

FIELD TRIP GUIDEBOOK

FOR

PITTSBURGH GEOLOGICAL SOCIETY

PREPARED BY

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UNIVERSITY OF PITTSBURGH AT JOHNSTOWN

JOHNSTOWN, PENNSYLVANIA

MAY 4, 1985

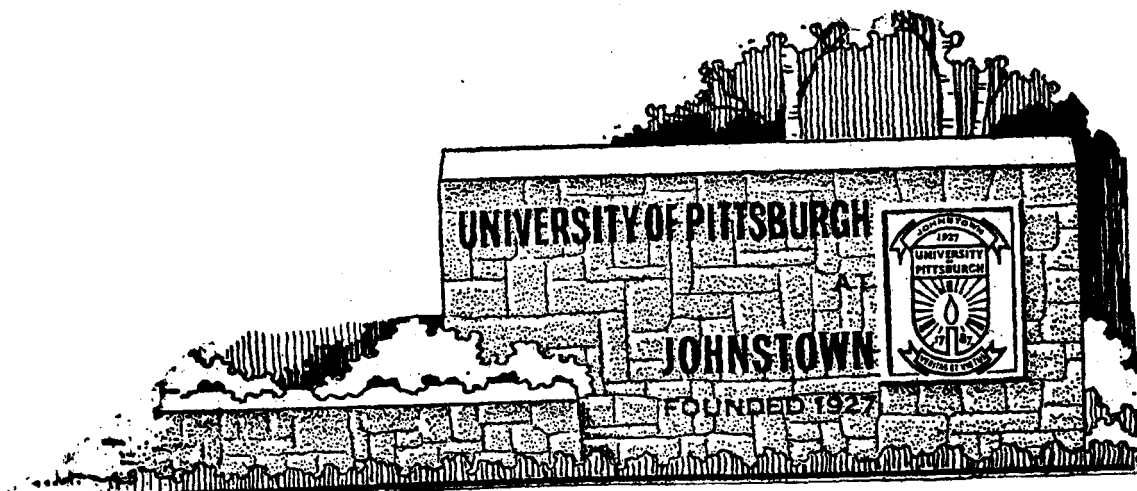


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INTRODUCTION

The purpose of this field trip is to examine the general geology of the Johnstown area. The route and stops have been chosen to give you as much variety as possible. The trip will begin near the Clark Run Nature Area on Route 403, and with time permitting, it will end on Route 56 near the intersection with Route 219.

REGIONAL STRUCTURE

The field trip area is within the Allegheny Mountain section of the Appalachian Plateau Province (see figure 1). The city of Johnstown lies in a syncline between Laurel Hill anticline and the less visible Ebensburg Anticline (see the attached geologic maps; Geistown, Johnstown, and Vintondale Quadrangles). The UPJ campus is situated almost on the crest of the Ebensburg Anticline and the Conemaugh River water gap is cut through the Laurel Hill Anticline, an open, slightly asymmetric fold. Laurel and Chestnut Mountains are the only two major "wrinkles" or folds on the Allegheny Plateau. In the Johnstown area the Laurel Hill anticlinal axis closely follows the ridgeline with a strike of approximately N 43 E with a plunge to the NE varying from 0.5 to 1.5 degrees. The southeastern limb has a maximum dip of approximately 13 degrees while the northeastern limb dips a maximum of only about 10 degrees (Keim 1983).

The Conemaugh Gorge is approximately 4.5 miles long and has a maximum relief of about 1400 feet which is the greatest local relief in Pennsylvania (see figure 2). The gorge has been formed by the down-cutting action of the Conemaugh River as the landscape developed since the uplift of the Plateau. Sub-surface data suggest it is fault controlled (Personal Communication - Peoples Natural Gas Company), but there appears to be little surface expression of the fault. Since the uplift of the Plateau Region, down-cutting and erosion have kept pace with the exposure of the fold.

GEOLOGIC SUMMARY

The surface rocks exposed in this part of Pennsylvania consist of Lower Paleozoic strata ranging in age from Upper Devonian to Upper Pennsylvanian (see figure 3). While most of the area is underlain by rocks of the Pennsylvanian System, older rocks are exposed in the Conemaugh Gorge where the Conemaugh River has cut through from the Pennsylvanian to rocks of the Upper Devonian. This is one of the few places on the Plateau where rocks of this age are exposed. The environments of deposition in the Johnstown region vary from marine to fluvial, but the majority are of freshwater origin, and many provide a rich supply of plant fossils. Inter-bedded with these freshwater fluvial materials are a few fossiliferous marine limestones. Coal is commonly found in many of the road cuts in the area.

One of the outstanding features of the rocks of Western Pennsylvania is the cyclic nature of the sediments. A composite "normal" cyclothem for the Johnstown area would include:

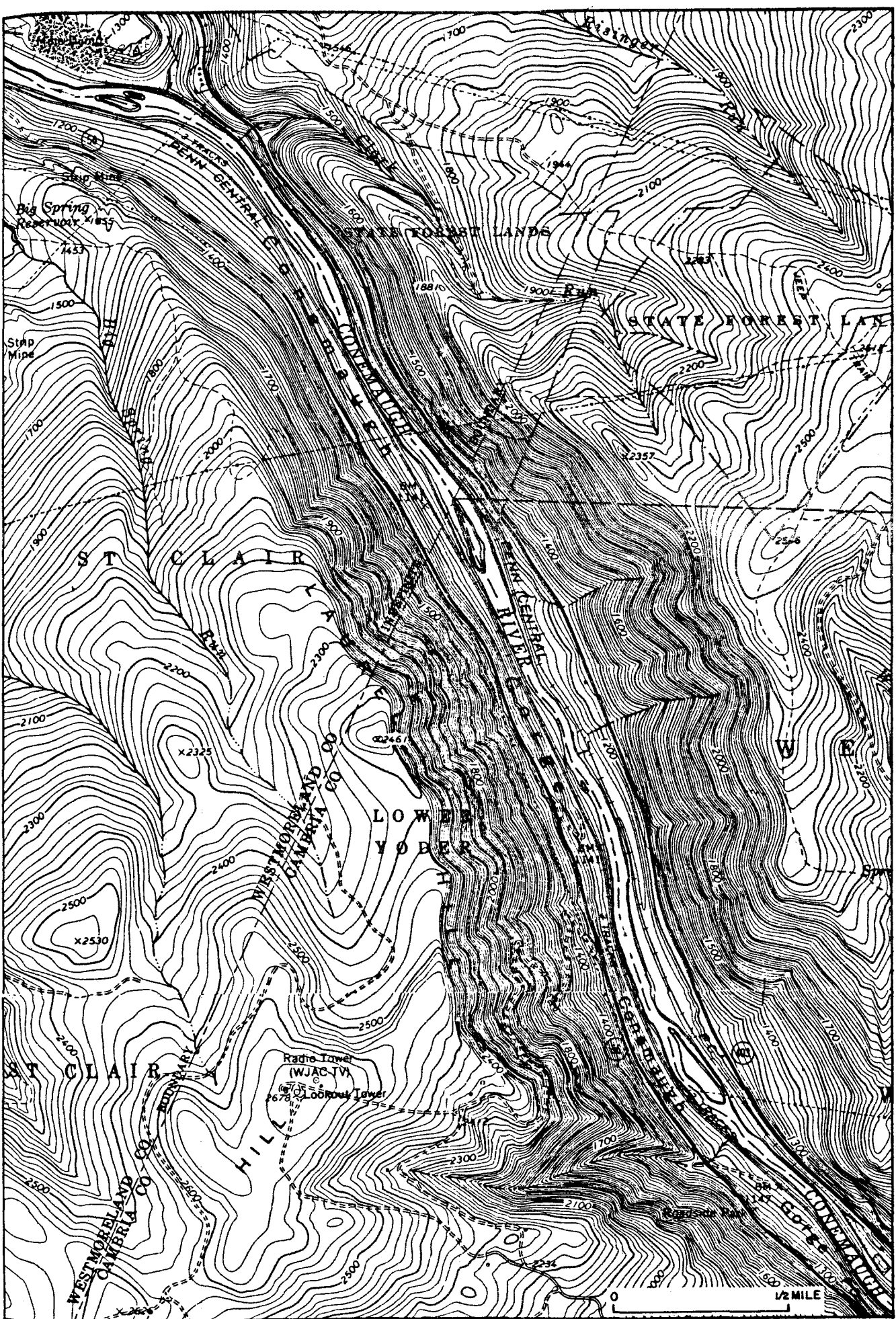


Figure 2. Topographic map of Conemaugh Gorge. (From Geyer & Bolles 1979)


