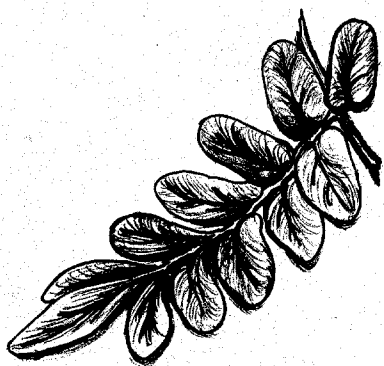


GEOLOGICAL SOCIETY OF KENTUCKY

FIELD TRIP
MAY 15-16-1953

GUIDE TO SOME
PENNSYLVANIAN SECTIONS IN
MORGAN, MAGOFFIN AND
BREATHITT COUNTIES,
KENTUCKY,



edited by
JOHN W. HUDDLE

prepared in cooperation with
KENTUCKY GEOLOGICAL SURVEY

GUIDE TO SOME PENNSYLVANIAN SECTIONS IN
MORGAN, MAGOFFIN, AND BREATHITT COUNTIES, KENTUCKY

Edited by

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GEOLOGICAL SOCIETY OF KENTUCKY

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May, 1953

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GENERAL INFORMATION

1. Please carry as many passengers as your car will accomodate comfortably. Parking space is limited at several stops. Extra cars may be left in the parking lot at Natural Bridge State Park.
2. Several stops will be on main traveled roads - U. S. Route 460 and Ky. Route 15. Please watch for traffic and park cars clear off the highway.
3. The lead car - a jeep station wagon - will leave on schedule. Late comers may catch up by following the road log. The stops will be long enough and the lead car slow enough so that it should not be difficult to keep up with the group. Keep the car behind you in view.
4. No rest stops are available.
5. The following topographic maps include most of the area crossed during the field trip:

 Friday: Cannel City, West Liberty, Lenox, Lykins, and Lee City quadrangles.

 Saturday morning: Land Saw, Jackson, Quicksand, Gauge, Seitz, and Salyersville South quadrangles.

 Optional trip Saturday afternoon: Tip Top and Gauge quadrangles.

These new 7½ minute quadrangle topographic maps are being published by the U. S. Geological Survey in cooperation with the Kentucky Agricultural and Industrial Development Board at a scale of 1:24,000. The ones already published are available from the Kentucky Geological Survey and from the Kentucky Agricultural and Industrial Development Board. Unpublished maps are available as blueline prints and aerial photos from the Kentucky Agricultural and Industrial Development Board.
6. If you plan to take the optional trip to Evanston, Kentucky, carry a lunch from Hemlock Lodge at Natural Bridge.
7. Central Standard time will be used throughout the road log.

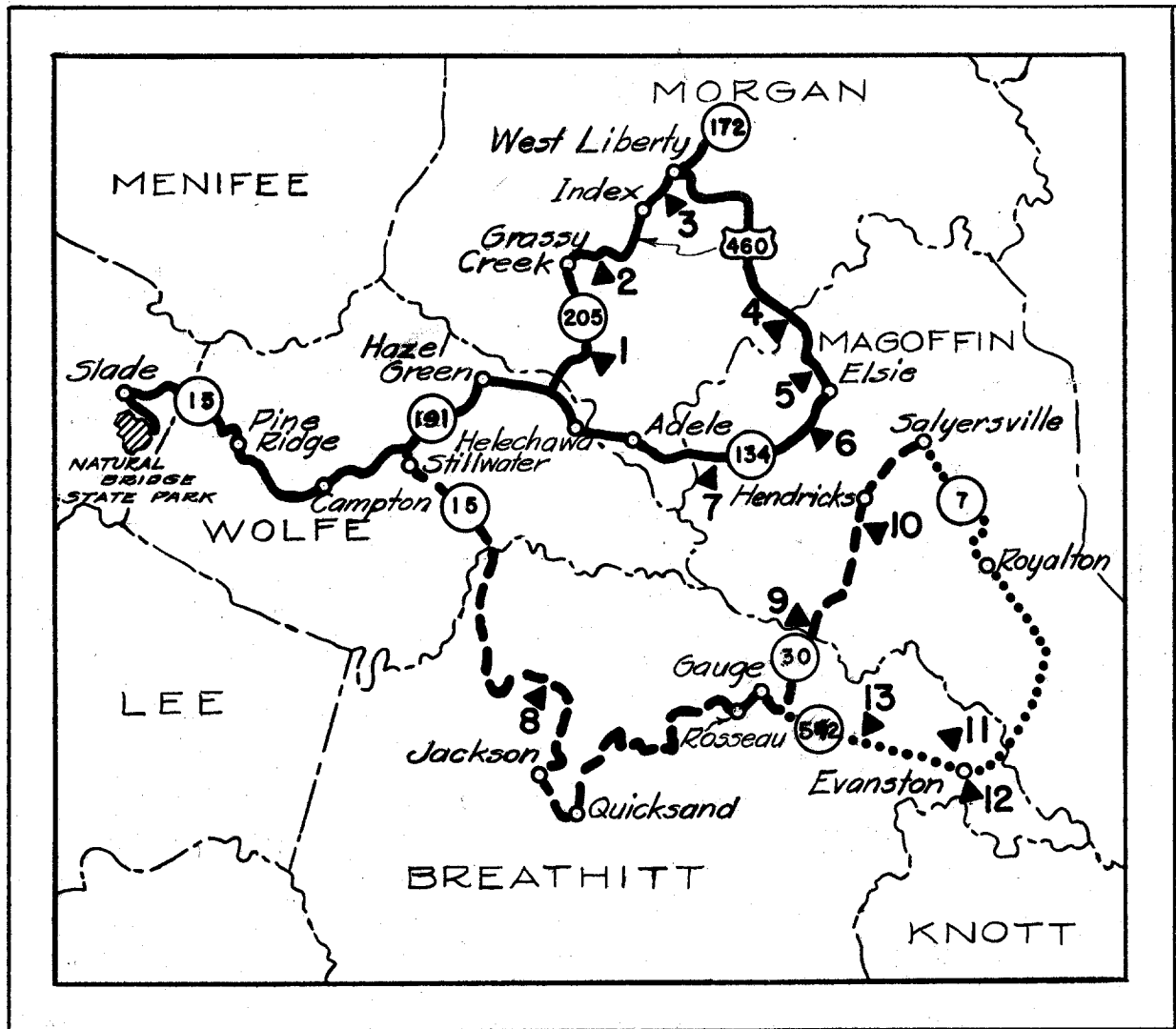


FIGURE 1.

Scale: 1 inch=8 miles

ROUTE MAP

LEGEND

- First day's trip.
- Second day's trip.
- Optional trip.
- 2 Stop.

SUMMARY OF PROGRAM

Thursday, May 14, 1953. Evening.

1. Registration at the Hemlock Lodge, Natural Bridge State Park, 7:00 - 9:00 p.m., c.s.t.
2. There will be no scheduled trip through the Park. We suggest you arrive early enough to visit Natural Bridge before supper Thursday.

Friday, May 15, 1953.

3. 8:00 a.m., c.s.t. Leave parking lot at Natural Bridge State Park and drive 34 miles to Stop No. 1, a small fault. During the morning examine sections at Stop No. 2, on U. S. Route 460 near Grassy Creek and Stop No. 3, sections between Index and West Liberty on the same route.
4. Lunch in West Liberty.
5. During the afternoon examine sections at the Morgan-Magoffin County line (Stop 4) and at Elsie (Stop 5) on U. S. Route 460; the Johnson Creek fault (Stop 6) and a section at the head of State Road Fork (Stop 7) on Ky. Route 134.
6. Return to Natural Bridge State Park.
7. Dinner and annual business meeting at Hemlock Lodge 7:30 p.m., c.s.t.

Saturday morning, May 16, 1953.

8. Leave parking lot at Natural Bridge State Park at 8:00 a.m., c.s.t. Drive 42 miles to Stop 8, a section near Jackson. Examine sections at Magoffin-Breathitt County line (Stop 9) and at Hendricks (Stop 10) on Ky. Route 30.
9. Field trip ends near Salyersville.

Optional trip Saturday afternoon.

10. This trip requires about 4 hours and about 42 miles of driving. The Skyline strip mine at Evanston is the main stop (No. 11) of the optional trip. This mine, along the ridge crest, has more than 60 feet of sandstone in the high wall at several places and the coal ranges from 13 to 19 feet in thickness. Stops will be made at a quarry near Evanston (Stop 12) and at a fault near Lambric (Stop 13).

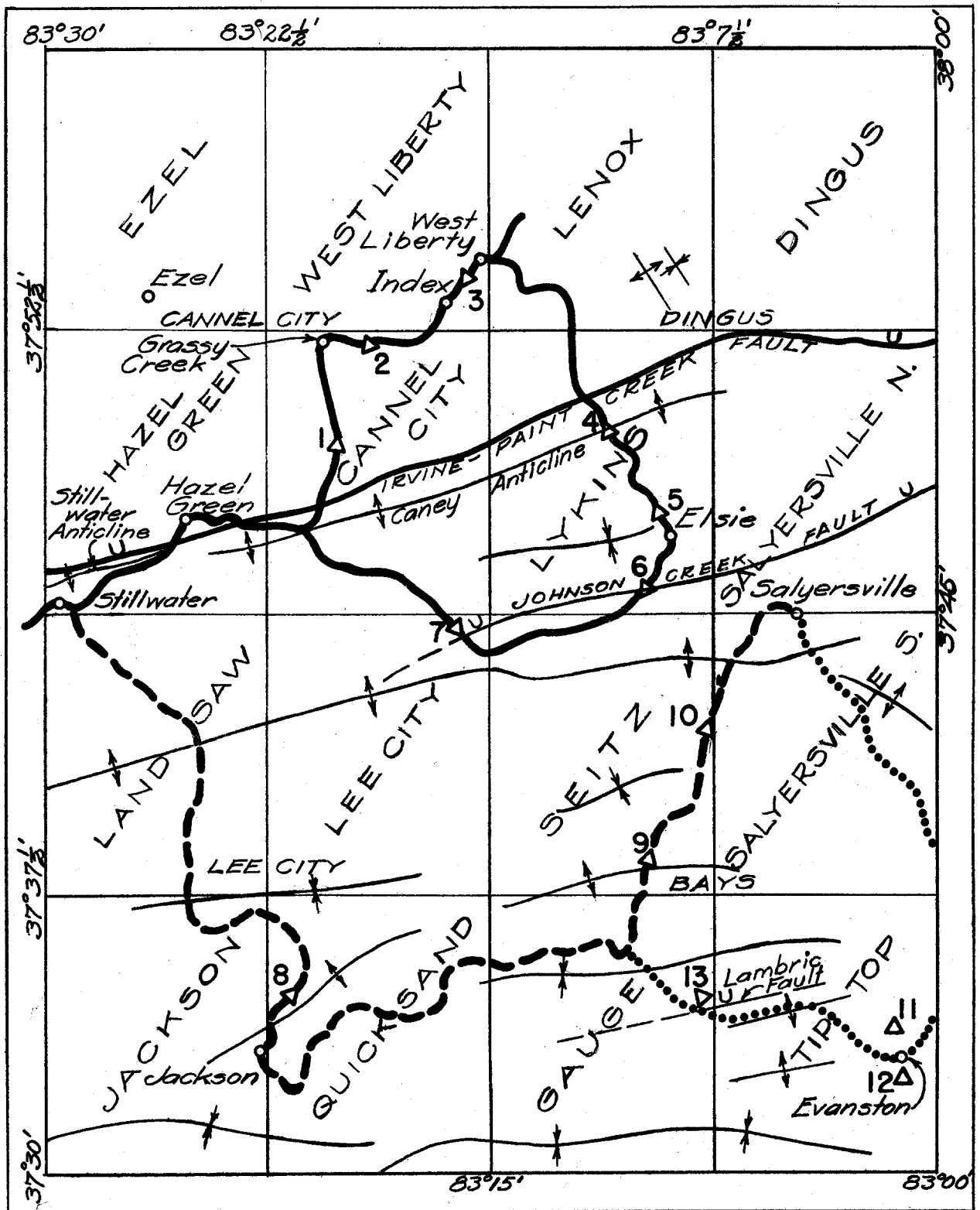


FIGURE 2.

Scale: 1 inch = 4.5 miles approx.

INDEX MAP

TOPOGRAPHIC QUADRANGLES, FIELD TRIP STOPS, MAJOR FAULTS AND FOLDS.

- First day's trip.
- - - - - Second day's trip.
- Optional trip
- Δ₂ Stop

- u Fault; u upthrow
- X Syncline
- + Anticline

PURPOSE OF THE FIELD TRIP

Sections to be examined at scheduled stops include rocks in the lower part of the Breathitt formation, approximately 0-500 feet above the Lee formation. This trip does not include stops at sections in the Lee formation nor the upper part of the Breathitt formation. The sections selected for examination show key beds, such as the Fire Clay coal, the Magoffin beds of Morse and the Kendrick shale of Jillson, as well as significant changes of facies. The Magoffin beds of Morse and the flint clay parting in the Fire Clay coal have been used extensively in making correlations, but the difficulty of recognizing these key beds at some places is illustrated by sections exposed at several stops which contain more than one coal bed with a flint clay parting and more than one marine zone similar to the Magoffin beds of Morse.

Certain coal beds, identified in several quadrangles, were not correlated with named coal beds to the satisfaction of the field trip committee. For convenience in writing the Guidebook the following field names have been used for the uncorrelated coals: "Van Cleve", "Grassy", "Little Caney", "Cannel City", "Prater", "Adele", "Index Hill", "Nickell", "Sebastian", and "Tip Top".

ROAD LOG

Friday, May 15, 1953

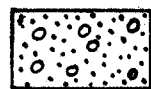
Assembly point.--The party will leave from the parking lot below Hemlock Lodge at Natural Bridge State Park at 8:00 a.m., c.s.t.

Plan of the trip.--The party will visit several Pennsylvanian sections on a circle route through West Liberty via Ky. Routes 77, 15, 191, 205, U. S. Route 460 and Ky. Route 134, and will return to Natural Bridge State Park in the evening. Total mileage for the day will be 114 miles. No stops are scheduled for the first 34 miles, but notes on geology are given in the road log.

Total Mileage	- Distance Between Points	
------------------	------------------------------	--

0.0	0.0	The zero point for the trip is the bridge at the entrance of the parking lot. Leave the Park on Ky. Route 77. The Lodge and the cabins at the Park are stratigraphically near a limestone of Mississippian age called the Big Lime by well drillers. The Big Lime is exposed behind Hemlock Lodge and in the cliffs opposite the Lodge. Between Hemlock Lodge and Slade Mississippian shales and siltstones are exposed in a number of road cuts, and there are excellent views of the Lee formation along the skyline.
3.1	3.1	Junction of Ky. Routes 11 and 15 with 77 at Slade. TURN RIGHT ON KY. ROUTE 15. Mississippian rocks are exposed in the road cuts. The large slump blocks of sandstone are from the Lee formation.
4.7	1.6	Base of section shown in Fig. 3. Section begins just east of a concrete bridge.
4.9	0.2	Big Lime exposed in road cuts and quarries near the boundary of the Cumberland National Forest.
5.2	0.3	Contact between Mississippian and Pennsylvanian. (See Fig. 3)
5.5	0.3	Base of the conglomerate in the Lee formation.
6.1	0.6	Good view of the canyon cut in the Lee formation near the overlook.

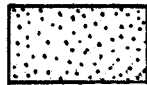
EXPLANATION FOR MEASURED SECTIONS



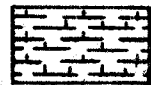
Conglomerate



Canneloid shale



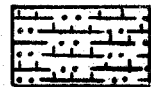
Sandstone



Calcareous shale



Siltstone



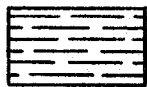
Calcareous siltstone



Silty shale



Calcareous sandstone



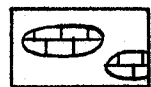
Shale



Limestone



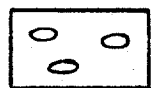
Black shale



Limestone concretions



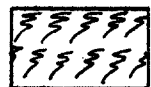
Coal



Ironstone concretions



Cannel Coal



Rootlets



Concealed



Marine fossils



Lingulas



Plant fossils

Fig. 3a

Fig. 3b.

No STOP. Section along Ky. Route 15,
east of Slade.

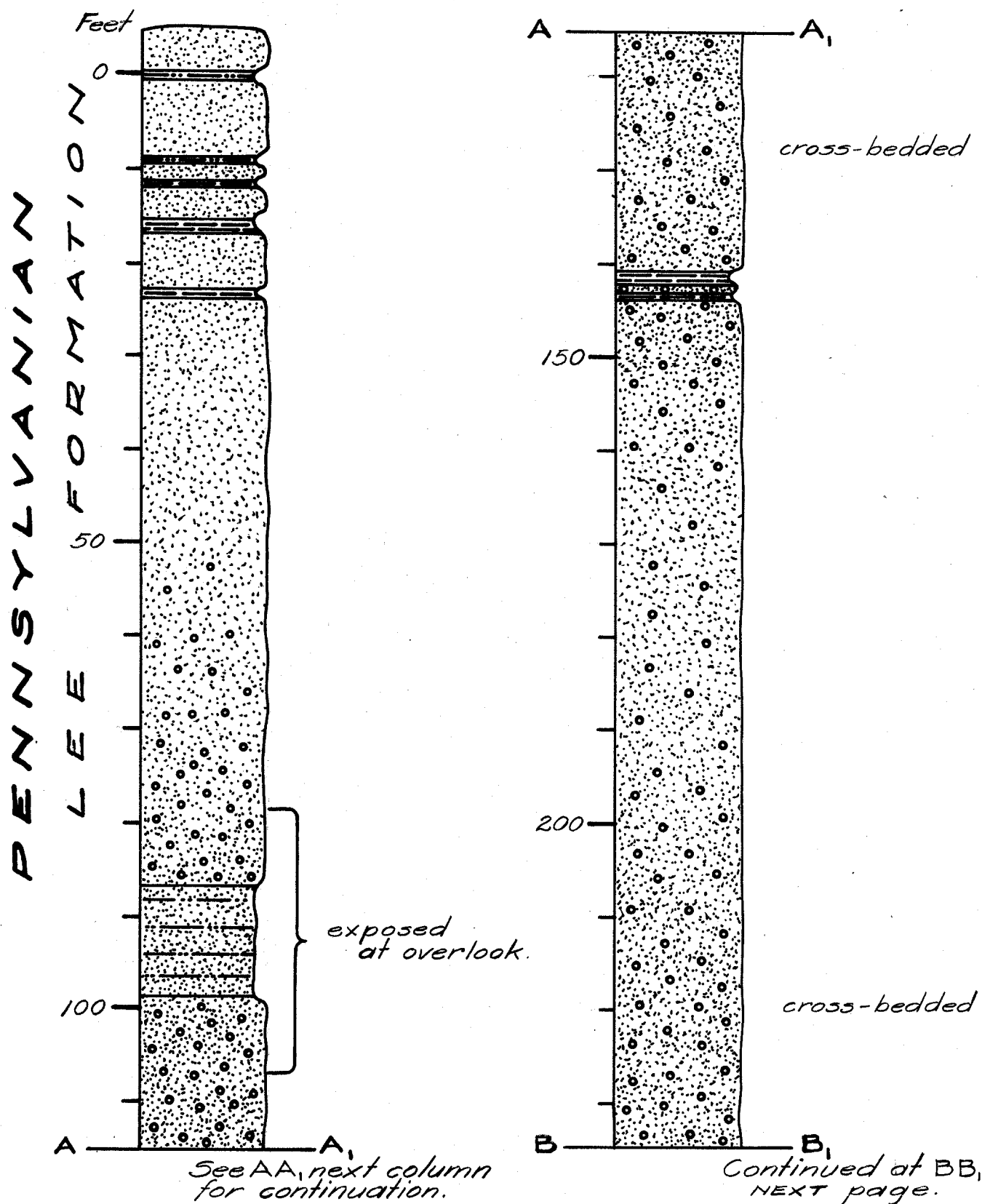
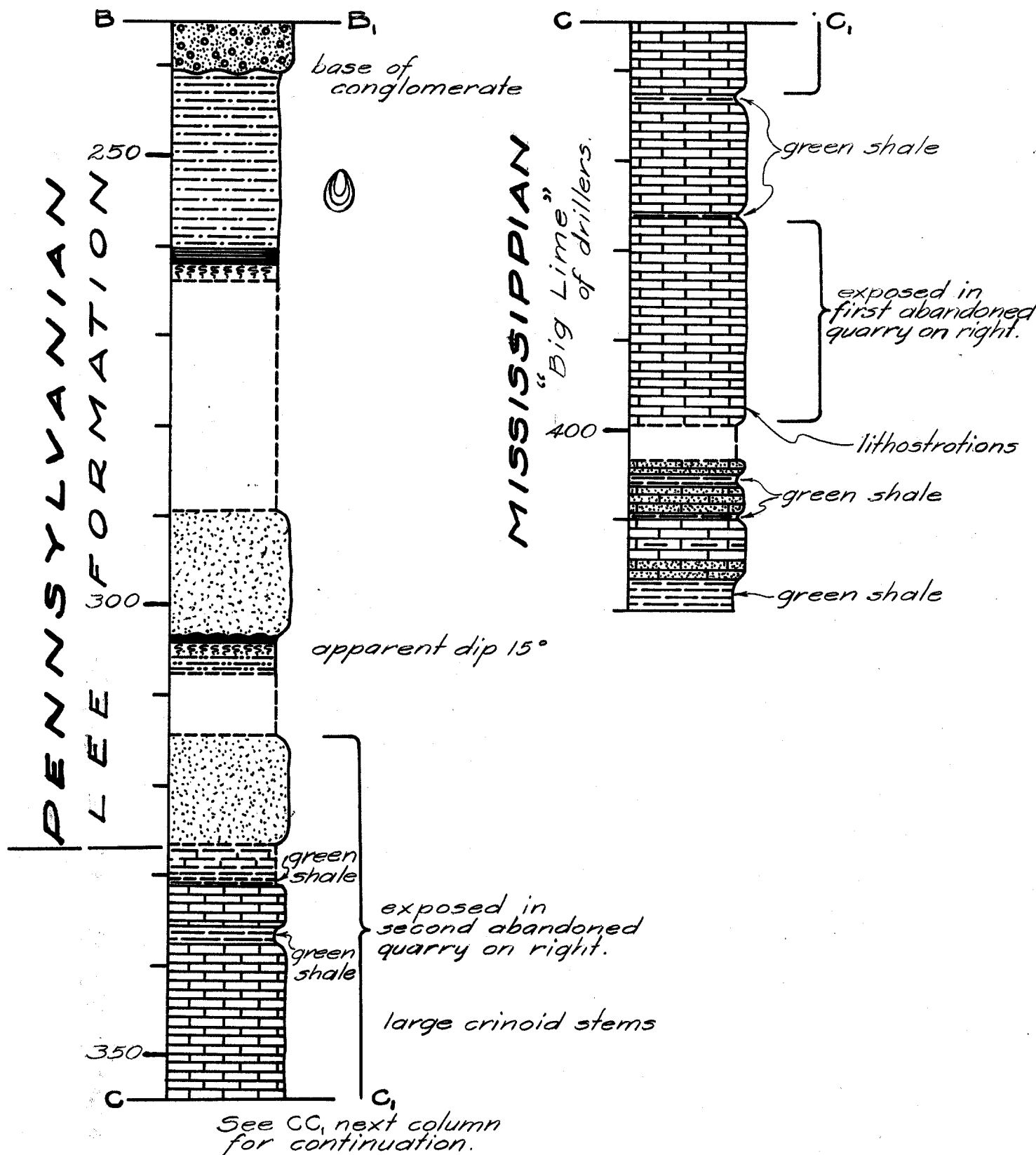


Fig. 3b.

