

AREAL GEOLOGY

STATE OF MARYLAND
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STATE GEOLOGIST

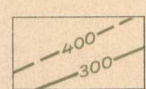
MARYLAND
TOLCHESTER QUADRANGLE

DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY
GEORGE OTIS SMITH, DIRECTOR

LEGEND

ECONOMIC AND STRUCTURE DATA

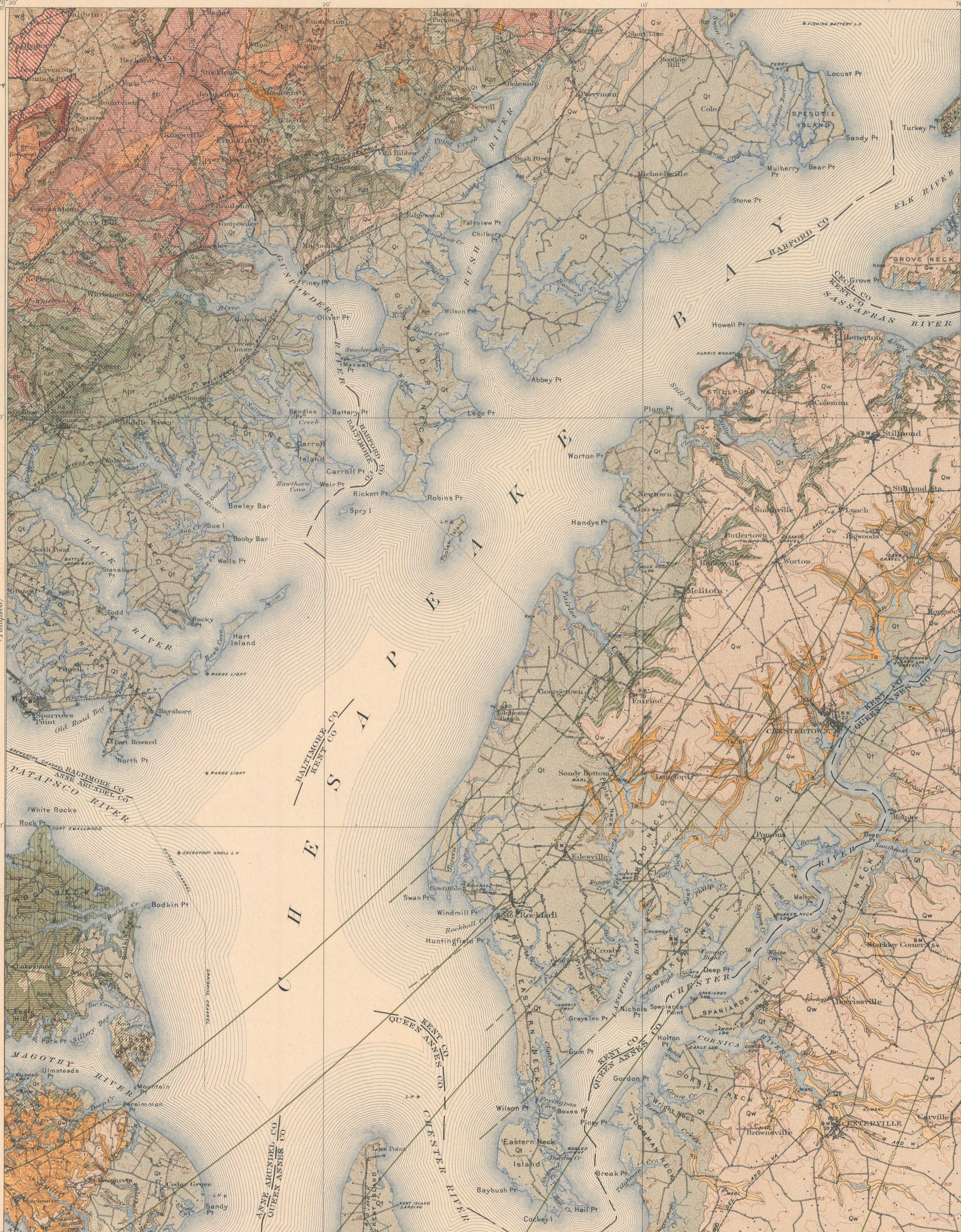
- ⊛ Iron mines (unless otherwise indicated)
- ⊛ Granite Quarries
- ⊛ Marl, clay, sand, and gravel pits
- ⊛ Artesian wells (Depth in feet)
- ⊛ Flowing wells



Depth below sea level to artesian-water horizons (dashed lines represent horizon in Magdoff formation; solid line horizon near base of Harton formation; other water horizons in the Potomac group, of greater depth)

