FIELD CONFERENCE OF PENNSYLVANIA GEOLOGISTS

ANNUAL MEETING 1947

Bethlehem, Penna.

HOST: Lehigh University

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THE LOCAL GEOLOGY

South Mountain, on whose northern flank Lehigh University is located, is an east-west trending ridge composed chiefly of pre-Cambrian metamorphics. South of the Mountain, the Saucon Valley is floored by lower Paleozoic limestones. The south rim of the Valley is largely pre-Cambrian, but immediately south of the pre-Cambrian, the Triassic red beds and basic intrusives are encountered. North from South Mountain, the Lehigh Valley opens as a great east-west lowland. It is floored by Cambrian and Ordovician limestones to the south and Ordovician slate to the north. Kittatinny Mountain borders the valley on the north. It is formed of Silurian sediments, which, like all the other formations in this region, strike generally east-west. Beyond the Mountain, successive Devonian, Mississippian and Pennsylvanian formations crop out.

From the foregoing it will be seen that within a radius of 25 miles from Lehigh University one may examine the entire Paleozoic, except the Permian, plus the Triassic. In addition to these, there is considerable of interest among the Pleistocene and Recent deposits. Economically, the region is of some importance. Approximately 25% of all the cement produced in the United States comes from the Lehigh Valley district. Anthracite fields are close at hand, as also extensive slate quarrying operations, building stones and ornamental stones. In the Saucon Valley are a number of abandoned zinc mines, and iron ore, though no longer mined, was once an important mineral product in this region.

THE GEOLOGIC SEQUENCE

Pleistocene and Recent; Till and fluvio-glacial deposits, outwash gravels, moraine materials, etc. occur. The maximum advance of the ice was approximately to the crest of South Mountain. Two incursions, assigned to the Illinoian and Wisconsin, are recognized.

Triassic: Basic igneous intrusives. Basalt or diorite dikes and sills are worked for building stone, crushed stone and sold for ornamental purposes under the trade name of "black granite".

Brunswick formation. Only the upper member of the Newark series of red beds is exposed near Bethlehem, although the entire series crops out to the south in Bucks County. The Brunswick consists of red sandstones and shales. Along its northern border, which is a fault separating the Triassic from older formations, are a number of deposits of very coarse fanglomerate. These are well exposed along the Delaware River on the New Jersey side, and their probable counterpart is recognized at the crest of Spitzenberg (Trip 5). Thickness 6000-8000 ft.

Pennsylvanian:

Coal Measures. The anthracite basins consist of a closely folded succession of coals, shales and sandstones, all of continental origin save for a single known, thin marine limestone. Thickness 2400 ft.

Pottsville fm. At the base of the coal measure is this widespread, coarse, white-quartz pebble conglomerate. It is a ridge-maker, encircling the coal basins. Thickness 1400 ft.

Mississippian:

Mauch Chunk fm. Throughout, this formation is chiefly red shales with some massive red sandstones and occasional gray or greenish beds. Conglomerates are rare to absent. Mud cracks and ripple marks abound, but fossils, except for a few foot tracks and plants, are lacking. Thickness 3000 ft.

Pocono fm. This formation consists of quartzitic, gray sandstones and conglomerates and a few black shale bands. Plants have been identified from this formation. It is a ridge-making element. It was long confused with the Honesdale sandstone (see below) of the Devonian. It is the latter, not the Pocono, which forms the escarpment and much of the surface of the Pocono Plateau. The Pocono itself is found along the western and northern edges of the Plateau. Thickness 750 ft.

Devonian:

Catskill continental facies. The continental facies of the Devonian consists of red beds plus certain non-red units. The oldest expression of this facies is found in northern New Jersey where the lowest red beds are approximately of Marcellus age. In the Lehigh Valley they came in in Portage time. Although several divisions of the Catskill are recognized, only three need be noted here:

Upper red beds with pinkish conglomerates, 500 ft.
Honesdale gray sandstone and conglomerates lithological identical to Pocono, 500 ft.
Lower red beds.

