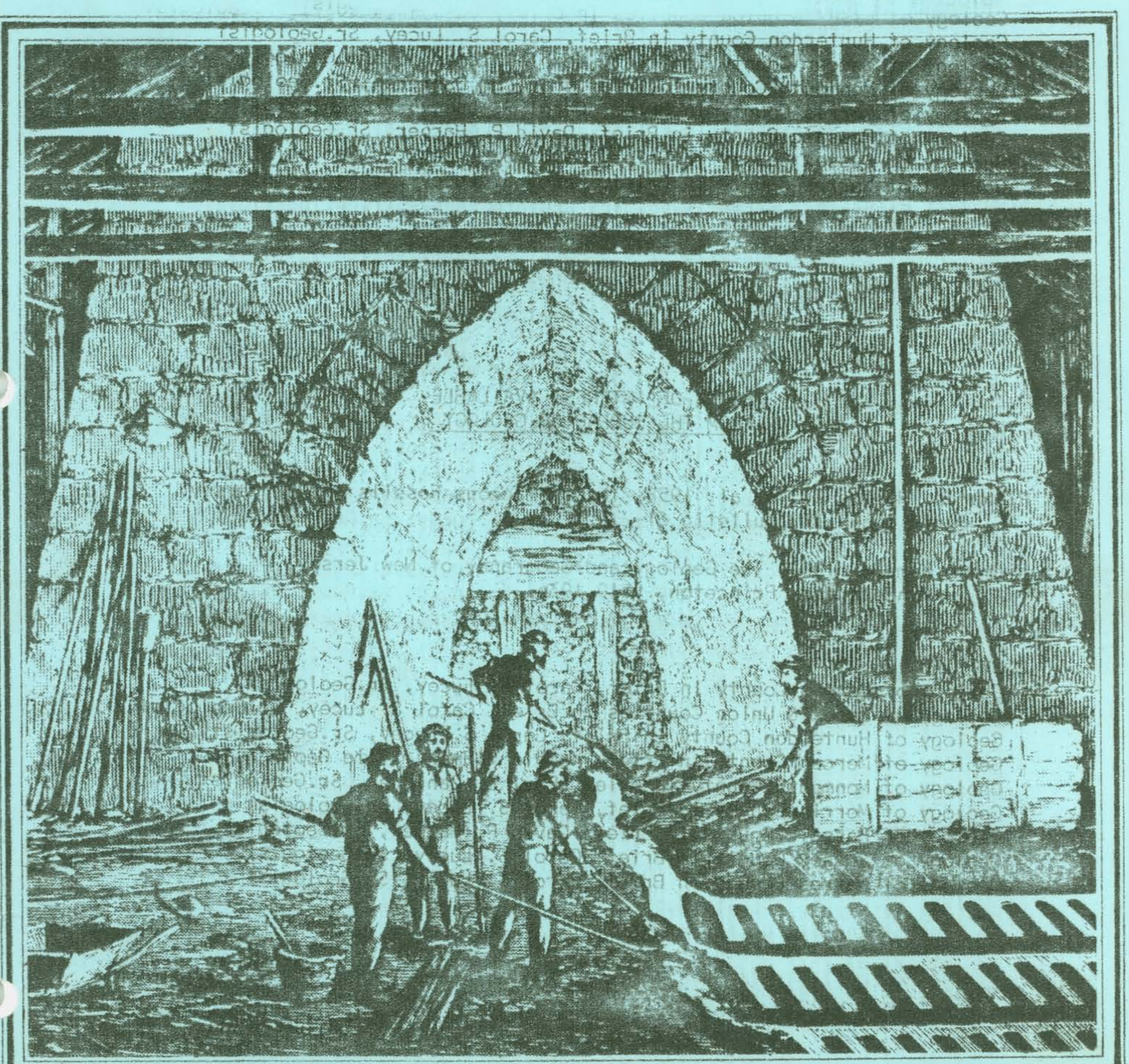
GEOLOGY
OF
BURLINGTON COUNTY
IN BRIEF



NEW JERSEY GEOLOGICAL SURVEY

BOOKS OF INTEREST AVAILABLE FROM THE BUREAU OF GEOLOGY

Richards, Horace G., et al, 1958, The Cretaceous Fossils of New Jersey, Parts I and II, Bulletin 61

Widmer, Kemble, 1964, The Geology and Geography of New Jersey, D. VanNostrand, Princeton, v.19,193p.