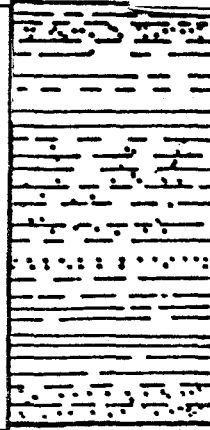
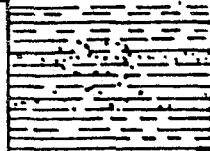

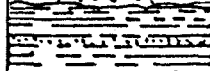
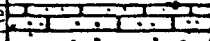
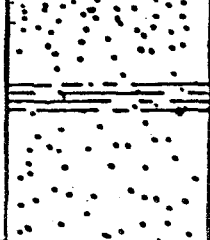
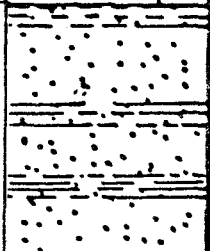
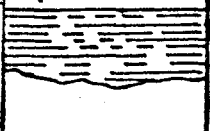
GENERALIZED SECTION OF ROCKS IN THE JOHNSTOWN AREA				
scale: 1" = 400'				
SYS- TEM	FORMATION OR GROUP	SECTION 	thick- ness (ft.)	CHARACTER OF FORMATION
PENNSYLVANIAN	CONEMAUGH GROUP		850 to 960	Upward fining sequences of sandstone, siltstone, and shale; with thin beds of coal and a few thin limestones
	ALLEGHENY GROUP		220 to 290	Coal cyclothem; with up to 5 workable seams
	POTTSVILLE GROUP		175 to 250	Upward fining sequences of sandstone, siltstone and shale
	unconformity MAUCH CHUNK Fm.		175 to 200	Red and green silty shale; sand- stone
MISSISSIPPIAN	Loyalhanna Limestone		~ 50	cross-bedded calcarenite
	Burgoon sandstone		~350	medium to coarse sandstones predominate; some conglomeratic sandstone and interbedded siltstone
	?? undifferent. Shenango and Oswayo Fms.		~650	Grayish-green sandstone, silt- stone and shale; lower units include thin fossiliferous and calcareous beds
DEVONIAN	CATSKILL Fm.		400+	Red siltstone and shale; inter- bedded sandstone

Figure 3. Generalized stratigraphic section of the Johnstown area, including the Conemaugh Gorge. (Various sources)

5. Shale, non-marine/or sandstone with an erosional base representing the start of the next cycle.
4. Coal
3. Underclay
2. Shale without marine fossils
1. Sandstones, with nonconformable base

Although it is rare to find a complete sequence at any one location, regional mapping has produced the composite listed above.

In addition to the non-marine cycle listed above, in a few locations in the Johnstown area, the cycles have been interrupted by a marine transgression producing a composite cycle like this:

8. Shale; non-marine
7. Shale/limestone; brackish/marine
6. Coal
5. Underclay (Paleosol)
4. Limestone (Freshwater)
3. Siltstone/shale
2. Fine sandstone/shale (Planar bedding, small scale cross stratification)
1. Medium-coarse sandstone (Trough cross-bedding, erosional base)

Note that Units 1-6 represent an upward fining, meandering stream sequence

This cyclic nature is well exposed along Rt. 56 as you enter Johnstown from Rt. 219. At the Widman Street exit you can see several coal seams exposed in the road cut; each produced by a different sedimentation cycle.

The following descriptions will give a brief geologic summary of each of the major units to be examined on this trip.

DEVONIAN

The oldest rocks of the area belong to the Catskill Formation of the Upper Devonian Period. These are primarily red shales and sandstones, rather rich in mica, with some plant fossils and root markings. The rocks suggest a nearshore, mudflat type of environment with freshwater or at most brackish water deposition. The Catskill rocks exposed in the Conemaugh Gorge are very similar to the ones seen along Route 30 in Bedford County.

The next sequence of beds, the Oswayo Formation, represent a sudden

change in relative sea-level to deeper water. In this sequence are inter-bedded shales, sand- and siltstones, and an occasional limestone layer. In several of these are examples of washed in fossil pieces, mostly brachiopods, and strong evidence of bioturbation. Current ripples, both climbing and in-phase, are dominate in the lower beds. Several beds have small layers of shale rip-up clasts. Several times these thin-bedded sequences are punctuated by a massive sandstone (up to 2 feet thick) with well developed cross-bedding, all dipping the same direction, truncated by a series of planar sandstone beds. Plant fossils are found at the bases of these massive sands. The combination of beds suggest a location at or near the distal delta slope in the beginning of the sequence, but then with time, the sea slowly regressed. Figure 4 is a stratigraphic section illustrating the Oswayo and the upper portion of the Catskill beds that are exposed in the Conemaugh Gorge.

MISSISSIPPIAN

In this area, the lower Mississippian/Devonian boundary is uncertain and there is some confusion as to the proper stratigraphic nomenclature. Fettke and Bayles (1945) referred to the lower units as part of the Pocono Group, while, more recently, Edmunds et al (1979) refers to it as the Rockwell Formation (see figure 5). On the Vintondale Quadrangle geologic map the strata are mapped as "Shenango Formation through Oswayo Formation Undivided" (Berg and Dodge 1981). Therefore, for the sake of consistency we will use the Shenango and Oswayo terminology. In this scheme then, the Shenango would represent Lower Mississippian deposition and would include the strata above the last marine fossiliferous beds up through the Patton Shale of Phalen (1910). Stratigraphic nomenclature aside, the beds exposed in the Gorge represent a shallowing sequence up through the Burgoon Sandstone, the upper portion of which used to be termed the Pocono (Phalen 1910). As you move higher in the Mississippian beds, plant fossils tend to become more abundant.

This shallowing sequence was brought to an abrupt close by the Loyalhanna environment which appears to include a change in sediment source as well (see figure 6). This rather distinctive unit has massive cross bedding and as such is very easy to spot in the field. Actually at this location the unit is more of a calcareous sandstone than a limestone. The major minerals are quartz, calcite granules, minor amounts of chert, feldspar and rock fragments; all held together by a calcareous cement. At the Clark Run locality, the average ratio of calcite to quartz is about 45/55 (although there is substantial variation in the carbonate content, the general trend is one of decreasing carbonate as you go up-section in the Loyalhanna). Salver (1962) and Adams (1970) suggested that the Loyalhanna environment was one of transgressive beaches and barrier bars formed in shallow, turbulent, but somewhat open water. Both longshore and tidal currents were involved in the deposition process.

The upper sequence of Mississippian strata exposed in the Gorge is the Mauch Chunk Formation (see figure 7). At the Clark Run Nature Area is a series of red and green shales, siltstones, cross-bedded sandstones, and a thin, hematite-rich fossiliferous limestone layer which appears to be equivalent of the Wymps Gap of Flint (1965). Below are some of the fossils found in this thin limestone.

