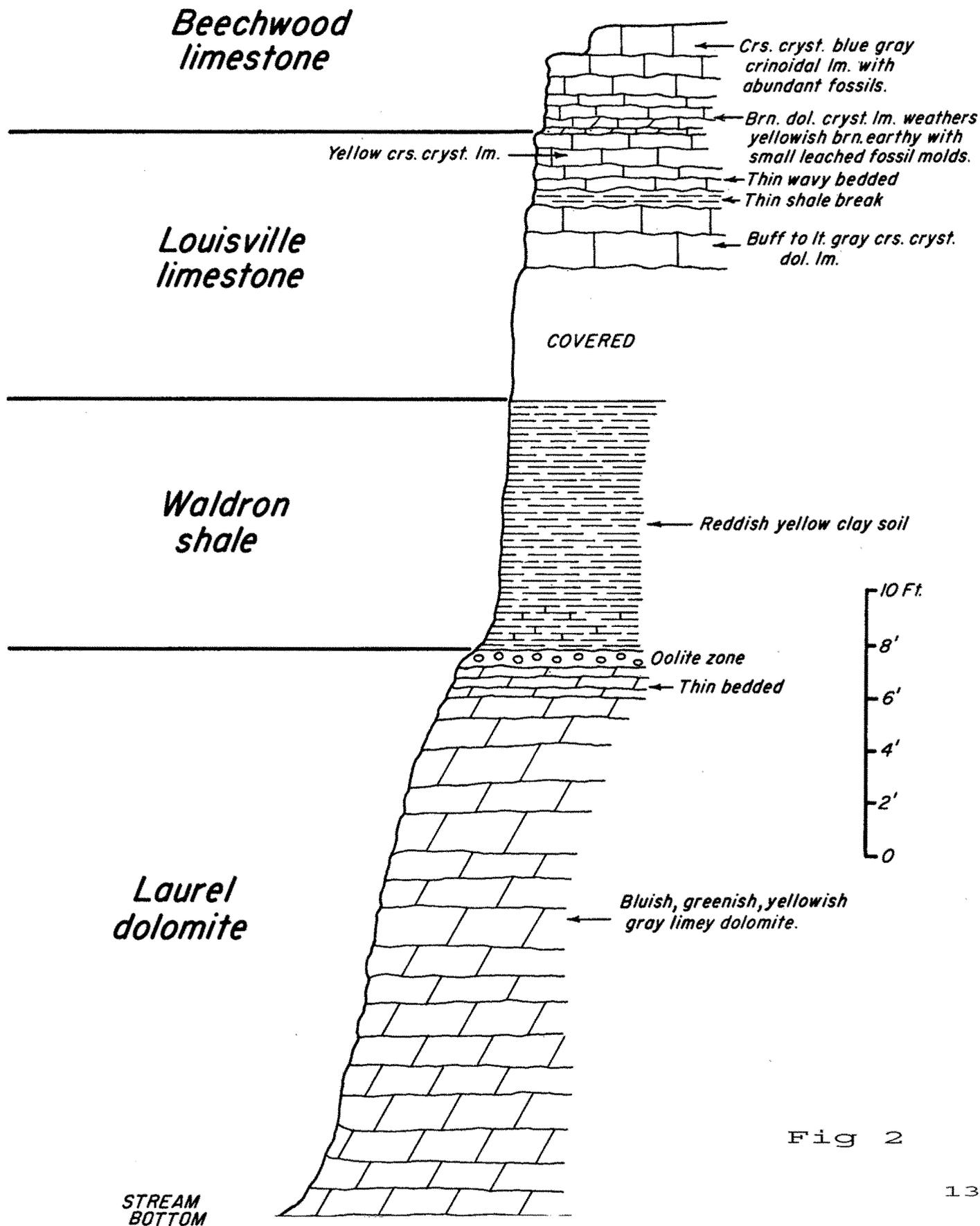


Fig 2

- 7.0 Sideroad left. Busses will turn around.
- STOP 1. Beechwood outcrop.
- 7.3 Laurel dolomite.
- 7.8 Sideroad on left. Waldron shale bank is overlain by Beechwood limestone. New Albany shale is exposed showing 4-inch thick sandstone beds, probably Lower Blackiston (see Campbell's correlation charts).
- 8.5 Descend hill; abandoned Laurel quarry on left.
- 8.65 Creek and bridge.
- 9.4 Highway 733.
- 11.0 Sideroad on right, descend hill.
- 11.2 Saluda-Brassfield contact just below bend to right. Saluda down to creek.
- 11.45 Buffalo Creek.
- 11.65 Bend on right.
- 11.7 Osgood and Laurel on left.
- 12.5 Bend right, descend; to left, abandoned quarry at 12.7 in Brassfield. Sharp bend to left exposes Hitz to best advantage. Tetradium found in mudstone underlying Hitz.
- 13.7 Jones Home Restaurant.
- 14.1 East end of square; proceed east and turn left at intersection of Highway 62 and 150, towards Bloomfield.
- 14.9 Wickland, home of 3 governors.
- 15.6 Quarry entrance.
- STOP 2. Geohagen-Mathis Quarry, 1 1/2 miles north of Bardstown on Highway 62. This is a typical quarry operation in the Laurel dolomite, and the stop is mainly to observe the bedding and lithology of the Laurel. Calymene trilobites are common in some layers.
- 16.7 Enter highway and turn left.