All three of these units carry late Devonian plants. The Honesdale is a ridge maker, forms the escarpment of the Pocono Plateau, and, with the Pocono, produces double-crested Second Mountain. Thickness 2000 ft.

Portage group: The Portage group in eastern Pennsylvania is dominantly sandstone, but grows shaly to the west. The succession in the Lehigh Valley is:

Delaware River flags
Trimmers Rock sandstone
Burket black shale
Tully shaly limestone

Delaware River flags. Strictly speaking, these beds are part of the Catskill facies, but are non-red and are known to be of late Portage age. They consist of flaggy, brown to greenish or grayish sandstones which grade gradually upward into the Catskill red beds and pass downward into marine strata.
Thickness 700 ft.

Trimmers Rock sandstone. This unit is lithologically very like the Delaware River flags, but is grayer and carries more shale. Storm roller zones are common. A fairly abundant "Ithaca" fauna is present. The Trimmers Rock and Delaware River flags together form small ridges. Thickness 800 ft.

Burket black shale. This is the "Genesee" of early writers and probably is the correlative of the Geneseo of New York. In the Lehigh Valley we have a remnant of this formation which disappears rapidly eastward and has passed entirely over to sandstone north of the Delaware Water Gap. It is usually barren, but sometimes carries Buchiola, Styliolina, etc.
Thickness 40-50 ft.

Tully shaly limestone. The Lehigh River section exposes the last Tully limestone as one traces it eastward in Pennsylvania. It is quite shaly, but diligent collecting has yielded a number of fossils including Hypothyridina. This and other Tully fossils are found in sandstone farther east.
Thickness 15-20 ft.

Hamilton group: The New York sequence, Moscow, Ludlowville, Skaneateles, Marcellus, cannot be readily distinguished in Pennsylvania. In condensed form, our sequence is:

Mahantango formation
Centerfield bioherm
Marcellus formation

Mahantango fm. This is a succession of dark, sandy shales and sandstones. Its upper part is usually quite shaly, probably equals the Moscow of New York and carries at its top the usual Pustulina ("Vitulina") zone. In the midst of the Mahantango is the Centerfield bioherm, a reef of cup-florals plus numerous other remains of invertebrates. It is doubtless the correlative of the Centerfield of New York
Thickness 1200 ft.

Marcellus formation. Black shale, sometimes finely arenaceous, often with siderite concretions, characterizes this formation. Usually barren, it may carry a surprisingly large and diversified fauna of plantonic organisms.
Thickness 650 ft.

Onondago group. This is a highly variable group. Its upper part consists of limestones which change noticeably along the strike. The lower part is shaly to the east and becomes sandstone and chert in the Lehigh Valley, thus:

Lehigh Valley	Delaware Valley
Limestone, mostly chert-free; including paint ore at Hazard	Buttermilk Falls cherty limestone.
Palmerton sandstone Bowmanstown chert	Esopus shale

These units are not well exposed or are so much folded and faulted that they will not be studied on this trip. Glimpses of them will be had along the route (Trip 3). It is important to note that the Palmerton sandstone was long confused with the older Oriskany, until its Onondagan age was made known through paleontological evidence. The limestones are usually fossiliferous. The paint ore is a phase of the limestone, high in iron carbonate which, when fired, produces a red-brown pigment. Thickness 400 ft.

Oriskany group. This group is poorly represented by the Ridgeley sandstone only. It is a coarse to conglomeratic unit plus cherty beds, is quite fossiliferous with large, thick-shelled brachiopods. With the younger Bowmanstown and Palmerton it is a ridge-maker, and it is sometimes difficult to distinguish among these units topographically. Thickness 50 ft.

Helderberg group. This group is not exposed where it may be seen on the trip. It consists of the New Scotland and limy shale and the Coeymans limestone, both with distinctive fossils. It is believed to underlie the town of Palmerton in part. Thickness 150 ft.