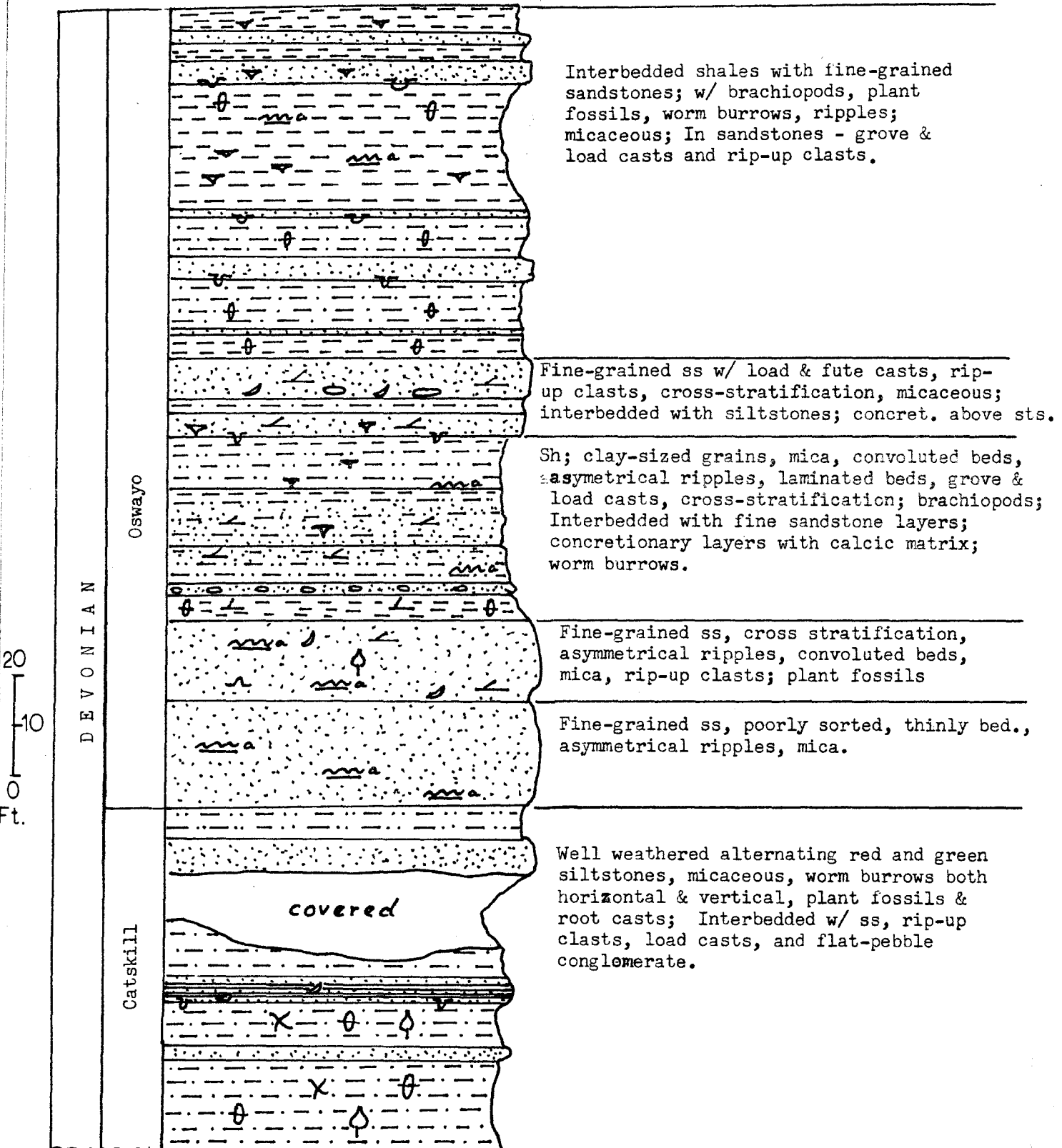


Figure 4. General stratigraphic section along Conrail tracks below Route 403 near county line in Conemaugh Gorge. (Modified from Mastrorocco et al 1985)

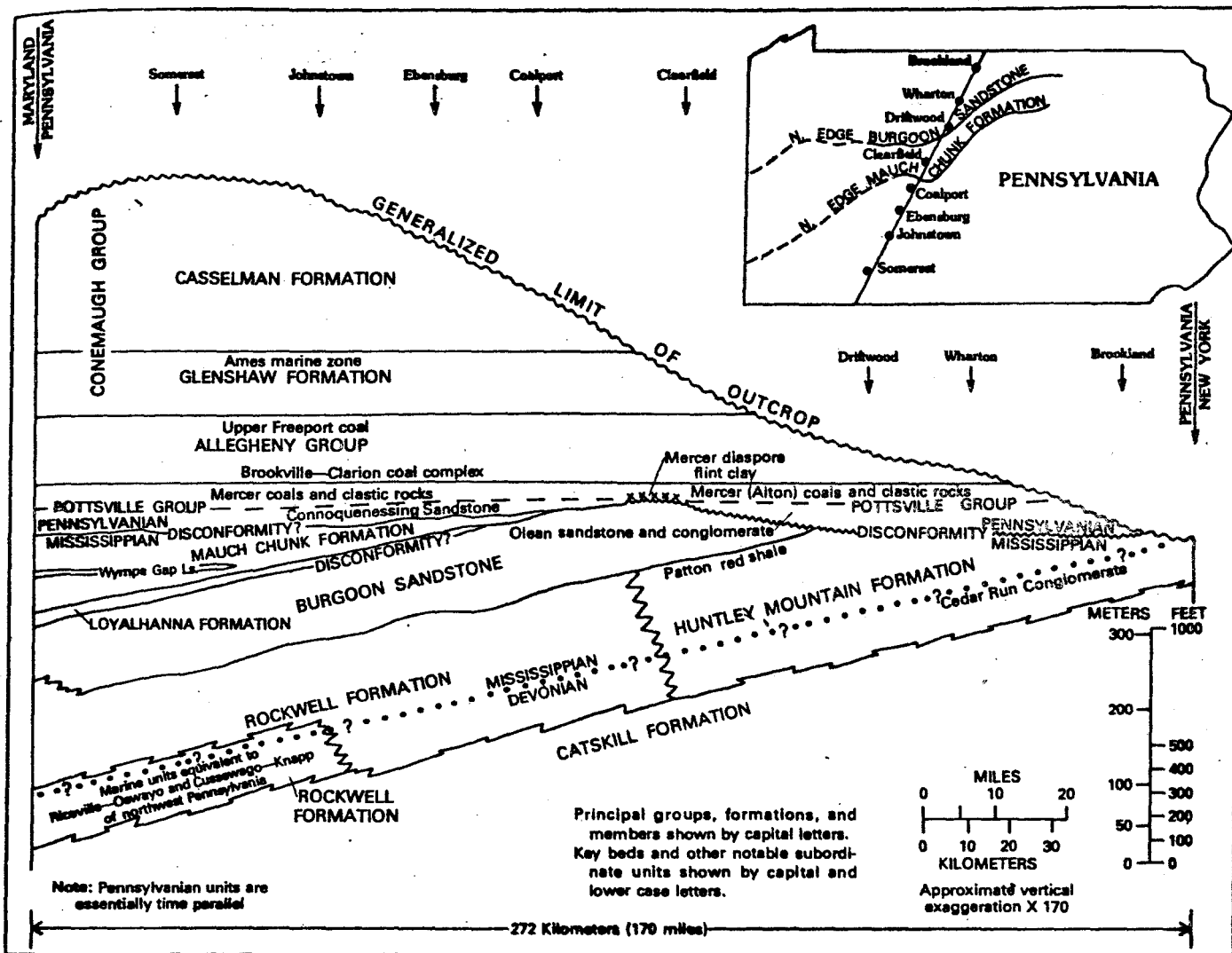


Figure 5. Stratigraphic correlation of Upper Devonian through Pennsylvanian strata in the state of Pennsylvania. (From Edmunds et al 1979)

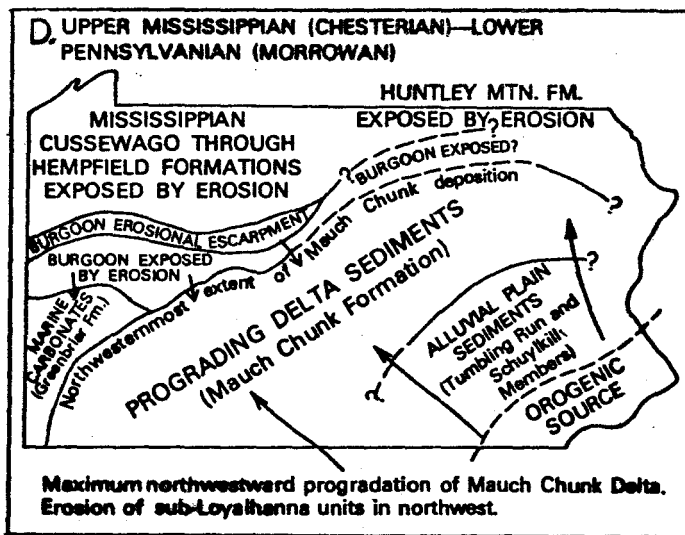
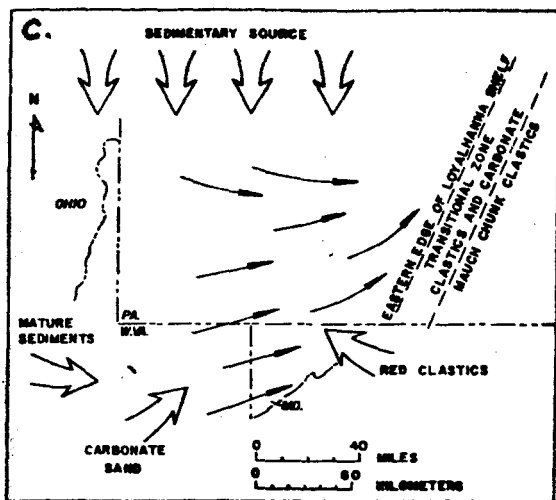
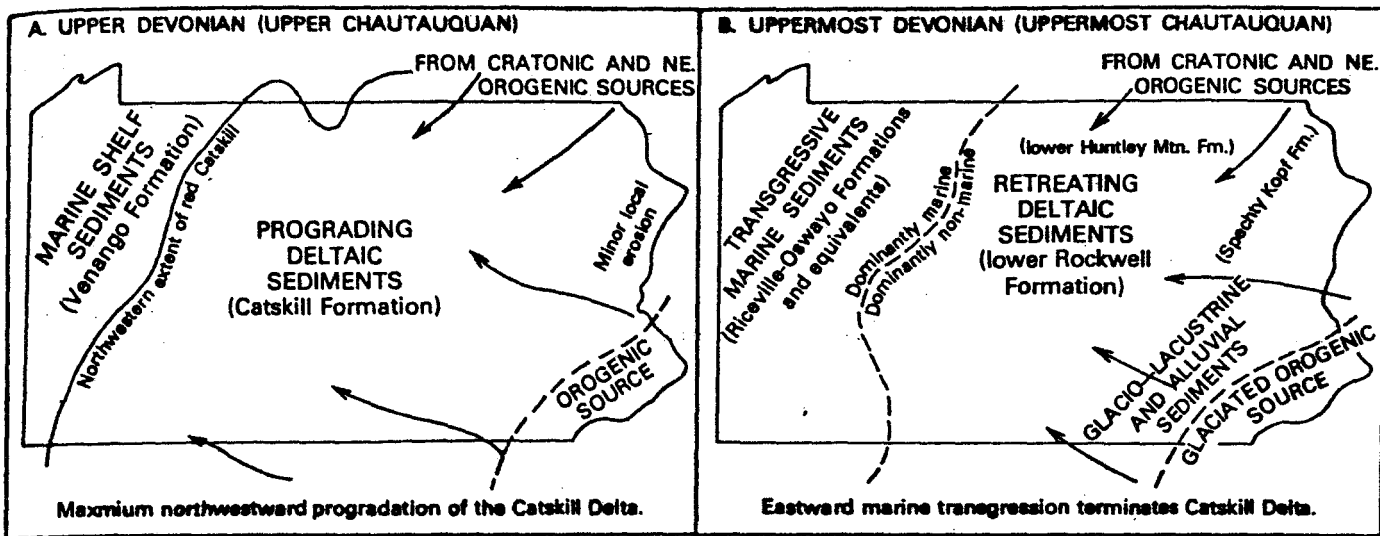