Stop 2
Geohagen-Mathis Quarry
1.5 mi. N. of Bardstown, Highway 62

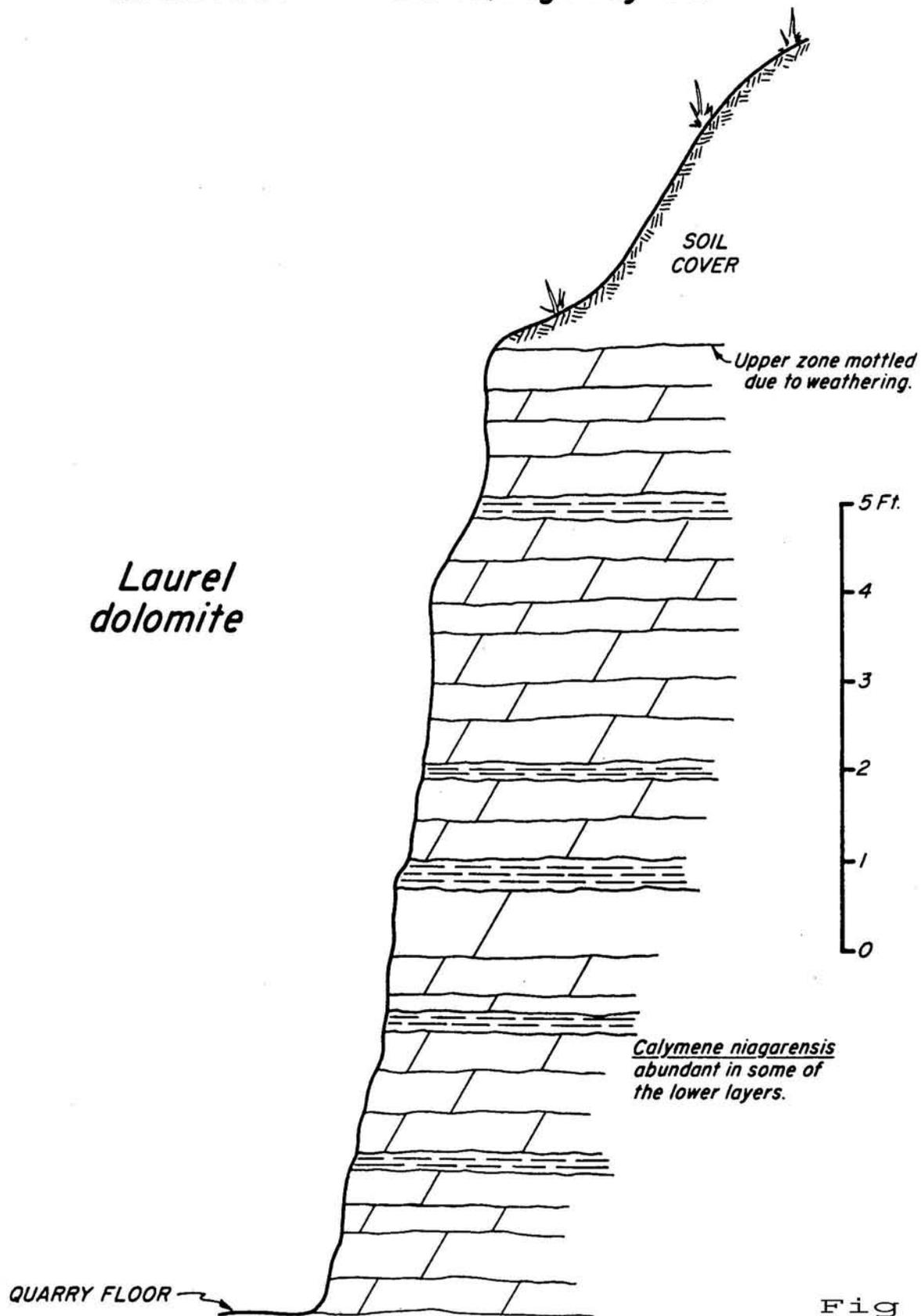
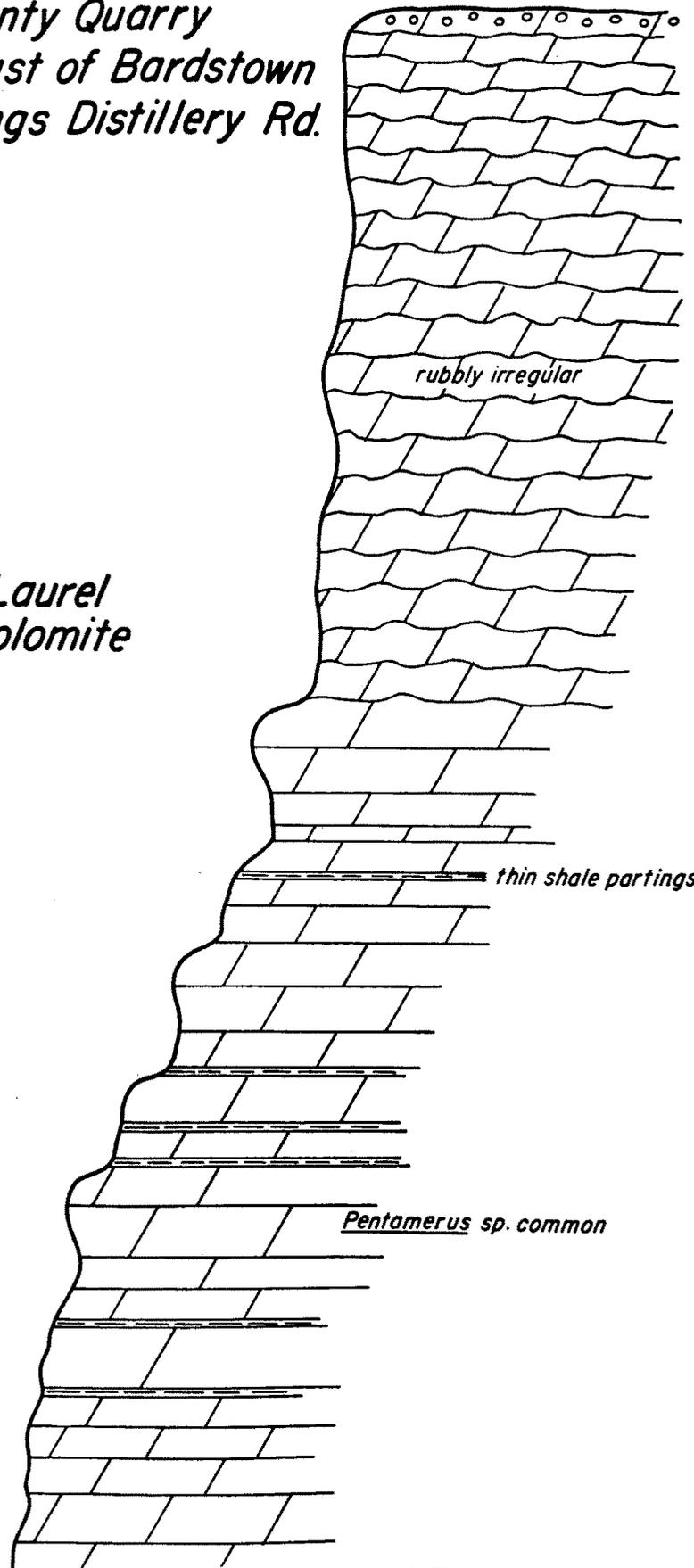


Fig 3

- 18.2 Turn right onto Double Springs Distillery road.
- 18.9 Railroad; outcrop is Laurel.
- 19.2 Abundant chert banks present represent weathered Beechwood. In immediate area chert is resting on either Laurel or weathered yellow Waldron.
- 20.5 Chert bank on Waldron shale.
- 20.6 Bend left, quarry on right.
- STOP 3. Old County Quarry represents an abandoned Laurel quarry. Turn around and retrace route to square at Bardstown.
- 26.0 West end of square. Proceed to first stop light and turn left on South Fourth Street.
- 26.8 STOP 4. Old Rock Quarry south of Bardstown. The Saluda limestone can be seen along road just beyond quarry. The Hitz member resting on the Saluda Tetradium zone is exposed below the quarry floor level.
- 27.5 Turn to Highway 62, turn left 2 blocks and south on Highway 31E.
- 28.5 Park on north side of bridge. STOP 5, one mile south of Bardstown. Proceed southward.
- 29.0 Abandoned Laurel quarry on left.
- 30.5 STOP 6, Silurian-Devonian contact. The upper part of this exposure has Beechwood limestone with abundant Dolatocrinus plates and calyces present. Cystiphyllum, Favosites, Eridophyllum, Syringopora and other corals have been found at this outcrop, in addition to numerous brachiopods such as Rhipidomella, Tropidoleptus, and Spirifer (several species). (See faunal list of Macke from Speed, Indiana.) Note the Waldron shale wedges out completely here, and the Lower Beechwood rests on the Laurel directly. Proceed southward.
- 31.7 Turn right into Nelson County Quarry road.
- 33.3 STOP 7, New Nelson County Quarry. The New Albany shale is resting on Beechwood, which in turn overlies the Laurel dolomite which is being quarried.
- 40.0 Turn onto highway and proceed south.
- 42.7 Start of Ordovician section.

Stop 3
Old County Quarry
5.4 miles east of Bardstown
Double Springs Distillery Rd.

**Laurel
dolomite**



Oolite zone
Schuchertella
abundant

rubbly irregular

thin shale partings

Pentamerus sp. common

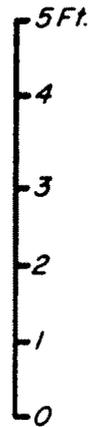
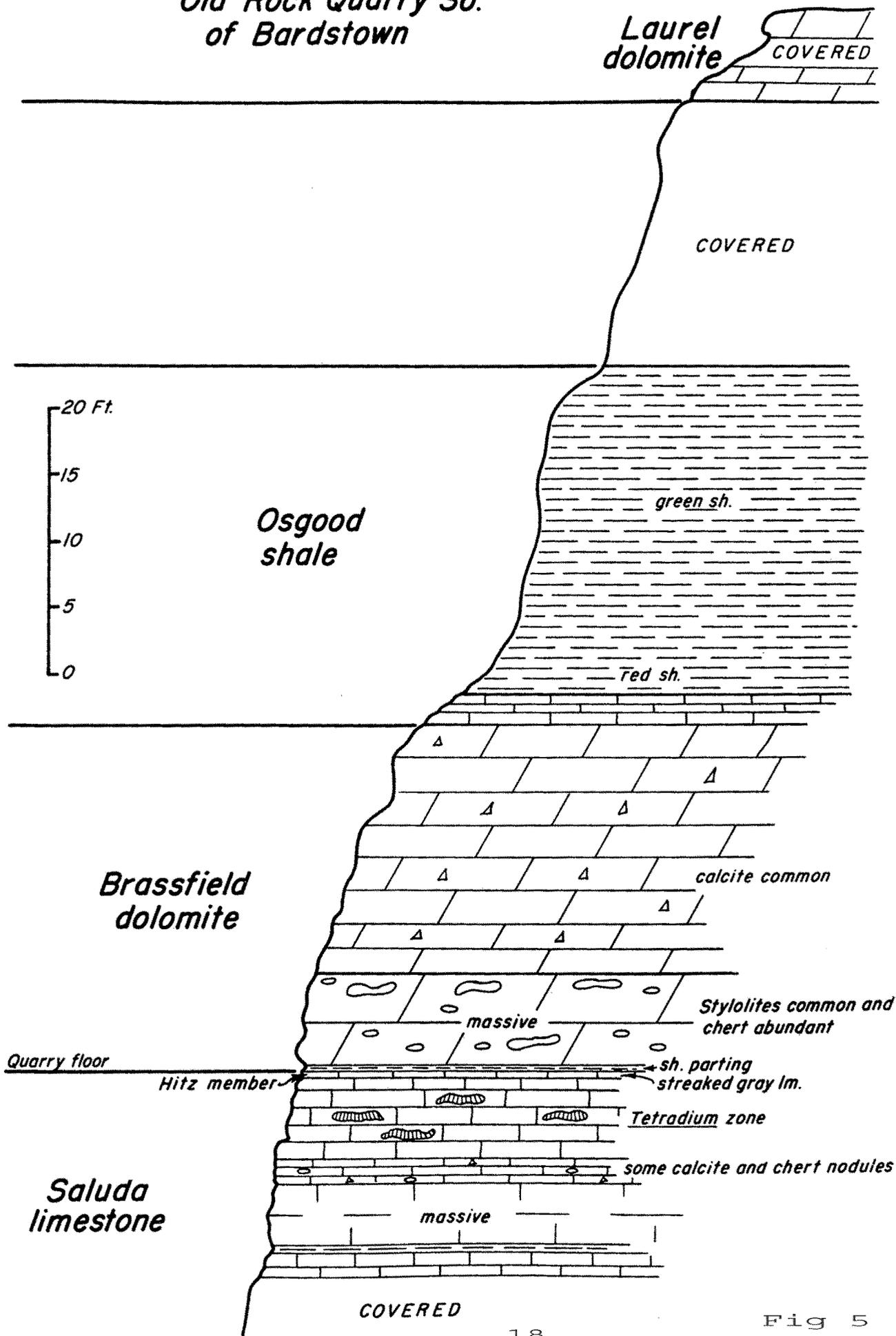