COUNTY SERIES:

- Geology of Bergen County in Brief, Carol S. Lucey, Sr.Geologist
- Geology of Essex & Union Counties in Brief, Carol S. Lucey, Sr.Geologist
- Geology of Hunterdon County in Brief, Carol S. Lucey, Sr.Geologist
- Geology of Mercer County in Brief, Kemble Widmer, State Geologist
- Geology of Monmouth County in Brief, Paul B. Dahlgren, Sr.Geologist
- Geology of Morris County in Brief, Carol S. Lucey, Sr.Geologist
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- Geology of Warren County in Brief, Carol S. Lucey, Sr.Geologist

Cover from *Vanishing Ironworks of the Ramapos* by James M. Ransom (Rutgers University Press, 1966). Courtesy of the author.

Richards, Horace G., et al, 1958, The Cretaceous Fossils of New Jersey, Parts I and II, Bulletin 61

STATE OF NEW JERSEY

Department of Environmental Protection
Rocco D. Ricci, Commissioner
Glenn L. Paulson, Assistant Commissioner

GEOLOGY OF BURLINGTON COUNTY IN BRIEF

by

Carol S. Lucey
Supervising Geologist

and

Kemble Widmer
State Geologist

1977

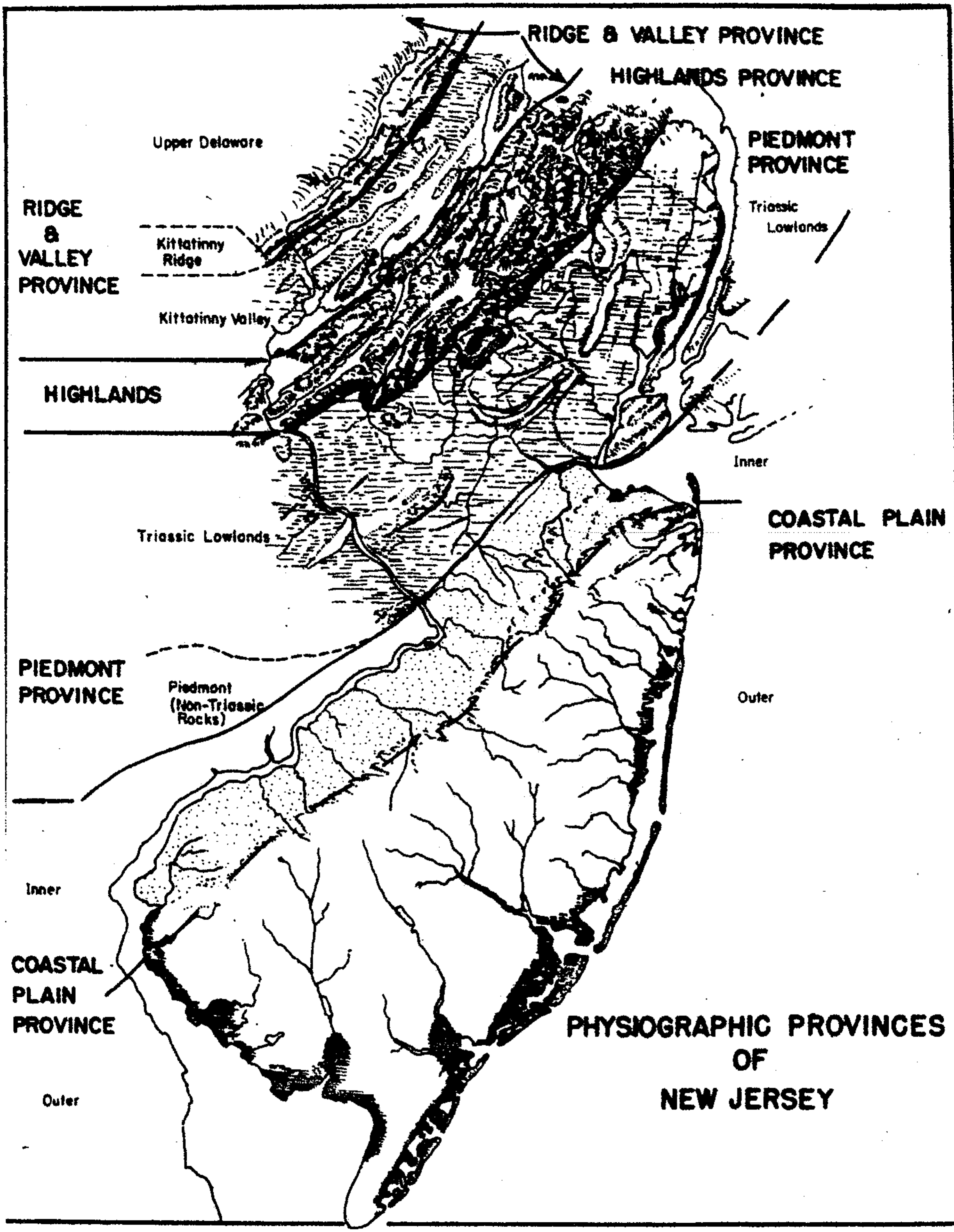
Bureau of Geology and Topography
P.O. Box 2809
Trenton, New Jersey 08625

