

U.S. GEOLOGICAL SURVEY
GEORGE OTIS SMITH, DIRECTOR

AREAL GEOLOGY
STATE OF PENNSYLVANIA
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COMMISSIONERS.
(Jamestown)

PENNSYLVANIA-NEW YORK
WARREN QUADRANGLE

U.S. GEOLOGICAL SURVEY
ENGRAVING DIVISION
MAY 18 1909
10.15



LEGEND

SEDIMENTARY ROCKS
(Areas of subaqueous deposits are shown by patterns of parallel lines, subaerial deposits by patterns of dots and circles)

Recent

Qal

Alluvium
(flood-plain deposits of present streams)

Qlt

Lower terrace deposits
(partly stratified sand and gravel, outwash from Wisconsin terminal moraine)

Qwm

Wisconsin terminal moraine
(mainly unstratified sand and gravel)

Qwd

Unclassified drift of Wisconsin age

Platystrophia

Qht

Approximate limit of Wisconsin ice sheet

Qht

High terrace deposits
(sand and gravel, in places stratified and cross-bedded, outwash from terminal moraine of supposed Kansan age)

Qed

Earlier glacial deposits
(rudely stratified sand and gravel, either terminal moraine of supposed Kansan age or outwash therefrom)

Carboniferous

Cpc

Connoquenessing sandstone member
(very coarse, white, quartz sand rock, containing some small quartz pebbles)

Cps

Sharon shale member
(black and gray clay and sandy shales, with thin coal streaks and limonite nodules)

Cpo

Olean conglomerate member
(coarse, rounded quartz pebbles embedded in fine quartz sand, underlain locally by thin coal)

Devonian

Cch

Chemung formation
(greenish shale and thin bedded fine grained sand and gray sandstone, with lenses of conglomerate of small flat quartz pebbles, i.e., mc, uc)

Cb

Berea sandstone
(thin sandstone, commonly yellow, highly fossiliferous at top probably Venango first oil sand)

Ck

Knapp formation
(mainly flat pebble conglomerate with shale parting in portion of area; upper part of Venango oil sand group)

Ccw

Conewango formation and Salamanca conglomerate lentil
(green, gray, and red shales, thin bedded, fine grained sandstone and thin conglomerate lentils; Salamanca flat pebble conglomerate, probably Venango third oil sand, in middle)

Dch

Chemung formation
(gray, green, and purple shale and thin bedded sandstone, including pink rock of well drillers)

Cch

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Quarries and mines
X Coal prospects

H.M. Wilson, Geographer.
Robt. D. Cummin and J.H. Jennings, in charge of section.
Topography by Hoyt L. Johnston, Assistant, B.D. Stewart.
Control by E.L. McNair and Robt. D. Cummin.
Surveyed in 1905 and 1906.

Geology by Charles Butts.
Surveyed in 1907.

SURVEYED IN COOPERATION WITH THE STATE OF PENNSYLVANIA

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APPROXIMATE MEAN DECLINATION 1906.

Scale 1:25,000

0 1 2 3 4 5 Miles
0 1 2 3 4 5 Kilometers

Contour interval 20 feet.
Datum is mean sea level.