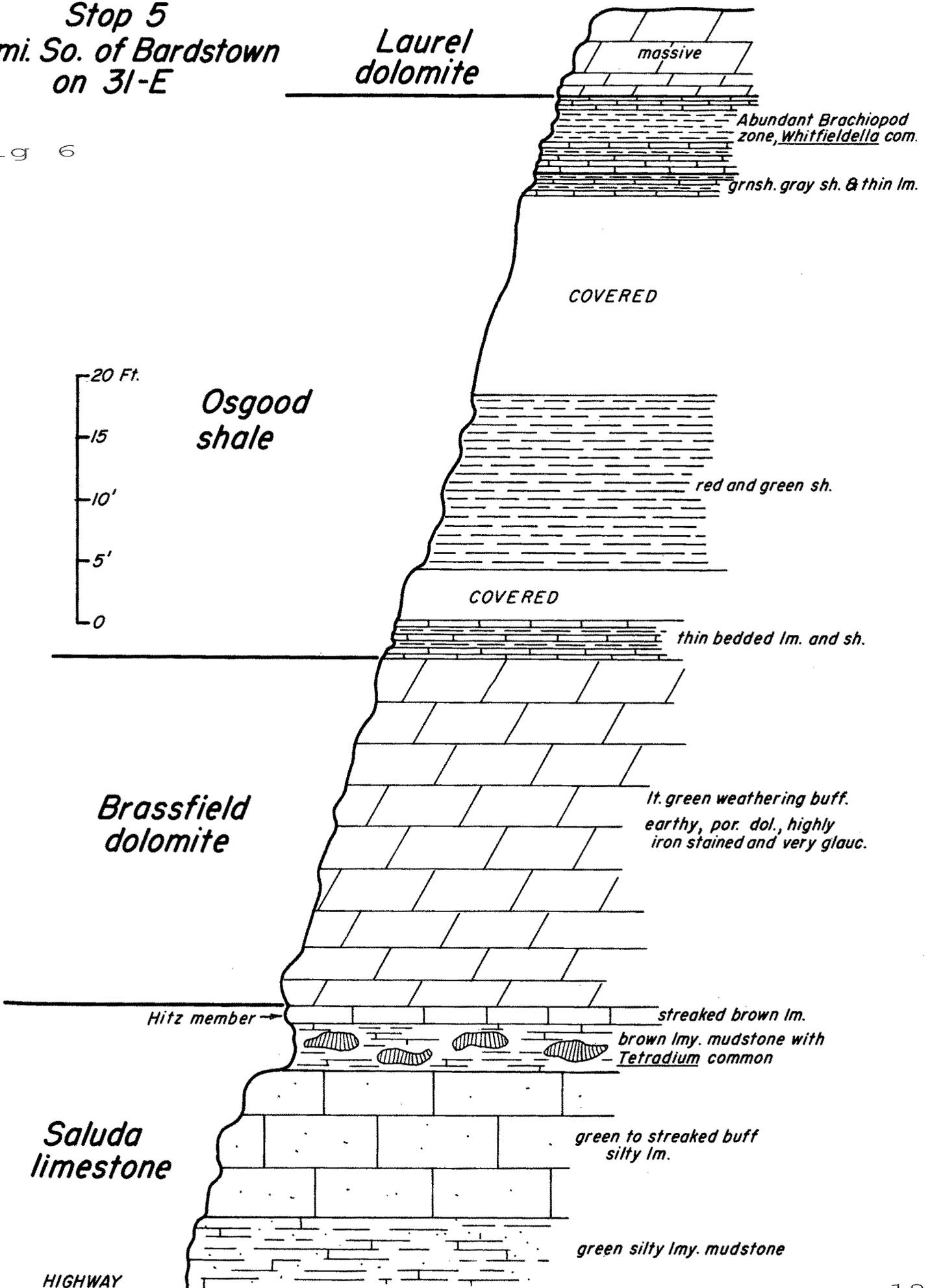
Fig 4

Stop 4
Old Rock Quarry So.
of Bardstown



Stop 5
1 mi. So. of Bardstown
on 31-E

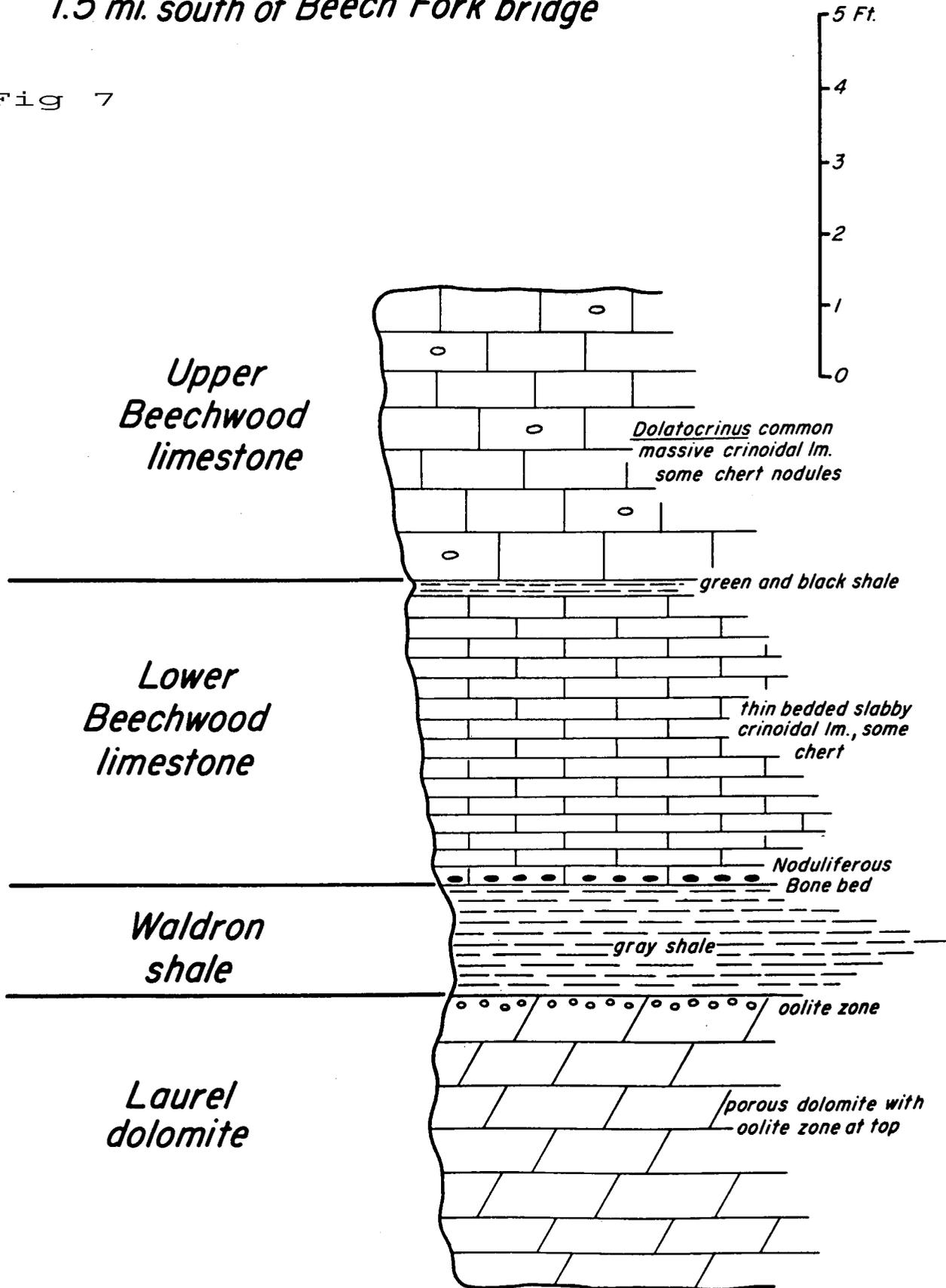
Fig 6



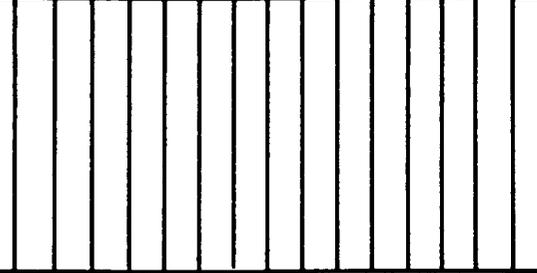
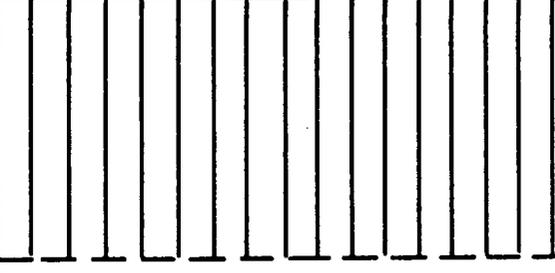
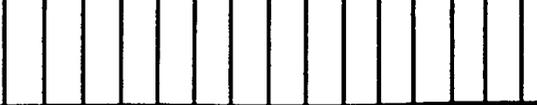
Stop 6

Beechwood exposure on 31E
1.5 mi. south of Beech Fork bridge

Fig 7



Middle Devonian Correlation Chart

		New York Schuchert, 1943	Speed, Indiana Macke, 1952
H A M I L T O N	TULLY		NEW ALBANY BLACK SH.
	MOSCOW	WINDOM SH.	
		KASHONG SH.	
		MENTETH LS.	
	LUDLOWVILLE	DEEP RUN SH.	
		TICHENOR LS.	
		WANAKAH SH.	
		LEDYARD SH.	
		CENTERFIELD LS.	BEECHWOOD LS.
	SKANEATELES	LEVANNA BLACK SH.	
MARCELLUS	STAFFORD LS.	SILVER CREEK LS.	
	OATKA BLACK SH.		
			
ONONDAGA	ONONDAGA LS.	JEFFERSONVILLE LS.	
			

BEECHWOOD FAUNAL LIST (Macke, 1952)

Corals

Heterophrentis prolifica (Billings)
H. simplex (Hall)
Scenophyllum conigerum (Rominger)
Aulacophyllum sulcatum (d'orbigny)
A. parvum Davis
Odontophyllum convergens (Hall)
Blothrophyllum zaphrentiforme Davis
B. corium Davis
Heliophyllum halli Edwards and Haime
Eridophyllum archiaci (Billings)
Chonophyllum nanum Davis
Cystimorphs
Favosites turbinatus Billings
F. baculus Davis
F. goodwini Davis
F. placentus Rominger
F. rotundituba Davis
Emmonsia epidermata (Rominger)
E. eximia (Davis)
Platyaxum ? alicornis Davis, Stumm
Cladopora roemeri (Billings)
C. gulielmi Davis
Pleurodictyum wardi (Greene)
P. insigne (Rominger)
P. michelinoidea (Davis)