GEOLOGY OF BURLINGTON COUNTY IN BRIEF

Burlington County lies entirely within the Atlantic Coastal Plain, a physiographic province which extends along the seacoast from Massachusetts to Florida. The Coastal Plain consists of unconsolidated sands, silts, clays, and marls. As all of these sediments are easily eroded, the Coastal Plains of the United States are regions of low relief. In New Jersey, there are local areas where gravel capped hills have protected the underlying sediments, and thus topographic highs known by such quaint names as Apple Pie Hill or Beacon Hill were preserved.

In New Jersey, the Atlantic Coastal Plain has been divided into three physiographic subdivisions (Owens and Minard, 1960): the inner lowland, the inner upland, and the outer lowland. In Burlington County, the inner lowland is the area bordering the Delaware River, where elevations rarely exceed 100 feet. Streams in the inner lowland drain to the Delaware River. Rancocas Creek comprises the principal drainage basin. In some areas, these streams are steeply incised into the steep slope of the subdued Coastal Plain cuesta. A cuesta is a hill with one steep slope (toward the Delaware River) and one gentle slope (toward the Atlantic Ocean).

The inner upland, which forms the drainage divide in the county, is a narrow, slightly dissected cuesta with some elevations up to 200 feet. Erosional remnants upon this surface form the prominent hills of Mount Holly, Juliustown, and Arney's Mount. The sands and gravels in these hills, in addition to having been protected by capping gravels, have frequently been partially cemented by iron oxide precipitated from water percolating down through the ground. These reddish-brown iron oxide cemented sediments are more resistant to erosion than the uncemented sands.



PHYSIOGRAPHIC PROVINCES OF NEW JERSEY

Southern Burlington County lies within the outer lowland where elevations rarely exceed 50 feet. Streams within this subprovince empty into the Atlantic Ocean. Sloping gently toward the sea, the flat terrain of this area has been slightly modified by the Mullica, Wading, and Bass Rivers.

Precambrian and Paleozoic Era

The Coastal Plain sediments lie unconformably on crystalline rocks formed in Precambrian times or deposited in the earlier Paleozoic and then intensely metamorphosed. This surface may have a relief of 200 feet or more but is generally relatively flat and increases in depth (dips) towards the ocean at a rate of about 80 feet to the mile.

The Appalachian Orogeny, a period of mountain building, occurred at the end of the Paleozoic era. Intrusion of hot, molten magma caused the previously deposited sedimentary rocks to be changed or metamorphosed into gneiss and schist. Gneiss is coarsely grained and bands of light and dark minerals are seen, such as quartz, plagioclases, and pyroxenes or amphibolites. Schist is finer grained and consists of clearly visible flakes of one of the micas. Known as the Wissahickon formation, the schist does not appear at the surface in Burlington County. The Wissahickon and gneisses do appear north of Burlington County on the Pennsylvania side of the Delaware River. Wells close to the river in Burlington County from 50 to 100 feet deep will encounter these formations at depth. As one progresses towards the Atlantic Ocean, the overlying unconsolidated formations thicken, and the depth to bedrock is greater than 5000 feet as the ocean is reached. The bedrock surface beneath the Coastal Plain sediments was apparently worn down to a peneplain resembling that found in Piedmont province of New Jersey but with even less relief.

Mesozoic Era

The Mesozoic Era is divided into three periods: the Triassic, which underlies the present Piedmont province of New Jersey; the Jurassic, which does not occur in the state or in the eastern United States except in the bottom of deep wells near Florida; and the Cretaceous, present in the Coastal Plain of New Jersey. Events which occurred in the Triassic period in New Jersey are described in the Geology in Brief series for the relevant counties, such as Mercer, Bergen, and Passaic.