Silurian:

Bossardsville limestone. This highest exposed Silurian formation is a "ribbon limestone" and has been extensively worked to the east. Concealed on the Lehigh, we shall have a glimpse of it near Saylorsburg. Other late Silurian formations as Keyser and Poxono Island are probably present, but are not exposed where we can see them. Inclusive thickness 400 ft.

Bloomsburg red beds. This unit is the Silurian counterpart of the Devonian Catskill continental facies. It commences in the Lehigh Valley approximately in late Clinton time, and is well exposed as a thick sequence of red sandstones and shales. Thickness 1200 ft.

Clinton formation. Brown sandstones and some shales and pebble beds below the Bloomsburg, although unfossiliferous here, are assigned to the Clinton. Thickness 1100 ft.

Tuscarora formation. The massive sandstones, quartzites and conglomerate beds of the Tuscarora form Kittatinny Mountain. This ridge can usually be differentiated from others supported

by different formations because of the prominent talus slopes formed by the Tuscarora. To the east, this formation and the Clinton are designated collectively as the Shawangunk formation. Locally, the only Tuscarora fossil is the Arthrophycus which is rare. Thickness 450 ft.

Ordovician: Bald Eagle conglomerate. There is some doubt as to the identity of a few feet of massive but friable, coarse conglomerate at the base of the Tuscarora. Lithologically, it is unlike the conglomerates of that formation, and is similar to the Bald Eagle farther west. This particular type of conglomerate comes in at this zone in all sections west to the Susquehanna except that on the Schuylkill. Thickness 4-5 ft.

Martinsburg group. This group is separated from the overlying conglomerate by an angular unconformity, which is believed to mark the Taconic Disturbance. If this is a correct deduction, then the Taconic in the Lehigh Valley did not come at the close of the Ordovician, provided we have Bald Eagle present.

The Martinsburg consists of a great thickness of slate and sandstone. These are distributed as three broad, east-west bands, slate to the north and south, sandstone (the Shochary, 750 ft.) between. The earlier interpretation was that of three successive formations, slate, sandstone, slate, but recent investigations indicate that the sandstone is the youngest, and the two slate belts synchronous, making the whole a syncline. The sandstone carries a Pulaski fauna, while the slates have produced Eden fossils in their higher parts. Anomalously, Normanskill graptolites have been identified from the slate or its unaltered equivalent to the west. Since the Martinsburg rests upon beds of Middle Trenton , the graptolites are a serious problem. Recent suggestions have been offered that the graptolites actually belong to older beds and have been faulted up.

Thickness 4000 ft.

Jacksonburg limestone. This is the cement-producing formation of the Lehigh Valley. It consists of a shaly upper and highly calcareous lower part. The rock is usually dark gray to black, and the shaly part is often so cleaved as to be distinguished with difficulty from the overlying slates. Fossils of approximately middle Trenton age are not rare in this unit. Thickness 500-700 ft.

Beekmantown limestone. Underneath the Jacksonburg, the limestones are usually high in magnesium. The Beekmantown is a massive, dolomitic formation with little that is distinctive in its lithology, and almost no fossils. However, enough remains have been found to establish its age. In the Saucon Valley, zinc was once extensively mined from the Beekmantown.

Thickness 1000 ft.

Cambrian: Conococheague ("Allentown") limestone. This is called Upper Cambrian and is in many ways very like the overlying Beekmantown. The beds are massive, usually high in $MgCO_3$ content.

Sandy and oölitic zones are often found and the alga, Cryptozoön is widespread in these beds. Thickness 1500 ft. No middle Cambrian has been identified in the Lehigh Valley, but the Upper-Lower contact is not well understood.

Tomstown limestone. This Lower Cambrian limestone is distinguished from the younger limestones by the large proportion of shaly beds present. Mostly these are sericitic. In a good exposure the Tomstown often shows a cyclic or rhythmic sequence of massive limestone, platy limestone, shaly limestone. The formation is barren. Thickness 1000 ft.