Figure 6. Depositional environments and sediment sources. Maps A, B, and D are adapted from figure 12 of Edmunds et al (1979), and map C is from Adams (1970)

Bryozoa	Brachiopods	Mollusca
<u>Zhombopoda</u>	<u>Composita</u>	
<u>Fenestrellina</u> (?)	<u>Anthracospirifer</u>	<u>Straparollus</u>
	<u>Diaphragmus</u>	<u>Phestia</u>
Plus numerous crinoid pieces.		<u>Aviculopecten</u>

(Identification by D. Brezenski 1983, Personal Communication)

In Mauch Chunk times the region was again getting shallower, for there are mudcracks on bedding planes and plant fossil pieces are rather abundant in these sandstones and shales. At the location near Cramer, the sea did return briefly depositing the thin limestone mentioned above. The lateral extent of this limestone is unknown, but it has been traced across the ridge to the other limb of the anticline (Keim 1983 and other student reports).

PENNSYLVANIAN

Between the Mississippian and Pennsylvanian strata exposed in the Gorge is an unconformity, and above this is the Pottsville Group; characterized by very coarse sandstones and conglomerates and a few thin coal seams. At Clark Run the Homewood sandstone, representing the upper part of the Pottsville Formation, can be seen topping the ridge to the north of the parking area. This sequence of beds were produced when there was complete exposure and beginning of a total fluvial environment. This is the last unit that will be seen in the Conemaugh Gorge.

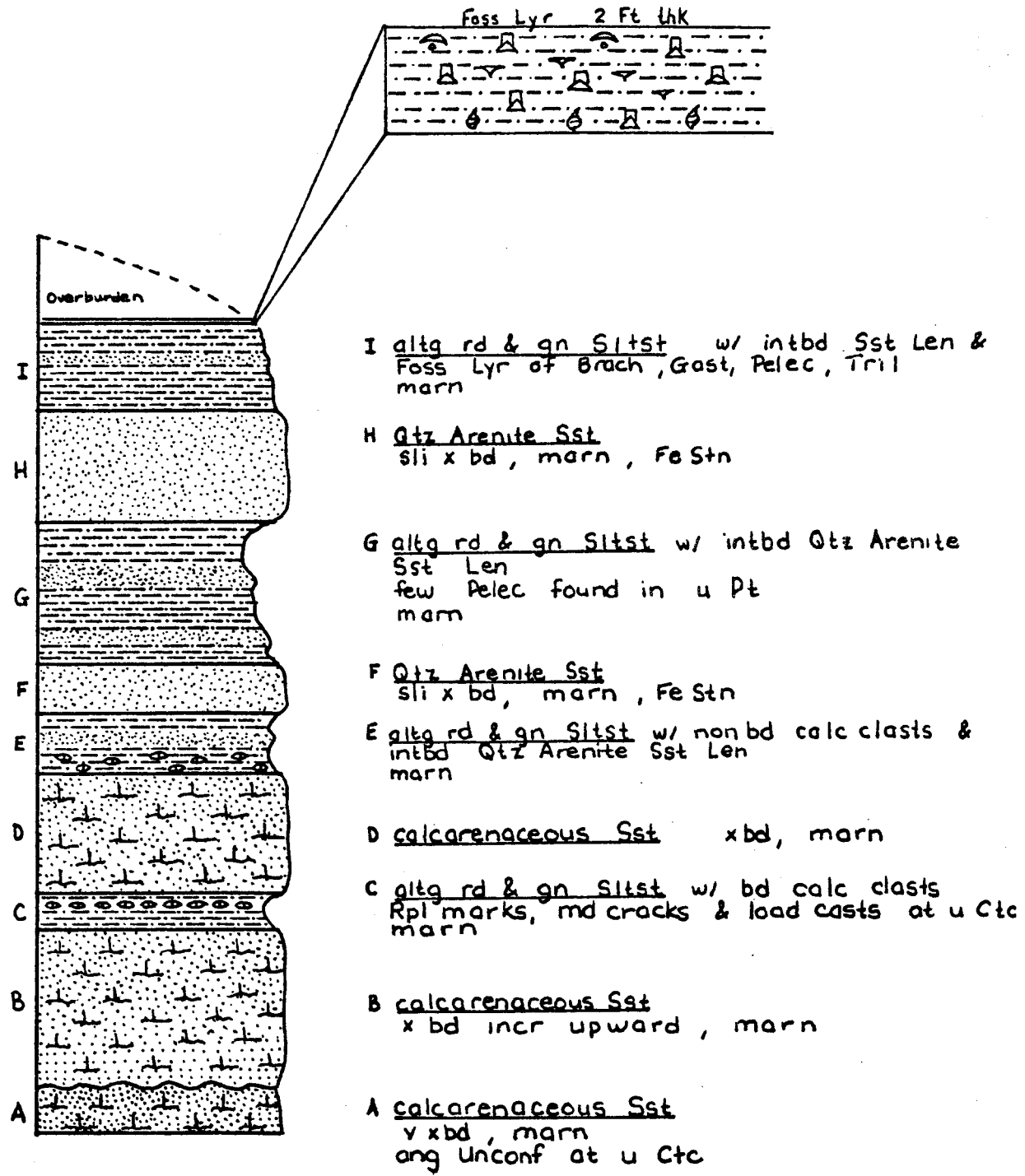
Above the Pottsville Group is the Allegheny Group, and most of the area's mineable coal comes from the Allegheny Group which is defined as the strata between the Brookville Coal and the Upper Freeport Coal. The rocks are predominately shales, siltstones, and fine grained sandstone. Although few marine fossils are reported in the rocks of the Allegheny Group north of the Conemaugh River (Dutcher et al 1959), in our area only plant fossils have been found (see Figure 8). One of the best exposures of the upper portion of the Allegheny Group is at the Widman Street Exit off Route 56 in Johnstown. In the road cut everything from the Upper Kittanning Coal to the top of the Formation is exposed (see figure 9).

Next in the stratigraphic sequence is the Conemaugh Group which does contain a few marine layers (See Figure 10). The major marine unit in this area is the Brush Creek Limestone. At the Scalp Avenue location the Brush Creek is more of a black, calcareous shale than a typical limestone. Figure 11 illustrates some of the fossils that are found in the Brush Creek. There are a few other marine units in the Glenshaw Formation of the Conemaugh Group in the region, but they are not well exposed and will not be seen in this trip. To the north and west of us are several similar limestones including the Ames Limestone which is described by Dutcher et al (1959) as, "...the highest known occurrence of marine strata in the coal measures of Pennsylvania".