During the Jurassic and the early part of Cretaceous times, all of what we know of as New Jersey at present was eroded to a peneplain surface. In mid-Cretaceous times, this surface began to warp so that what is now the Coastal Plain was depressed to the southeast, while the northern areas of New Jersey were uplifted. This caused the velocity of the northern New Jersey streams to increase. Burlington County, which was first subjected to continued erosion, began to receive sediments carried from the northern mountains. The first sediments deposited in Burlington County upon the "basement" rock are the Magothy and Raritan formations of sand and clay.

These sediments were deposited in stream channels and in the bogs and estuaries of the fluctuating shoreline. Both marine and non-marine sediments are found within this series of alternating clays and sands. Plant fossils in the non-marine stream deposits and marine fossils in the sea deposits record the diverse conditions under which the sediments accumulated.

Subsidence continued to be the dominant force throughout late Cretaceous time. The sea transgressed (encroached upon the land) until all of south and central New Jersey was under water. Abundant quantities of glauconite, an iron magnesium silicate mineral, were precipitated in the shallow waters of the Continental Shelf. This green mineral was incorporated in the mica-rich sandy clay, producing the green, quartz-glauconite clays and sands of the Matawan Group. The formations which compose the Matawan Group are, from oldest to youngest, the Merchantville and Woodbury clays, the Englishtown sand, the Marshalltown formation, and the overlying Wenonah formation. These green clays and sands contain occasional fossil clams, oysters, and brachiopods, and abundant remains of microscopic protozoa. Textural and faunal evidence suggests variation between nearshore lagoonal and deeper water of the Continental Shelf environments.

The Red Bank overlies the Navesink and is found for only about four miles from the northeastern border of the county in the vicinity of Jacobstown. It is difficult to distinguish the contact between the two formations. Pyrite, lignite, and mica are prominent as accessory minerals associated with the major constituents, clay and glauconitic sand.

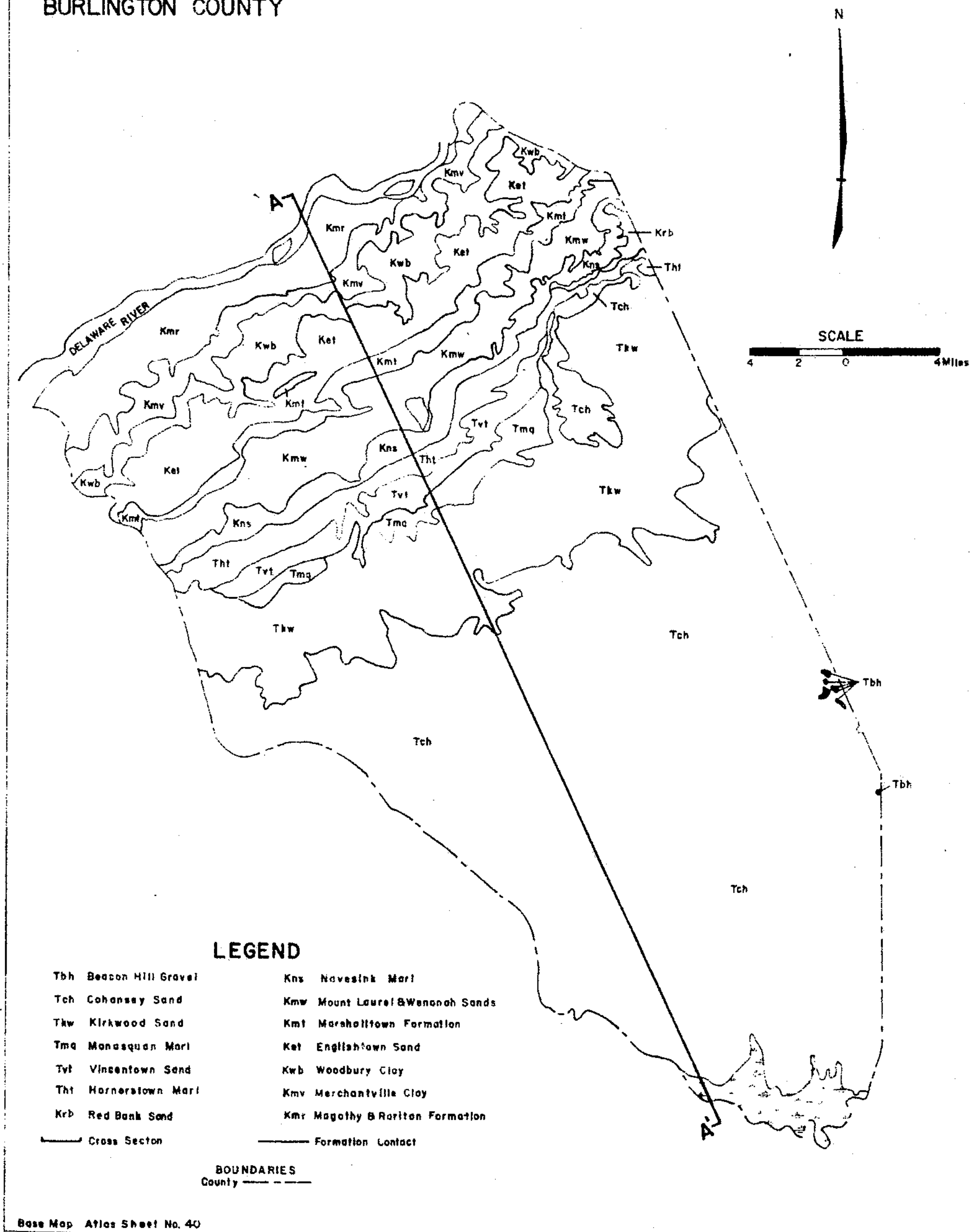
The Wenonah, the uppermost formation of the Matawan Group, consists of a dark gray, lignitic, micaceous, clayey silt to fine quartz sand with moderate amounts of glauconite.

