PENNSYLVANIA
DONEGAL QUADRANGLE


*Map base from U.S. Geological Survey topographic map, Donegal quadrangle Contour interval 20 feet*

Geology by M. N. Shaffner, 1952

Scale
1 0 1 2 3 4

## EXPLANATION

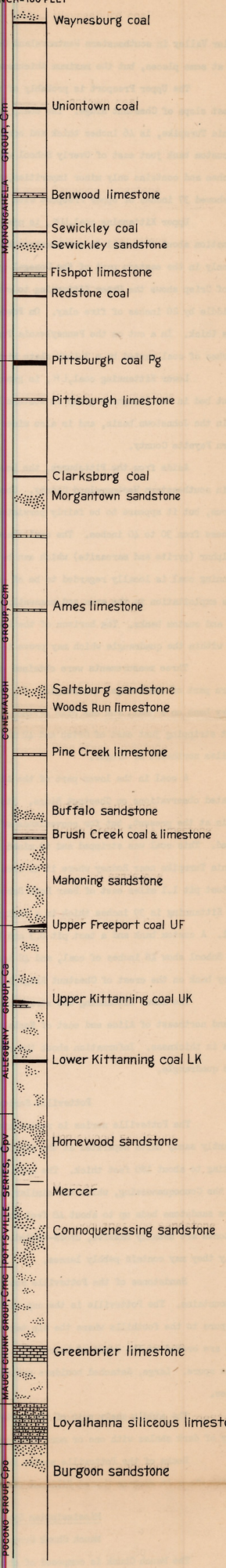
- Mine, stripping, test pit
- Outcrop
- Gas well
- Dry well
- Well, drilling

PRELIMINARY MAP
OF
## GEOLOGIC STRUCTURE ON BASE OF LOWER KITTANNING COAL
IN
## DONEGAL QUADRANGLE
PENNSYLVANIA

ELEVATION IN FEET ABOVE SEA LEVEL
CONTOUR INTERVAL 100 FEET

TRUE NORTH
MAGNETIC NORTH
APPROXIMATE MEAN DECLINATION 1931

GENERALIZED COLUMNAR SECTION
1 INCH = 100 FEET




PENNSYLVANIA GEOLOGICAL SURVEY
4th SERIES, PROGRESS REPORT 141
1952

PRELIMINARY REPORT

GEOLOGY AND MINERAL RESOURCES OF THE DONEGAL QUADRANGLE

By

M. N. SHAFFNER

### INTRODUCTION

The Donegal quadrangle, in southwestern Pennsylvania, includes an area of approximately 227 square miles, extending from latitude north 40°00', to 40°15', and from longitude west 79°15' to 79°30'. It includes parts of southeastern Westmoreland, northeastern Fayette and western Somerset counties.

Chestnut Ridge and Laurel Hill, rugged northeast-trending anticlinal ridges, dominate the topography of the Donegal quadrangle. Between these ridges is the broad, undulating, synclinal Ligonier Valley. The quadrangle is drained mainly by north-east flowing Fourmile Run and Loyalhanna Creek, south-west flowing Indian Creek, and west-flowing Jacobs Creek. The Pennsylvania Turnpike traverses east-west across the central part of the quadrangle.

In the preparation of this progress report the geology of the southern part of the Donegal quadrangle occupied by Fayette County is reproduced from plates 1 and 2 of Bulletin C26, "Geology and Mineral Resources of Fayette County, Pennsylvania", (Hickok and Moyer, 1940). The structural datum was converted from the Upper Freeport coal horizon to the Lower Kittanning coal horizon.

The geology of the Westmoreland County area in the northern part of the quadrangle is based on a reconnaissance survey by the writer during part of the summer field season 1951. Structure control points are rather sparsely distributed in some areas, and correlation of some geologic units is uncertain. As a result, the structure contours, which are drawn on the Lower Kittanning coal horizon, are considerably generalized, and the formational boundaries are only approximately correct. It is believed, however, that the essential features of the geology are fairly accurate.

Because of the availability of published detailed geologic information on Fayette County (Hickok and Moyer, 1940), the ensuing discussion is largely restricted to the northern part of the quadrangle. Pending completion of the field investigation, a detailed report will be published on the geology and mineral resources of the Donegal quadrangle.

### STRUCTURE

The rocks of the Donegal quadrangle are folded into high arches, anticlines, and deep basins, synclines. These structures, roughly parallel, trend generally northeastward and are reflected in the topography; the anticlines forming the mountains and the synclines forming the valleys. The anticlinal axes rise and fall in a series of domes and saddles, the rate of plunge ranging from 100 to 400 feet per mile. The beds normally dip from 10 to 13 degrees on the flanks, or limbs, of the folds. The west limbs tend to be slightly steeper, suggesting mildly asymmetrical folds with axial planes inclined a few degrees east of vertical. The synclines are broad and have a nearly-flat trough area.

Chestnut Ridge anticline, one of the more prominent geologic structures in western Pennsylvania, may be traced from West Virginia northeastward across Fayette, Westmoreland, Indiana, and Clearfield counties. From a dome in the southwestern part of Donegal quadrangle west of Clinton, the axis of the Chestnut Ridge fold plunges northeastward into a saddle between Mounts Creek and Greenlick Run. From there it rises to form another dome of lesser magnitude just south of the Westmoreland-Fayette county line. From another saddle, where the Chestnut Ridge anticline is observed along the Pennsylvania Turnpike at Jacobs Creek, the structure rises northeastward to form an elongated dome with the structural high centering at St. Boniface Chapel. The dome is approximately 8 miles in length and extends to the northern margin of the quadrangle.

Laurel Hill anticline, likewise a prominent structure, crosses the southeastern corner of the Donegal quadrangle. Here the anticline forms a broad, elongated dome, the flanks of which are relatively symmetrical.

Ligonier syncline is between Chestnut Ridge and Laurel Hill anticlines. The axis of this structure enters the Donegal quadrangle at the southwest, east of Normalville and, continuing northeastward, leaves the quadrangle in the extreme northeastern corner, where it enters the New Florence quadrangle. From a structurally high point near Sagamore, in the south-central part of the quadrangle, the syncline plunges to the southwest and also to the northeast into the structurally prominent Ligonier basin. The divergence of the axis of the Ligonier syncline in the structurally high area between Jones Mills and Sagamore corresponds with similar divergence and domal highs on the flanking anticlines. This suggests the possible influence of cross-warping.

The southwest-plunging axis of the Latrobe syncline crosses the northwest corner of the Donegal quadrangle.

### Faulting

Faults are present on Chestnut Ridge anticline in New Florence quadrangle and in Fayette County. On the east limb of Chestnut Ridge anticline in the