EXPLANATION FOR MOUNT CARMEL AND ASHLAND QUADRANGLE MAPS, PLATE 2, AND STRUCTURAL CROSS SECTIONS, PLATE 2-A

QUATERNARY — Recent

Qal

Alluvium

UNCONFORMITY

PENNSYLVANIAN — Upper Pennsylvanian

Pl

Llewellyn Formation

PENNSYLVANIAN — Lower and Middle Pennsylvanian

Ppu | Pps | Ppc | Ppt

Pottsville Formation

Ppu, Sharp Mountain Member and Schuylkill Member, undifferentiated;
Pps, Sharp Mountain Member;
Ppc, Schuylkill Member;
Ppt, Tumbling Run Member

MISSISSIPPIAN AND PENNSYLVANIAN — Upper Mississippian and Lower Pennsylvanian

PMmu | Mm | Mmm | Mml

Mauch Chunk Formation

PMmu, upper member;
Mm, middle and lower members, undifferentiated;
Mmm, middle member;
Mml, lower member

MISSISSIPPIAN — Upper Mississippian

MISSISSIPPIAN — Lower Mississippian

Mp | Mpm | Mpc

Pocono Formation

Mp, Pocono Formation;
Mpm, Mt. Carbon Member locally at top;
Mpc, basal conglomerate

The following subdivisions are used on the cross sections.

Mp | Mpm | Mpb | Mpc

Pocono Formation

Mp, Pocono Formation;
Mpc, basal conglomerate;
Mpm, Mount Carbon Member;
Mpb, Beckville Member

UNCONFORMITY

DEVONIAN AND MISSISSIPPIAN — Upper Devonian and Lower Mississippian

DEVONIAN — Upper Devonian — Susquehanna Group

MDcs | Dcb | Dci

Catskill Formation

MDcs, Spechty Kopf Member;
Dcb, Buddys Run Member;
Dci, Irish Valley Member

Dtb

Trimmers Rock Sandstone and Brallier Shale, undifferentiated

Dhr | Dhu | Dhb

Harrell Shale

Dhr, Harrell Shale;
Dhu, upper shale member;
Dhb, Burket Shale Member

Dmu

Mahantango Formation

Dmu, upper shale member

DEVONIAN — Middle Devonian — Hamilton Group

The following stratigraphic units do not outcrop in the report area. They are shown below drainage on the structural cross sections

Dmb | Dml — UNCONFORMITY (?)

Mahantango Formation

Dmb, Montebello Sandstone Member;
Dml, lower shale and sandstone member

Dm

Marcellus Shale

Do | Dn

Onondaga Formation

Do, Selinsgrove Limestone Member;
Dn, Needmore Shale Member

UNCONFORMITY

DEVONIAN — Lower Devonian

Dsh

Shriver Chert and Helderberg Formation, undifferentiated

SILURIAN AND DEVONIAN (?) — Upper Silurian and Lower Devonian (?)

DSk

Keyser Limestone

SILURIAN — Upper Silurian

Sto

Tonoloway Limestone

pt

pre-Tonoloway

CARBONIFEROUS

GEOLOGIC MAP LINE SYMBOLS

Line symbols that illustrate coal outcrops, contacts, or boundaries between geologic formations or other rock units, and the surface traces of faults and fold axes are classified in order to indicate the accuracy of location and the relative certainty of existence of the geologic feature they illustrate.

Geologic features are shown by solid lines where accurately located, by long dashes where approximately located, and by short dashes where indefinitely located. Geologic features concealed by an overlying mapped geologic unit are shown by continuous dots where accurately located, by sequences of four dots where approximately located, and by sequences of two dots where indefinitely located.

The existence or interpretation of geologic features in some localities is uncertain owing to a general inaccessibility and or cover and heavy vegetation which prevent the acquisition of pertinent geologic data. The geologic features in such localities are classified on the geologic map as probable if there is little uncertainty, in which case the feature is shown by sequences of long dashes separated by queries, or it is classified as inferred if there is considerable uncertainty or if an alternate interpretation is possible, and the feature is shown by sequences of short dashes separated by queries. If such features are concealed by an overlying mapped geologic unit, the probable features are shown by sequences of four dots separated by queries and the inferred features by sequences of two dots separated by queries.

Queries on the map at the end of a line symbol illustrating a geologic feature indicate the extension of the geologic feature beyond that point is uncertain.