The similarity of the overlying Mount Laurel, Navesink, and Red Bank formations suggests that comparable conditions of sedimentation prevailed to the end of the Cretaceous Period.

The sediments of the Monmouth Group, also marine deposits, are similar to the Matawan Group. However, they do not contain the abundant mica and lignite found in the Matawan beds. Generally, there are differences between the groups in decreasing amounts of mica and lignite.

The Mount Laurel sand which forms the bottom unit of the Monmouth Group is a slightly clayey, glauconitic, fine to coarse sand.

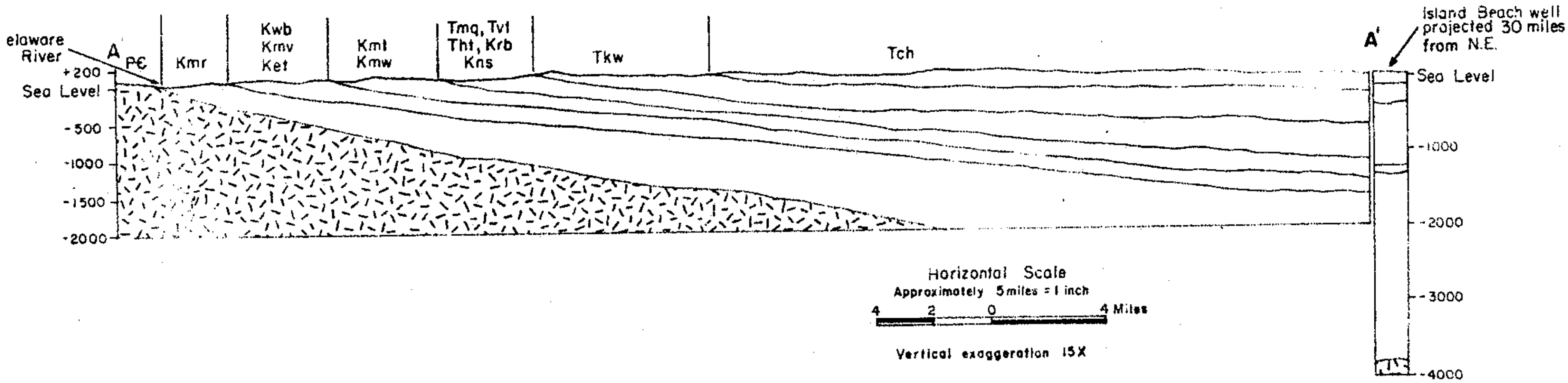
GEOLOGIC MAP OF BURLINGTON COUNTY



GEOLOGIC CROSS SECTION
OF
BURLINGTON COUNTY

NEW JERSEY GEOLOGICAL SURVEY 1977

SECTION A-A'



Overlying the Mount Laurel sand, the Navesink formation is composed of greenish-black glauconite sand and gray clay. The Navesink is one of the most fossiliferous formations in this group, containing fish teeth, ammonites, belemnites, and brachiopods. The clay content of the Navesink increases upward through the formation, usually accompanied by an increase in micaceous silt. Beds of glauconitic sand are usually interbedded with the clayey beds in the upper part of the formation.