P. (Antholites) speciosus (Davis)
P. planum (Davis)
Drymopora ? procumbens (Davis), Okulitch
D. jacksoni (Grabau)
D. frutectosa Davis
Syringopera perelegans Billings
Alveolites goldfussi Billings
A. dispansus (Davis)

Echinodermata

Pentremitidea ? approximata Rowley
Nucleocrinus angularis (Lyon)
Ancyrocrinus bulbosus Hall
Dolatocrinus corporosus Miller and Gurley
D. bulbaceus Miller and Gurley
D. bellarugosus Miller and Gurley
D. greeni Miller and Gurley

Gennaeocrinus carinatus Wood
Megistocrinus expansus Miller and Gurley

Gastropoda.

Murchisonia ? sp.
Platyceras (Platyceras) bucculentum Hall
P. (Platyceras) milleri Nettleroth
Naticonema lineatum (Conrad)

Pelecypoda

Pterinopecten (Pseudaviculopecten) princeps (Conrad)

Brachiopoda

Rhipidomella penelope (Hall)
R. sp. indt.
Pentamerella pavilionensis (Hall)
Tropidoleptus carinatus (Conrad)
Megastrophia concava (Hall)
Stropheodonta cf. demissa (Conrad)
Douvillina inaequistriata (Conrad)
Pholidostrophia iowaensis (Owen)
Productella spinulicosta (Hall)
Camarotoechia cf. neglecta (Hall)
Camarotoechia horsfordi (Hall)
Atrypa "reticularis" auct.
Fimbrispirifer venustus (Hall)
"Spirifer" bynesi Nettleroth
"Spirifer" varicosus var. hobbsi (Nettleroth)
"Spirifer" macrus Hall
Delthyris sculptilis Hall
Nucleospira concinna (Hall)
Pentagonia biplicata Hall
Parazyga hirsuta (Hall)
Athyris spiriferoides (Eaton)
Centronella impressa Hall
Centronella campbelli Cloud

Cephalopoda

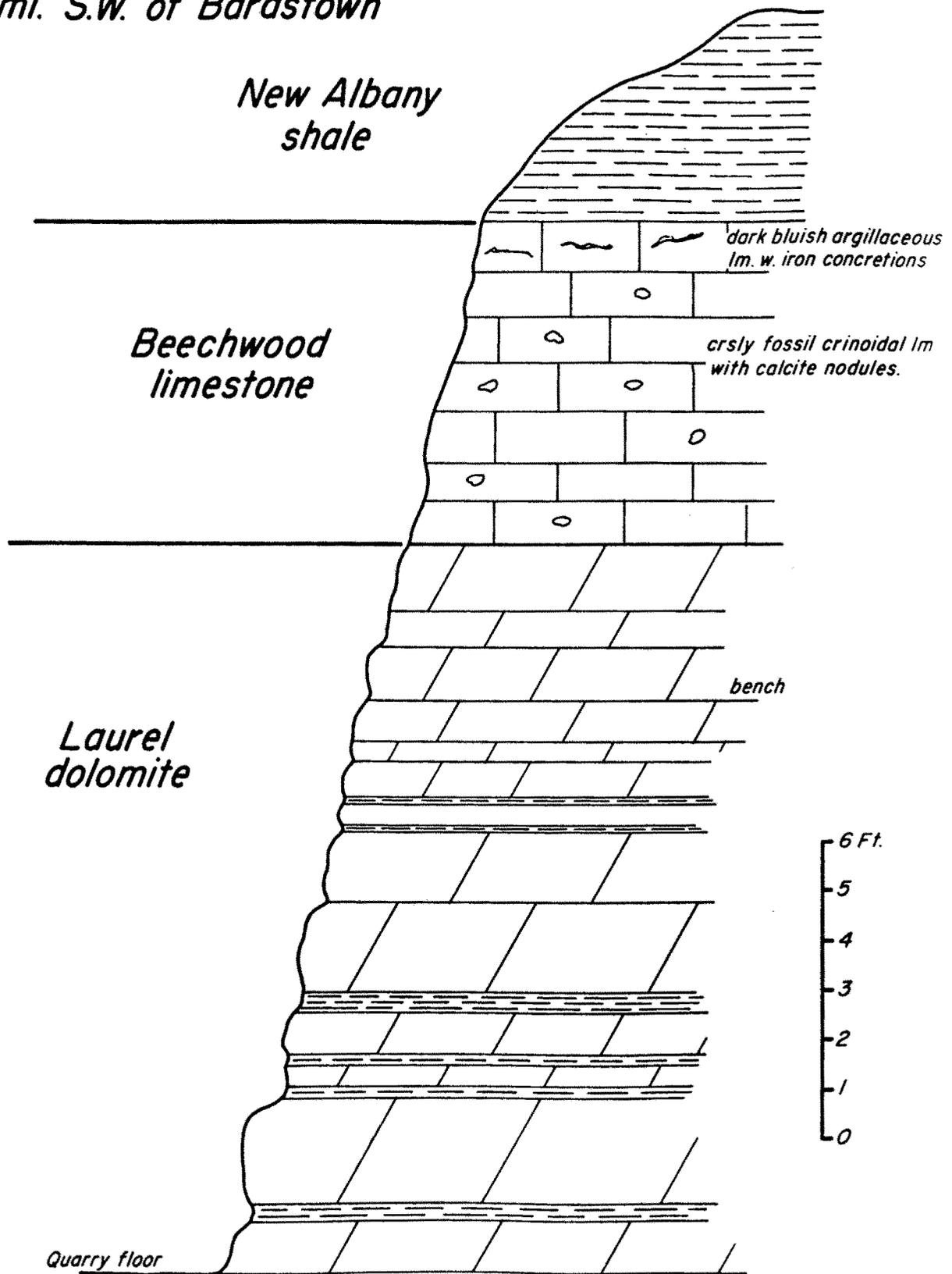
Spyroceras nuntium (Hall)
Cephalopod undet.