Contact

Coal bed
16, Tracy No. 16 coal bed
12, Orchard No. 12 coal bed
10, Holmes No. 10 coal bed
9, Mammoth Top Split No. 9 coal bed
8, Mammoth Bottom Split No. 8 coal bed
5, Buck Mountain No. 5 coal bed
Lv4, Lykens Valley No. 4 coal bed
only selected coal beds shown

U D 65 — High angle reverse fault, showing dip as plotted on cross section.
Angle of dip interpreted to be greater than 45° at time of faulting. Real direction of movement not necessarily known; U, upthrown side; D, downthrown side

T 30 — Thrust fault, showing dip as plotted on cross section.
Angle of dip interpreted to be less than 45° at time of faulting. Real direction of movement not necessarily known; T, upthrown side

UT — Underthrust fault
Angle of dip interpreted to be less than 45° at time of faulting; UT, underthrust side

70 — Fault, showing relative movement and showing dip as plotted on cross section

5° — Anticline
Showing crest line and bearing and plunge

Overturned anticline
Showing crest line, direction of dip of limbs, and direction of plunge of axis

Syncline
Showing trough line and direction of plunge

Overturned syncline
Showing trough line, direction of dip of limbs, and direction of plunge of axis

Minor anticline, showing direction of plunge

Minor syncline, showing direction of plunge

30 — Strike and dip of beds
?, questionable strike and dip

80 — Strike and dip of overturned beds

Horizontal beds

XM A-1093
Marine fossil locality
Number refers to description in text

XP MSH
Plant fossil locality
Number refers to description in text

X
Local unconformity locality

Vertical shaft

Tunnel or slope

Wassers D.H.
Drill hole

No. 2
Nonflowing well

CROSS SECTION LINE SYMBOLS

Line conventions used on geologic map apply also to cross sections

Contact

Coal bed
Mined parts of coal beds are shown by heavier solid lines

Thrust fault
Arrow shows plate that moved

Fault, showing relative movement

Fault, showing lateral movement
T, towards observer; A, away from observer

Shear zone

Drill hole, showing position of coal beds found in core or cuttings

Mine tunnel, showing position of intersecting coal beds

Mine waste, not shown on geologic map

LITHOLOGIC SYMBOLS FOR SELECTED MAP UNITS WITHIN MAUCH CHUNK, POCONO, AND CATSKILL FORMATIONS

Consists largely of gray, yellowish brown, and olive hued conglomeratic sandstone with lesser amounts of similarly colored sandstone, siltstone, and shale

Consists largely of gray, yellowish brown, and olive hued sandstone, siltstone, and shale

Consists of gray and olive hued conglomerate, conglomeratic sandstone, sandstone, siltstone, and shale intercalated with red and brown hued sandstone, siltstone, and shale

Consists largely of gray, olive, and yellowish brown hued sandstone, siltstone, and shale commonly intercalated with lesser amounts of red sandstone, siltstone, and shale

Consists largely of red and brown hued sandstone, siltstone, and shale commonly intercalated with lesser amounts of gray, olive, and yellowish-brown sandstone, siltstone, and shale

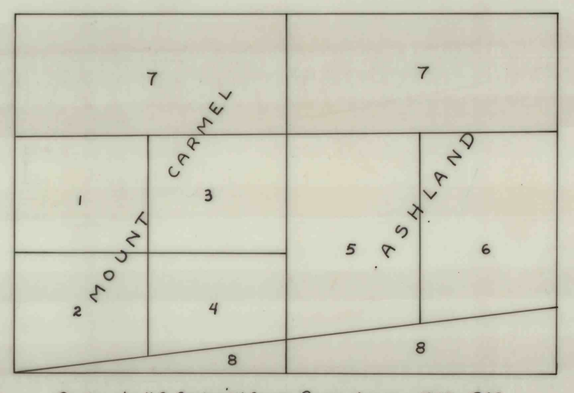
Consists of intercalated red, brown, yellowish brown, olive, and gray hued sandstone, siltstone, and shale which cannot be separately distinguished on map

Consists largely of red and brown sandstone with lesser amounts of similarly colored siltstone and shale

Consists largely of red and brown shale and siltstone with lesser amounts of similarly colored sandstone

Consists of intercalated red and brown sandstone, siltstone, and shale which cannot be separately distinguished on map

DIAGRAM SHOWING AREAS OF RESPONSIBILITY



Geology by U.S. Geological Survey. Survey between 1947-1962

Coal Geology (with later modifications by H.H. Arndt)

1. H.C. Wagner, H.E. Rothrock, and B.R. Haley, 1947-1948
2. H.E. Rothrock, H.C. Wagner, B.R. Haley, and H.H. Arndt, 1948-1949
3. B.R. Haley and H.C. Wagner, 1947-1950
4. B.R. Haley, H.C. Wagner, H.E. Rothrock, and H.H. Arndt, 1949-1951
5. H.H. Arndt, B.R. Haley, H.E. Rothrock, and H.C. Wagner, 1949-1951
6. B.R. Haley, H.H. Arndt, H.C. Wagner, H.E. Rothrock, and D. Meyers, 1950-1952

Geology of Pottsville and older rocks

7. H.H. Arndt and R.F. Schryver, 1959-1962
8. H.H. Arndt, J.P. Trexler, and G.H. Wood, Jr., 1956-1962