In 1955, when excavating for a basement in Eastampton Township, two caves were discovered. The caves appeared to have been formed at the contact between the Navesink and Mount Laurel formations. They were filled in before they could be explored and, therefore, their full extent is not known. Apparently they were formed by subsurface drainage starting in a field about 300 feet from the excavation removing clay and fine sand.

Cenozoic Era

Tertiary Period - During the early part of the Cenozoic Era, the seas retreated. After a short interval of erosion followed by subsidence of the land, the sea invaded again. The formations of early Tertiary time are similar to those of the underlying Matawan and Monmouth Groups.

The Hornerstown marl, chiefly composed of dark green, clayey glauconitic marl, was deposited on the eroded Cretaceous surface. Distinguishing this formation from the underlying Monmouth Group is sometimes difficult. One criterion is the color of the clay; grayish black in the unweathered Monmouth and green in the unweathered Hornerstown.

The Vincentown formation, which is a clay formation with abundant calcareous fossils, overlies the Hornerstown marl. In the surface outcrop where the Vincentown has weathered, the formation is a yellow quartz sand, at times consisting entirely of microscopic fossils, chiefly bryozoan fragments and foraminifera. However, mixed with these very abundant sand grain-size fossils, corals, echinoids, and other larger fossils may be found. When seen as unaltered material, the Vincentown is usually a gray or dark gray, clayey glauconitic sand with some mica.

The glauconite increases in the Manasquan formation, which overlies the Vincentown. The glauconite sand, or as it is more commonly known, the "greensand marl," was once widely mined in this formation. Because the glauconite itself breaks down, it provides phosphorous to the soil. In using the glauconite sands as a fertilizer or soil conditioner, farmers soon found that certain areas of the "greensand marl" had too much clay and when spread upon the fields would develop hardpan. This high clay content caused these areas of the formation to be known as "poison marls," since they inhibited plant growth rather then improving it. Fossils are not common in the Manasquan formation.

The period of erosion occurred after deposition of the Manasquan formation. This removed the uppermost sediments which would have been part of the Manasquan and probably other Coastal Plain formations which were exposed elsewhere. This erosion ended some time in the Miocene with the deposition of the Kirkwood formation, which can be divided into two parts. The earlier part is predominantly clay and is sufficiently fossiliferous so that it may be dated as having been deposited during Miocene times. In the upper Kirkwood, the clay gives way to beds of sand containing lenses of clay and alternating with thin clay layers. Towards the top of the formation, the sand is abundant. There is evidence in some localities that the top of the Kirkwood was reworked during the deposition of the overlying Cohansey formation. This would indicate some erosion but the two formations, the Cohansey and the Kirkwood, have almost the same dip towards the Atlantic Ocean.

Ilmenite, an iron titanium oxide mineral which is very heavy and, therefore, may be deposited as a placer deposit in streams, estuaries, or along shore, is found in the reworked portion of the Kirkwood and is sufficiently abundant in the overlying Cohansey to be worked at several localities in Ocean County to the northeast.

Miocene, Pliocene, Pleistocene

The Cohansey formation can be any of the geologic ages mentioned above. It is shown on the geologic map as being Miocene because the first fossiliferous underlying formation is the clay of the Miocene-Kirkwood. However, since the Cohansey was first described and an attempt was made to relate the ages of the Cohansey and the overlying yellow gravels to the geologic time scale, there has been much conflicting evidence and no fossils which can be used with certainty. A number of geologists now believe the Cohansey may be Pliocene, while a few think it may be early Pleistocene in age.

The Cohansey formation is a white to light yellow quartz sand which may include areas cemented by iron oxide. These ledges of ironstone are common to many of the Coastal Plain formations, but in the Cohansey they are abundant and are known along Cohansey Creek in Cumberland County as Cohansey quartzite or some beds used for their building stone from Vineland as the Vineland sandstone. These iron-cemented sands may be any color from a light red to a dark red-brown to a dark green. In some cases, quartz pebbles may occur within the sand matrix. Such rocks, because the quartz pebbles are usually stained yellow on the outside while the matrix is a dark brown, are known as "peanut brittle" rock.

