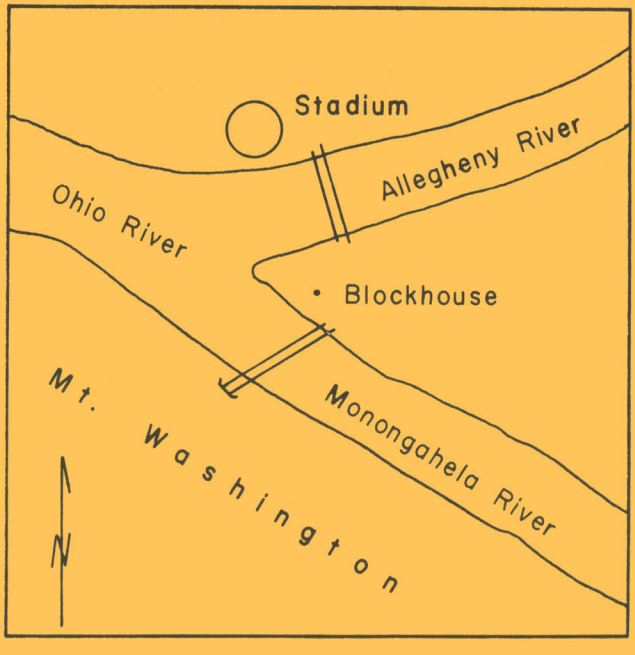
Geology of Point State Park



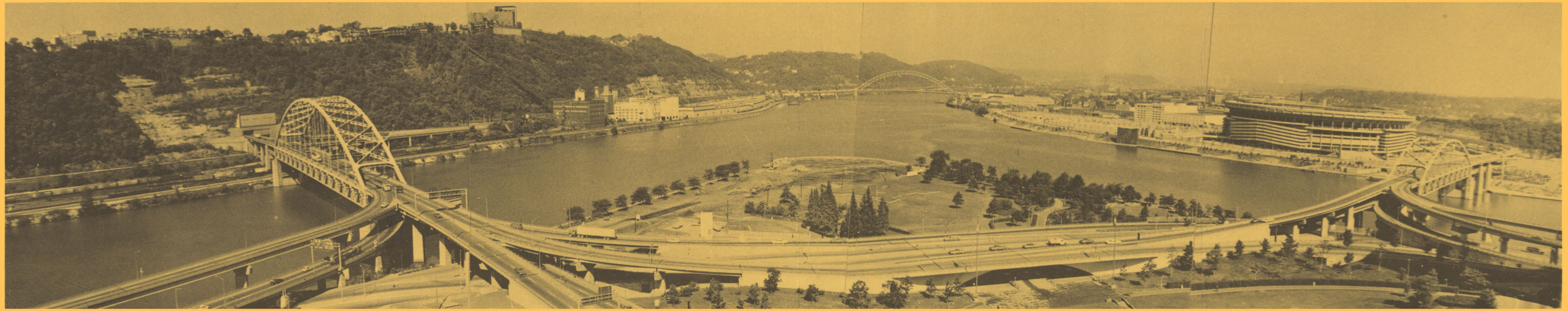


Figure 1. Panorama of Point State Park and Environs. *(Figures 1 and 3 photos by Michael Bikerman, University of Pittsburgh)*

This folder is designed to introduce to you the geology of the area around Point State Park in Pittsburgh, Pennsylvania. The park is situated at the confluence of the Allegheny River flowing from the northeast and the Monongahela River flowing from the southeast. They join to become the Ohio River which flows to the west-northwest (see map and Figure 1). The Ohio soon turns southwesterly and joins the Mississippi River at Cairo, Illinois.

The park and the flat area immediately north of the Allegheny River (site of stadium) sit on about 40 feet of river-deposited gravels and sands called alluvium. Most of this material was deposited during the Ice Ages, which ended some 12,000 years ago. The glaciers (ice sheets) never reached Pittsburgh, but their meltwaters carried alluvium and deposited it here. High waters, such as those seen in the photograph of the June, 1972 flood (Figure 2), deposit muddy alluvium. The coarser (sandier) Ice Age alluvium was laid down by a swifter running river which flooded often.