LATE MISSISSIPPIAN

Loyalhanna

Mouch Chunk



Scale: 1 inch vertical = 20 feet

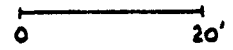
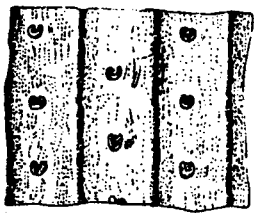
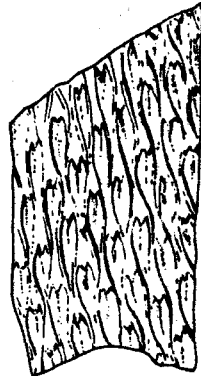


Figure 7. Stratigraphic section at the entrance to Clark Run Nature Area on Route 403, near Cramer, Pennsylvania. (Hinrich et al 1982)



Sigillaria x0.5



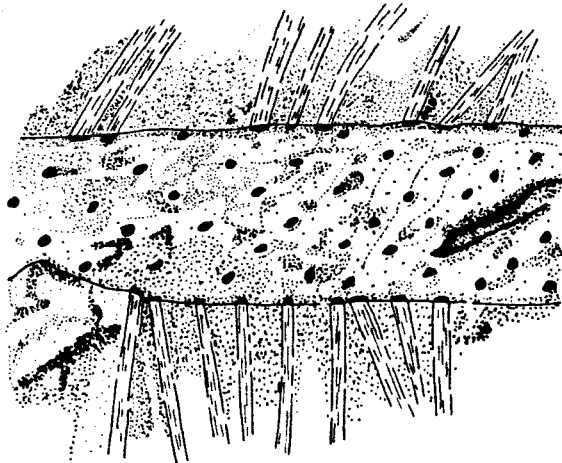
Lepidodendron
x0.5



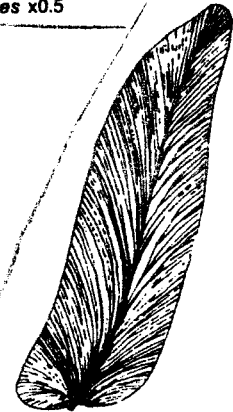
Calamites x0.5



Pecopteris
x0.6



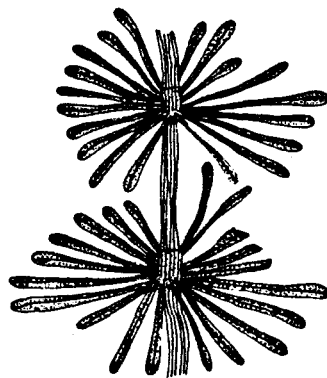
Stigmaria x0.5



Neuropteris x0.8



Neuropteris
x0.4



Annularia x1.5



Asterophyllites
x1

Figure 8. Some of the plant fossils found in the Johnstown Area.
(After Hoskins et al 1983)

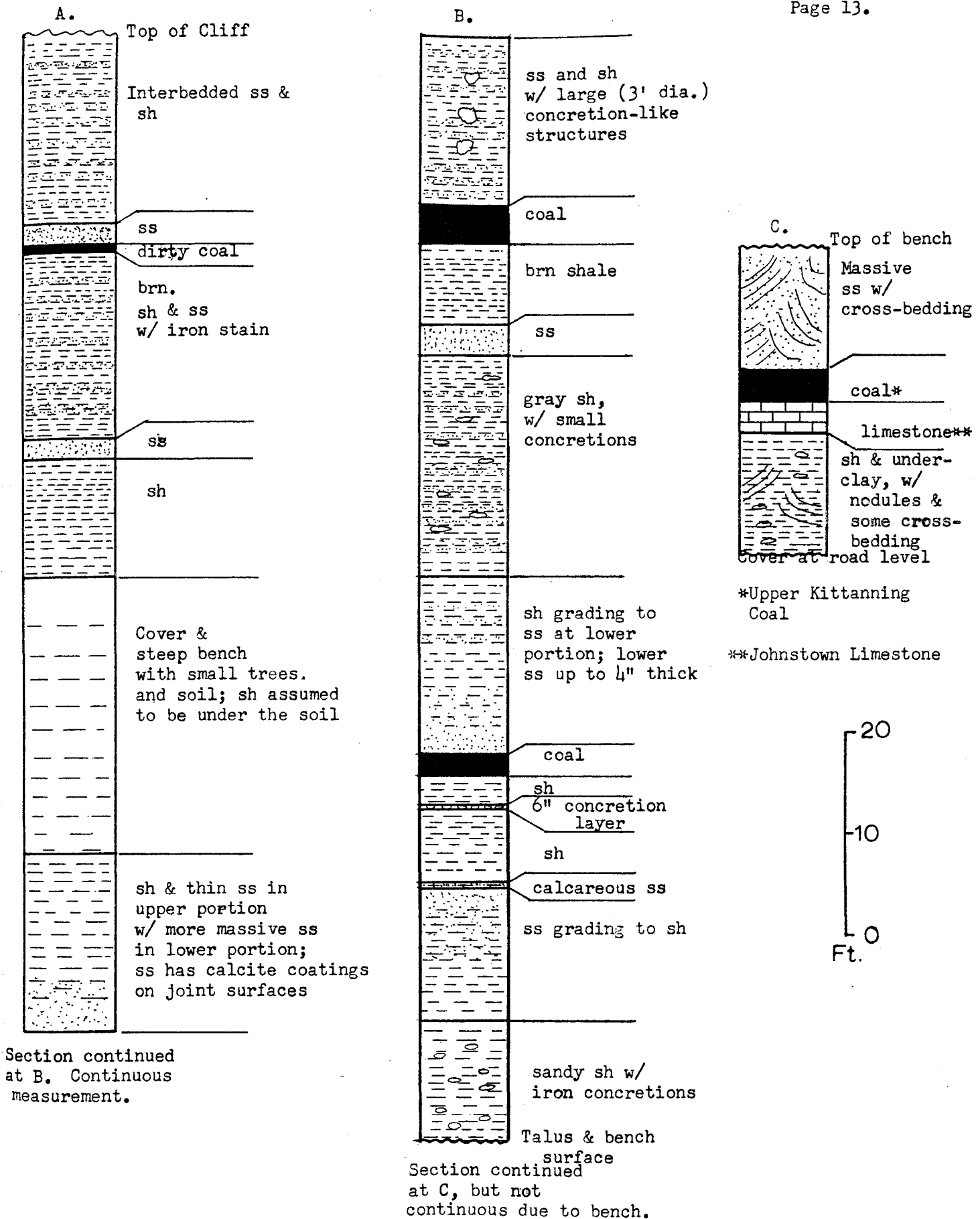


Figure 9. Stratigraphic section at the Widman Street Exit of Route 56 By-pass east of Johnstown. Measured by Tim Perry and Sean Sherlock 1982.