No STOP. Section along Ky. Route 15,
east of Slade. (cont.)



<u>Total Mileage</u>	<u>Distance Between Points</u>	
6.4	0.3	Top of section shown in Fig. 3.
6.5	0.1	Plateau level reached near the elevation sign at 1,200 feet. The plateau is held up by the Lee formation.
6.9	0.4	Powell-Wolfe County line.
8.5	1.6	Coal bloom in a road cut to the left.
10.4	1.9	Black shale in the lower part of the Breathitt formation exposed in several road cuts.
11.3	0.9	Pine Ridge. Junction with Ky. Route 715 to Sky Bridge, a natural bridge developed in the Lee formation. CONTINUE STRAIGHT ON KY. ROUTES 15 AND 11.
12.2	0.9	Junction of Ky. Routes 15 and 11. CONTINUE STRAIGHT ON KY. ROUTE 15. Road cuts expose the lower part of the Breathitt formation - black shale with abundant ironstones.
16.0	3.8	Junction with Ky. Route 651.
17.2	1.2	Campton. TWO SHARP TURNS--A LEFT AND A RIGHT.
18.5	1.3	Junction with Ky. Route 746. CONTINUE ON KY. ROUTE 15.
21.6	3.1	Stillwater.
22.1	0.5	Junction with Ky. Route 191. TURN LEFT ON KY. ROUTE 191. Black shale in lower part of the Breathitt formation.
23.6	1.5	Coal mine in the gap.
27.8	4.2	Hazel Green. Junction Ky. Route 203. TURN RIGHT, FOLLOWING KY. ROUTE 191.
30.1	2.3	Approximate position of the Irvine-Paint Creek fault. No outcrops. The fault nearly parallels the road for a short distance.
30.3	0.2	Daysboro.

<u>Total Mileage</u>	<u>Distance Between Points</u>	
30.7	0.4	Dipping beds near the Irvine-Paint Creek fault at the east edge of town. The Kendrick shale of Jillson here dips to the north.
31.0	0.3	Strip mines in the "Cannel City" coal on the south side of the valley.
31.9	0.9	Junction of Ky. Route 205. TURN LEFT ON KY. ROUTE 205. GRAVEL ROAD.
32.3	0.4	Old mines in the "Cannel City" coal.
34.0	1.7	Note dips in the shale below the "Little Caney" coal associated with Irvine-Paint Creek fault.
34.3	0.3	STOP NO. 1. Fault cutting the "Grassy" coal. The fault is probably due to slump contemporaneous with deposition but is near the Irvine-Paint Creek fault. See Fig. 4. (20 minute stop)
34.7	0.4	"Grassy" coal in road cut near school and bridge.
35.6	0.9	SLOW. Fault and disturbed bedding near the Irvine-Paint Creek fault. The main fault lies approximately in the valley at the foot of a long grade. Fire Clay coal with flint clay partings.
36.4	0.8	"Little Caney" coal.
36.7	0.3	Several splits of the "Cannel City" coal in the road cut to the right. Note the rapid thinning of the "Cannel City" coal in this direction.
37.7	1.0	Old mines in the creek bank to the left are in the "Grassy" coal.
39.1	1.4	Black shale with ironstone concretions below the "Grassy" coal.
39.8	0.7	Road cuts to the right show exposures of a coal below the "Grassy" coal, and calcareous shale.
39.9	0.1	Junction U. S. Route 460. RIGHT TURN. DANGEROUS INTERSECTION. This is the base of the section shown in Fig. 5.
40.4	0.5	Old mine in the creek bank behind the house is in the "Grassy" coal.

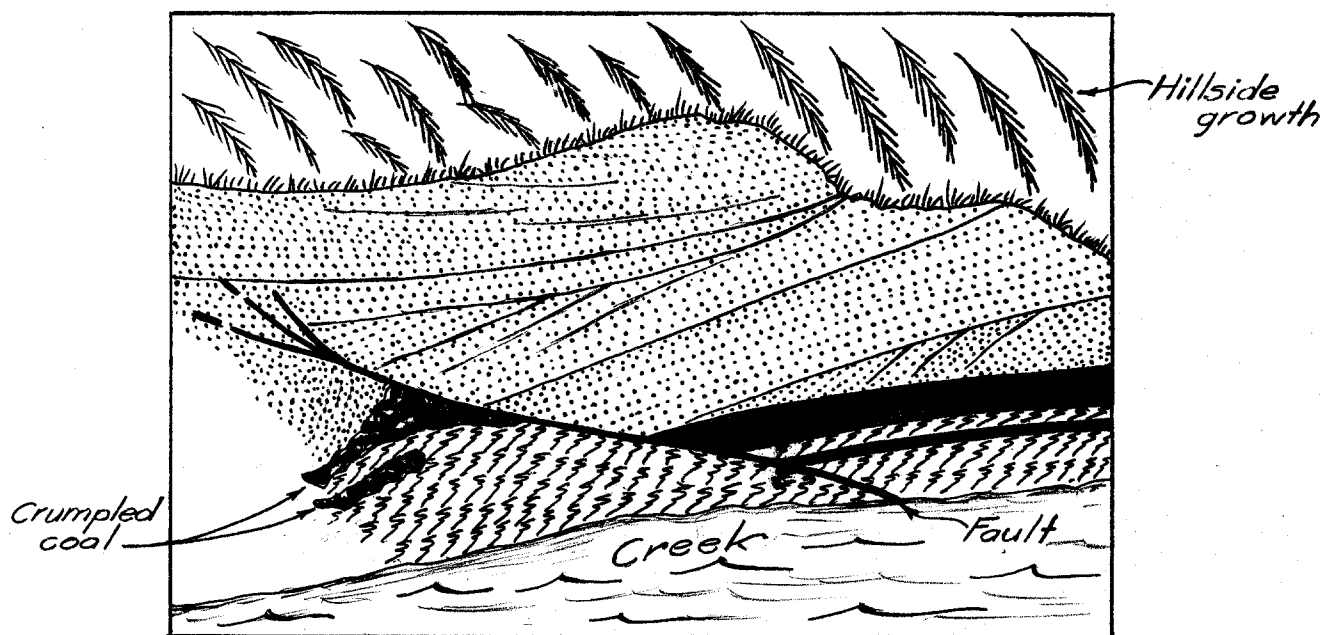


Fig. 4 STOP 1. Sketch of a small fault
at Sellars Fork.

<u>Total Mileage</u>	<u>Distance Between Points</u>	
40.7	0.3	Concretions below the "Little Caney" coal.
40.9	0.2	Concretions in the Kendrick shale in old road cut to the right.
41.1	0.2	Fire Clay coal and associated beds exposed in the road cut to the left.
41.3	0.2	Magoffin limestone. Two benches exposed in the road cut at the gap.
41.4	0.1	STOP NO. 2. Greear Branch section near Grassy Creek, Fig. 5. One hour stop. Park to the right of the road near the hill crest. The upper part of the section was measured in the road above the parking area and the lower part of the section along U. S. Route 460.
41.7	0.3	Concretions in the Kendrick shale exposed in the high banks to the left.
42.3	0.6	Old mines in the "Little Caney" coal. Numerous openings in this coal are seen along the road from here to Index.
45.0	2.7	Junction Ky. Route 191. STRAIGHT ON U. S. ROUTE 460.
45.6	0.6	STOP NO. 3. Index-West Liberty section, see Fig. 6. One hour stop. This section was measured from Index over the crest of the hill and down to West Liberty. Note the differences in the sections on the two sides of the hill. The party will walk the section from where the cars are parked to the bridge at West Liberty. Transportation will be provided for the drivers of cars to return to the parking area to pick up the cars.
46.2	0.6	Crest and highest exposures.
46.4	0.2	Flint clay parting in the "Index Hill" coal exposed in road cut to left.
46.7	0.3	Limestone in the Magoffin beds exposed in road cut on left opposite house on right at a sharp curve.

Fig. 5

STOP 2. Section along U.S. Route 460
on Greear Branch.

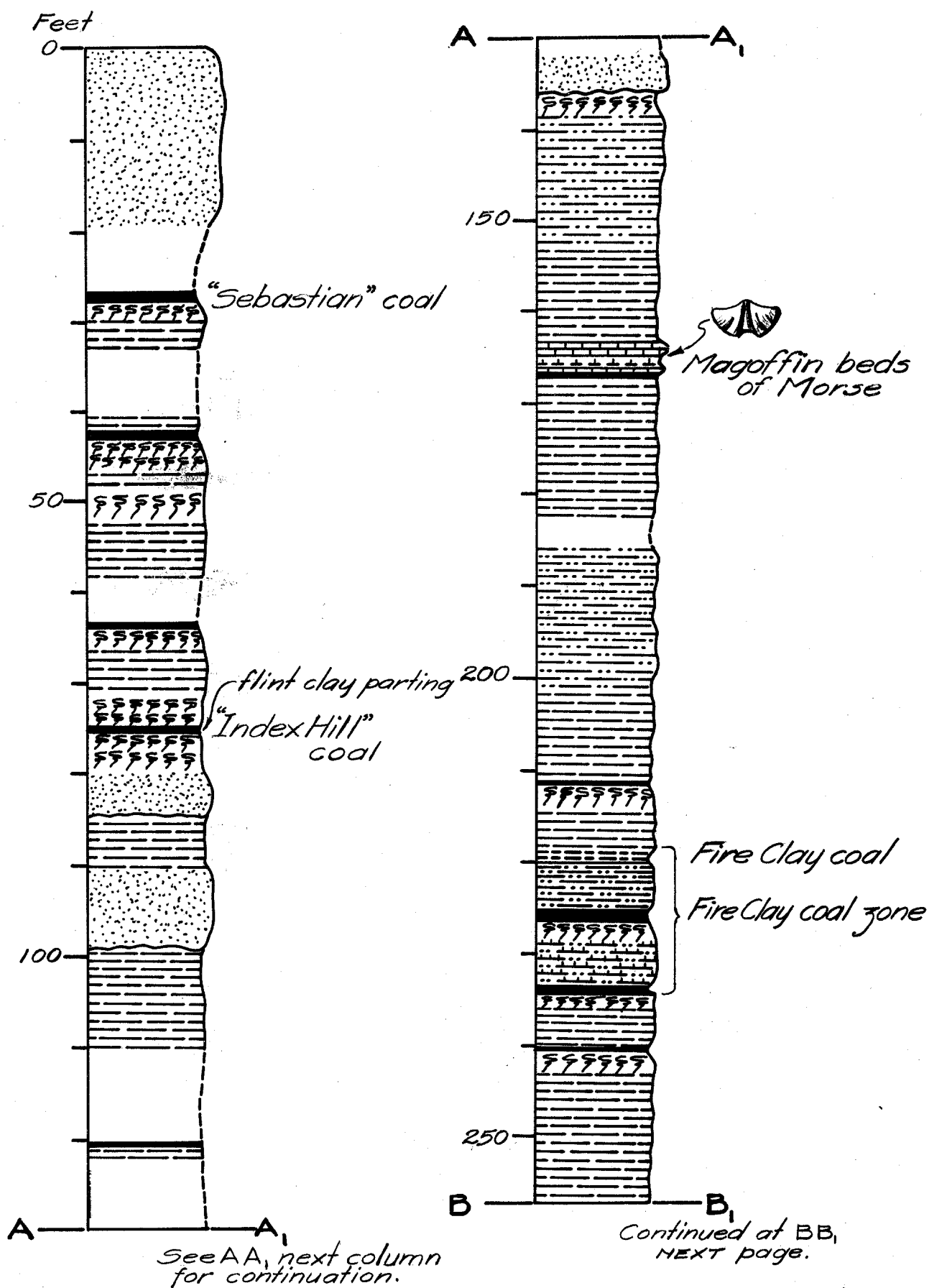


Fig. 5

STOP 2. Greear Branch section (cont.)

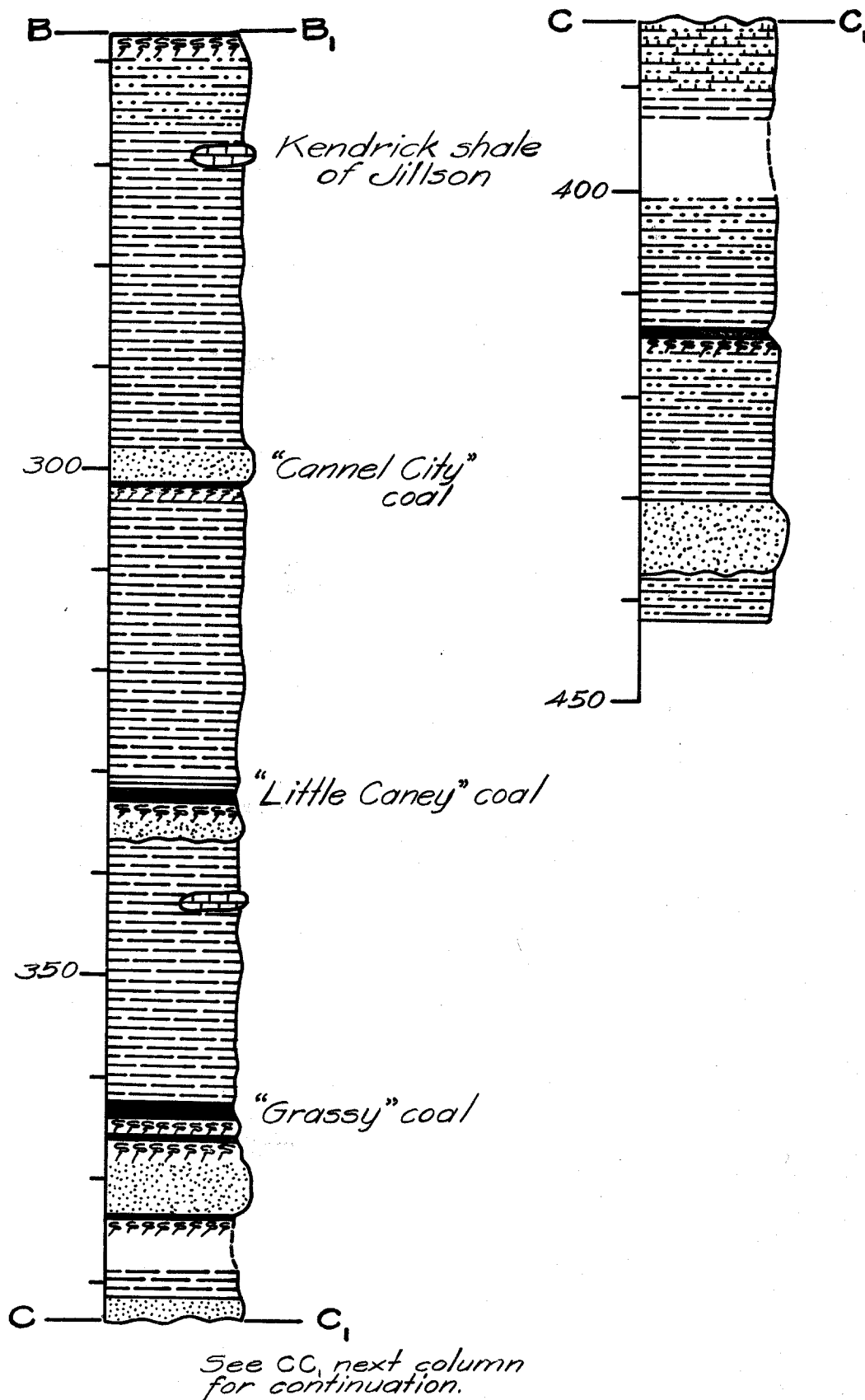


Fig. 6

STOP 3. Section along U.S. Route 460
between Index & West Liberty.

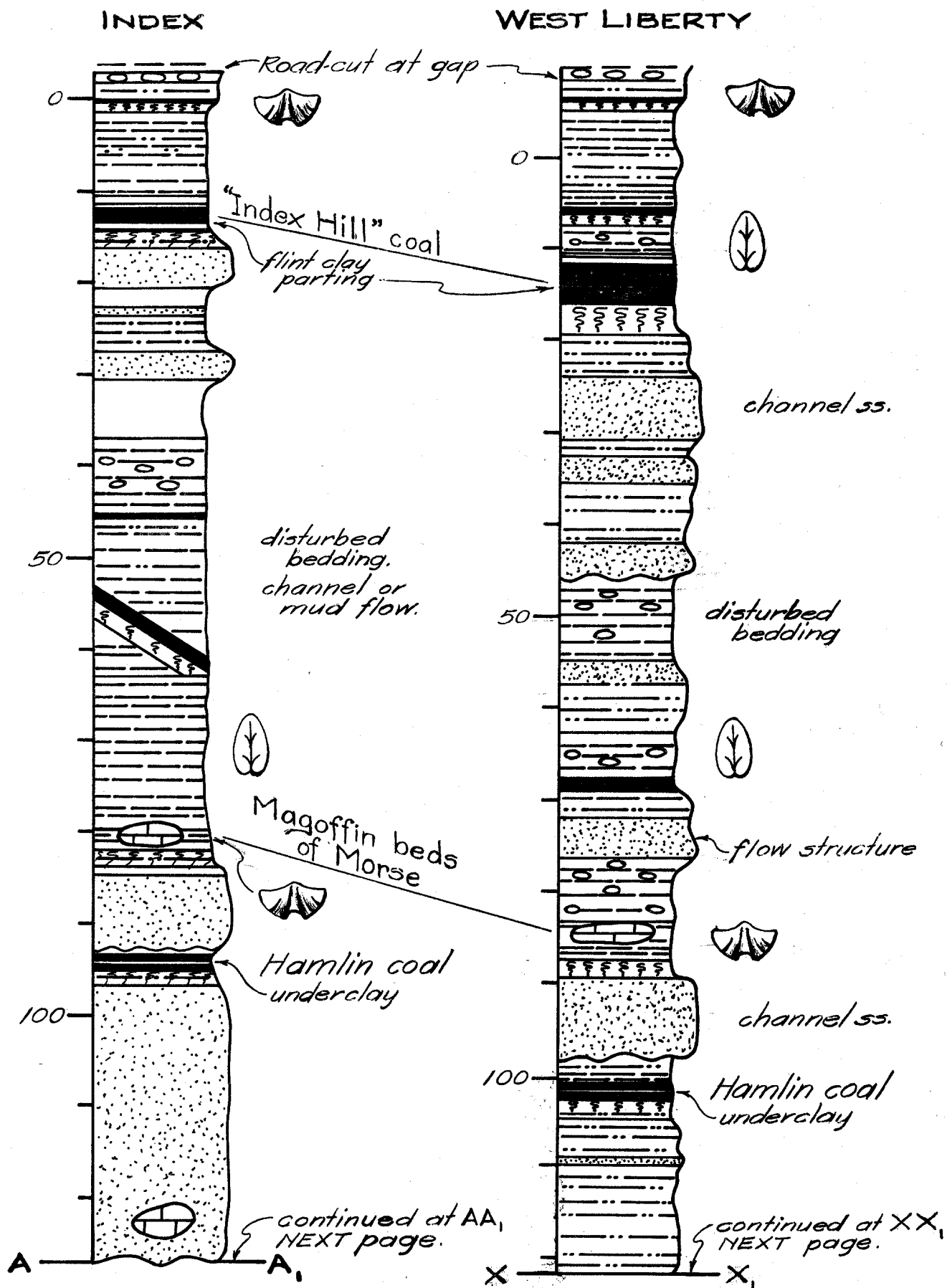


Fig. 6 STOP 3. Index-West Liberty section (cont.)