The bedrock of the Pittsburgh area is made up of nearly horizontal layers of much older sedimentary rock. These layers can be seen exposed on the hillsides in the area, and include shale (compacted mud), sandstone, (cemented sand), limestone (calcium carbonate rock, often with abundant shell fragments) and coal (compacted plant material).

Figure 2. The Point area during the June, 1972 flood, a recent example of flood deposition. Pittsburgh Press photo by Anthony Kaminski.

A stratigraphic column (Figure 5) gives the general sequence of older geologic formations exposed in the vicinity of the park. The hillside to the south above the Fort Pitt Tunnels (Figure 3) contains units from just below the Ames limestone to just above the Pittsburgh coal.

The layers in this exposure were deposited about 300,000,000 years ago over a time span estimated to be several million years. Rocks of about this age are known the world over as the Pennsylvanian System, because they were first described in western Pennsylvania and adjacent areas.

Were you to have visited the Pittsburgh area during Pennsylvanian time, you would have seen a coastal delta region with many lakes, swamps and bays—very much like the region of the Mississippi delta around New Orleans today. Accumulating within the lakes and bays would be lime and clay deposits, which upon compaction and lithification (process of changing unconsolidated sediment into sedimentary rock) would become today's limestones, claystones, and shales. During times of flood the streams feeding the deltas would deposit coarser sands which would become today's sandstones. Blocks of these sandstones can be seen along several of the walkways in the park.

Within the swamps, decaying plant materials could be seen forming first peat and later, after burial, the coal seams such as the Pittsburgh Coal ("P" in Figures 4 and 5)

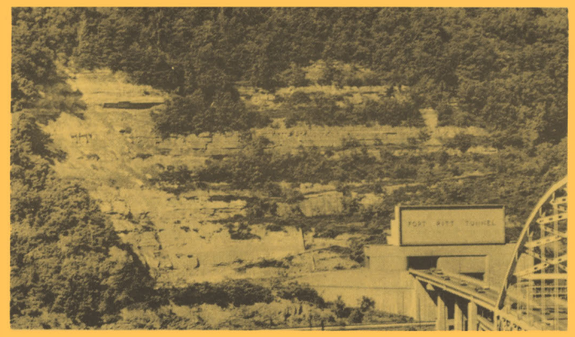


Figure 3. Road cut reveals the near perfect horizontal layering which prevails throughout the Pittsburgh area.