The bottom surface of the Cohansey formation dips seaward at about 10 feet to the mile; and in southeast Burlington County, the entire formation is 250 feet in thickness. The coarse sands of the Cohansey and of the underlying Kirkwood can be considered as a single hydrologic unit with respect to the ground water resource. Wells in the Cohansey, because it is a coarse well-sorted sand, frequently yield 500 gallons per minute and may yield as high as 1,500 gallons per minute. Except for the younger yellow gravels, the Cohansey formation is the surface formation for fully 2/3 of Burlington County and for most of the Coastal Plain, where drainage is toward the Atlantic Ocean.

The Cohansey formation is not only an extremely good aquifer, but it is so porous and permeable that rainfall soaks into the ground and moves down to the water table too fast for most plants to use. Percolation rates are equal to or in excess of 1/2" of water per hour, a rate probably two or more times that of the heaviest rainstorms. This ability of the sandy formations of the Cohansey and the Kirkwood to quickly drain away rainfall may be one of the principal causes of the development of the distinctive flora of the Pine Barrens.

The Pine Barrens is a sparsely settled, ecologically unique area covering 1.2 million acres in New Jersey. It is a region of highly flammable pine vegetation and fires are frequent. The vegetation sprouts from underground roots after the tops have been burned. Because of the regrowth after fires, the area's fauna and flora are quite different from any other area in New Jersey.

The area produces cranberries, blueberries, and wood cut for fiberboard around the county.

There are overlying yellow gravel formations which are dated as the Pleistocene or Ice Age. Along the eastern borders of southern Burlington County, there are a number of local hills which are capped by yellow gravels. Named after the occurrence on Beacon Hill in Monmouth County, these gravels are known as the Beacon Hill gravels.

Since the deposition in the early Pleistocene, the topography of the Coastal Plain has been reversed. Those parts of the Coastal Plain not protected by the gravels deposited in the former stream valleys have been eroded below the level of these early Pleistocene valleys. In the higher elevations of southern Burlington County there is a second set of yellow gravels lower and younger than the Beacon Hill, known as the Bridgeton gravels from their occurrence in the vicinity of Bridgeton in Cumberland County. A third yellow gravel series, known as the Pensauken, occurs in northern Burlington County in that part draining to the Delaware River. These gravels were deposited in a large Ice Age stream, or perhaps a sound, which was generally parallel to the present course of the Delaware River between Trenton and Wilmington. The youngest formation of yellow gravels, the Cape May, occurs at low elevations adjacent to that part of Burlington County in the vicinity of the Mullica River.

At this time, the principal geologic processss going on in Burlington County is erosion. The streams are very slowly cutting through the Pleistocene and earlier deposits. Because the gradient of most streams in the county is so low, the water moves sluggishly and is incapable of removing sediments, except the very finest clays and sands, during periods of flood.

GEOLOGIC TIME SCALE

Geologic time intervals are unequal subdivisions of the earth's history corresponding to earth's geologic events. Eras are the longest divisions of time and contain many periods which are further subdivided into epochs. Formations, which are mappable units of rock or sediments, usually have lithology or characteristic distinctions and are assigned to that period or epoch during which they are formed.

A formation's place within the stratigraphic column is determined by the predominant form of life preserved as fossils within the rocks or sediments. If fossils are lacking, a formation's location in the time scale may be determined by its relationship to previously dated units. Only recently have geologists been able to place an absolute date on these relative time units by radioactive methods.

The geologic column is used throughout the world, although some regional modifications may be used for greater clarity.

In the accompanying stratigraphic column, the rock type given after the name is the most common variety found in the county. There may be variation of lithology within the formation from place to place.

GEOLOGIC TIME SCALE OF BURLINGTON COUNTY

Era	Period	Epoch	Formation or Rock (Approx. Thickness in Ft.)	Approx. Age Million Years before Present
CENOZOIC	Quarternary	Recent	Soil and Alluvium	0-1
		Pleistocene	Cape May Formation (0-30) Pensauken Formation (0-60) Bridgeton Formation (0-30)	
	Tertiary	Pliocene (?)	Beacon Hill Gravel (0-20)	1-70
		Pliocene (?) and Miocene	Cohansey Sand (100-250)	
		Miocene	Kirkwood Formation (325)	
		Eocene	Manasquan Formation (25)	
		Paleocene	Vincentown Formation (25-100) Hornerstown Sand (30)	
MESOZOIC	Cretaceous		Red Bank Sand (0-130) Navesink Formation (25-40) Mount Laurel Sand (5-60) Wenonah Formation (20-35) Marshalltown Fm. (30-40) Englishtown Fm. (20-140) Woodbury Clay (50) Merchantville Fm. (50-60) Magothy Formation (25-175) Raritan Formation (150-300)	70-135
	Jurassic		Not present in state	135-180
	Triassic		Not present in county	180-225
PALEOZOIC	Permian Carboniferous Devonian Silurian		?	225-600
	Ordovician Cambrian		Crystalline basement	
PRECAMBRIAN			Wissahickon Formation (?)	600+