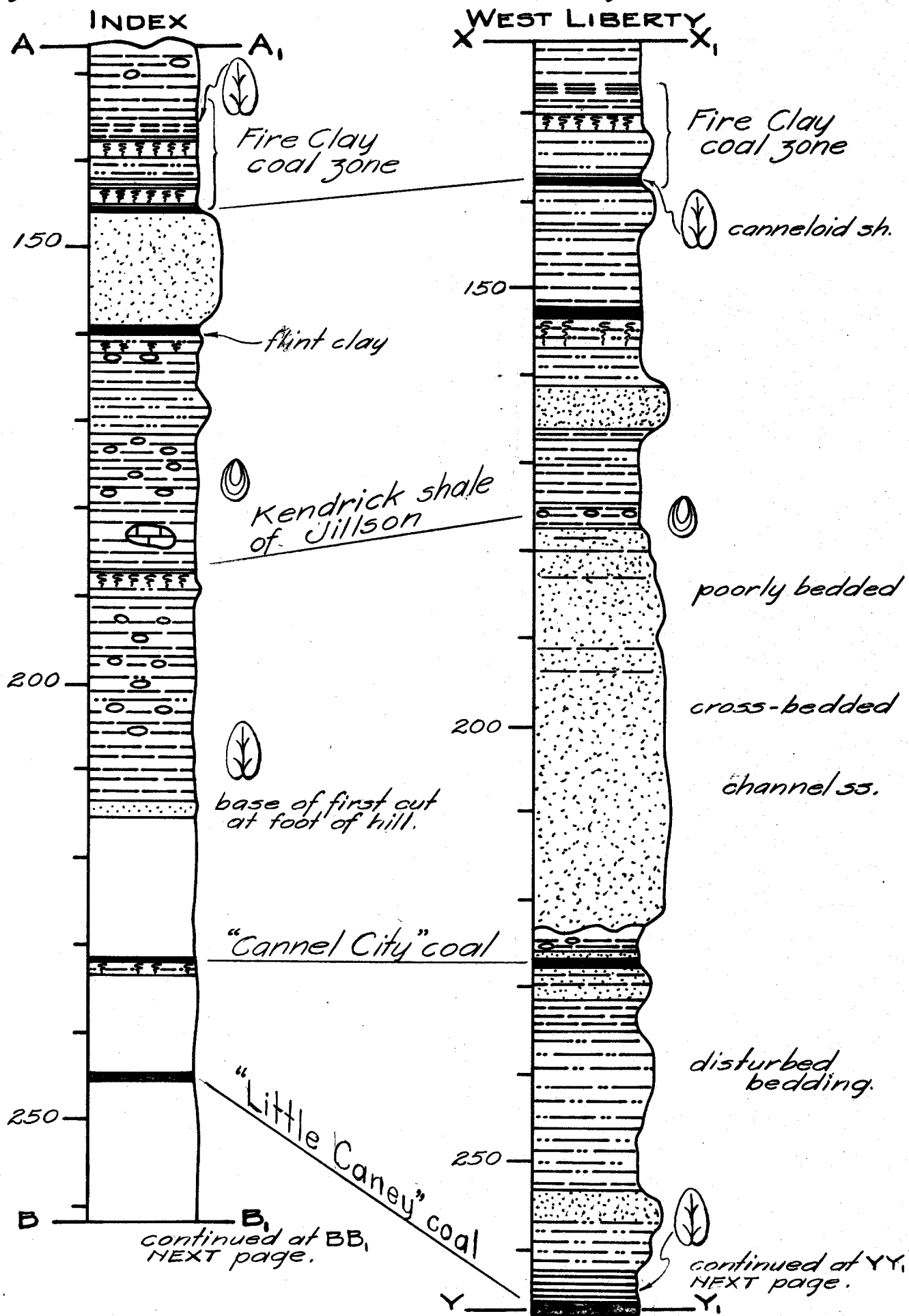
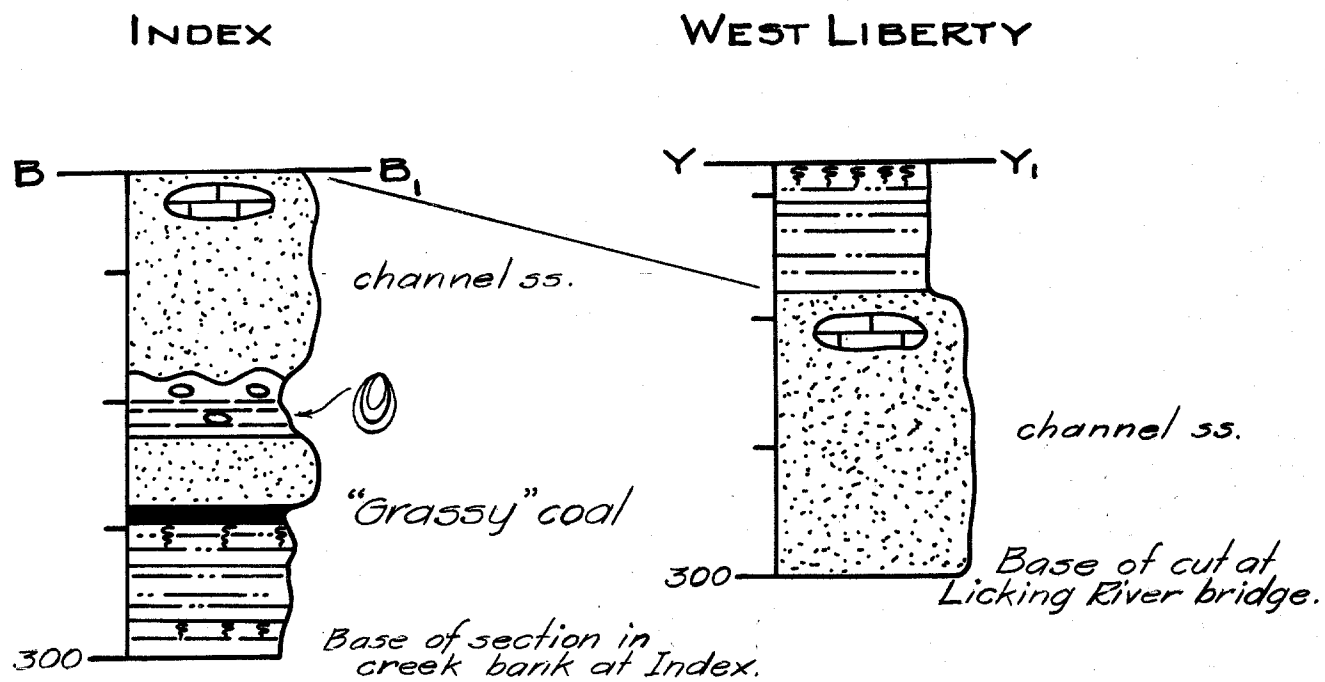


Fig. 6

STOP 3. Index-West Liberty section (cont.)



<u>Total Mileage</u>	<u>Distance Between Points</u>	
--------------------------	------------------------------------	--

47.3	0.6	Bridge over Licking River at West Liberty.
48.3	1.0	LUNCH STOP WEST LIBERTY.
48.4	0.1	Stop light in West Liberty. TURN RIGHT, FOLLOW U. S. ROUTE 460.
49.0	0.6	Junction Ky. Route 172. The section on Ky. Route 172, Fig. 7, shows very thick sandstones which are not present in the Index-West Liberty section, Fig. 6, one mile west. CONTINUE ON U. S. ROUTE 460.
50.4	1.4	SLOW. Base of section shown in Fig. 8.
50.8	0.4	Fire Clay coal exposed in road cuts to the left at the gap.
52.4	1.6	Near the curve at gap note the shales which are replaced by channel sandstone on the far side of the curve.
54.0	1.6	Fire Clay coal zone in road cuts on left. The Magoffin beds exposed in cut at gap on the right. They are mainly dark shales and sandstone here.
54.3	0.3	Fire Clay coal exposed in road cuts.
54.6	0.3	Junction of Ky. Route 364. Concretions in the Kendrick shale exposed in road cut opposite Cox's restaurant. Bridge over Licking River. Note the sandstone quarry at the southeast end of the bridge. The Fire Clay coal is exposed above the sandstone.
55.4	0.8	Concretions in the Kendrick shale exposed in several cuts. The shale becomes increasingly sandy toward the south.
57.0	1.6	Whiteoak. Bridge over Licking River. Kendrick shale exposed in road cut in town.
57.4	0.4	Junction Ky. Route 1000.
58.1	0.7	Approaching Irvine-Paint Creek fault. Note dips on the benches on the southwest side of the valley.

Fig. 7

No STOP. Composite Section along Ky. Route 172
between West Liberty & Elk Fork.

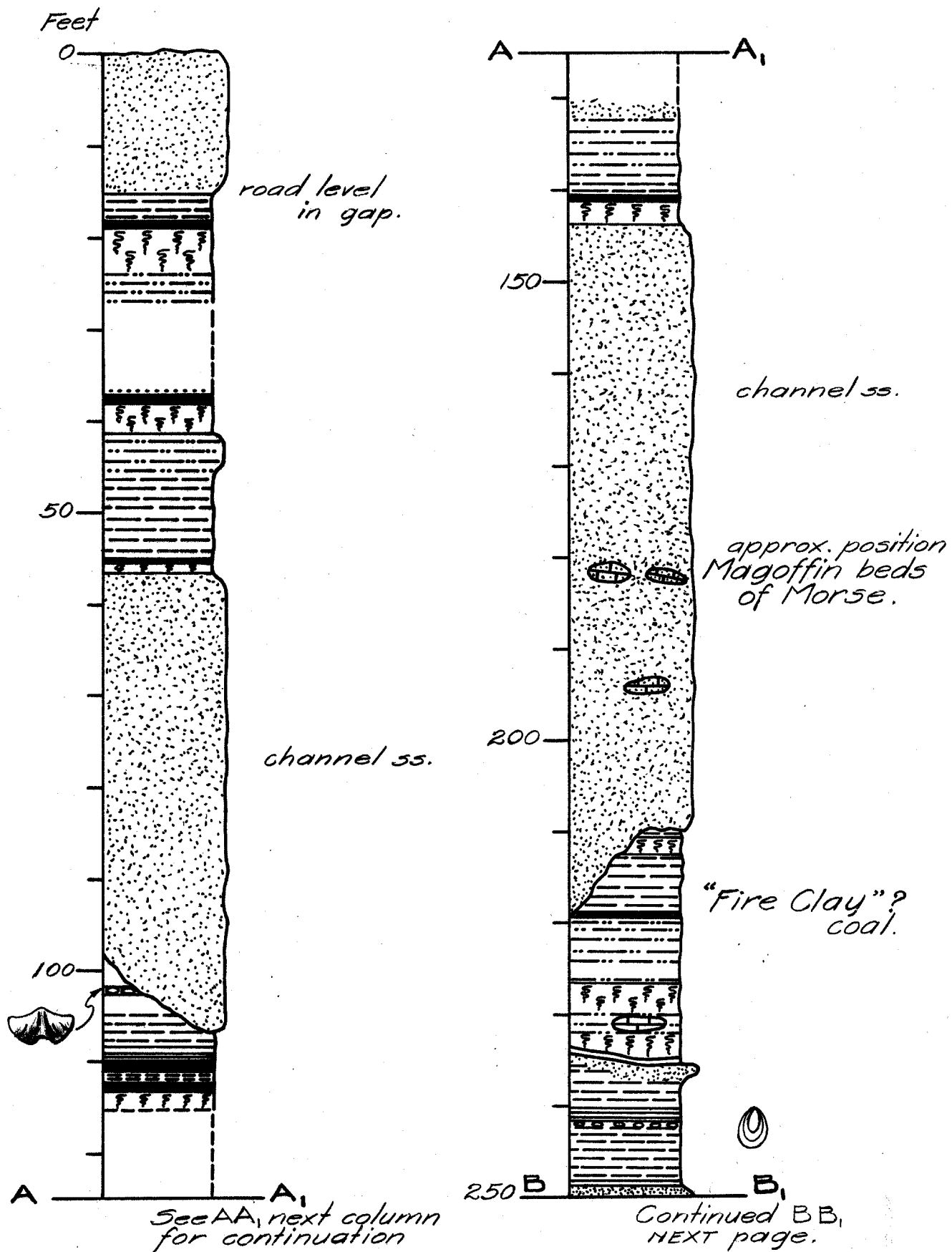


Fig. 7

No STOP. West Liberty-Elk Fork (cont.)

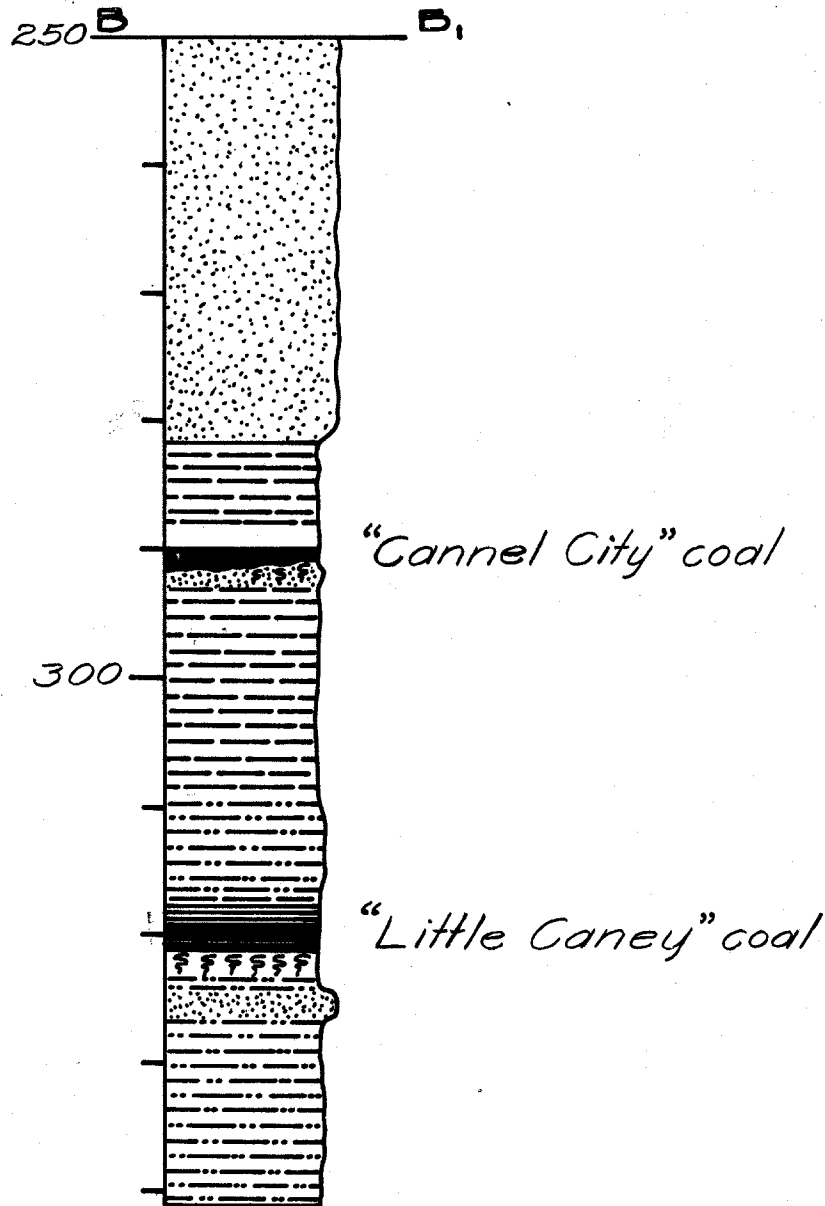
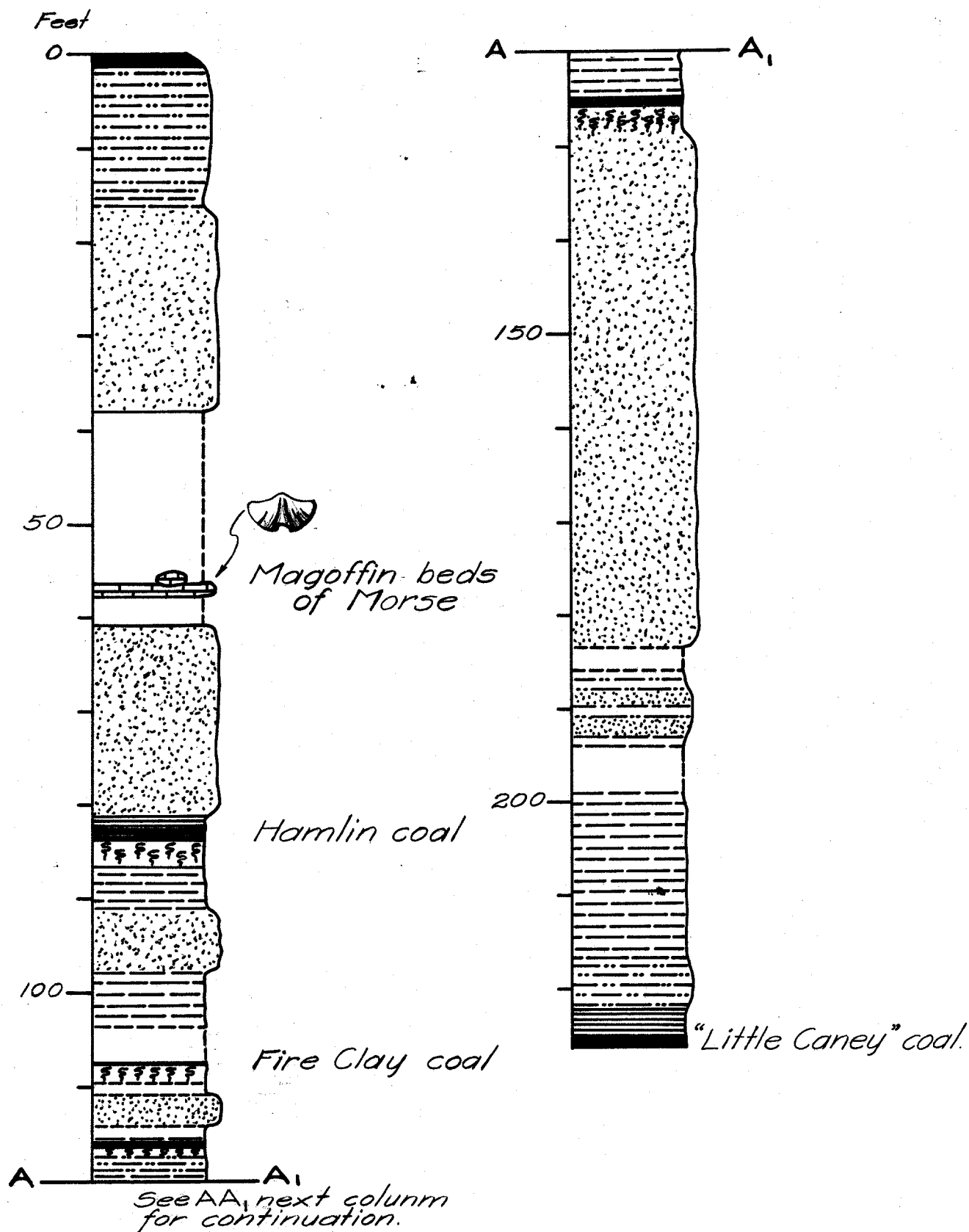


Fig. 8

No STOP. Section along U.S. Route 460
1.4 miles southeast of West Liberty.



<u>Total Mileage</u>	<u>Distance Between Points</u>	
58.4	0.3	Dipping beds on the south side of the Irvine-Paint Creek fault.
58.6	0.2	"Cannel City" coal with a flint clay parting exposed in the creek bed to the right of road.
59.3	0.7	Base of section shown in Fig. 9.
59.4	0.1	"Cannel City" coal with flint clay parting.
59.5	0.1	Kendrick shale.
59.8	0.3	Magoffin beds exposed in the gap. STOP NO. 4. Morgan-Magoffin County line section. 30 minutes. Park to the right of the road on shoulder. Section shown in Fig. 9.
61.7	1.9	Bridge over Licking River.
64.1	2.4	Magoffin beds exposed in gap.
64.2	0.1	Fire Clay coal.
64.7	0.5	STOP NO. 5. Section along U. S. Route 460 at Elsie. See Fig. 10. 20 minutes. RETURN TO CARS. TURN RIGHT ON KY. ROUTE 134 (GRAVEL ROAD). CROSS BRIDGE OVER LICKING RIVER. Kendrick shale exposed in the banks on the far side of the bridge. Note the flow rolls.
65.2	0.5	Concretions in the Kendrick shale. For the next 1.9 miles there are numerous exposures of Kendrick shale along the road.
67.1	1.9	STOP NO. 6. Johnson Creek fault. See Fig. 12. 15 minutes.
67.5	0.4	Fire Clay coal in many road cuts for next 5.6 miles.
73.1	5.6	Fire Clay coal exposed beneath the sandstone in the creek bed on the left. The coal goes below the stream level near here.
73.5	0.4	Limestone concretions in creek on the left.
74.1	0.6	Base of a channel sandstone. Landslides on left across creek.