Hardyston quartzite. The lowest Cambrian consists of a clastic unit which varies from chert to fine conglomerate. It may be absent or as much as 500 feet thick. It apparently represents the incursion of the Cambrian sea over an uneven land surface. The Hardyston has been extensively quarried for building stone, many of the University buildings being faced therewith. The only fossil found locally is the worm boring, Scolithus. Thickness 0-300 ft.

Pre-Cambrian: The oldest rocks in the region form the core of South Mountain. Principally, the pre-Cambrian consists of a light-colored, granite-gneiss, the Byram. This contains inclusions of a dark, hornblendic gneiss, the Pochuck, which may be found in patches a few inches across up to mappable areas. Pegmatite dikes and quartz veins occasionally cut the gneisses. Though locally of no economic importance, the pre-Cambrian has produced iron ore in the past to the east of Bethlehem in the area south of Durham and Riegelsville.

THE TRIPS

Trip 1. Nazareth Cement Plant.
2. Saucon Valley zinc mines and Triassic intrusives.
3. The Valley of the Lehigh (BRING YOUR LUNCH).
4. West from Bethlehem.
5. Triassic fanglomerates of Delaware Valley.

N.B. Trips 1, 2, and 3 start from the University Parking Lot, Brodhead and Packer Avenues.
Trips 4 and 5 leave from the Hotel Bethlehem, Main Street.

THE PROGRAM

Friday, May 30

MORNING: Registration, Williams Hall, Lehigh University, Saucon Valley. FEE $1.00 DINNER TICKETS $1.50

AFTERNOON: Trip 1, Nazareth Cement Plant, leaving University Parking Lot, Brodhead and Packer Avenues at 1 P.M. sharp.
Leaders: Drs. Whitcomb and Betz.

Trip 2, leaving University Parking Lot, Brodhead and Packer Avenues at 1 P.M. sharp.
Leaders: Dr. Gault and Mr. Stephenson.

EVENING: Rendezvous, Room 102, Williams Hall, 7:30 P.M. for special gathering and brief discussion of next day's trip. Refreshments served by student members of the Howard Eckfeldt Society.

Saturday, May 31

ALL DAY: Trip 3, the Valley of the Lehigh. Leave University Parking Lot 8 A.M. sharp.
Leaders: Drs. Willard and Whitcomb, BRING YOUR LUNCH.

EVENING: Informal dinner, Drown Hall, Lehigh University at 6:30 P.M.

Sunday, June 1

Alternate trips are offered in which members may participate on their way home if they so wish.

Trip 4, west of Bethlehem. Those leaving via Route 22 may arrange to visit the Spitzenberg near Lenhartsville. Leave Hotel Bethlehem 9 A.M. sharp.
Leader: Dr. Whitcomb.

Trip 5, those going east may arrange to visit the Triassic fanglomerates along the Delaware River. Leave Hotel Bethlehem 9 A.M. sharp.
Leader: Dr. Willard.

TRIP 1, NAZARETH CEMENT PLANT

Mileage	
0.0	University parking lot Packer & Brodhead Avenues. Down hill and across Hill-to-Hill Bridge on Route 12.
1.1	Broad and Main Streets. Straight on Route 12.
1.8	Moravian College for Men, right on Route 12.
2.5	Left at High School and Traffic Light on Route 12.
11.5	Nazareth. Leaving Route 12, continue east on Route 45 to plant of Nazareth Cement Company.