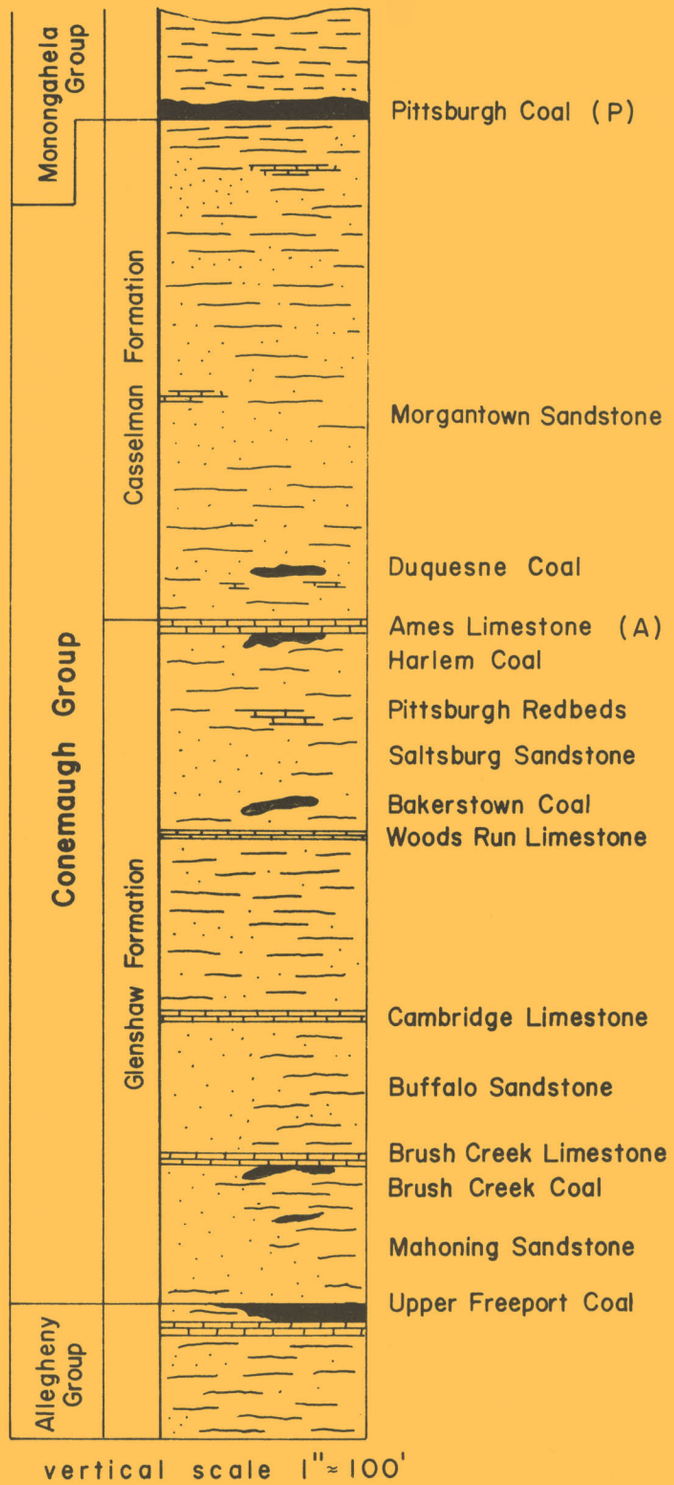
Figure 4. (above) Block diagram of area showing positions of Pittsburgh Coal (P) and Ames Limestone (A), Fort Pitt bridge and tunnel, and Three Rivers Stadium. Dotted pattern indicates deposits of alluvium.

Figure 5. (right) Stratigraphic column showing a representative section of the Pennsylvanian age rocks which occur in this area.

so important to this area's economy. A fine diorama of a Pennsylvanian age coal swamp (as well as other geological exhibits) can be seen in the Carnegie Museum in the Oakland area of Pittsburgh.

Periodically the seas invaded the land creating marine conditions which are now recorded in some of the fossil-bearing limestones, such as the Ames Limestones, exposed at the level of the railroad tracks across the Monongahela River below the Fort Pitt Tunnel ("A" in Figures 4 and 5). This unit is out of sight from the park, however.

Some of the critical engineering geology problems of this area can be seen from the park. The steep slopes cut on fractured sedimentary rocks combine with heavy rains, much freezing and thawing, and man's impact on the area to make landsliding an everpresent concern.



GLOSSARY

alluvium	sedimentary deposits laid down by streams in normal flow and in floods, whenever the velocity of water drops too low for suspended particles to remain in suspension.
claystone	massive, lithified or cemented clay.
coal	hard black combustible rock made up largely of carbon; formed from plant material.
delta	triangular (in theory) deposit of sediment formed when a stream flows into a body of standing water and drops all its suspended particles.
floodplain	flat area on sides of stream subject to flooding; made of alluvium.
geologic period	an arbitrary unit of geologic time used to denote some major block of time.
limestone	a sedimentary rock made up largely of the mineral calcite (calcium carbonate).
lithification	the process of converting soft or loose sediment into hard sedimentary rock.
sandstone	a sedimentary rock made up of grains 1/16 millimeter to 2 millimeters in size; usually, but not always, predominantly the mineral quartz.
shale	a laminated sedimentary rock made up of grains smaller than 1/256 millimeter; commonly made up of clay minerals.

Prepared by

University of Pittsburgh

Department of Earth and Planetary Sciences

for the

Pittsburgh Geological Society

P.O. BOX 44
CARNEGIE, PA. 15106