Fig. 9

STOP 4. Section along U.S. Route 460 at Morgan-Magoffin County line.

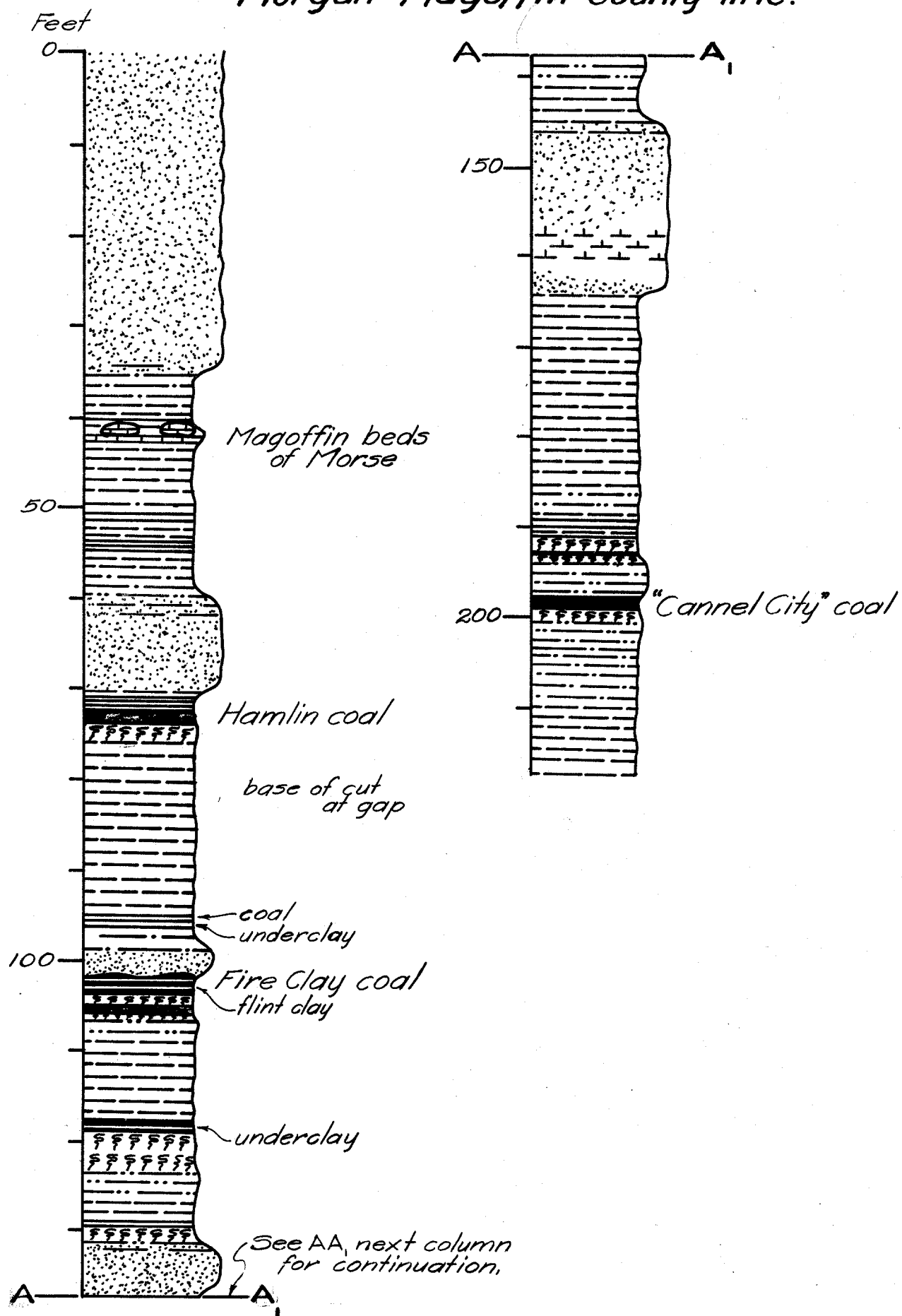


Fig. 10

**STOP 5. Section along U.S. Route 460
at Elsie.**

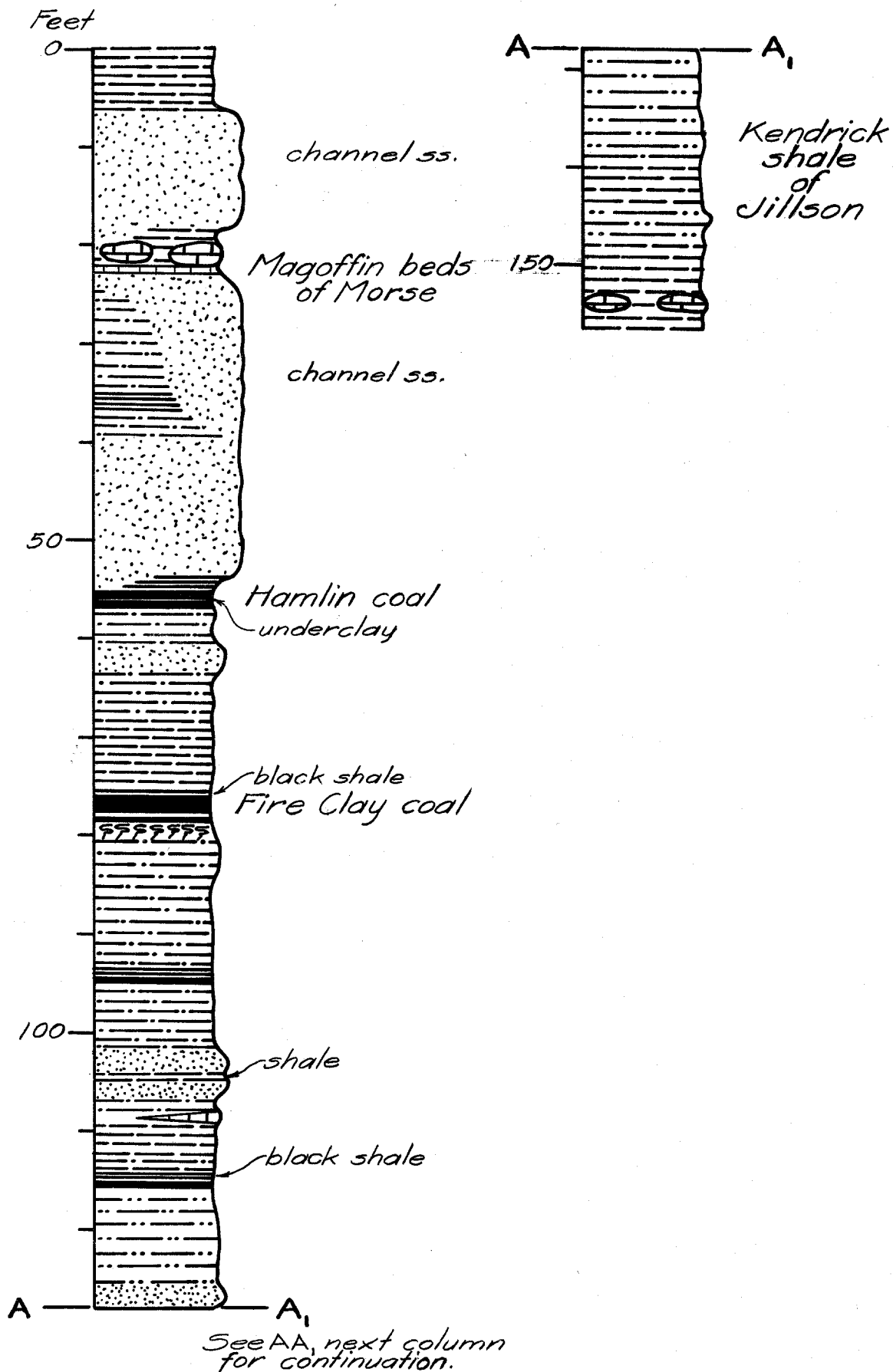
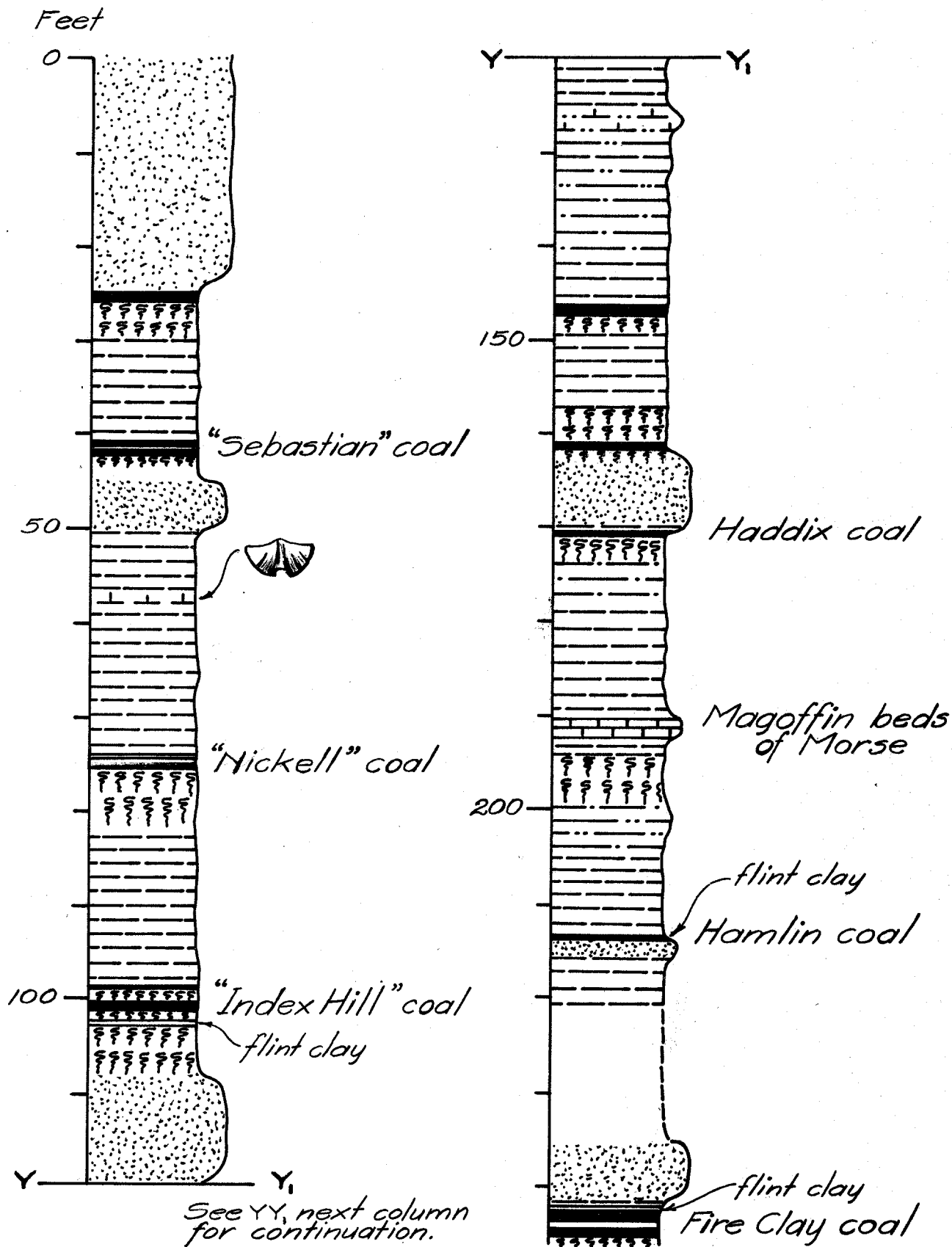


Fig. 11

No STOP. Section in the Headwaters of Wells Branch off Caney Creek, NW. part of Lykins Quadrangle.



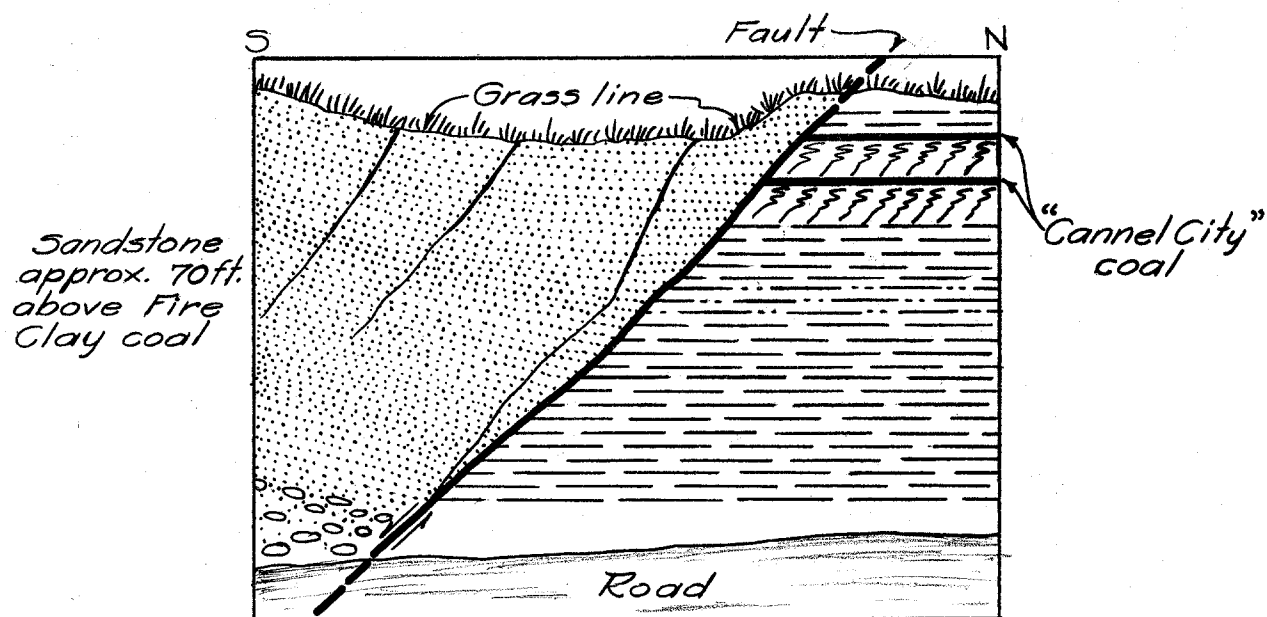


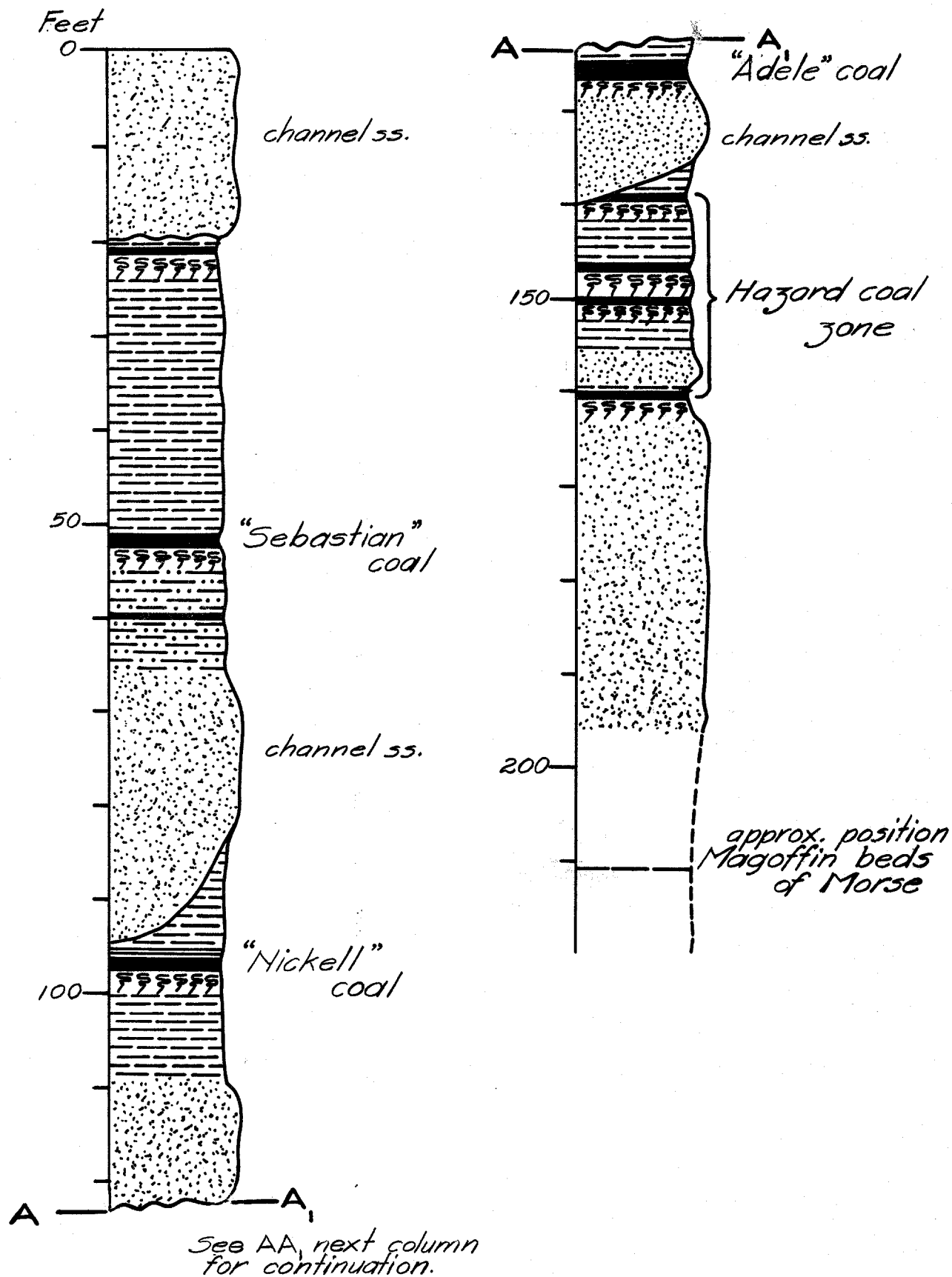
Fig. 12

STOP 6. Sketch of Johnson Creek Fault.

Approximate displacement - 160 ft.
Dip of fault plane 40° - 45° S.

<u>Total Mileage</u>	<u>Distance Between Points</u>	
75.0	0.9	Coal in the Hazard coal zone. Channel sandstone above.
75.2	0.2	"Adele" coal in the road cut on the right.
75.3	0.1	"Nickell" coal in the road cut on the right.
75.4	0.1	"Sebastian" coal in the road cut on the right.
75.6	0.2	STOP NO. 7. Park along the shoulder of the road near the "Sebastian" coal. Section along Ky. Route 134 at head of State Road Fork. See Fig. 13. 15 minutes.
75.8	0.2	"Adele" coal shows in many cuts along the road.
76.4	0.6	Old mine in hollow to the right. "Adele" coal. Note thick sandstone above.
77.3	0.9	Junction Ky. Route 191 at Adele. TURN LEFT ON KY. ROUTE 191.
77.8	0.5	Magoffin beds in road cut. Fossiliferous shales, overlain by sandstone.
79.4	1.6	Morgan-Wolfe County line.
79.9	0.5	Helechawa. Junction Ky. Route 205. Fire Clay coal is exposed in the cut bank behind the barn at the store.
80.5	0.6	Concretions in Kendrick shale.
81.0	0.5	Mines in "Cannel City" coal on the right. Here the "Cannel City" coal dips east on the flank of the Caney anticline. Note the old openings on the coal seam rising toward the west on the hills to the north of the road.
81.3	0.3	This point is near the crest of the Caney anticline.
81.7	0.4	Junction Ky. Route 205. CONTINUE STRAIGHT ON KY. ROUTE 191. This is the junction where we turned north this morning to go to Stop No. 1. Return to Natural Bridge State Park via Ky. Routes 191, 15, and 77 as we came out this morning. 31.8 miles to Park.

**Stop 7. Section along Ky. Route 134
at head of State Road Fork.**



Saturday Morning, May 16, 1953

Assembly point.---The party will leave from the parking lot below the Lodge at Natural Bridge State Park, promptly at 8:00 a.m., c.s.t.

Plan of the trip.---During the morning several Pennsylvanian sections will be visited on a route through Jackson to Salyersville via Ky. Routes 15 and 30. In the afternoon an optional trip will be offered to the Skyline mine, a quarry exposure of the Magoffin beds at Evanston, and a fault at Lambric. The route will be via Ky. Routes 7 and 542. Carry a lunch if you plan to take the optional trip.

<u>Total</u> <u>Mileage</u>	<u>Distance</u> <u>Between Points</u>	
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0.0	0.0	The zero point for the trip is the bridge at the entrance of the parking lot. Yesterday's route will be retraced for 22.1 miles to the junction of Ky. Routes 15 and 191 near Stillwater.
22.1	22.1	Junction with Ky. Route 191. KEEP RIGHT ON KY. ROUTE 15.
23.0	0.9	Coal bloom in ditch on right in the lower part of the Breathitt formation. Cross bridge over Buchanan Creek.
23.2	0.2	Coal bloom on left in lower part of the Breathitt formation.
23.7	0.5	Dark shale on left - lower part of Breathitt formation.
23.9	0.2	Cross bridge over Land Saw Creek.
24.2	0.3	Town limit of Land Saw.
25.0	0.8	Coal bloom above channel sandstone on left. Lower part of the Breathitt formation.
25.5	0.5	On left channel sandstone shows undulating base.
26.7	1.2	Cross bridge over Rockhouse Creek.
26.8	0.1	Exposure on left shows thin coal with shale and sandstone above. One and one-half inch shale directly above coal contains lingulas, orbiculoids, and pelecypods.
27.5	0.7	On left sandstone and thin coals. Probably the "Little Caney" coal.