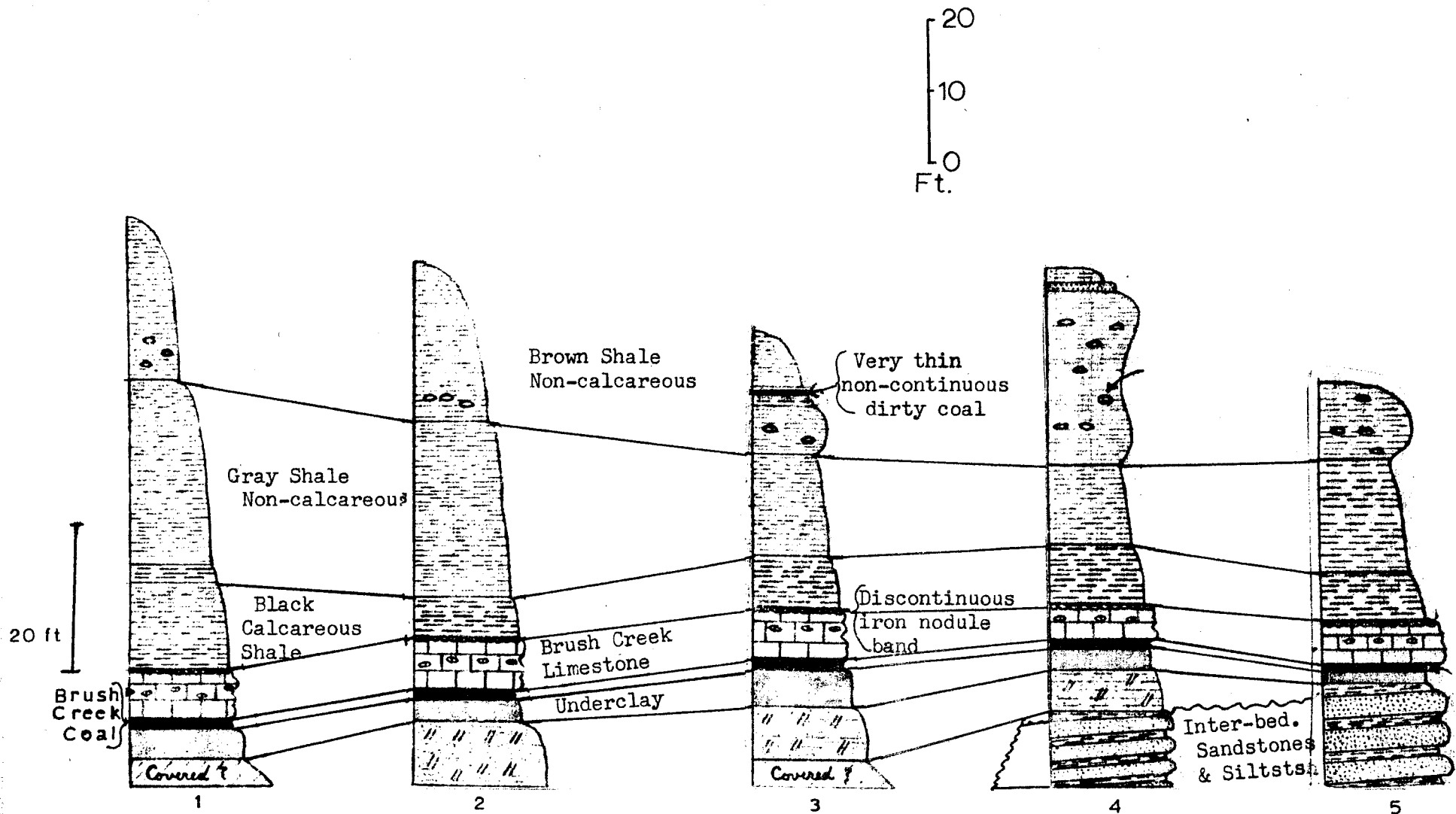


Figure 10. Stratigraphic sections of the Gee Bee Outcrop, Richland Township. Conemaugh Group, Lower Glenshaw Formation. Sections prepared by Jerry Hawk (1982). Sections are approximately 100 feet apart starting at the northern end. Another marine limestone was exposed above the 4th section, but the area has been graded and the unit is now covered.

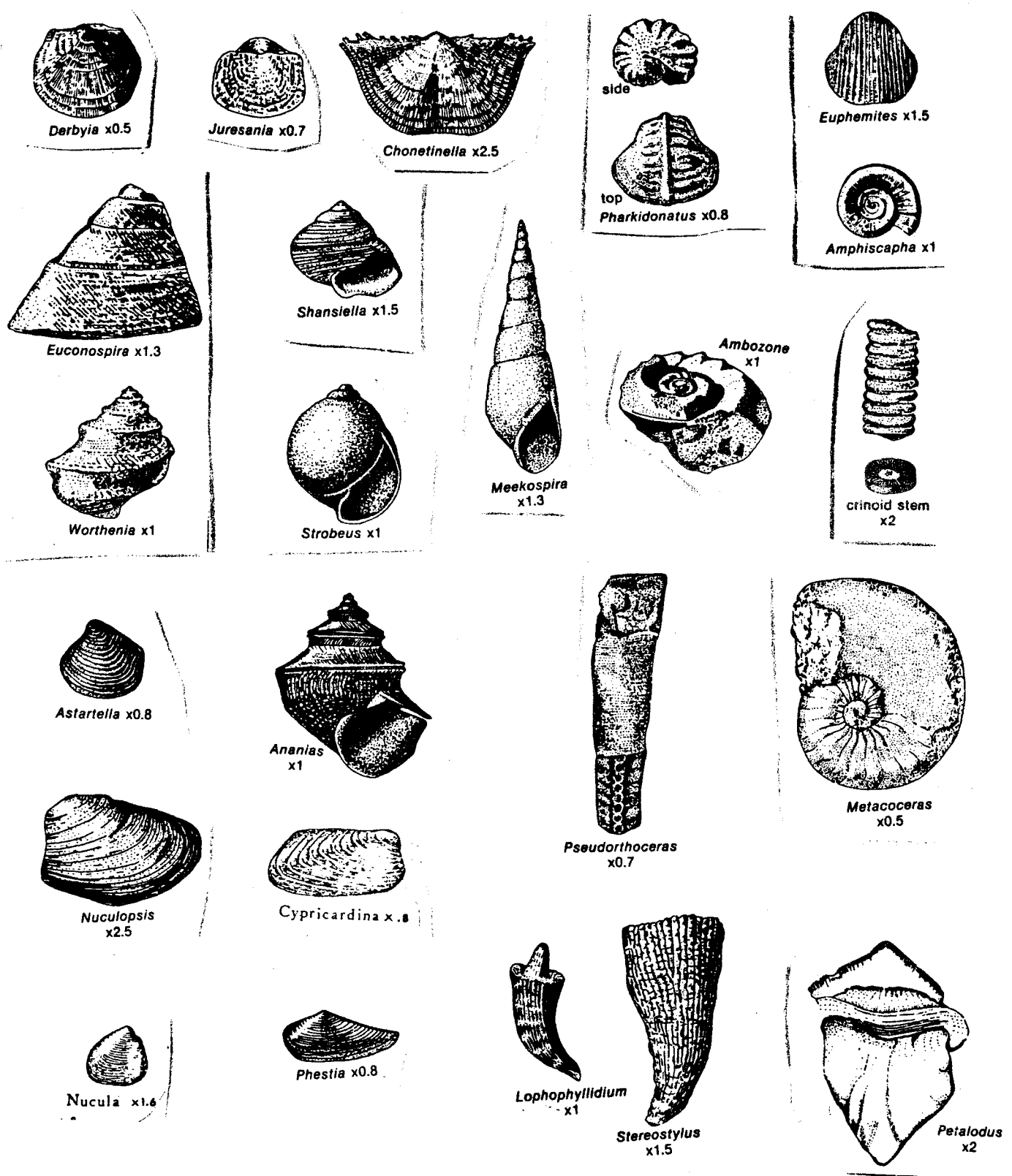


Figure 11. Some of the fossils found in the Brush Creek Limestone. (After Hoskins et al 1983)

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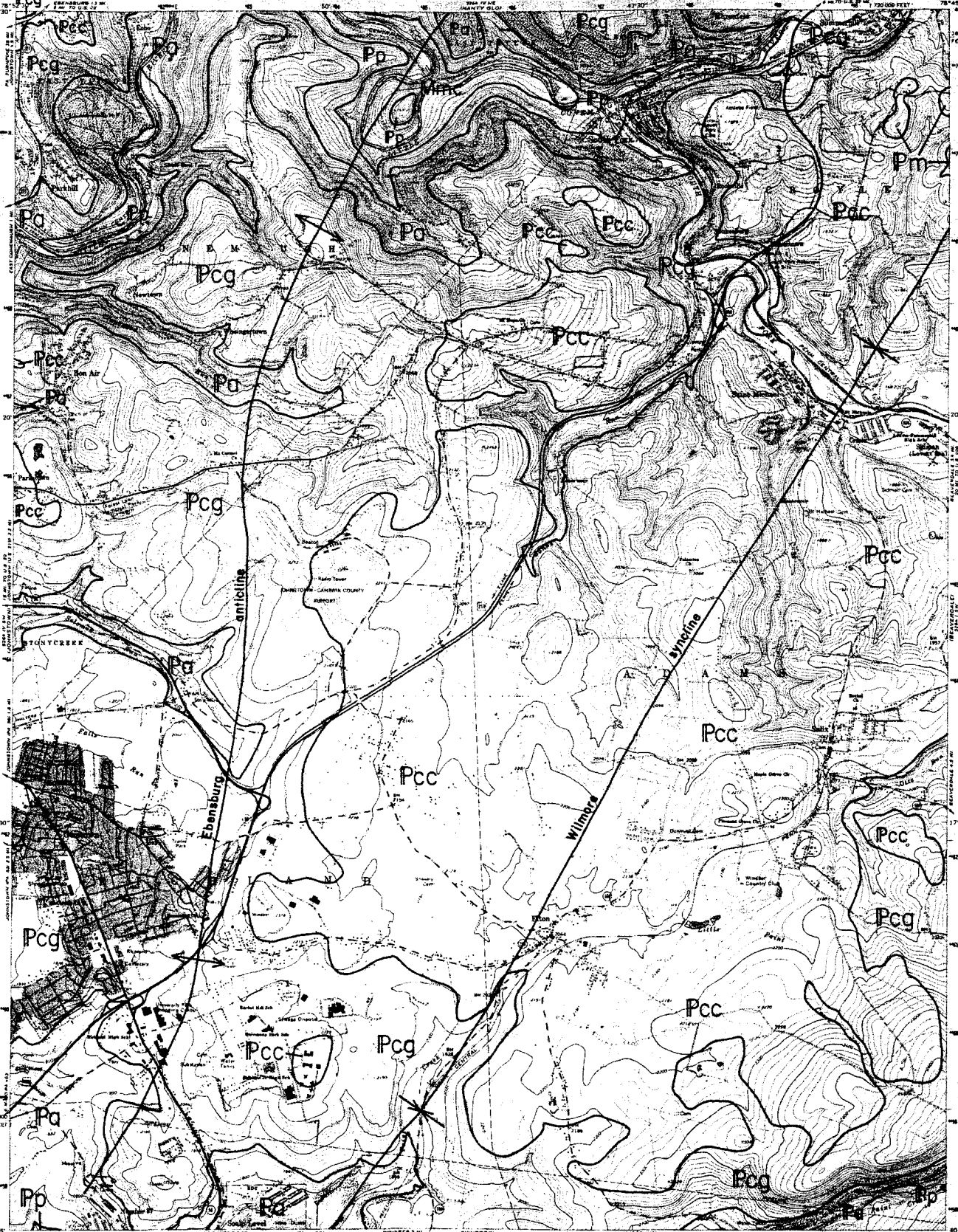
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Salver, H. A., 1962, A Stratigraphic and petrologic study of the Mississippian Loyalhanna Limestone of Western Pennsylvania. M. S. Thesis, University of Pittsburgh.