Trilobita

Greenops pleione (Hall)
Proetus crassimarginatus (Hall)
Dechenella (Basidechenella ?) boteroi Caster and Richter
Phacops rana (Greene)

Stop 7
New Nelson County Quarry
6 mi. S.W. of Bardstown

Fig 9



- 43.3 Small sideroad; park busses.
- STOP 8. Bardstown Reef section, 1.5 miles south of Balltown.
An almost continuous section of Waynesville through Brassfield is exposed. The Liberty is distinct enough from the underlying Waynesville and overlying Saluda, both lithologically and with its prolific fauna to distinguish it easily. Such characteristic fossils as Rhynchotrema capax, Beatricia undulata, Rhombotrypa quadrata, and Hebertella sinuata mark the Liberty here. Proceed southward into Mississippian Knobs area.
- 44.8 Junction Highway 247 beyond Immaculate Conception School. New Albany black shale outcrops in vicinity.
- 45.5 STOP 9. Meadows Lake. The Trousdale (equals Blocher) member of the New Albany shale rests on Beechwood limestone.

Proceed south to New Haven. New Albany and New Providence shale outcrops will be noted along the way. Dolomite outcropping in New Haven is Laurel.
- 49.8 Highway 52 on right.
- 50.1 Junction Highway 52 on left at blinker light; turn left onto Highway 52.
- 51.1 Junction Highways 52 and 247. Turn left.
Most of area has New Albany black shale outcropping on surface.
- 53.5 Turn right on Highway 52.
- 53.8 Small outcrop of black shale resting on Beechwood. Follow road left at J. W. Dant Distillery.
- 55.3 Junction Highway 457. Turn right.
- 56.0 Park for STOP 10.
Small quarry near New Hope.
Turn around and return to junction of Highways 457 and 52; continue straight ahead on Highway 457.
- 58.0 New Albany black shale on right.
- 62.6 Enter Marion County, leave Nelson County.
- 62.8 Junction Highways 49 and 257; turn left at Holy Cross.
- 63.0 STOP 11. New Albany-New Providence contact. Return to Bardstown on Highway 49.
- 75.0 Intersection Highway 150, turn left to Bardstown.

Stop 8
1.5 mi. So. of
Balltown on 31-E

Brassfield
dolomite

Saluda
limestone

Liberty
limestone

Waynesville
limestone

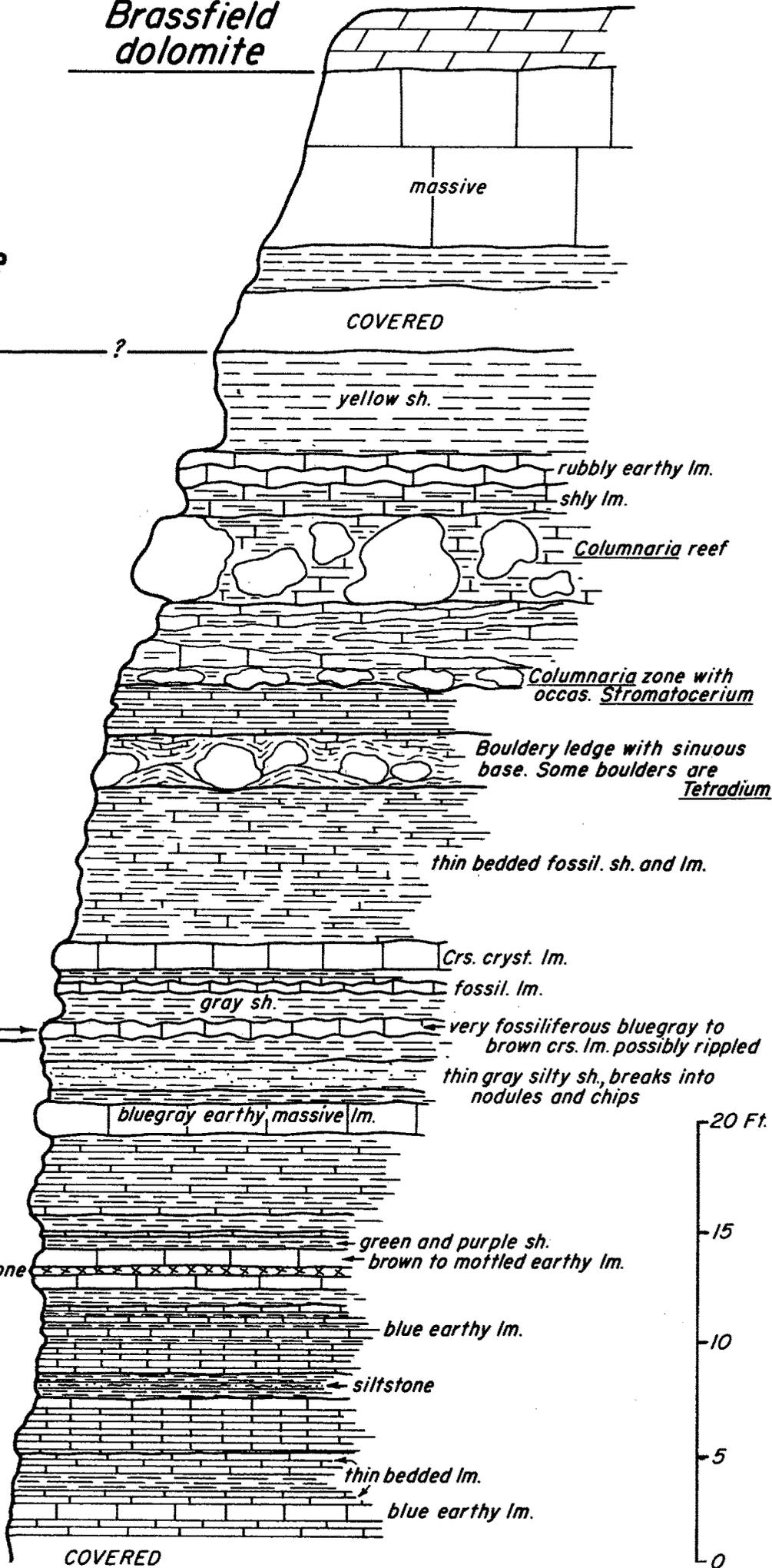
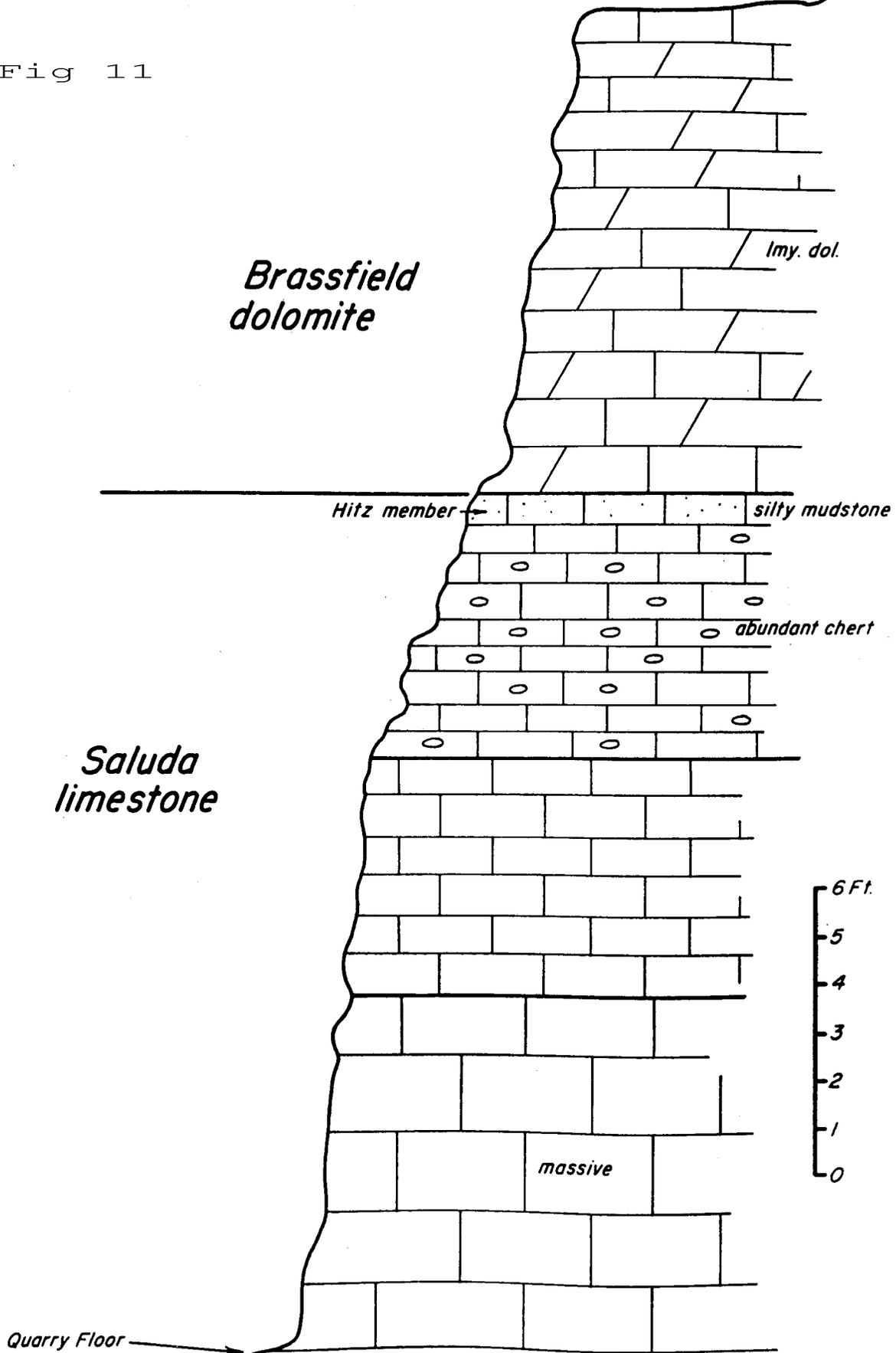