Economic note: Iron ore, chiefly carbonate, has been extensively mined in the Arundel formation and springs in the Patuxent formation, and the clay can be obtained from Kp, Ka, Kpt, Kr, Km, Ta, Qw, Oq, and Qs. Pottery and pottery clays from Kp, Ka, Kpt, and Kr; building sand from most Cretaceous and younger formations; glass sand from Harton formation; gravel from Ta, Qs, Oq, and Qw; and Qs, mark for bricks from Km, Kp, Ta, and Ta. Diatomaceous earth from Calvert formation. Feldspar for pottery industry occurs in pegmatite dikes in Wissahickon gneiss. Crude and small amounts of amber occur in the Magdoff formation. Granite and gneiss are locally quarried for building stone, foundation stone, and flagstone.

Note: Structure section along line A-B in the text.



LEGEND

SEDIMENTARY ROCKS

Areas of ambiguous deposits are shown by patterns of parallel lines; subequal deposits by patterns of dots and circles; metamorphism is indicated by hachures combined with the line pattern.

Q_t
Talbot formation
(loam, sand, and gravel, with clay lenses and calcareous nodules; forms terraces and lowlands from 0 to 50 feet above sea level)
UNCONFORMITY

Q_w
Wicomico formation
(loam, sand, and gravel, with terrace benches; coarse rolling terraces and divides from 50 to 100 feet above sea level)
UNCONFORMITY

Q_s
Sunderland formation
(loam, sand, and gravel; coarse terraces and divides from 100 to 200 feet above sea level)
UNCONFORMITY

T_b
Brandywine formation
(coarse sand and gravel, coarse divides from 200 to 300 feet above sea level)
UNCONFORMITY

T_c
Calvert formation
(blue clay, sandy clay, shell marl, and diatomaceous earth)
UNCONFORMITY

T_a
Aquia formation
(light brown to pinkish sand and shell marl; in places finely laminated by thin shales)
UNCONFORMITY

K_{mw}
Miomouth formation
(reddish brown to pinkish sand with many iron concretions)
UNCONFORMITY

K_{ma}
Matawan formation
(gray to black micaceous sandy clay carrying glauconite)
UNCONFORMITY

K_r
Magothy formation
(thin lambed alternating lignite and clay with shaly lignite and ferruginous sandstone)
UNCONFORMITY

K_{pt}
Raritan formation
(irregular clay sand, and gravel with some lignite)
UNCONFORMITY

K_a
Patuxent formation
(dark red and black clay carrying lignite and some shaly lignite)
UNCONFORMITY

K_p
Arundel formation
(dark red and black clay carrying lignite and some shaly lignite)
UNCONFORMITY

C_c
Cockeysville marble
(coarse-grained, granular, magnesian marble containing numerous mica flecks)
UNCONFORMITY

C_s
Setters quartzite
(thin bedded, quartzite-bearing and magnetite-bearing quartzites)
UNCONFORMITY

wg
Wissahickon mica gneiss
(coarse-grained micaceous schist and gneiss, finely crystalline)
SEQUENCE CONCEALED

bg_n
Baltimore gneiss
(medium-grained, quartzite-bearing gneiss, intensely altered, intensely intruded in places with gabbro altered to hornblende and mica schists, bgs)
UNCONFORMITY

sp
Serpentine
(including talc, chlorite schist, and unaltered peridotite and perovskite)
UNCONFORMITY

gb
Gabbro
(massive, medium-grained, dark bluish-green to grayish rock, magnesian, intrusions in Baltimore gneiss mapped with this formation as bgs)
UNCONFORMITY

g
Granite
(coarse-grained, white and pink granite)
UNCONFORMITY

Faults
Overthrust side of thrust faults on the left margin.

Quaternary

Tertiary

Cretaceous

Lower Cambrian ?

Upper Cambrian ?

Pre-Cambrian

Early Cambrian or older

Topography by U.S. Geological Survey. Reduced from Betterton, Chestertown, Gunpowder, and North Point atlas sheets. Shoreline topography by Coast and Geodetic Survey. Control by Coast and Geodetic Survey and U.S. Geological Survey. Surveyed in 1895, 1899, 1900, and 1902.

APPROXIMATE MEAN DECLINATION 1895



Scale 1:25,000
Contour interval 20 feet.
Datum is mean sea level.
Edition of Nov. 1915.

Geology of Crystalline rocks by Edward B. Mathews. Geology of the Coastal Plain by Benjamin L. Miller, Arthur B. Bibbins, L.W. Stephenson, and Homer P. Little. Surveyed in 1904-1911.

SURVEYED IN COOPERATION WITH THE STATE OF MARYLAND.