<u>Total Mileage</u>	<u>Distance Between Points</u>	
28.0	0.5	Road to left leads to abandoned mine in the "Cannel City" coal. CONTINUE ON KY. ROUTE 15.
28.6	0.6	Wolfe-Breathitt County line at gap. Beginning of section shown in Fig. 14. Slow down to observe section. NO STOP. Section continues for 1.5 miles.
28.7	0.1	On right - exposure of Fire Clay coal with flint clay parting.
30.1	1.4	Base of section shown in Fig. 14.
30.5	0.4	Junction with gravel road to left. CONTINUE ON KY. ROUTE 15.
31.0	0.5	Cross bridge over Johnson Fork.
31.3	0.3	On left are dark shale and siltstone with ironstone plates and nodules.
31.6	0.3	Small mine in the "Van Cleve" coal across creek on right. This coal is probably the first coal above the Lee formation.
32.0	0.4	Junction with Ky. Route 205. CONTINUE ON KY. ROUTE 15.
32.3	0.3	SLOW. Cross-bedded conglomeratic sandstone in creek bank on right. Probably near the top of the Lee formation.
32.5	0.2	On left are dark shale and siltstone which overlie the "Van Cleve" coal.
32.7	0.2	On left is "Van Cleve" coal with dark shale and siltstone above. The "Van Cleve" coal and associated rocks are exposed for the next 0.7 miles in road cuts and openings.
33.9	1.2	Town limit of Van Cleve.
34.1	0.2	Cross bridge over Boone Fork. Abandoned mines and openings in "Van Cleve" coal along road and across creek.
35.1	1.0	Junction with Ky. Route 731. CONTINUE ON KY. ROUTE 15.

Fig. 14

No STOP. Section along Ky. Route 15
at Wolfe - Breathitt County line.

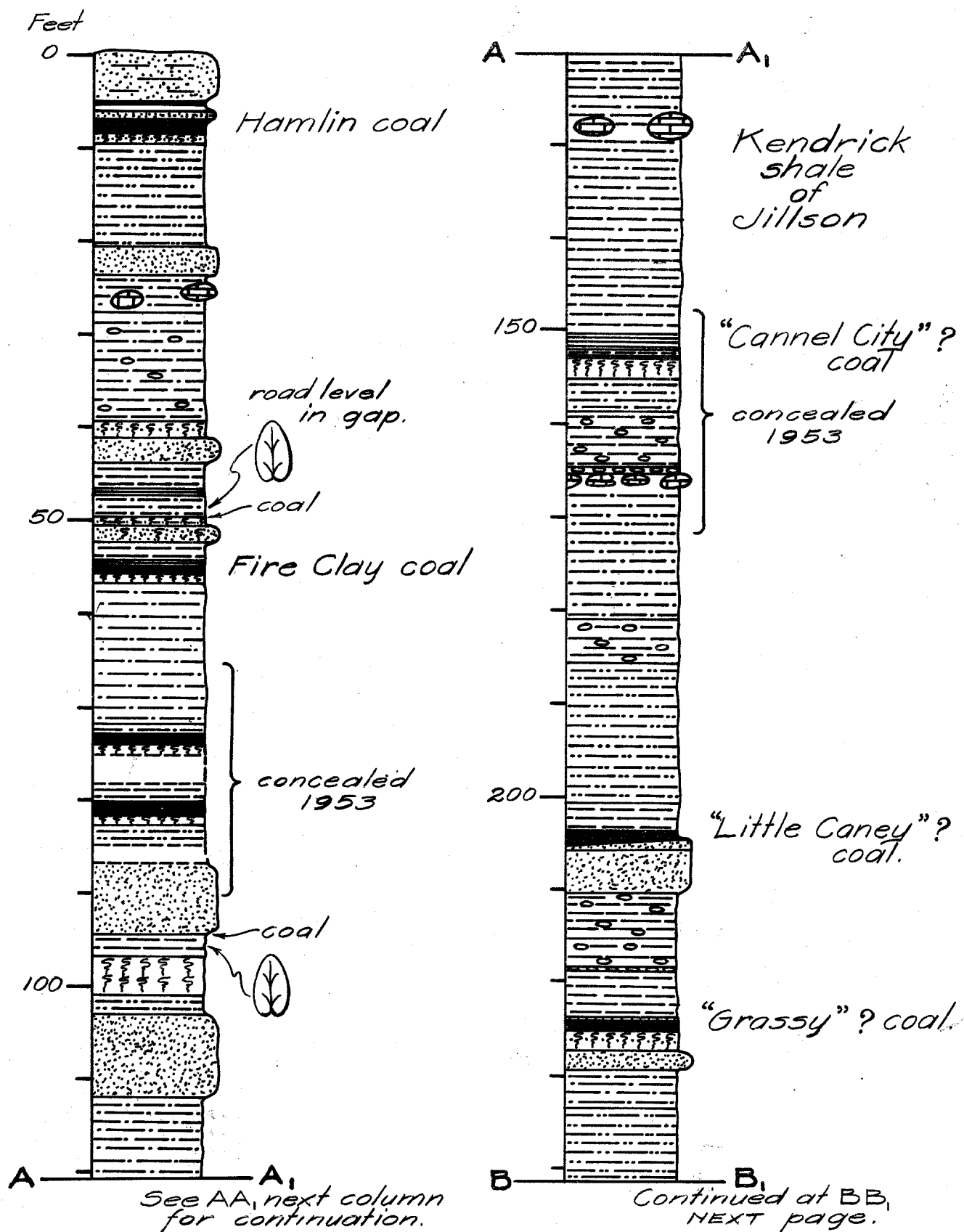
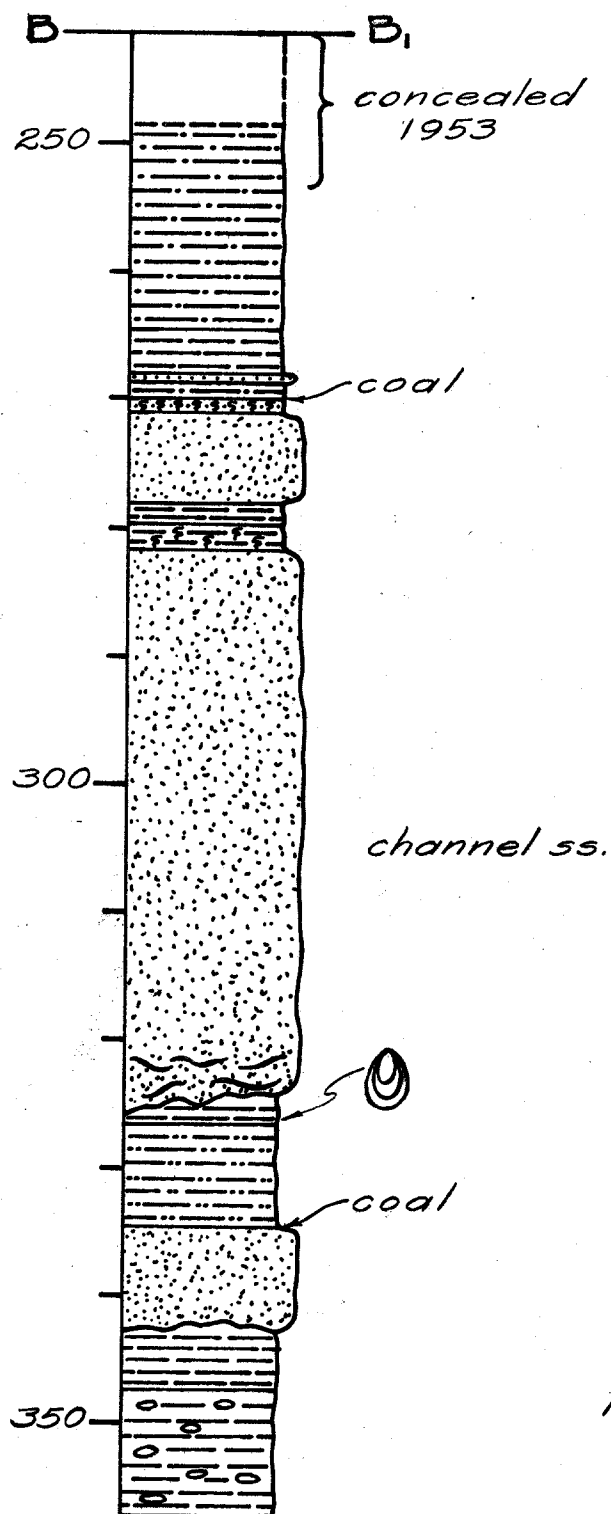


Fig. 14

No STOP. Wolfe-Breathitt County line.
(cont.)



Section measured by—
H.R. Wanless—July 6, 1936
(unpublished field notes)

<u>Total Mileage</u>	<u>Distance Between Points</u>	
35.2	0.1	For 0.1 mile dark shale and siltstone above "Van Cleve" coal.
35.9	0.7	"Van Cleve" coal exposed on left. Abandoned openings on left.
36.5	0.6	Dark shale and siltstone above "Van Cleve" coal.
37.1	0.6	Cross truss bridge. Junction with Ky. Route 378.
37.3	0.2	Dark shale and siltstone above "Van Cleve" coal.
38.6	1.3	Massive sandstone on left lies above the dark rocks overlying the "Van Cleve" coal.
39.1	0.5	Junction with Ky. Route 540. CONTINUE ON KY. ROUTE 15. Cross bridge over Cope Fork.
39.3	0.2	Town limit of Keck.
40.3	1.0	Small mine in "Grassy" (?) coal on right.
41.6	1.3	SLOW. Concretions in Magoffin beds nearly in place in ditch on left at sharp left curve.
41.9	0.3	Top of section shown in Fig. 15. Out crop continues for 1.5 miles.
42.8	0.9	STOP NO. 8. Section northeast of Jackson, Kentucky, see Fig. 15. One hour stop. The first cars will park on the shoulder of road near the sawdust pile. The remaining cars will continue for 0.2 mile along road and park on right shoulder of road across small ravine from old coal mines. The party will assemble at the old coal mines near the latter parking spot.
43.9	1.1	Junction with Ky. Route 731. CONTINUE ON KY. ROUTE 15. Rocks exposed along road are probably those in lower part of Fig. 15.
45.6	1.7	Town limit of Jackson. FOLLOW KY. ROUTE 15 TO JUNCTION WITH KY. ROUTE 30 AS FOLLOWS:
46.0	0.4	TURN LEFT - FOLLOW KY. ROUTE 15.
46.1	0.1	TURN RIGHT ON KY. ROUTE 15.

Fig. 15

STOP 8. Section along Ky. Route 15
about 2 miles northeast of Jackson.

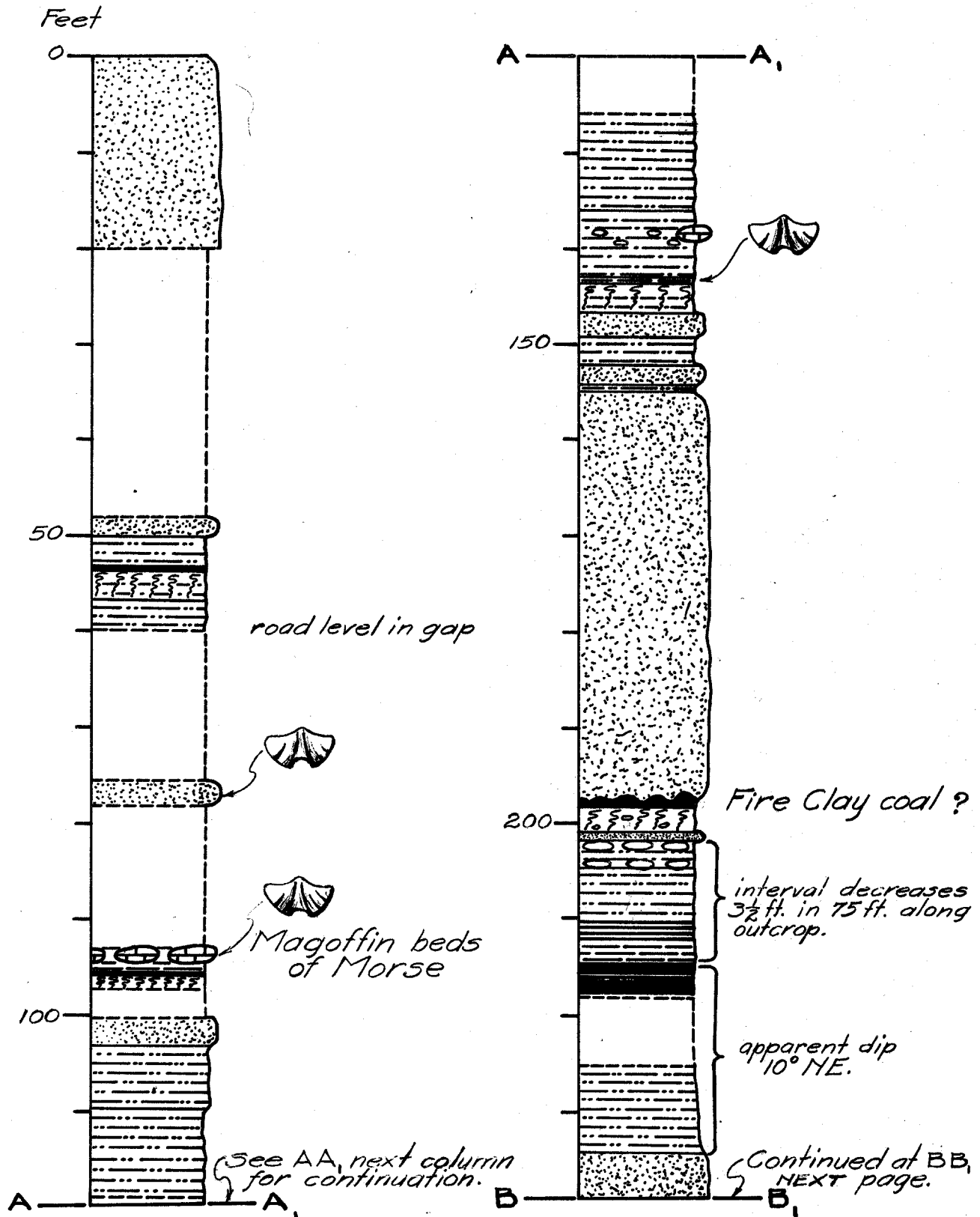


Fig. 15

STOP 8. Jackson section (cont.)

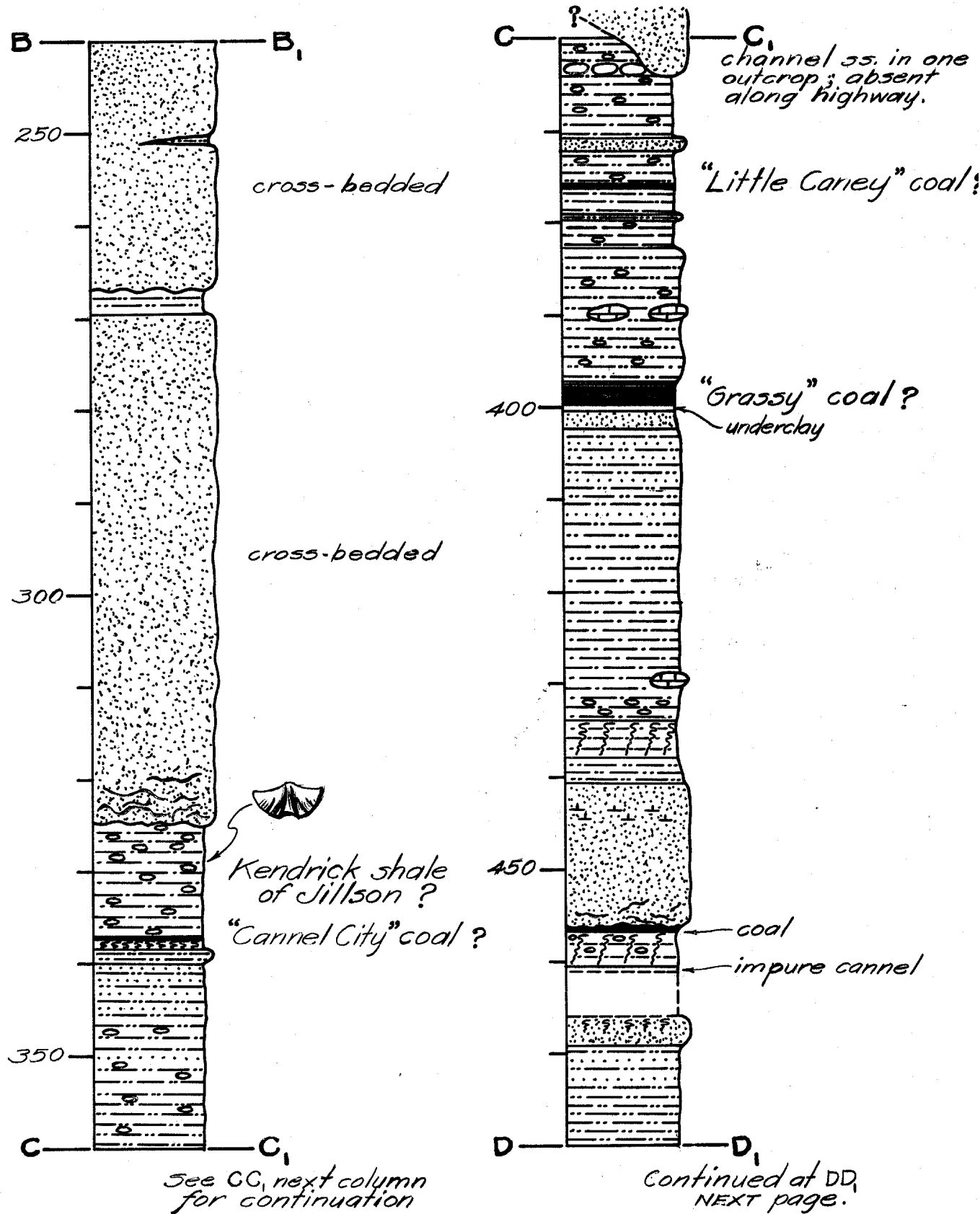
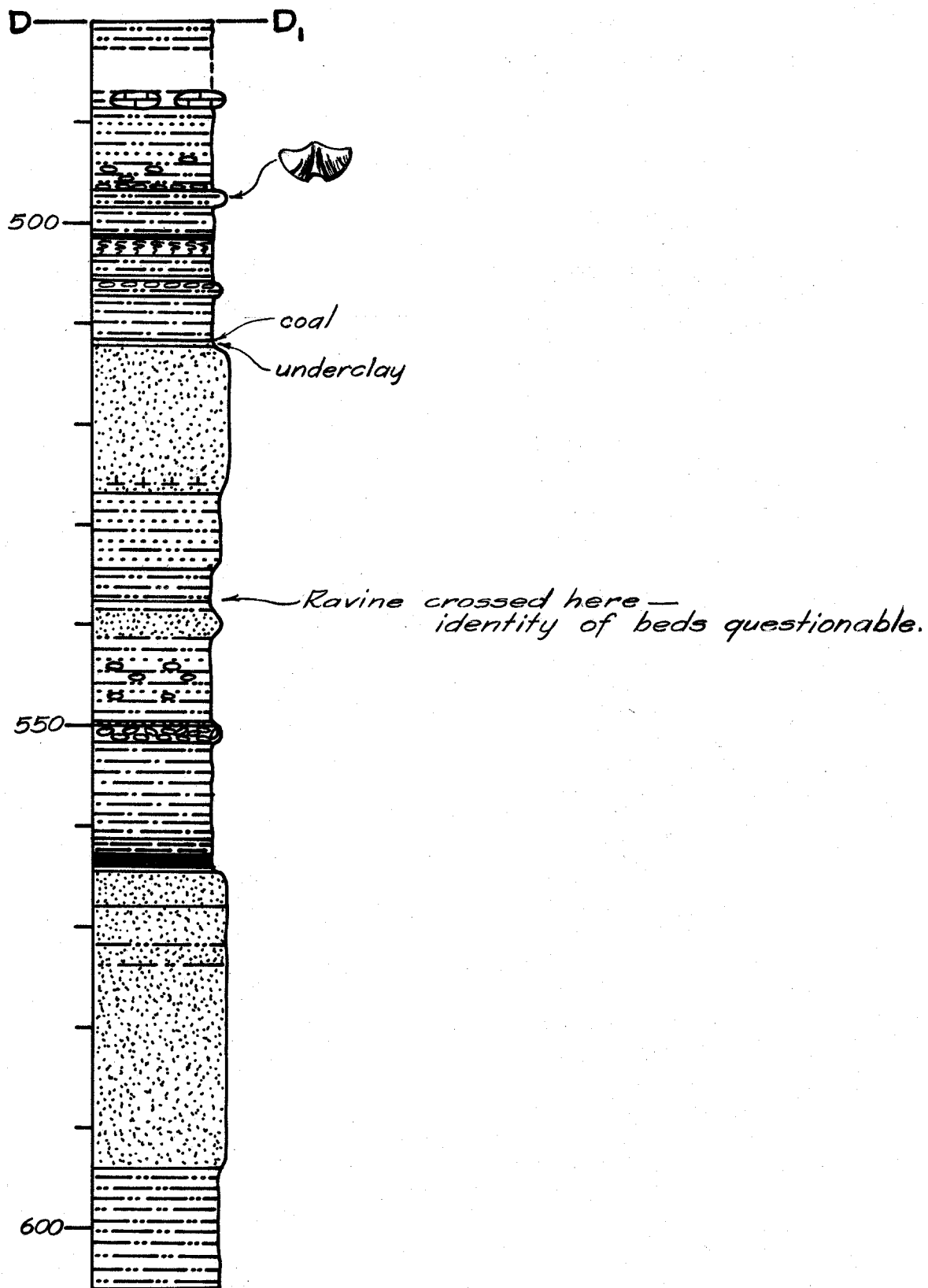


Fig. 15

STOP 8. Jackson section (cont.)

