The Generalized Geologic Map of Delaware is a brief sketch map, of general use indicating the major types and locations of rocks present throughout the State, and their interrelationships. The map is preliminary as it is a first step in a continuing program of detailed geologic mapping. It is based upon many existing sources of data; additional detail may be found in the references listed.

Delaware encompasses portions of two regional geologic provinces: the Appalachian Piedmont and the Atlantic Coastal Plain. The northernmost part of the State, characterized by gently rolling hills, lies in the Piedmont Province. The surface of this complex of very old metamorphic and igneous rocks slopes seaward forming the basement upon which lies the wedge-shaped mass of sedimentary rock of the Coastal Plain, as is shown in the cross-section. This wedge consists largely of unconsolidated clays, silts, sands, and gravels which reach a thickness of more than 8,000 feet in southeastern Delaware. It is part of the Atlantic Continental Shelf and represents the landward extension of an enormous trough of sedimentary rocks parallel to the coastline. This trough constitutes the Atlantic Coast Geosyncline. The rocks of the Coastal Plain are poorly exposed so that they must be studied largely in the subsurface, where it is found that they grade into one another forming complex facies relationships. Some units are not exposed at the surface and, therefore, do not appear on the map but are shown on the cross-section.

Most of the Piedmont in Delaware is underlain by the Wissahickon Schist. The older Cockscomb Marble is exposed in two small areas at the crest of unconsolidated anticlines. The much younger sand and gravel of the Bryn Mawr section occur as a prominent surface in the unconsolidated deposits of the Coastal Plain, the Potomac Formation, during the latter part of the Lower Cretaceous, about 120 million years ago. Streams transported these variegated clays with interbedded sands from the Appalachians which lay to the northwest. This process continued into lower Upper Cretaceous (Turonian) time and built a wedge with a thickness of about 4,000 feet in southern Delaware. A small unconformity, or period of nondeposition, separates the Potomac from the overlying Magothy Formation. The white sands and lignitic black silts of the Magothy form a distinctive marker indicating the transition from the older nonmarine sediments to the later marine deposits, from which they are separated by another small unconformity.

The sea now encroached deeply upon the land and remained over most of Delaware until at least Middle Eocene time; a sequence of varied marine sedimentary rocks was deposited essentially continuously during this interval. The oldest of these sediments form the Matavon Group; consisting of the Merchantsville and Wissahickon Formations. Neither of these persist as distinct entities far into the subsurface, and so the Matavon is relegated to formational status at depth, as is shown on the cross-section. Above the Matavon is the Monmouth Formation, also divisible into two formations near the surface, the Mount Laurel-Navesink and the Redbank, but comprising a single Monmouth Formation in the deeper subsurface. These marine Upper Cretaceous formations have been well exposed in the Chesapeake and Delaware Canals (Groot, et al. 1954), where the Mount Laurel-Navesink is particularly fossiliferous (Richards and Shapiro, 1965). Of the four marine formations, the sandy, quartzeous Wissahickon and Redbank represent periods of relative regression and the silty, glauconitic Merchantsville and Mount Laurel-Navesink indicate transgression.

In the northern half of the Delaware Coastal Plain the time boundary between the Cretaceous and Tertiary (ca. 70 million years) is located within unit B. Farther south, in the subsurface, unit B, the upper part of the underlying Monmouth Formation, the Paleocene to Eocene Rancocas Formation, and unit C grade into a thick clay-silt mass termed unit A. The interrelationships of these rocks in the subsurface may be seen on the cross-section and are described by Jordan (1962); their lithologies are noted in the explanation of this map. The subsurface Pinew Point Formation, a quartzite-glauconite sand which is the youngest of the Eocene units, is, in part, the time equivalent of units A and C and is, in part, younger. All of these marine sediments are truncated by a major unconformity: no Oligocene deposits are present.

During the Miocene, the sea returned to cover the State, and deposition of sediment resumed. A sequence of three silts separated by two sand intervals forms most of the Chesapeake Group. Additional sands and silts are added toward the southeast where the Chesapeake attains its maximum thickness in Delaware of over 1,000 feet. Sands within the Chesapeake supply important amounts of water and are named, from oldest to youngest, the Chincoteague, Fredericks, Manokin, and Pocomoke aquifers. No sediments of proven Pleistocene age are known from the Coastal Plain, and the Chesapeake sediments are bevelled by another major erosion unconformity.

During the Pliocene, the advance and retreat of the continental glaciers brought about profound changes in sea level and in the streams which drained into Delaware. The Columbia Formation, consisting mostly of coarse sand with gravel, was deposited on the stream-channelled surface formed by the truncated edges of the Cretaceous and Tertiary beds and thus is a sheet of irregular thickness. During a later period of higher-than-present sea level, the sea reworked these continental deposits in the southern part of the State where they may be subdivided into the Omar and Beavardam (and probably other) formations (Jordan, 1964). The general nature of the Columbia deposits is shown on the geologic map by patterns overlying the symbols of the older rocks; these are dashed where the relationship is in doubt.

It is this basic geologic framework, so briefly outlined here, that influences much of Man's activity in Delaware. The extremely important large ground-water supplies are derived from some of the Potomac and marine Cretaceous sands, the Magothy, Rancocas, and Pinew Point Formations, and sands of the Chesapeake and Columbia deposits. The Wissahickon Formation and the banded gneiss of the Wilmington Complex yield engineering stone; the Potomac Formation, brick clay; and the Columbia, sand and gravel for construction. The rocks of Delaware contain additional deposits of probable industrial value, including, for example, pure quartz sands of various textures, heavy mineral concentrates, and very pure glauconite.