SOURCE
U.S.G.S.
Folio
174

- EXPLANATION
- Pm Monongahela Gp.
 - Pcc Casselman Fm.
 - Pcg Glenshaw Fm.
 - Pa Allegheny Gp.
 - Pp Pottsville Gp.
 - Mmc Mauch Chunk Fm.



REFERENCE
Phalen, W. C. (1910), *Johnstown folio, Pennsylvania*,
U. S. Geological Survey Geologic Atlas of the
U. S., Folio 174, 15 p.

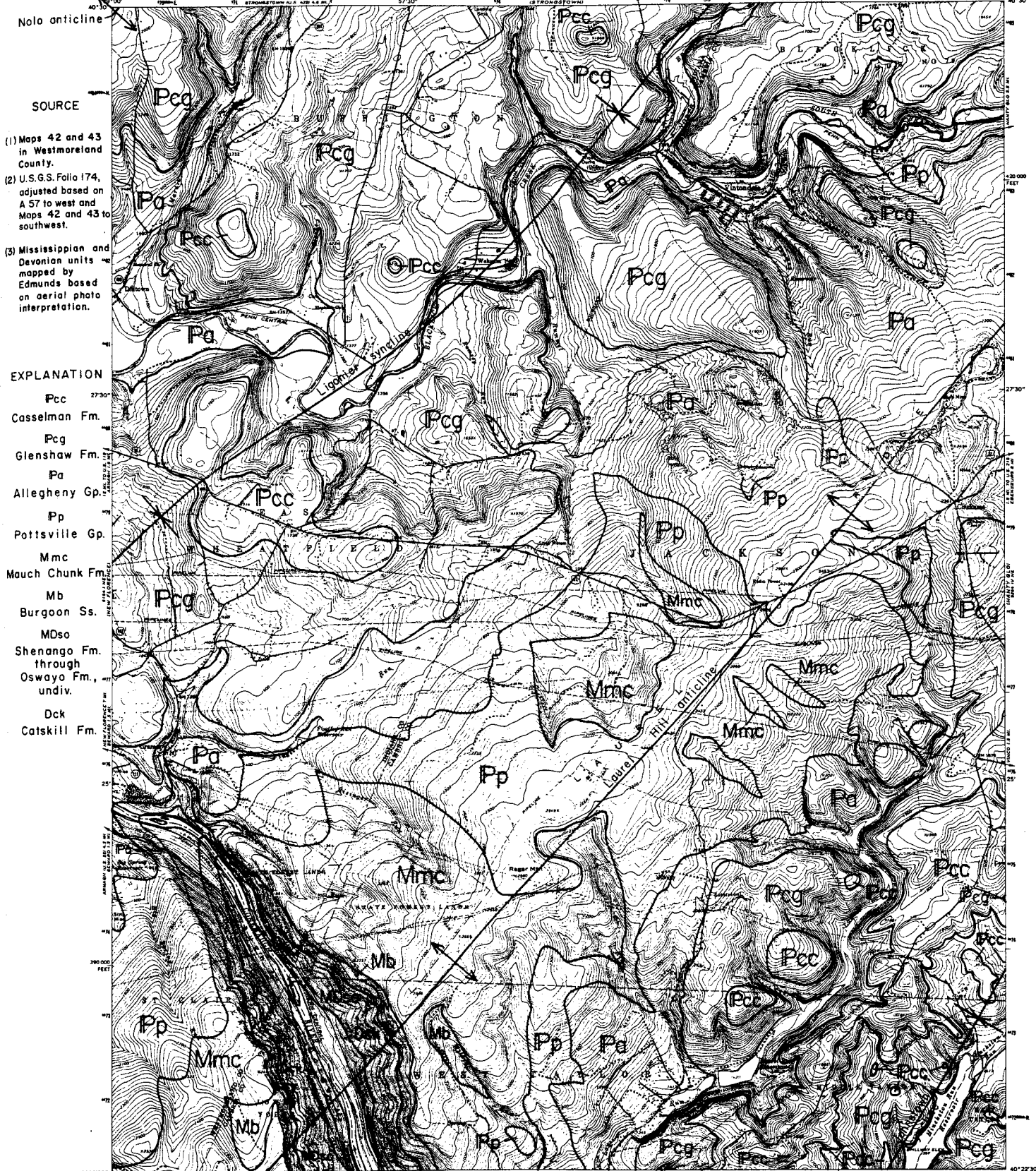
SCALE 1:62500
CONTOUR INTERVAL 20 FEET
DATUM IS MEAN SEA LEVEL

ROAD CLASSIFICATION
Heavy-duty Light-duty
Medium-duty Unimproved dirt
U.S. Route State Route

Compiled by A. D. GLOVER, 1976

Revisions shown in purple compiled in cooperation with
State of Pennsylvania agencies from aerial photographs
taken 1972. This information not field checked.

GEISTOWN



- SOURCE
- (1) Maps 42 and 43 in Westmoreland County.
 - (2) U.S.G.S. Folio 174, adjusted based on A 57 to west and Maps 42 and 43 to southwest.
 - (3) Mississippian and Devonian units mapped by Edmunds based on aerial photo interpretation.

- EXPLANATION
- Pcc Casselman Fm.
 - Pcg Glenshaw Fm.
 - Pa Allegheny Gp.
 - Pp Pottsville Gp.
 - Mmc Mauch Chunk Fm.
 - Mb Burgoon Ss.
 - MDso Shenango Fm. through Oswayo Fm., undiv.
 - Dck Catskill Fm.

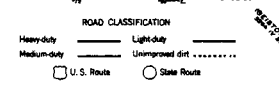
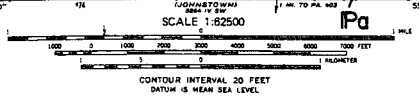
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Wagner, W. R., Heyman, L., Craft, J. L., and others (1975), *Greater Pittsburgh Region structure contour map*, Pennsylvania Geological Survey, 4th ser., Map 43.



SOURCE

- (1) In Westmoreland County, Maps 42nd and 43.
- (2) U.S.G.S. Folio 174.
- (3) Aerial photo interpretation by Edmunds for Mississippian and Devonian units.

EXPLANATION

- Pcc Casselman Fm.
- Pcg Glenshaw Fm.
- Pa Allegheny Gp.
- Pp Pottsville Gp.
- Mmc Mauch Chunk Fm.
- Mb Burgoon Ss.
- MDso Shenango Fm. through Gawayo Fm., undiv.
- Dck Catskill Fm.

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Wagner, W. R., Craft, J. L., Heyman, L., and Harper, J. A. (1975), Greater Pittsburgh Region geologic map and cross sections, Pennsylvania Geological Survey, 4th ser., Map 42.

Wagner, W. R., Heyman, L., Craft, J. L., and others (1975), Greater Pittsburgh Region structure contour map, Pennsylvania Geological Survey, 4th ser., Map 43.



ROAD LOG

MILEAGE		NOTES
TOTAL	FROM LAST NOTE	
0	0	Start at the entrance sign of UPJ campus.
0.1	0.1	Turn left on to School House Road.
0.3	0.2	Turn right on to Theatre Drive, and follow Theatre drive to the second traffic light at Elton Road, next to Denny's.
1.1	0.8	Turn left on to Elton Road (Bedford Street), and then turn right immediately on to Rts. 56 West and 219 North. Follow this to the next exit, Rt. 56 West toward Johnstown.
1.9	0.8	Leave 219 at this exit and follow Rt. 56 toward Johnstown.
3.9	2.0	At this point on the North side (right) of Rt. 56 begins the first exposure of Pennsylvanian age rocks. These belong to the Allegheny Group and you will see coal seams exposed in some of the cuts.
6.6	2.7	Widman Street Exit from Rt. 56 West.