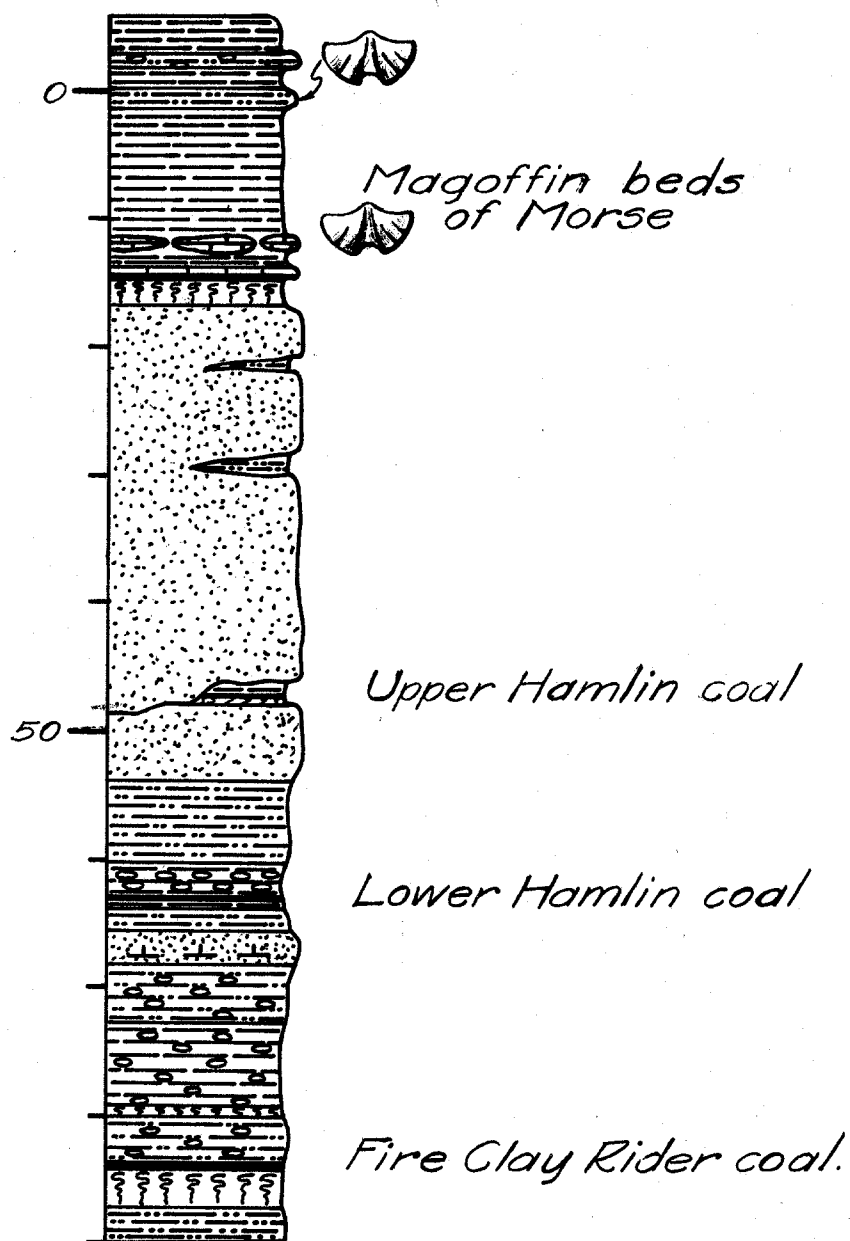


<u>Total Mileage</u>	<u>Distance Between Points</u>	
46.2	0.1	Junction with Ky. Route 30 at stop light. TURN LEFT ON KY. ROUTES 15 AND 30.
46.5	0.3	Shale, siltstone, and sandstone on left are probably below the "Grassy" (?) coal.
47.5	1.0	Exposures on left show shales, siltstones, and sandstones below the "Grassy" (?) coal.
48.5	1.0	Railroad cuts across creek to right show the "Grassy" (?) coal overlain by dark shale and channel sandstone.
49.0	0.5	Quarry on left in channel sandstone.
49.2	0.2	Channel sandstone splits - "Grassy" (?) coal between benches. Eastward along the highway the interval between sandstones increases and there is a shale containing limestone concretions above the "Grassy" (?) coal.
49.5	0.3	Junction Ky. Routes 30 and 15. TURN LEFT ON KY. ROUTE 30.
50.2	0.7	Rock preparation plant at right uses sandstone from quarry for road paving material. Ky. Route 30 is paved with an asphalt-sandstone mix.
50.6	0.4	Shale above "Grassy" (?) coal on left. Channel sandstone above; coal directly beneath is the "Little Caney" (?).
51.3	0.7	Across creek on right is opening in the "Grassy" (?) coal.
51.5	0.2	Shale above "Grassy" (?) coal on left.
52.7	1.2	Shale above "Grassy" (?) coal on left.
53.0	0.3	Coal bloom on left is probably the "Grassy" (?) coal.
53.4	0.4	Small sandstone cliffs to left of road may be the sandstone above the "Little Caney" (?) coal.
53.7	0.3	"Grassy" (?) coal exposed in cut on left.

<u>Total Mileage</u>	<u>Distance Between Points</u>	
54.4	0.7	Cliffs on left probably formed by the sandstone above the "Little Caney" (?) coal.
55.3	0.9	Black shale on left.
55.5	0.2	Domestic coal opening on right - probably the "Grassy" coal.
56.5	1.0	Shale on left is probably that below the "Grassy" (?) coal.
56.6	0.1	Domestic opening on left in the "Grassy" (?) coal.
57.3	0.7	Black shale and siltstone in low gap. Coal at top of cut is probably "Cannel City" coal.
57.7	0.4	Shale with limestone concretions above the "Grassy" (?) coal, exposed on left.
58.3	0.6	Channel sandstone above "Little Caney" (?) coal exposed on left. " Little Caney" coal may be locally eroded at this locality.
59.5	1.2	Amburgy (?) coal exposed in road cut on left.
60.6	1.1	Sandstone above Whitesburg (?) coal exposed on left.
61.3	0.7	Thin coal on left.
61.9	0.6	Thin coal below sandstone on left.
62.4	0.5	Coal bloom on left.
63.1	0.7	Exposure on left shows two thin coals above a sandstone. The coals may be in the lower part of the Fire Clay coal zone.
63.7	0.6	Fire Clay (?) coal below sandstone on left.
64.8	1.1	Cross bridge over Hunting Creek.
65.3	0.5	SLOW - Coal on left in ditch at culvert is probably the Fire Clay coal.
65.4	0.1	SLOW - Base of section shown in Fig. 16. No stop. Section continues for 0.3 mile.

Fig. 16

No STOP. Section along Ky. Route 30,
between Rosseau & Gauge.



<u>Total Mileage</u>	<u>Distance Between Points</u>	
66.3	0.9	On left the Hamlin coals and associated dark shales and siltstones are exposed.
66.4	0.1	Tipple to coal opening on hillside to left.
69.3	2.9	Junction with Ky. Route 542, gravel road to right. CONTINUE ON KY. ROUTE 30.
69.9	0.6	Note large limestone concretions in dark shale on left. This is probably the concretion zone above the Fire Clay rider coal.
70.5	0.6	Hamlin coals and associated dark rocks exposed on left.
72.0	1.5	Limestone concretions in the Magoffin beds in ditch on left. Ledge of sparsely fossiliferous calcareous siltstone above the concretions continues along road for 0.2 mile.
72.7	0.7	Openings on both sides of road are in the "Prater" coal.
73.2	0.5	Channel sandstone above "Prater" coal.
73.3	0.1	Bloom of "Nickell" coal on right.
73.7	0.4	Breathitt - Magoffin County line at gap. Top of section in Fig. 17.
74.1	0.4	Bloom of "Nickell" coal on left. Channel sandstone above "Prater" coal below.
74.5	0.4	STOP NO. 9. Section shown in Fig. 17. Twenty minute stop. Exposure of flint clay above the "Prater" coal. Park cars on right shoulder of the road. Openings across creek are in the "Prater" coal.
74.8	0.3	Mines in branch on left are in the "Prater" and "Nickell" coals.
75.2	0.4	SLOW. Magoffin beds exposed in ditch on left.
76.0	0.8	Bloom on left is Hamlin coal.
77.1	1.1	Fire Clay coal exposed on left.
77.5	0.4	Fire Clay coal exposed on left. Uppermost of the three coals contains the flint clay parting.

Fig. 17

STOP 9. Section along Ky. Route 30 at
Magoffin-Breathitt County line.

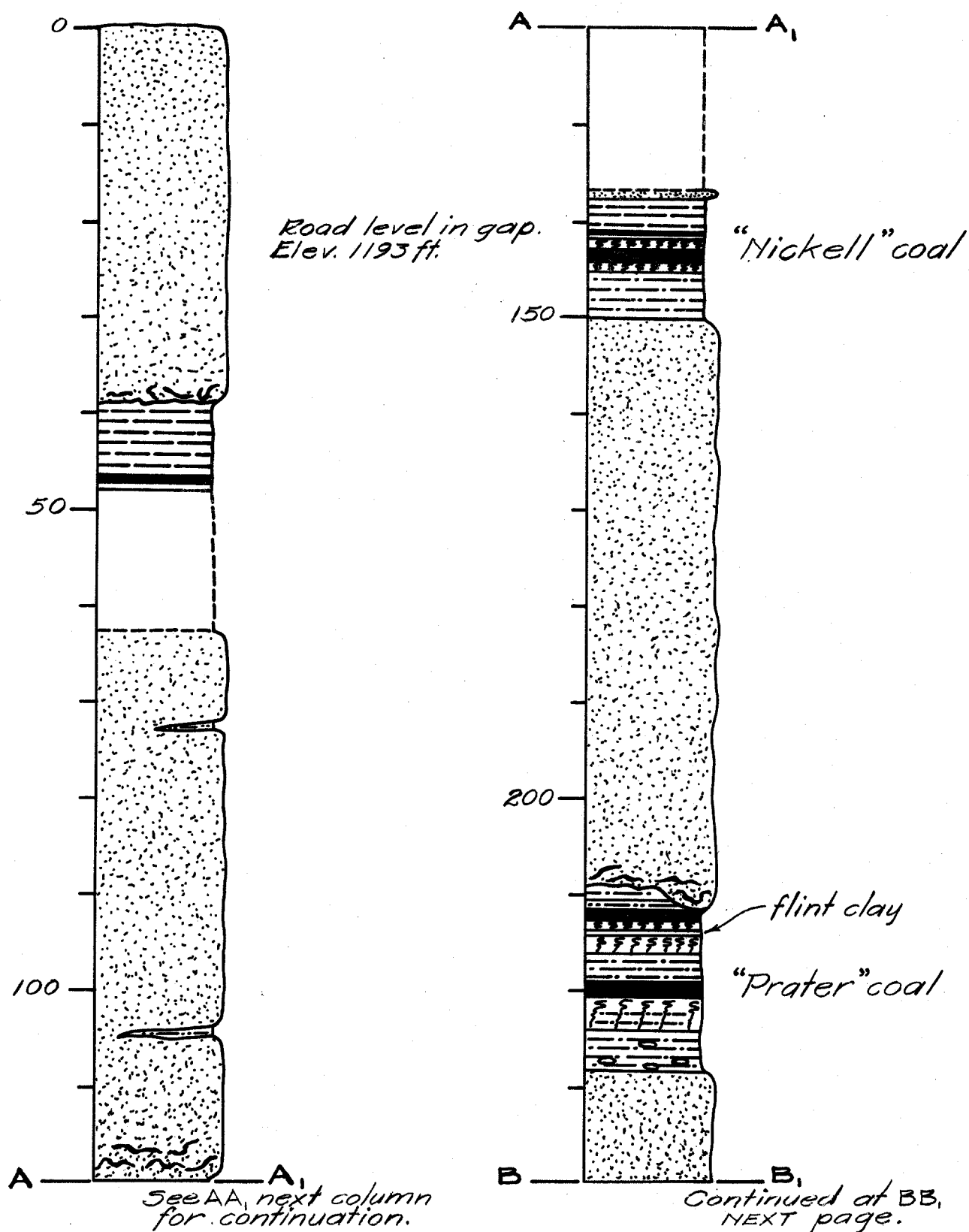
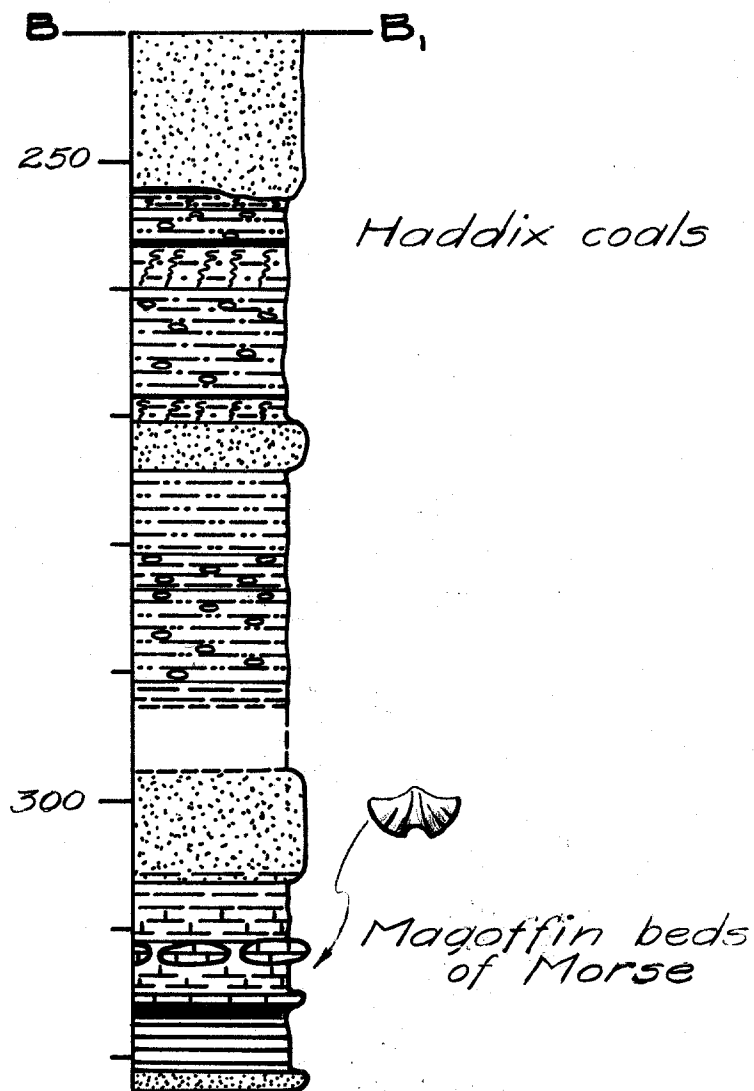


Fig. 17

STOP 9. Magoffin-Breathitt County line.
(cont.)



<u>Total Mileage</u>	<u>Distance Between Points</u>	
77.9	0.4	Fire Clay coal exposed in cut at gap in curve. Two thin coals below the coal with a flint clay parting are present here also.
78.1	0.2	Calcareous sandy beds above the Whitesburg coal.
78.5	0.4	Kendrick shale on left.
78.8	0.3	Whitesburg coal exposed on left.
79.5	0.7	"Cannel City" coal exposed in ditch on left at sharp left turn. The dip of beds in Kendrick shale above the coal probably is caused by recent slump.
80.2	0.7	"Cannel City" coal in ditch on left.
80.7	0.5	Kendrick shale on left.
80.8	0.1	STOP NO. 10. Section near Hendricks shown in Fig. 18. Park on right side of road. This is the last stop of the regularly scheduled field trip. Those who do not take the optional trip in the afternoon, may continue on Ky. Route 30 to the junction with U. S. Route 460 and Ky. Route 7 (1.0 mile west of Salyersville). Turn left to go to West Liberty, Lexington, and Ashland; turn right to Salyersville, Paintsville, and Prestonsburg. The road log continues to Salyersville. Stop No. 10 will be the lunch stop for those who take the optional trip.
80.9	0.1	Kendrick shale on left. Black fossiliferous shale at base of cut.
81.5	0.6	Small mine in "Cannel City" coal on left.
82.3	0.8	"Cannel City" coal on right.
82.8	0.5	Whitesburg coal exposed in ditch on left.
82.9	0.1	Fire Clay coal exposed at base of road cut on left.
83.3	0.4	Kendrick shale on left and bloom of "Cannel City" coal.
85.3	2.0	Junction with U. S. Route 460 and Ky. Route 7. TURN RIGHT.

Fig. 18

STOP 10. Section along side road,
0.3 mile south of Hendricks.

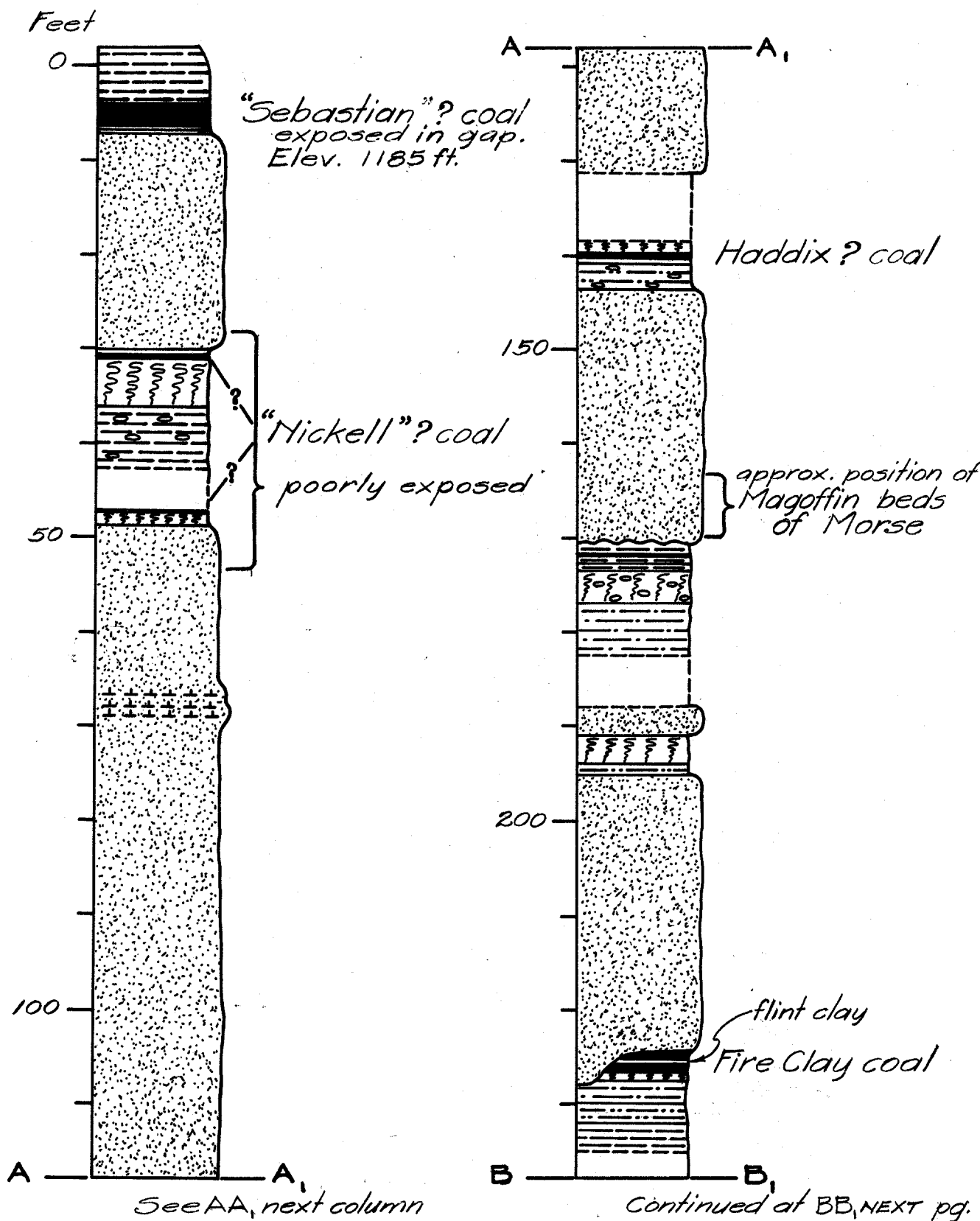
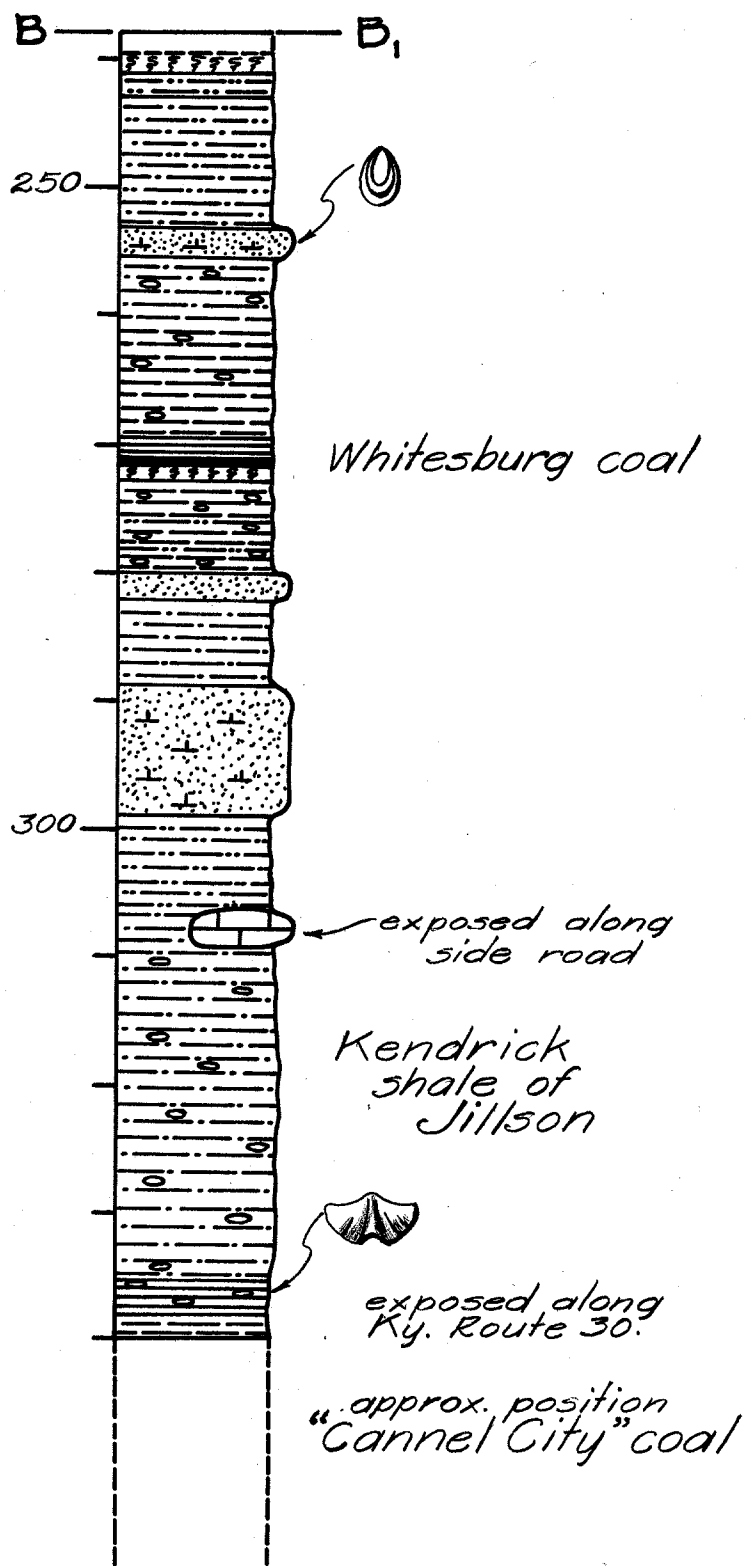