Fig 10

*Stop 10
Small Quarry
3/10 mi. No. of New Hope*

*Osgood shale
on hillside*

Fig 11



*Stop 11
Holy Cross*

Fig 12

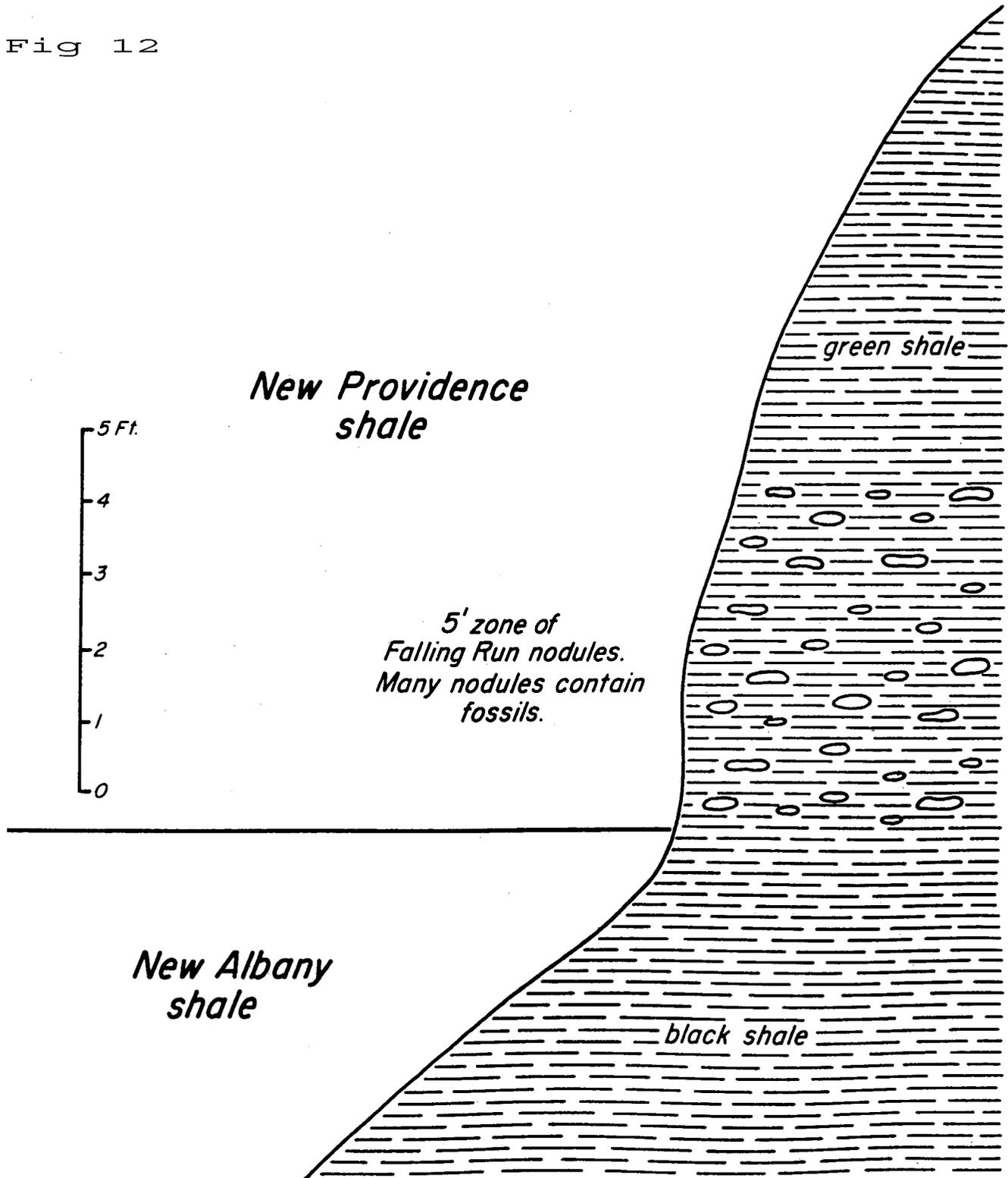
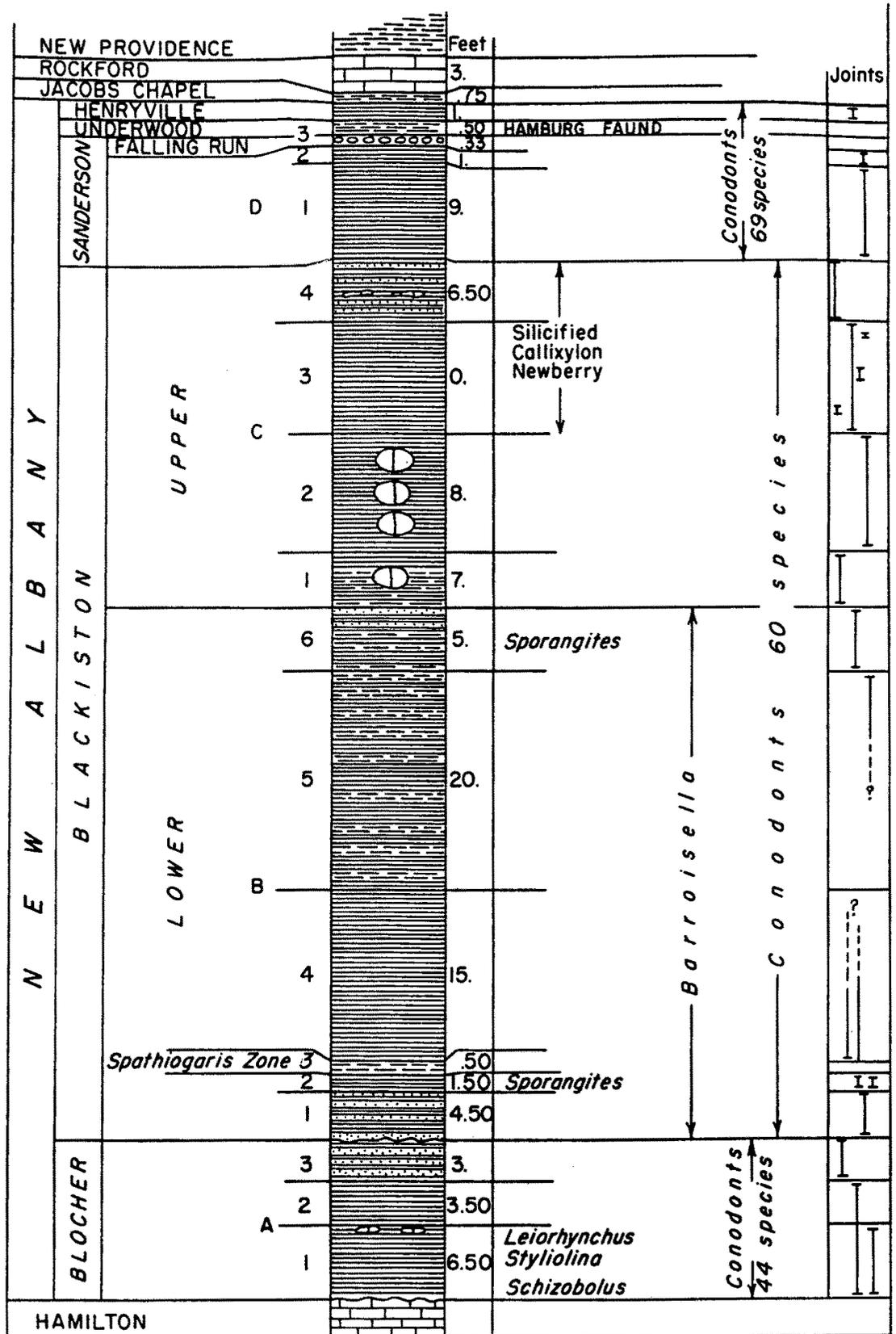