STOP 1

At this stop you will have a chance to examine part of the Allegheny Group of the Pennsylvanian Period. In the lower section is a brownish weathering, rather massive unit, just below the large coal seam; where the coal isn't mined out. This is the Johnstown Limestone, a freshwater limestone, and the coal immediately above it is the Upper Kittanning seam. In the hillside above you can see several more coal layers and repeating sandstones and shales of various "cyclothem." A short walk up the entrance ramp on the North side is a place to get up on the large bench where you can examine the shales and sandstones above the Upper Kittanning coal seam. In these, notice the numerous concretions and nodules, and another very thin limy unit within one of the shales just below the next coal seam; similar to, but less extensive than the Johnstown Limestone.

As you proceed on down the hill toward Johnstown, notice how the beds and the road go "down hill" at about the same rate. Everything exposed along the road down to the Bedford Street exit is still part of the Allegheny Group.

7.4	0.8	Rt. 403 joins Rt. 56 at this point, and from here on stay with Rt. 403 North. On the left is the Johnstown Inclined Plane. If you have time, there is a nice view of the city and the valleys from the top.
8.0	0.6	Just past the stadium is where the Stony Creek

River and the Little Conemaugh River join to form the Conemaugh River, and the old railroad bridge at this point is one that has survived the floods of 1889, 1936, and 1977. If you look back as you go under it you can see some of the original stone facing.

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| -- | -- | Continue to follow Rt. 403 North. Get into the right hand lane and stay in it. |
| 9.2 | 1.2 | Go straight ahead at the traffic light. Rt. 56 will turn left at this point, you follow Rt. 403. |
| 9.5 | 0.3 | Turn right across the bridge and then back left on the other side; still following Rt. 403. |
| 10.8 | 1.3 | Railroad tracks and old part of Bethlehem Steel car shop will be on your right as you enter the Conemaugh Gorge. Notice the dip of the beds on this limb of the fold. For safety sake, it is better to drive completely through the Gorge to the Clark Run Nature Area, turn around and make the stops on the way back. There is more room to park on the southbound lane, and Rt. 403 is a very busy highway. |
| 14.9 | 4.1 | Clark Run Nature Area with parking on the right side of the road. Pull into the parking area. |

STOP 2

As you are examining the outcrops here, be very mindful of the traffic, for the shoulder is very narrow and the traffic is very fast. At this point you will see much of the Mauch Chunk Formation including the Loyalhanna Limestone, both of Mississippian age. The Mauch Chunk is exposed first as you walk back toward Johnstown, and then you can't miss the Loyalhanna with its massive cross bedding. Across from the parking lot, is an old quarry in which the Loyalhanna is very nicely exposed. If time permits, a short walk up the nature trail will bring you to the top of the ridge to the North and on to part of the Pottsville Group. A massive sandstone and conglomerate can be seen topping the ridge. Return to Rt. 403 and retrace your path toward Johnstown, Rt. 403 South.

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| 15.7 | 0.8 | Park on the right. At this point you are in the Burgoon Sandstone |
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STOP 3

The Burgoon Sandstone is part of the Lower Mississippian System and in these inter-bedded sandstones and shales are some small secondary folds developed in some of the thin sandstone layers. Below these folds, and probably part of the cause, are rather large-scale ripples on the bedding surface. When the small folds are examined carefully, tension cracks can be seen; a type of axial plane cleavage developing. Be very careful crossing the highway.

- 15.9 0.2 Park on the right again, and be very careful crossing the road.

STOP 4

At this point you are at the bottom of the Mississippian System and the beginning of the Devonian which are the oldest rocks exposed in the Johnstown area. The lower unit in the Mississippian is a very massive, medium to coarse-grained sandstone with several layers of scattered quartz pebbles. You can't miss the contact, for many years ago someone painted "POCO BOT" on the rock with an arrow pointing at the contact. Below the contact are beds of the Oswayo Formation of the Upper Devonian. These are marine inter-bedded shales and calcareous and non-calcareous sandstones. In some of the more calcareous units are pieces of brachiopods fossils. The Oswayo strata is found above the more familiar Upper Devonian Catskill Formation. If you walk back along the outcrop toward Clark Run, there are several beds with well developed current ripples on the bedding planes. Please do not try to remove them. Such attempt will only destroy the outcrop for other people. Look and photograph the ripples, but leave them where you find them, please. Thank you.

- 17.0 1.1 Again park on the right.

STOP 5

You are back on the Johnstown side of the Gorge now, and once again looking at "red beds", but these are part of the Catskill Formation of the Upper Devonian. In the sandstones above the red and green shales are very nice "cut and fill" structures or channel fillings produced by streams or currents migrating across the bottom. At the contact with the red shales and the sands above are plant fossils pieces.

Continue your journey back toward Johnstown.

- 20.5 3.5 Rt. 56 East joins Rt. 403 South. Continue on 403 and as you pass the Inclined Plane again, move to the left lane and prepare for a left turn.
- 22.3 1.8 Turn left at Napoleon Street, follow Rt. 403 South. After the turn, the War Memorial should be on your right.
- 23.1 0.8 Bear right at the traffic light on to Franklin Street, still following Rt. 403. After the turn
move into the center lane, what there is of it, to prepare for a left turn at the next traffic light.
- 23.5 0.4 Turn left at traffic light, follow Rt. 403.
- 23.9 0.4 Turn right on to Central Avenue - Rt. 403 South.
- 24.4 0.5 Bear right at the traffic light after you pass

the Johnstown Corporation; still following Rt. 403.

25.6 1.2 At this point there is a left turn from Rt. 403 on to a bridge, but instead of going on the bridge, carefully pull into the parking area next to the bridge, or if traffic is too heavy, go on along, turn around and come back to the parking area.

STOP 6

These rocks are part of the top of the Allegheny and lower portion of the Conemaugh Formations. A portion of the Upper Freeport coal seam is exposed here. In fact it was the mining of this seam that has created the rock fall hazard and required the use of the retaining fence. Collapse which followed the removal of the support timbers has fractured the rocks above, and now that the road has exposed the fractured material it continues to fall. Even the fence isn't strong enough to stop the large boulders that fall, and in several places the fence is badly torn as a result. In addition, there is acid mine water pouring out of one of the old mine openings. The typical brown rust stain can be seen even coming up through one of the joints in the highway; altogether a real environmental problem.

At this point you should go across the bridge. As you drive along Eisenhower Blvd. note the color of the river to your right. The bright red color is due to the iron and acid production from the weathering of pyrite and/or marcasite which is almost always found with the coal. After you go over a small hill, look to the left for an outcrop of the Upper Kittanning coal and the Johnstown limestone. Eisenhower Blvd. will cross 219 and just beyond this are some old strip mine areas. To the right of the road was mined after the tough strip mine regulations were passed and enforced, while to the left is what happened when the industry regulated itself, and before the mining laws were passed.

30.6 5.0 Traffic light at Rt. 56. The usual junk food places and gasoline stations abound at this intersection. Turn left here and stay in the center lane. The next turn will be to the left on to 219.

30.9 0.3 Turn left on to Rt. 219 South.

33.2 2.3 Stop at the south end of the large bridge across Stony Creek River, the McNalley Bridge.

STOP 7

At this exposure are strata of the lower part of the Allegheny Formation, inter-bedded sandstones and shales, and even a conglomerate up at the top of the cut. The major features here are the series of cuts and fills by a fair sized stream that was flowing approximately perpendicular to the road. It appears to have migrated back and forth across the section several times. Along the contacts between the finer materials and the coarser sands above are small

pieces of plant debris, some of which has become coal. Plant fossils are found well preserved in some of the shales, but the sandstones do not, due to their grain size preserve the plants well. In each sequence there is an upward fining of the grain size, coarse sands at the bottom and finer sands and shales at the top of the series.

From this point, proceed to the next exit, turn around and return to Rt. 56.

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| 36.1 | 2.9 | Davidsville Exit - exit 219, turn left, go under 219 and get back on 219 North toward Johnstown again. |
| 42.2 | 6.1 | Exit for Rt. 56, Windber-Geistown Exit. Turn left after exit on to Rt. 56 East and stay in the center lane for a left turn. |
| 42.6 | 0.4 | Entrance to shopping center and before the traffic light, turn left into parking area. There is a Rax right at the turn. Proceed to the rear of the stores to the large cut at the back of the parking area. |

STOP 8

This is known as the "Gee Bee" outcrop, and exposed here is one of the few marine units found in the Johnstown area. Just above the thin coal seam is the Brush Creek Limestone of the Glenshaw Formation of the Conemaugh Group of the Pennsylvanian System. Actually here the Brush Creek is more of a calcareous shale than a true limestone, but with still a nice marine fauna in it. Before the section above the cut was re-graded another marine limestone was exposed, but now it is covered.

From this point go to the end of the outcrop and turn left on to Eisenhower Blvd. again, going up the hill.

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| 43.5 | 0.6 | Turn right on to Theatre Drive at the traffic light. |
| 43.9 | 0.4 | Turn left on to School House Road. |
| 44.1 | 0.2 | Turn right on to the UPJ campus. |

END OF TRIP