Fig. 18

STOP 10. Section along side road
0.3 mile south of Hendricks. (cont.)



<u>Total Mileage</u>	<u>Distance Between Points</u>	
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85.4	0.1	Quarry on left in channel sandstone. Kendrick shale and "Cannel City" coal probably have been removed by erosion before the sandstone was deposited.
86.1	0.7	Town limit of Salyersville. "Cannel City" coal with 1/4 inch flint clay parting on left.
86.6	0.5	Junction U. S. Route 460 and Ky. Route 7 at stop light. THOSE WHO PLAN TO TAKE THE OPTIONAL TRIP TURN RIGHT ON 7 AND CONTINUE 0.3 MILE TO ASSEMBLY POINT.

Saturday Afternoon, May 16, 1953

Assembly point.---The party will leave from the junction of Ky. Routes 7 and 114 in the southern edge of Salyersville.

Plan of the trip.---The party will visit the Skyline strip mine, a quarry exposure of the Magoffin beds, at Evanston, Kentucky, and a fault at Lambric, Kentucky. Follow Ky. Routes 7 and 542. No stops are scheduled for the first 26.8 miles, but notes on the geology are given in the road log.

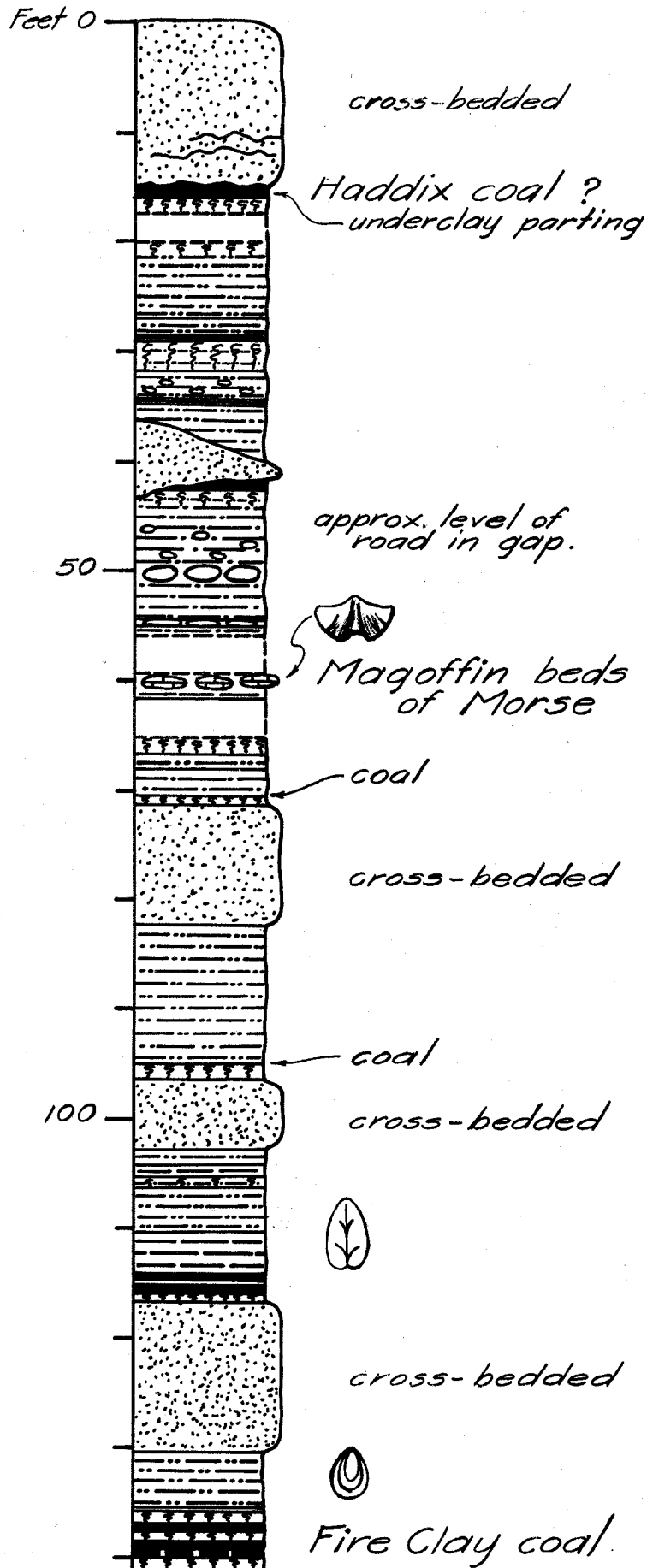
<u>Total Mileage</u>	<u>Distance Between Points</u>	
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0.0	0.0	Junction of Ky. Route 7 and 114. Check mileage. In the road cut on left the dark shale containing ironstone and limestone concretions probably is below the "Cannel City" coal. It is similar to the Kendrick shale but is older. KEEP RIGHT ON KY. ROUTE 7.
1.0	1.0	Massive sandstone on left probably above the Kendrick shale.
1.8	0.8	Exposures in road cuts on left show "Cannel City" coal with Kendrick shale above strip pit.
3.9	2.1	For 1.0 mile up this valley the numerous old mines on the hillside are in the Fire Clay coal.
5.1	1.2	Caved entry in the Fire Clay coal on right. From this mine to a point 1.0 mile down the valley the old mines on the hillsides are in the Fire Clay coal.
6.5	1.4	Old mines on hillside to left are in the Fire Clay coal.

<u>Total Mileage</u>	<u>Distance Between Points</u>	
7.2	0.7	SLOW - Enter Royalton. Cross railroad tracks and bridge. Stay on hard surface road. Kendrick shale exposed in cuts at edge of town.
8.1	0.9	Abandoned truck mine in Fire Clay coal on left.
8.5	0.4	Loading chute on left for mine in Fire Clay coal. Kendrick shale exposed along road.
8.8	0.3	Abandoned mine in Fire Clay coal on left.
9.1	0.3	Whitesburg coal on left.
9.4	0.3	Whitesburg coal exposed on left.
9.6	0.2	Abandoned mine in Fire Clay coal on left.
9.8	0.2	Hamlin coals exposed on left at curve.
10.2	0.4	Whitesburg coal on left.
10.5	0.3	Whitesburg coal and associated dark shale.
11.4	0.9	Hamlin coal exposed on left.
11.7	0.3	SLOW - Top of section at Galdia shown in Fig. 19. No stop. Magoffin beds exposed at 11.8 miles. End of exposure at 12.0 miles.
14.6	2.9	Massive sandstone is probably above Hamlin coal.
14.9	0.3	Hamlin coal and associated rocks.
15.5	0.6	Coal beneath overhanging sandstone is probably a Hamlin coal.
16.3	0.8	Sandstone in road cut on left overlain by a thin coal and the Magoffin beds.
16.5	0.2	For 0.3 mile the road cut on left shows the Magoffin beds between sandstone benches. Sandstone replaces Magoffin beds near junction Ky. Route 542, and the two sandstone beds join.
16.8	0.3	Junction with Ky. Route 542 (not marked). TURN RIGHT AND CROSS BRIDGE. Sign points to Evanston.

Fig. 19

No STOP. Section along Ky. Route 7
at Galdia.



<u>Total Mileage</u>	<u>Distance Between Points</u>	
18.8	2.0	Limestone concretions in Magoffin beds weathering out of bank on left.
19.7	0.9	Waldo Post Office on right. Opening in "Prater" coal in hollow on left.
19.9	0.2	Limestone concretions in the Magoffin beds in bank on left near oil tank.
20.0	0.1	Road fork - KEEP RIGHT.
20.2	0.2	Mine in "Prater" coal on hillside to left.
22.3	2.1	On left is Haddix coal overlain by channel sandstone.
22.6	0.3	Base of section shown in Fig. 20. "Prater" coal on right. No stop. APPROACHING HILL - LOW GEAR NEEDED.
22.9	0.3	Small mine in "Nickell" coal by house on right. A short distance above the Fugate coal poorly exposed in ditch on right.
23.0	0.1	Junction - TURN RIGHT INTO ENTRANCE TO SKYLINE MINE NO. 23.
23.5	0.5	Top of section shown in Fig. 20. Road forks. Follow lead car.
27.0+ —	3.5	STOP NO. 11. Park cars along road. The party will walk out ridge for 3/8 mile. Exposures along strip show splitting of "Tip Top" coal beds. Retrace route to entrance of strip mine.
31.0+ —	4.0	Junction at entrance of Skyline Mine. TURN RIGHT. CHECK MILEAGE.
31.1	0.1	"Nickell" coal on left.
31.3	0.2	"Prater" rider coal on left.
31.6	0.3	"Prater" coal on right.
32.2	0.6	Magoffin beds and sandstone beneath exposed on right by house.
32.4	0.2	Evanston, Pond Creek Pocahontas Coal Co. commissary. Cross railroad tracks and bridge. AT ROAD FORK TURN LEFT.

Fig. 20

No STOP. Section exposed in roadcuts at Magoffin-Breathitt County line on Ky. Route 542 and along road to Skyline Mine.

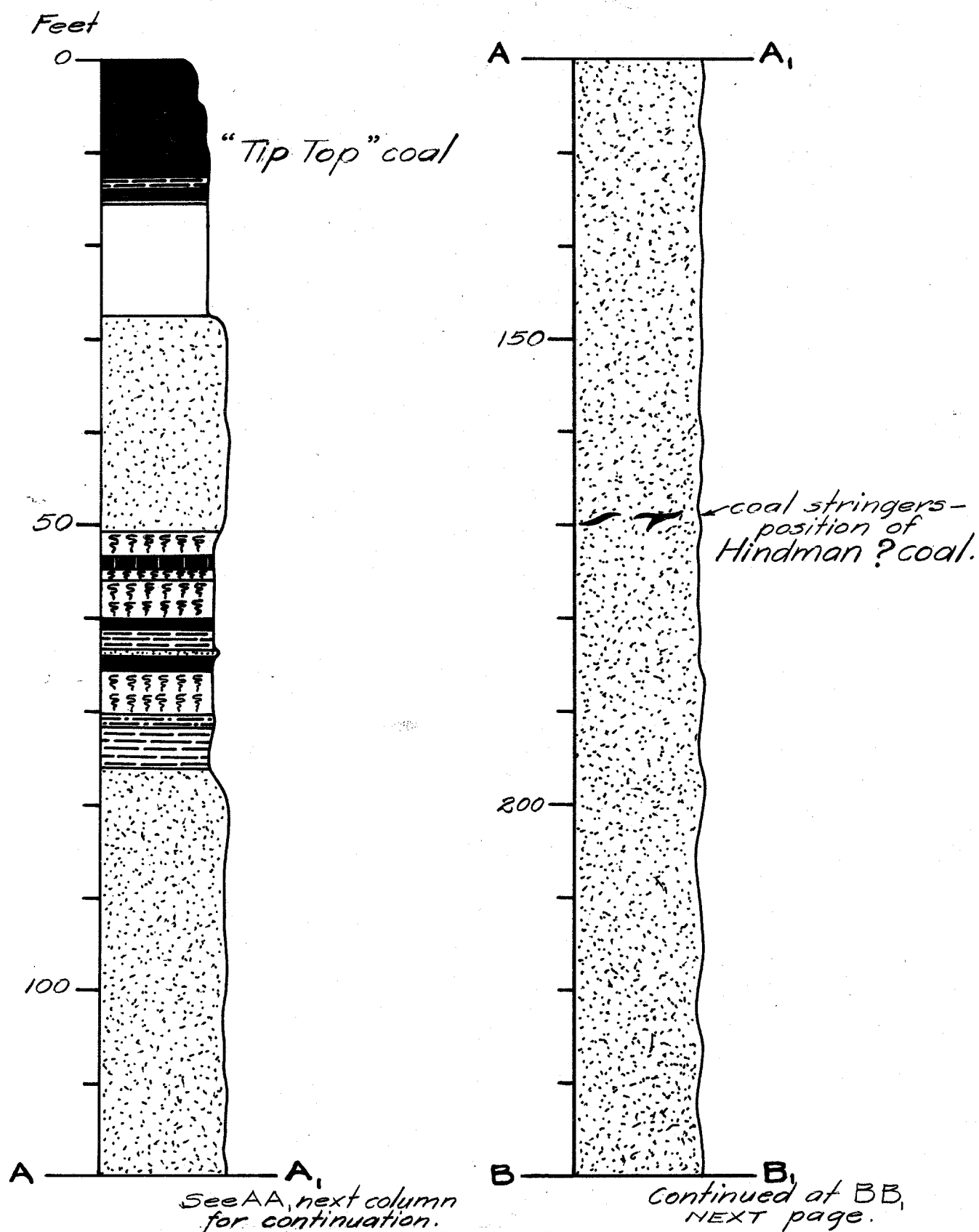
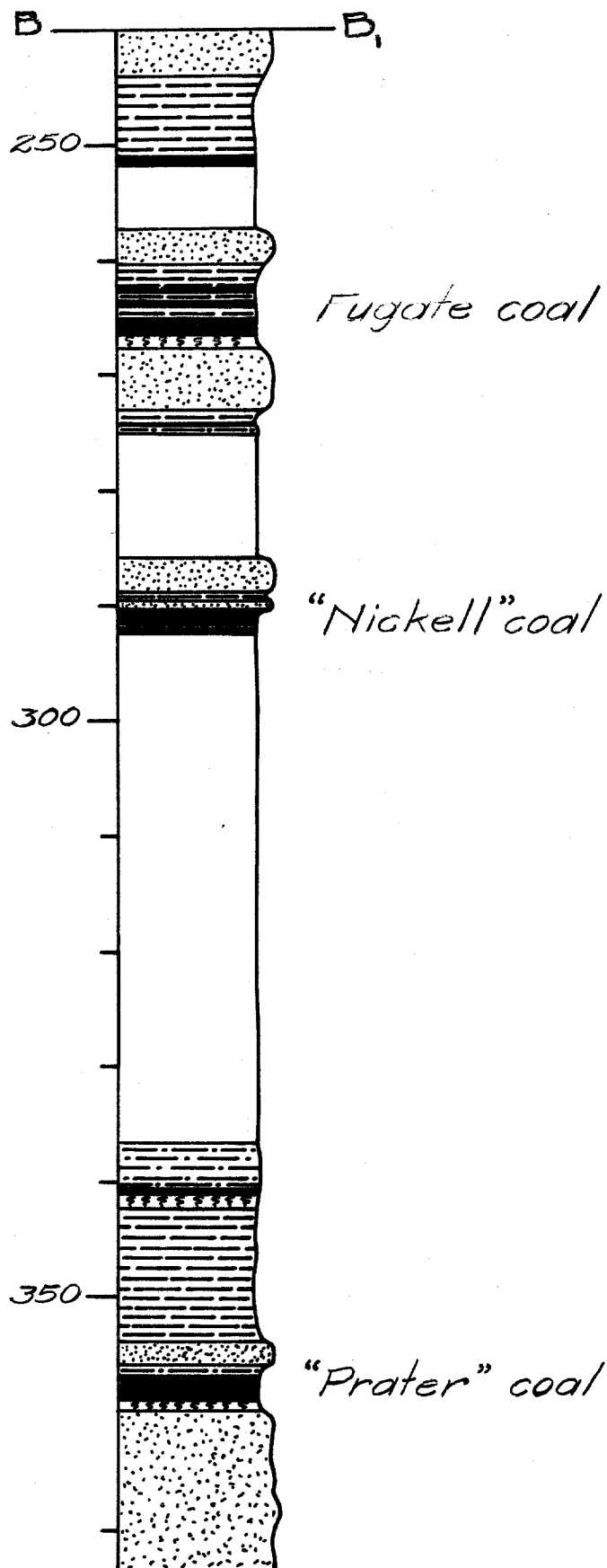


Fig. 20

NO STOP. Magoffin-Breathitt County line
on Ky. Route 542 (cont.)