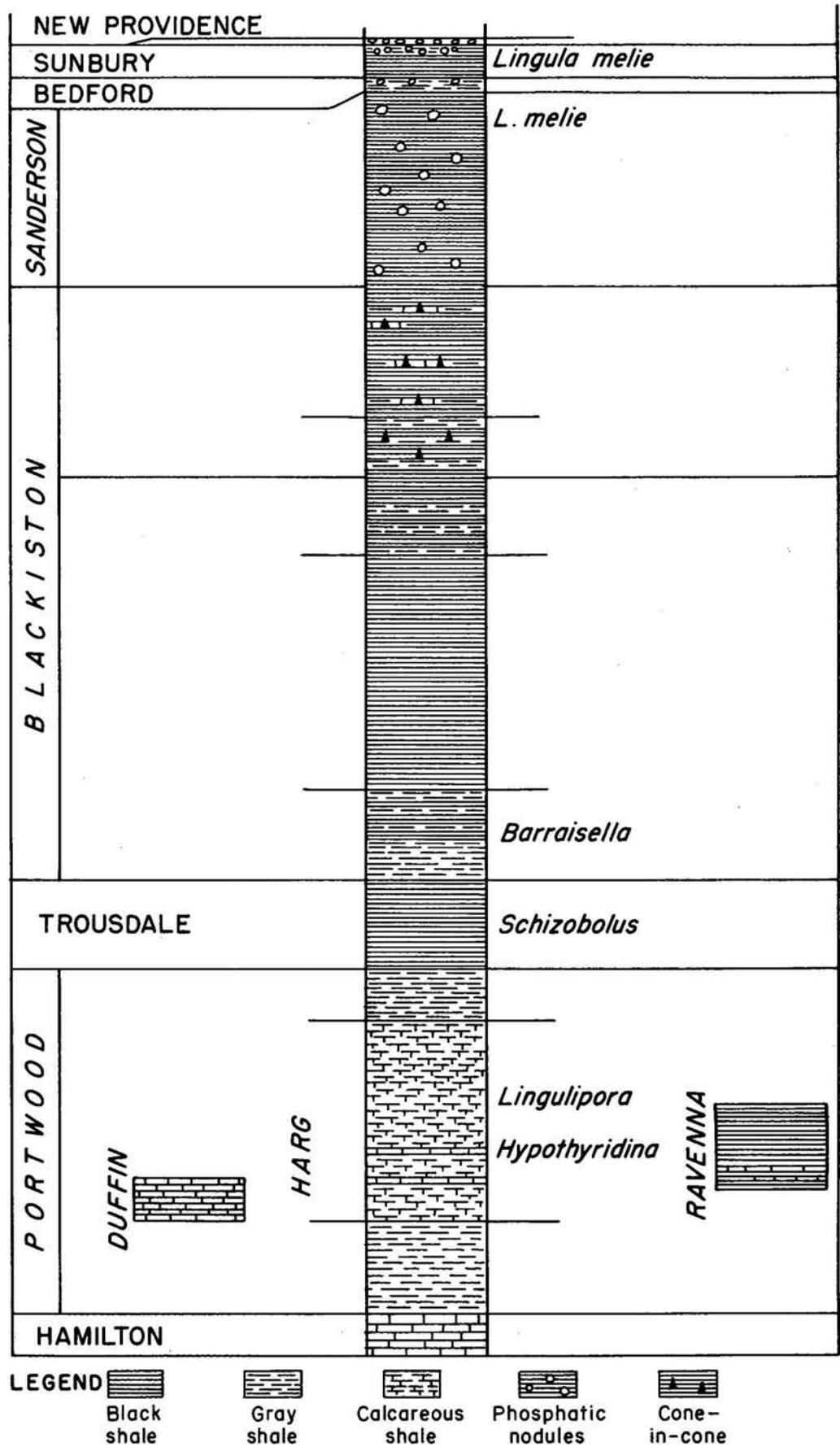
Fig 13



LEGEND Black shale Gray shale Calcareous concretions Phosphatic concretions Sandstone

Illustrated section of the New Albany shale at New Albany, Indiana

Fig 14



Illustrated generalized section of the New Albany shale in Estill Co., Kentucky

After Campbell (1946)

Saturday, May 9, 1959

The Saturday morning trip will be an informal one on which two of Stockdale's standard sections of Lower Mississippian will be examined.

The field part will follow Highway 31E south to New Haven, retracing part of the first day's trip.

- 0.0 New Haven, junction of Highways 31E and 52. Proceed south.
- 0.65 Enter LaRue County, leave Nelson County.
- 1.5 Turn right into sideroad right, and proceed up hill to STOP 12.

The New Providence is the basal unit of the Borden group in Indiana and Kentucky and is underlain by the Rockford limestone or New Albany black shale. Above the New Providence in Indiana is the Locust Point; in Kentucky the Brodhead overlies it. The Brodhead formation in Kentucky is overlain by the thin Floyds Knob, and according to Stockdale (1939), falls within the Burlington-Keokuk range. It takes in the Locust Point and Carwood units of the Indiana Borden group, and includes the Rosewood shale and Holtsclaw sandstone, and much of Butts' New Providence group, in Kentucky. The thin Floyd's Knob formation which is above the Brodhead, is in turn overlain by the Muldraugh formation.

- 4.8 Return to highway and turn right.
- 7.6 Abraham Lincoln's boyhood home on Knob Creek. STOP 13. The section climbing the hill to the south includes everything from the Brodhead formation to the St. Louis. The road is extremely winding and hazardous; however, there are several small areas available for parking 1 or 2 cars at a time, part way up the section.
- 9.6 Quarry, small parking area.
- 10.2 Upper part of cut, limited parking available.
- 103. White City. You are now 4.5 miles from Hodgenville. Those desiring to continue on to Greensburg, and visit the area of the Green County oil boom, can follow the directions which follow.

In Hodgenville turn left on Highways 61 and 31E. Follow Highway 61 to Buffalo. Turn right and stay on Highway 61 to Greensburg, which is about 23 miles away.