TRIP 2, SAUCON VALLEY

0.0	University parking lot Packer & Brodhead Avenues. East on Packer Avenue.
0.2	Dead end, left.
0.3	Stop street. Right one block.
1.1	Stop street. Left on Route 12. At top of grade, short stop may be made to examine pre-Cambrian gneisses in cut, right.
1.3	Bear right at fork on to black road toward Friedensville.
2.3	Right on dirt road to visit abandoned Ueberoth mine. STOP 20 minutes. Return to Friedensville Road and continue south.
2.8	Stop street. Right at Friedensville church and right again on dirt road to Correll abandoned zinc mine. STOP 20 minutes. About face and east to Route 12 again.
4.2	Stop street. Right on Route 12.
4.4	Large cut in Beekmantown limestone.
6.4	Stop street. Intersection Routes 12 and 309. Left on 309. Ridge to south is pre-Cambrian gneiss. Continue to Coopersburg.
7.9	In Coopersburg, left at traffic signal.
8.2	Bear left.
8.3	Bear right.
8.9	Triassic diabase along road.
10.3	Small quarry, right, in Triassic diabase.
10.5	Right on direct road.

Mileage	
11.1	Bear right, then left.
11.3	Quarry in Triassic diabase. STOP 20 minutes. Return by same route to Coopersburg.
14.4	Entering Coopersburg, just before crossing Railroad, left to Coopersburg Black Granite works. Park between R.R. station and works, walk on to works. STOP 20 minutes. Return to main road, left, to Route 309.
14.8	Traffic Signal. Left on Route 309.
15.3	Park in open space before sign board right of road. STOP 20 minutes. Leaving cars, walk across road and up bank. Cut along R.R. exposes contact of Triassic intrusive body with sediments. Return via Routes 309 and 12 to Bethlehem.
22.8	From Route 12, THOSE RETURNING TO PARKING LOT, right. Those who wish to return to the Hotel Bethlehem, continue straight through on Route 12.
23.1	Parking lot.

TRIP 3

THE VALLEY OF THE LEHIGH

Bring your lunch

Mileage	
0.0	University parking lot Packer & Brodhead Avenues. Set trip reading at 0.0 on odometer. Down hill and across Hill-to-Hill bridge on Route 12.
1.1	Broad & Main Streets. Straight on Route 12.
1.8	Moravian College for men, right on Route 12.
2.2	Left on Bath Pike Route 512.
4.3	STOP #1. Stokes Park west end of Pine Top Park on old road. Pre-Cambrian. 10 minutes.
5.2	Dumps from old iron mines can be seen in distance to left. Stack of National Portland Cement Company to right. This cement plant is located on an isolated block of Jacksonburg limestone and is therefore not in line with the rest of the cement plants of the valley.
6.5	Sink hole on left in field just beyond red brick house.
6.9	Dumps of old iron mine on left.
8.2	Plant of Keystone Cement Company on left. Quarry in Jacksonburg limestone beyond the plant located at the topographic break between limestone valley and shale hills in the Martinsburg.

Mileage

9.2 Bath. Turn left at first traffic light on Route 45. Follow 45 and climb escarpment to upper level on the Martinsburg. Weathered exposures visible at right of road. Notice the greater development of relief on this upper level.

14.0 STOP #2. Road cut in Martinsburg. Twenty minute stop for study of lithology, cleavage and structure. Some of the cleavage planes have been folded.

17.6 to 17.8) Cut in sandy member of the Martinsburg. Position of sandy member will be discussed at stop #3.

19.7 Road cut in slate at edge of northern slate belt. Slate dumps and old workings to left.

21.5 Good view of Lehigh Gap cut in Kittatinny Mtn. formed of Silurian Shawaugunk. The ridge seen through the gap is formed from the Devonian Palmerton sandstone.

22.2 Slides at right of road in the cut have caused a maintenance problem. Possible cause will be discussed at stop #3. Note coarse outwash or high terrace gravels at intersection, N. on Route 309.

22.6 STOP #3. Lehigh Gap. Park off road on cinders between highway and railroad. One hour and a half stop for study of Ordovician-Silurian boundary and other problems.

23.5 Bloomsburg red beds. Entering Palmerton. Plant of N.J. Zinc Company, left.

24.4 Loading plant for sand from quarry in the Palmerton sandstone. The sand is brought down the ridge by conveyor belt.

25.1 Dump from paint ore mine in Onondaga limestone.

26.1 to 26.3) Across the river to the left one can see two ridges, one made by the Oriskany sandstone and the other by the Palmerton sandstone with Lizard Creek Valley between. The first ridge (south) is the Palmerton, the second the Oriskany with castle-like outcrops.