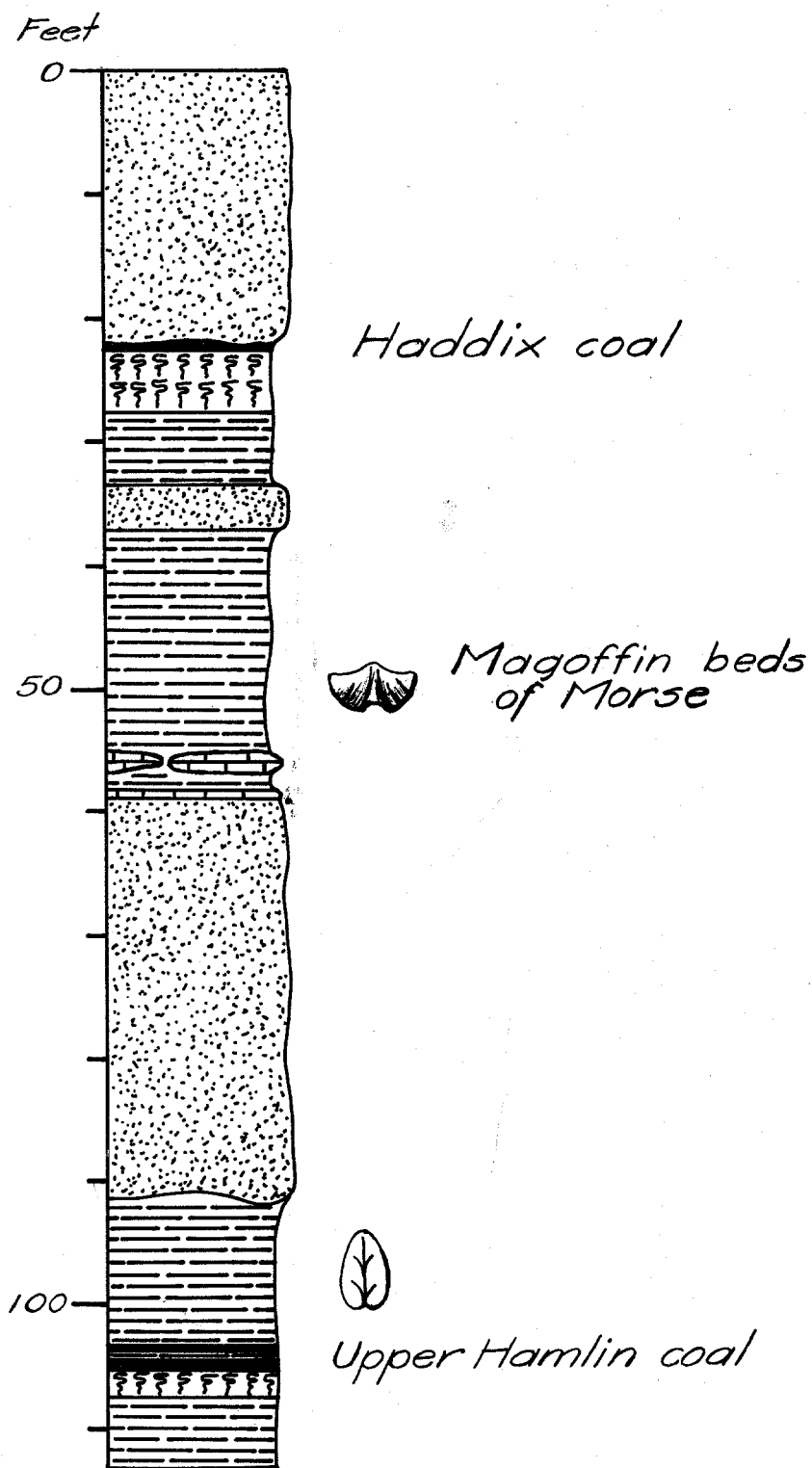


<u>Total</u> <u>Mileage</u>	<u>Distance</u> <u>Between Points</u>	
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32.8	0.4	STOP NO. 12. Quarry exposure of Magoffin beds. See Fig. 21. Park in school playground to left of road. Walk across creek and to left along railroad tracks to quarry. Hamlin coals exposed in railroad cuts. RETURN TO CARS. RETRACE ROUTE 0.4 MILE TO ROAD FORK.
33.2	0.4	Road fork - TURN LEFT. Hamlin coals and associated rocks exposed in road and railroad cuts.
34.0	0.8	Washing plant and tippie for the Skyline mine. Cut bank behind tippie shows from bottom to top: Hamlin coals and associated dark shale overlain by sandstone and the Magoffin beds.
34.3	0.3	Road cut on left shows the Fire Clay rider coal at base of cut and lower Hamlin coal above.
35.4	1.1	On left position of Fire Clay coal represented by 1.0 inch of cannel coal and underclay.
35.6	0.2	Fire Clay rider and lower Hamlin coals exposed in railroad cut to right.
36.0	0.4	Road cut on left shows Fire Clay rider coal above the sandstone and Fire Clay coal below the sandstone. Exposures of Fire Clay coal in railroad cuts on right.
36.8	0.8	Hamlin coals and associated dark shale on left.
36.9	0.1	Small bridge. Fire Clay coal exposed in bed of creek on left.
37.0	0.1	Road forks - KNEEP RIGHT.
37.4	0.4	Exposure of Hamlin coals and associated dark shale in railroad cut on right.
38.5	1.1	SLOW. Railroad cut to right shows good exposure of a sandstone channel replacing the Magoffin beds.
38.8	0.3	Road and railroad cuts expose the Hamlin coals and dark shale.
39.1	0.3	Fire Clay coal in cut across creek to right. SLOW - DANGEROUS CURVE RIGHT AND NARROW BRIDGE. TURN LEFT AFTER CROSSING BRIDGE.

Fig. 21

STOP 12. Section in abandoned quarry
at Evanston.



<u>Total</u> <u>Mileage</u>	<u>Distance</u> <u>Between Points</u>	
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39.3	0.2	Oil well on left.
39.4	0.1	Oil well on right.
40.0	0.6	Hamlin dark shales and overlying sandstone.
40.3	0.3	Channel sandstone above Hamlin coals on right.
41.0	0.7	Hamlin coals and associated dark shale on right.
41.6	0.6	STOP NO. 13. Lambric fault, shown in Fig. 22. Park on shoulder of road. Exposures showing repetition of beds are along stream in branch to right. This is the last stop of the field trip. Continue on this road for 10.0 miles to junction with Ky. Route 30. A left turn at this junction will take you to Jackson - 23.0 miles. A right turn at the junction will take you to the junction with U. S. Route 460 one mile west of Salyersville - 16.0 miles.

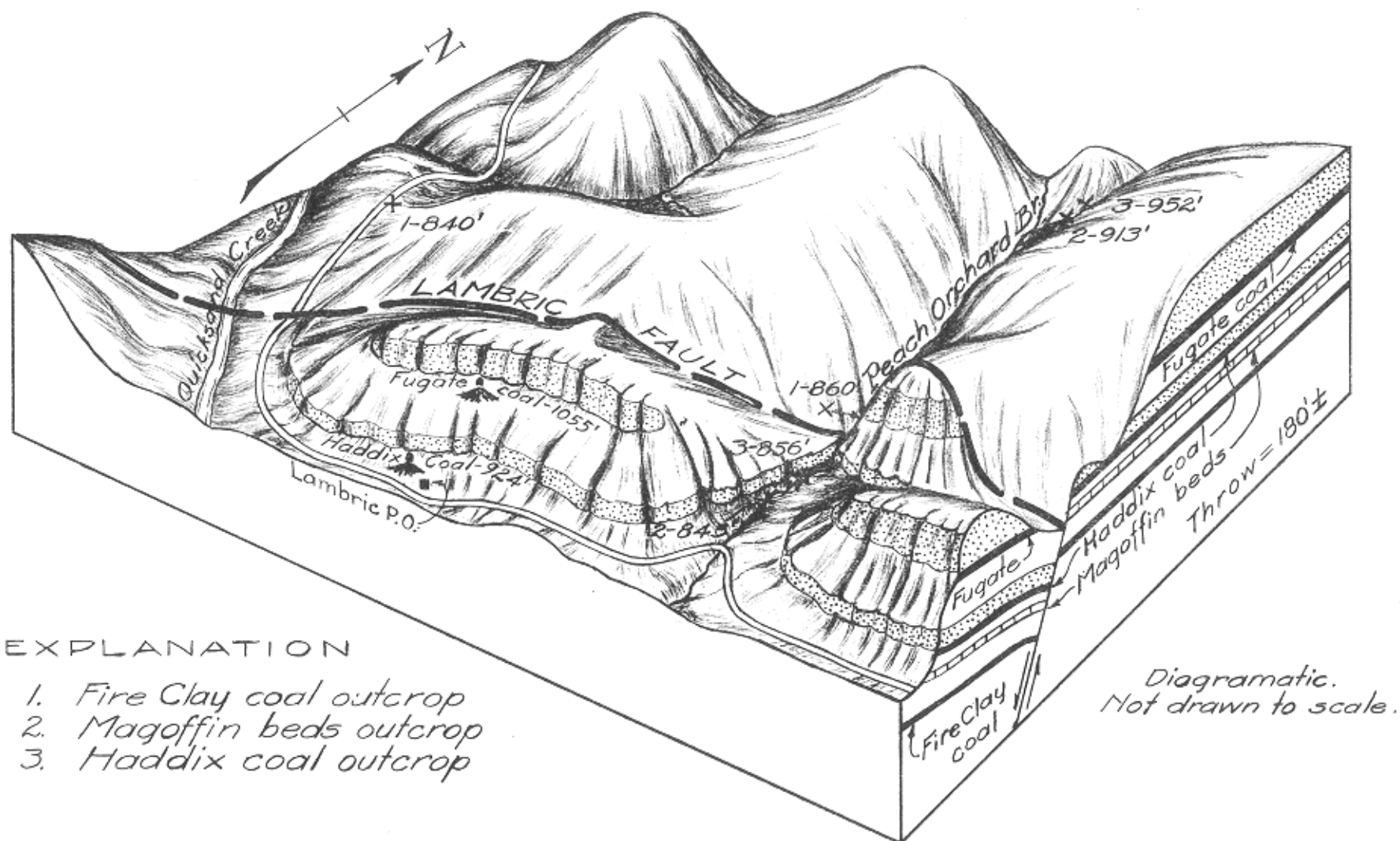


Fig. 22

STOP 13. BLOCK DIAGRAM OF THE LAMBRIC FAULT.

STRATIGRAPHIC NOTES

Introduction

The Pennsylvanian rocks in Eastern Kentucky are divided into the Lee formation and the Breathitt formation. The Lee formation includes a lower unit of sandstone, siltstone, shale, and coal, and an upper unit of sandstone and conglomerate. It rests unconformably on Mississippian rocks and grades upward into the overlying Breathitt formation, which includes all the post-Lee Pennsylvanian rocks in southeastern Kentucky.

The Breathitt formation in Morgan, Magoffin, and Breathitt Counties can be divided into three units. The lowest unit, from the top of the Lee formation to the top of the Kendrick shale of Jillson, is characterized by dark shales and siltstones with large calcareous concretions; small ironstone nodules and thin layers of ironstone. The middle unit, from the top of the Kendrick shale of Jillson to the top of the Magoffin beds of Morse, is characterized by light to medium gray shale and channel sandstones. The upper unit is predominantly composed of massive sandstones 40-150 feet thick. Sandstones in the lower and middle unit are either fine-grained or very fine-grained. The upper unit contains a few medium- and coarse-grained sandstones. Most of the sections visited on this field trip contain the middle unit of the Breathitt formation.

Sedimentary structures associated with scour and fill or mudflow and slump are conspicuous features of the Breathitt formation. These features occur in units ranging from less than 1.0 foot to more than 60.0 feet in thickness. The most obvious structures are the thick channel fills of sandstone but fills of coal, shale and siltstone occur at many localities. Structures probably resulting from mudflows include folds, faults, contorted bedding, tilted bedding, exotic blocks and flow rolls.

The Breathitt formation thins northward from the Hyden Quadrangle to the Dingus Quadrangle, as is shown in Fig. 23. All recognizable intervals appear to thin in this direction, but some thin more than others. Certain coal beds in the lower Breathitt formation probably disappear as traced northward from the Hazard area.

Description of Key Beds

The most useful key beds in the Breathitt formation in central eastern Kentucky are the Kendrick shale of Jillson, the flint clay parting in the Fire Clay coal and the Magoffin beds of Morse. All of these key beds show several facies and they are not always easily identified. Locally the limestone concretions and calcareous zones (see Fig. 23) are very useful for correlation.

NW. HYDEN
QUAD.

NW. CORNETTS-
VILLE QUAD.

BUCKHORN
QUAD.

TROUBLESOME
QUAD.

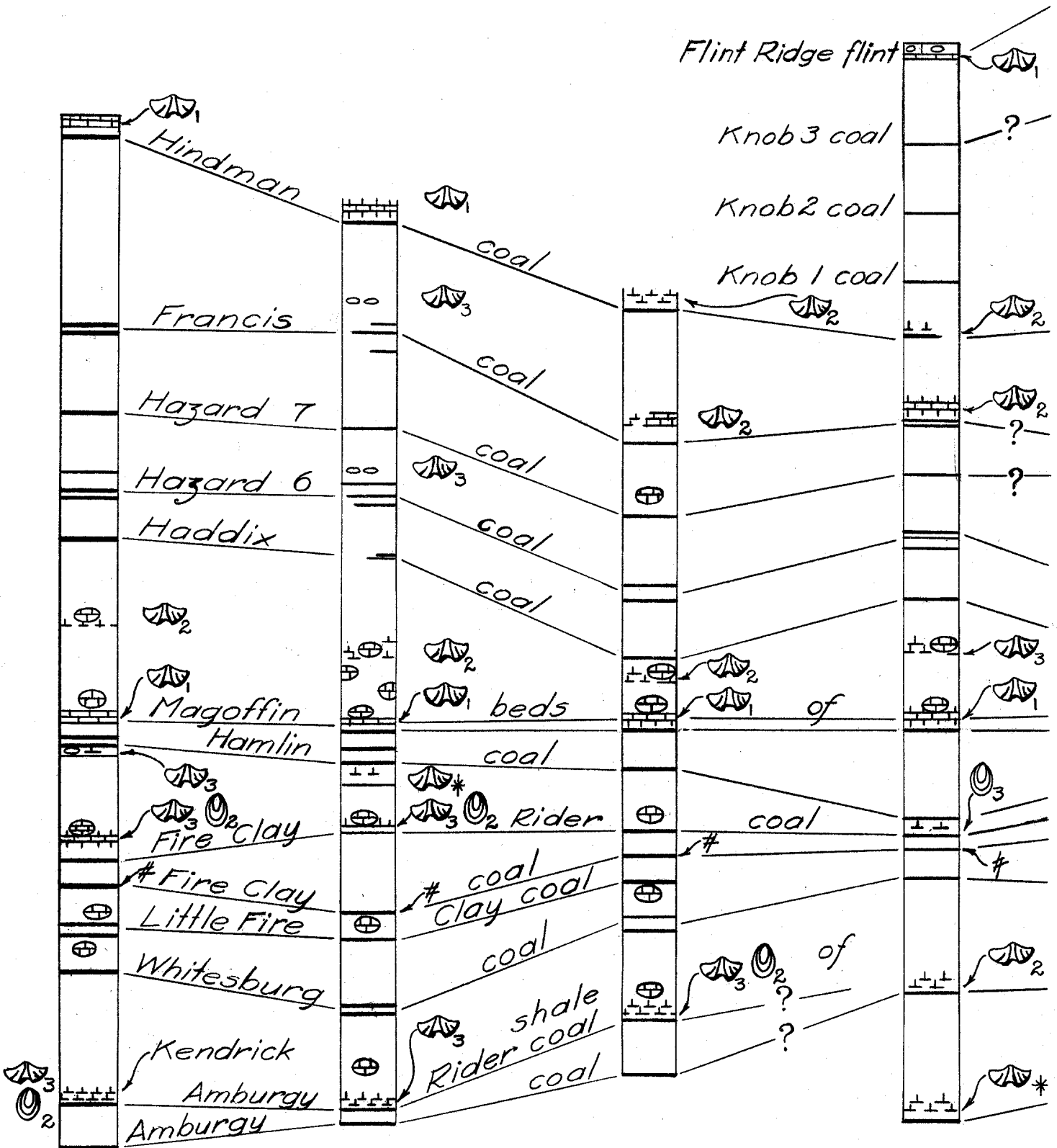
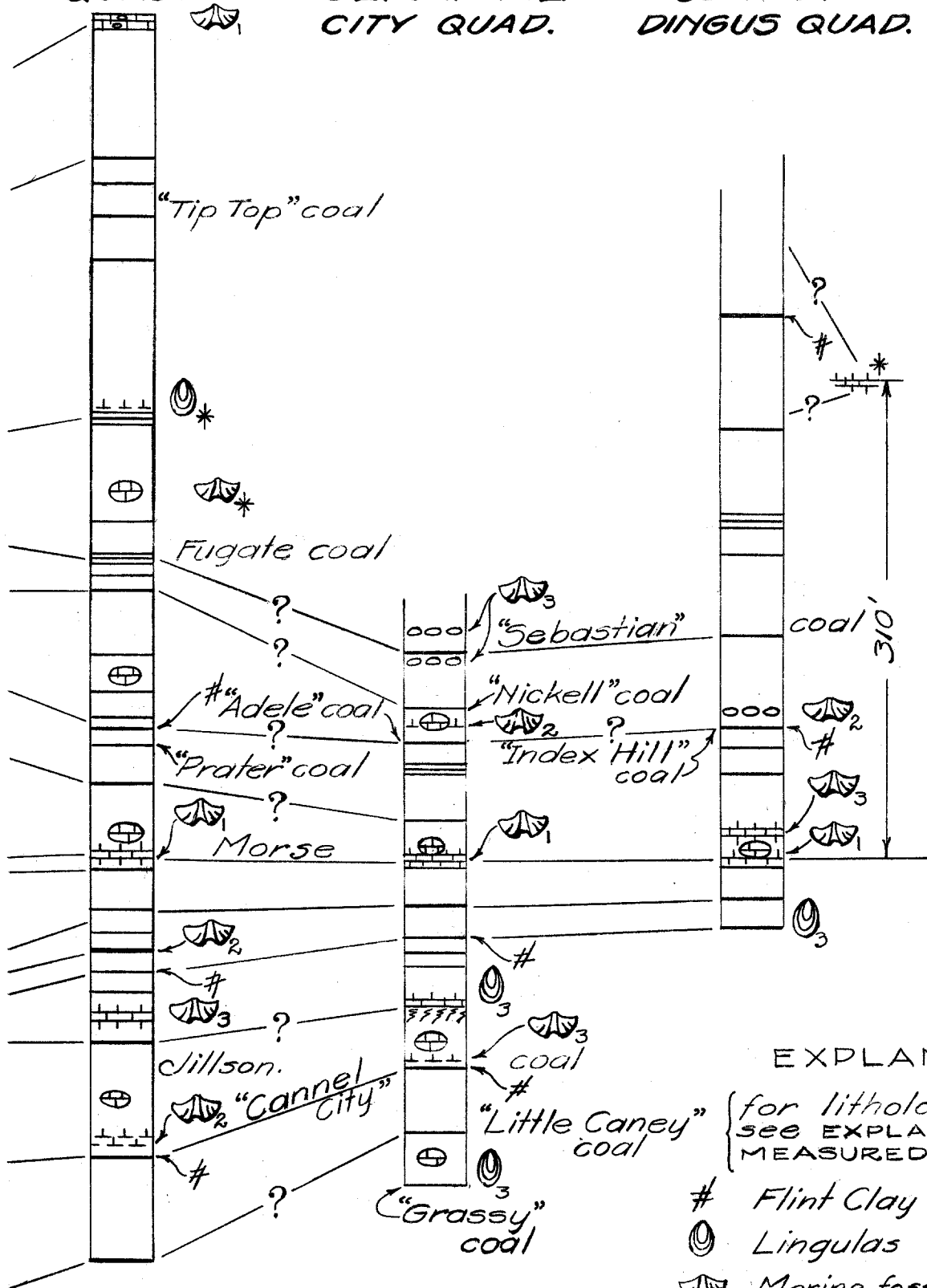


Fig. 23 GENERALIZED SECTIONS IN CENTRAL
SHOWING TENTATIVE CORRELATIONS OF COAL

BAYS
QUAD.

SE. CANNEL
CITY QUAD.

CENTRAL
DINGUS QUAD.



EXPLANATION

{ for lithologic symbols }
see EXPLANATION FOR
MEASURED SECTIONS.

Flint Clay

O Lingulas

Marine fossils widespread

Marine fossils at many localities

Marine fossils at a few localities

* Observed once

EASTERN KENTUCKY
BEDS & FOSSIL ZONES.

Vertical scale : 1 inch = 100 ft.

Kendrick Shale of Jillson

The Kendrick shale of Jillson is a medium- to medium dark-gray shale, weathering to chunks or chips, more or less silty, containing interbedded siltstone, and grading laterally into siltstone and sandstone. Note the change in the Kendrick shale between Index and West Liberty (see Fig. 6). The characteristic feature of the Kendrick shale is the presence of large elliptical calcareous concretions. These concretions are from 1 to 3 feet thick and 2 to 6 feet long. *Septaria* are rare. Siltstone laminae continue through many of the calcareous concretions. *Lingulas* are common in the Kendrick shale and at a few localities *chonetes*, *productids*, *spirifers*, and *gastropods* are abundant. There are no fossils at most outcrops.

The Kendrick shale is the highest shale of its type in the lower part of the Breathitt formation. It is easily confused with lower shales but is not easily confused with shales in the middle unit of the Breathitt formation. At many localities it is thin or absent.

Flint Clay Parting in Fire Clay Coal

The flint clay parting of the Fire Clay coal is a useful key horizon but it is not always present. Flint clay typically is a hard refractory clay, vitreous, brittle, and does not slack or become plastic. The parting in the Fire Clay coal is an impure flint clay ranging in color from light-brown to black and containing carbonaceous matter and plant fragments. The hardness, fracture, and color of the parting in the Fire Clay coal are characteristic. Flint clay partings have been found in at least four different coals and at several localities these partings occur in the same continuous sections (see Figs. 6, 11, and 23). At many localities the flint clay partings in coal beds other than the Fire Clay coal are not similar in lithology to the typical parting in the Fire Clay coal, but in some localities the flint clay partings are difficult to distinguish.

Magoffin Beds of Morse

The Magoffin beds of Morse consist of calcareous shales medium- to dark-gray in color, weathering to chips and flakes and containing marine fossils. The fossils include *pelecypods*, *chonetids*, *productids*, *spirifers*, and *crinoid stems*. The fossiliferous shale ranges from less than 1.0 foot to more than 40 feet in thickness.

The distinctive beds are near the base of the unit and consist of a dark-gray crinoidal, argillaceous and silty limestone, and an overlying zone of calcareous concretions and *septaria*. The limestone layer weathers to dark-brown or purple silty clay and must be very impure because there is little loss of volume as the limestone weathers. The crinoidal limestone is typical and widespread but not everywhere present. It is less than 1 foot thick at most localities, and has a maximum thickness of about 15 feet. The concretions are light- to medium-gray, dense limestone and contain few fossils, and occur at many localities where the crinoidal limestone is absent. They are similar in shape to the concretions in the Kendrick shale, but are not silty and tend to distort rather than preserve the bedding of the enclosing rocks. A thin coal and an underclay occur below the Magoffin beds at most localities, and these help to identify the Magoffin beds of Morse.

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