STOP 12

LARUE COUNTY, Kentucky. Along secondary road leading west up steep hill, one-fourth of a mile north of Athertonville.
(Stockdale, 1939)

	Feet
Muldraugh formation (West Point facies):	
Covered	
Floyds Knob formation (?):	
Limestone, silty, siliceous, drab; with crinoids	5
Brodhead formation (Athertonville facies):	
Covered	5
Limestone, shaly, siliceous; olive gray to buff; with chert lumps	6
Chert, weathered	1/2
Shale, brittle, and slightly calcareous siltstone; olive gray to blue gray	9
Chert and crinoidal limestone, grading and changing laterally in upper part, causing a confused zone; much crinoidal limestone in lower part grading laterally into gray to olive-gray siliceous rock with geodes	40
Siltstone, brittle, dense, slightly calcareous; mixed with chert beds, crinoidal lenses, and greenish-gray shale partings; contains geodes	25
Shale, gray to olive-gray; with scattered crinoids	10
Limestone, in single, resistant bed, crinoidal; with much chert	2
Shale, olive green; with many crinoids	4
Limestone, crinoidal; with much chert and greenish shale partings	15
Shale, silty, gray to drab; more argillaceous in lower part; with mica; few resistant thin layers slightly calcareous; with calcium carbonate concretions; few worm marks	80
New Providence formation (Keith Knob facies):	
Covered	10
Shale, clayey, olive gray to gray; mostly covered; with a layer of small, flat, gray to brown concretions at base	110
New Albany shale:	
Shale, fissile, black (not measured)	
Total thickness of measured section	321
Total thickness of calcareous rock beneath the Floyds Knob, approximately	115
Altitude at top of New Albany shale, 465	

STOP 13

LARUE COUNTY, Kentucky. Along U. S. Highway No. 31-E at "Muldraugh Escarpment;" bottom of section 3 1/4 miles southwest of Athertonville. (Stockdale, 1939)

	Feet
St. Louis limestone:	
Covered; residual soil, cherty, reddish brown	
Limestone, fine-grained to dense, brittle, blue gray	10
Salem limestone:	
Limestone, granular, partly oolitic, massive; blue gray to buff; cross-bedded; fossiliferous	5
Limestone, argillaceous, blue gray, grading laterally into fossiliferous limestone; mixed with shale and some chert; with profuse fossils in the limestone slabs; bryozoans predominate; also corals, brachiopods, fish teeth, and others	25
Shale, flaky; blue gray; weathering tan; with fossiliferous limestone slabs and lenses; profuse bryozoans. (Somerset member?)	15
Shale, flaky, blue gray to drab; with many bryozoans. (Somerset member)	10
Harrodsburg limestone:	
Limestone, massive, crinoidal; cross-bedded; bryozoan matrix in part	5
Shale, drab; with crinoidal streaks and many bryozoans	9
Limestone, massive, gray; with greenish specks; cross-bedded; with many bryozoans	8
Muldraugh formation (West Point facies):	
Limestone, blue gray to white; crinoidal beds and siliceous layers grading laterally one into another; with thin shaly partings; chert in irregular patches	15
Limestone, crinoidal, gray to white; mostly bedded, some layers massive; intertongued and transitional with siliceous beds grading laterally; with little chert	35
Floyds Knob formation (not recognized)	
Brodhead formation (Athertonville facies):	
Siltstone, gritty, massive where fresh; with mica flakes; top few feet of exposure grading laterally into chert and crinoidal limestone; weathers mainly by spalling parallel to slopes; lower part feebly calcareous	135
Total thickness of measured section	<u>272</u>
Altitude at bottom of section, 550 feet	

The Green County Oil Field

At the present time over 900 producing wells in Green County are yielding in excess of 25,000 barrels per day of crude oil. This is startling in light of Green County's production one year ago, which was less than 10,000 barrels per month.

The following table gives a summary of monthly crude oil runs in the county in 1958.

Jan.	5,454 bbls.	July	30,270 bbls.
Feb.	5,674 "	Aug.	63,107 "
Mar.	8,009 "	Sept.	162,244 "
Apr.	8,450 "	Oct.	308,860 "
May	18,216 "	Nov.	468,529 "
June	21,054 "	Dec.	556,181 "
Total for 1958:		1,656,048 bbls.	

The present extent of the field is approximately 18 miles long and about 4 miles wide. The success ratio for 1958 was about 92 percent, a surprisingly high figure for 625 wells drilled.

Most of the production has been at depths of 500 feet or less, and of late, some excellent production in the Marshall Ridge area has been found less than 350 feet deep. In this area, some of the better cores have between 30-40 feet of saturated section, with permeabilities in excess of 3,000 md., and porosities in excess of 15 percent. The yield should be truly phenomenal.

The average wells for the field have produced about 30 barrels per day, although there are many producing over 200 barrels per day. The estimated primary recovery is between 12 and 15 million barrels.

An amazing feature of the production is the fact that many operators have little idea of the exact formational sequence in their drilled wells.

Although most of the production is from the Laurel dolomite, there appears to be some production from the Louisville limestone as well. An examination of the Gamma Ray-Neutron logs shown in the following chart indicates some of the variations that occur west of the Cincinnati Arch in LaRue, Green and Taylor Counties. A study of logs within a relatively small area in either Green or Taylor Counties shows extreme variations in the sub-black shale sequence of Silurian formations. The Devonian "cap-rock", which has been called by various names: Jeffersonville, Lego-Dixon (Sil.), Sellersburg, Beechwood and Boyle, points up the lack of reliable information and knowledge of the stratigraphy of this horizon. The Devonian-Silurian unconformity is extremely pronounced and the Devonian "cap-rock" in Green County may be resting on any formation from the Louisville limestone to the Osgood shales. Although, generally, the total Silurian section thins eastward toward the axis of the Cincinnati Arch, the individual formations are extremely variable in their thinning and thickening. Structure apparently plays a minor role in the oil reservoir, while permeability and porosity traps are of prime importance.

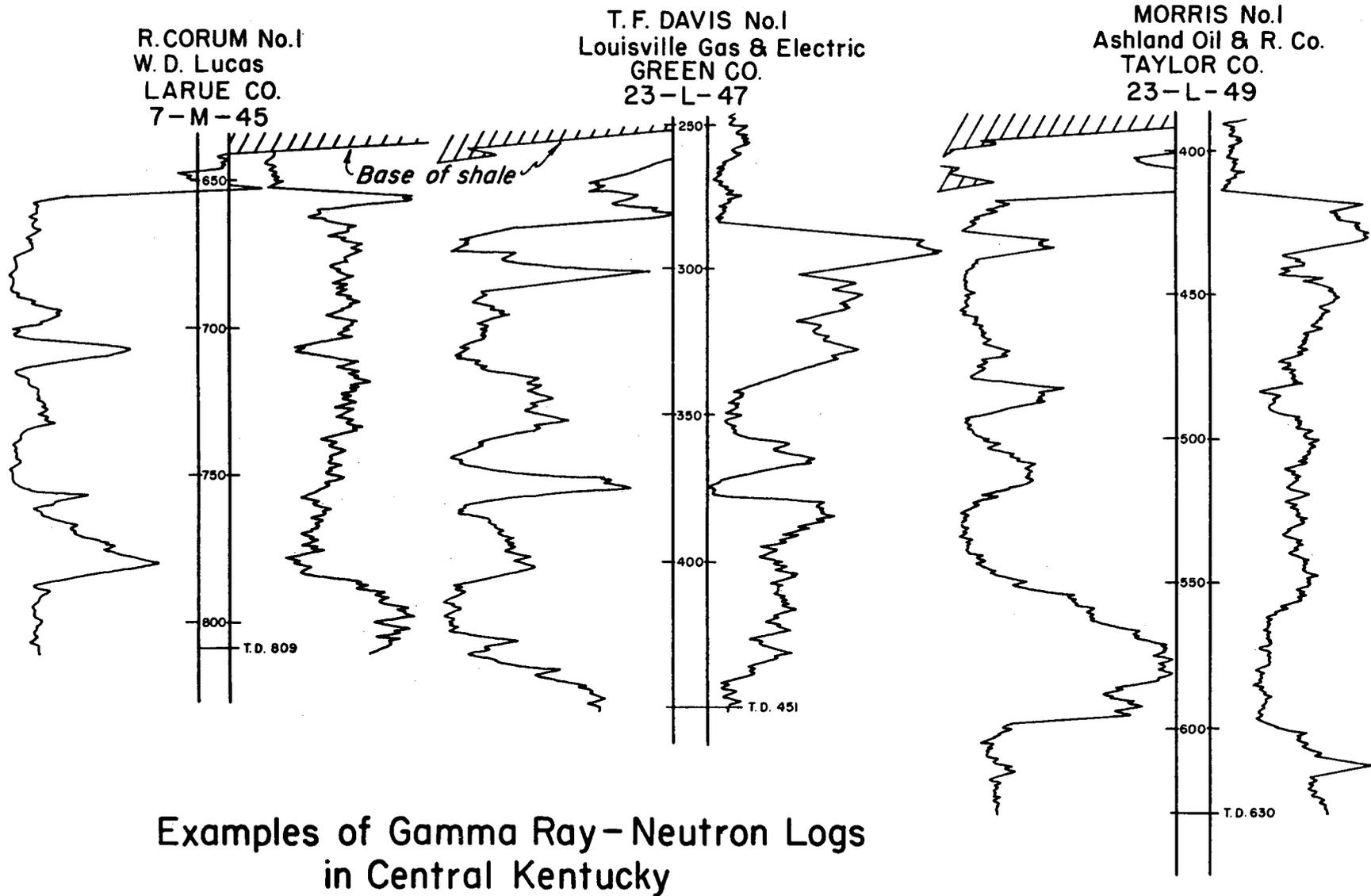


Fig 15

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