26.7 Crossing the Oriskany horizon.

27.0 Hamilton.

27.3 STOP #4. Park off road to right on old road. Park cars close so all can get off highway. Fifteen minutes Burkett shale, Tully limestone, top of Hamilton.

27.5 Trimmers Rock sandstone.

27.6 Notice the first red beds of the Catskill facies.
Notice the structure and alternation of red and green beds.

28.2 Syncline in the Catskill.

Mileage

28.6 Terrace gravels at top of banks.

29.6 Southward dipping Portage sandstone (Delaware River and Trimmers Rock).

29.9 Left over bridge then right to Lehighton.

30.3 Hamilton sandstone with the Centerfield coral bioherm at end of cut. No stop as better locality will be visited in the afternoon. Lehighton is on anticline which brings up the Marcellus.

31.5 Portage sandstone (Trimmers Rock). Red Catskill beds start to interfinger with Delaware River flags.

32.4 Packerton.

32.6 Turn left on road to Flagstaff.

32.9 Right on macadam.

34.0 Flagstaff. LUNCH, STOP #5, ONE HOUR.
Physiography and stratigraphy of the area seen from the observation platform. After lunch, continue north down grade.

34.3 Evidence of the incline of the old Switch Back Railroad can be seen on the nose of the mountain beyond Mauch Chunk.

34.7 Pocono sandstone.

36.3 Left at road junction toward Lansford.

36.4 Pottsville float on right. Coal on surface probably indicates location of preparation plant of coal bootleggers in the thirties.

37.7 Double crusted ridge on left of the Pocono (M) and Honesdale (D); valley in the Mauch Chunk Pottsville ridge on right.

38.6 Cross part of old Switch Back Railroad.

41.3 Right on Route 902 to Bloomingdale and Summit Hill.
Pottsville float along road.

41.8 Mauch Chunk red beds.

42.1 Pottsville. Coal strippings on left.

42.6 Right on 902 to Lansford.

42.9 Leave Summit Hill and proceed down grade into the synclinal Panther Valley. Notice extensive stripping operations and culm piles.

43.7 Right on Route 209 in Lansford.

44.6 Colliery on left.

45.4 Notice the reforestation along the road.

Mileage

47.6 STOP #6. Ten minutes. Stripping operation; anticlinal roll.

47.9 Gap out of valley through steeply-dipping Pottsville of the north limb of syncline.

48.2 Mauch Chunk red beds.

48.5 Right on Route 209 through Nesquehoning.

50.0 Mauch Chunk red beds underlie valley.

50.6 Pottsville on mountains to left.

51.8 East Mauch Chunk ahead with skyline behind it the edge of the Pocono Plateau gorge of Lehigh River on left.

52.3 STOP #7. Pottsville conglomerate. Carnotite locality. Ten minutes.

52.7 Mauch Chunk red beds: type region of formation.

53.1 Entering gorge at Borough of Mauch Chunk.
CAUTION: sharp turns, narrow streets.

53.2 Pocono across the river. Flagstaff on ridge top ahead of you.

53.4 Pocono across river at railroad.

53.6 Upper Devonian pinkish conglomeratic; highest Catskill ripple marks and mud cracks in red beds.

53.8 Honesdale sandstone in cuts. Follow strike section.
Directly below Flagstaff.

54.0 Pocono across river Honesdale on right, highest Catskill at river.

54.6 Honesdale outcrop across river.

55.0 Red Catskill below Honesdale.
Repetition of outbound trip as far as Weissport.

55.7 Portage Trimmers Rock sandstone.

57.1 Follow Routes 309 and 45 through Lehighton.

57.4 Bear left on Routes 309 and 45. Hamilton sandstone in the cut.

57.5 Left across river.

57.8 Straight ahead on Route 209. Strike section of Hamilton.

58.6 Fire tower on left on the plateau is on the Honesdale, the lower ridge is made by the Portage flags, the valley is cut in the Hamilton. Note the Pocono Plateau is edged by Honesdale.

59.6 Weir Mt. the ridge to the right is in Portage.

59.9 Passing through the Weir Mt. Syncline.

Mileage

60.5 Strike valley.

61.6 Catskill facies to right.

63.1 Red Catskill outcrops.

65.8 Sharp reverse turn to left on road to Wild Creek dam.

66.2 Portage flags.

67.1 Portage flags.

67.2 Black sandy Burkett shale at bridge Tully limestone across the stream at bridge.

68.9 Left at cross roads.

69.3 Right to Wild Creek Dam. STOP #8. Wild Creek dam and reservoir of Bethlehem Water Authority. 20 minutes.

70.3 Left on leaving reservation.

70.7 Straight at cross roads, headed for Kresgeville.

72.7 Good view ahead of nose of Weir Mt. syncline with Kittatinny Mt. in the distance.

73.7 Right to Kresgeville.

73.8 Left on Route 209 at Kresgeville.

74.6 Traveling on anticline of Hamilton.

79.6 Continue on Route 209 through Brodheadsville.

81.8 Right on Route 115 signs say Easton and New York. Crossing the Weir Mt. west, flanking syncline on Portage beds. There is no Catskill here as it was above the present surface.

82.6 Wind Gap ahead.

83.9 STOP #9. Centerfield coral bioherm. Thirty minutes. Good collecting.

84.5 Straight through Saylorsburg.
Abandoned plant of Blue Ridge Brick Co. They worked clays from the Oriskany and perhaps Esopus beds on ridge to east.

85.1 Crossing Oriskany.

85.6 Quarries on ridge to right in the "Helderberg", Bossardsville of Upper Silurian.

87.2 Wind Gap ahead. This is the type wind gap. Cross Bloomsburg red beds.

88.2 Crest of Wind Gap. Shawangunk conglomerate, lower part equivalent to the Tuscarora. Contact with the Martinsburg concealed.

89.1 Straight through the Borough of Wind Gap.

Mileage	
89.7	Slate dump on right
90.3	Keep on Route 12 at Junction.
92.7	Good view of typical topography of the Martinsburg belt. Harrisburg peneplain.
94.9	Break in topography seen on right. The upper surface is on the shales, the lower level on the limestones with the cement plants along the topographic break.
96.4	In Stockerton, turn right on 12.
96.5	Right again on Route 12.
97.0	Hercules Cement plant and quarry on left.
98.3	On left, Plant of Nazareth Cement Co. seen across a re-entrant valley of limestone into the shale belt.
99.3	Turn right on Route 12. Old Moravian building erected in 1740 on left.
99.5	Left on Route 12 at traffic light.
100.1	Escarpment between shale and limestone. Nazareth Cement Co. on left.
100.2	Right on Routes 12 and 45.
100.4	Straight ahead on Route 45 passing fairgrounds to your left.
100.7	Right. Lone Star Cement.
101.2	Right. Penn-Dixie Cement Plant #4.
101.6	Notice conveyor system at right. It carries stone between Penn-Dixie plant
101.7	Nazareth Brick Plant on left. Flurioglacial clays are worked.
102.6	View to left. Camels Hump. South Mt. and Saucon Gap.
103.2	Penn-Dixie Plant #5. Transfer station on conveyor system.
103.7	Conveyor crosses highway.
104.1	Penn-Dixie Plant #6.
104.2	Road climbs back on to the edge of the Martinsburg.
105.0	Bath. Turn left at traffic light onto Route 512, straight through to Bethlehem.
107.8	Sink hole in field between white and red brick houses. If you missed it coming out, here is another chance. Just keep watching the field; it will appear.
112.2	Right on Routes 12 and 22.
112.5	Left at traffic light. Party disbands here. Straight ahead for the Hotel Bethlehem.