Mineral History

Historically, the most famous and interesting mineral resource of Burlington County is the extensive bog iron deposits of the Pine Barrens. During the peak of the bog iron era in 1830, fourteen furnaces were operating in southern New Jersey. Of these, Atsion, Batsto, Hampton, Martha, and Mary Ann Furnaces are located in Burlington County. With the discovery of the more economically mined higher grade magnetite ores of New Jersey, the bog iron industry declined. By 1868 all of the localities had been abandoned.

Some of the largest and highest grade bog iron deposits of the state are in the extensive swamps and wet meadows of the Mullica and Wading Rivers and their tributaries. Water traveling through the iron rich clays and sands picks up oxides of iron. Carbonic acid, the agent by which the iron is retained in the dissolved state, is lost when the water comes in contact with the open air. The iron oxides are then quickly precipitated, concentrating along the banks and flood plains of the streams.

Tree trunks and stumps have been completely replaced by iron oxides from waters percolating down in the ore beds.

By volume, 65-75% of the ore is iron oxide, the actual metallic iron content of the ore ranges from 45-55% by volume. High concentrations of sulfur and phosphorus in ore are undesirable in the manufacture of steel, a factor which contributed to the decline of the bog iron industry.

Another valuable mineral of the state is the abundant glauconite of the greensands and marls of the Coastal Plain. Glauconite was valued as an agricultural fertilizer because of its high potassium concentrations but is not mined today. There were also a number of operations at the start of the century which removed the greensand for use in water softeners. This use became obsolete and a manufactured compound (a plastic), which had a more consistent chemical composition than the natural material, is now used.

Among the most extensive of the county's natural resources are the sand and gravel deposits for fill, driveways, and cement aggregate. In several localities, the Cohansey sand is such pure quartz (sand) in some areas it can be used in the production of glass. The Cohansey and other formations which have sands with a slight amount of clay are used for molding sands in metal casting. At Arney's Mount and elsewhere, sands have been cemented by iron oxide cement. In the past, minor, very local operations existed to extract this "stone" for local use in fences, farmhouses, and graveyards.

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Included as an appendix to Burlington County in Brief is a list of 26 deep wells and a map (A-3) showing their locations. It is from information such as this that we are able to reconstruct with considerable accuracy the depth to the several Coastal Plain geologic formations southeast of the areas in which they outcrop. The tabulation below gives the depth to the bottom of each geologic formation or, in the case of the last figure, the depth of the bottom of the well within the last formation penetrated.

Well No.	Coord.	Permit (Year)	Owner	Depth (Ft.)	Elev. (Ft.)	Type Log	Bot. Fm.	Formation Depth
1	28-32	28-4082	Wm. D'Angelo	300	120	S	Kr	0-30 Reworked Ket,-80 Ket, -130 Kwb,-190 Kmv,-280 Km, -300 Kr
2	27-35	27-3357	Walters	130	40	S	Kr	0-40 Pleist.,-50 Kmv, -130 Kmr
3	28-32	1948	Methodist Church	165	190	S	Kmw	0-20 Tkw,-50 Tvt & Tht, -143 Tht(?), Krb & Kns, -165 Kmw
4	28-31	1909	Columbus Water Co.	257	75	S	Kmr	0-32 Pleist.,-50 Ket, -130 Kwb, -195 Kmv, -257 Kmr
5	28-42	(6/53)	Maguire AFB	1139	115	S	pЄ	0-35 Tkw, -69 Tkw(?), -151 Tvt & Tht(?), -224 Kmw, -520 Kmt,Ket, Kwb & Kmv, -1100 Kmr, -1139 pЄ
6	27-43	27-1840	Delaware Riv. Water Co.	140	10	D	pЄ	0-82 Qp, -135 Kr, -140 pЄ
7	27-44	27-1580	DCB-11 Levitt & Sons	390	30	D	pЄ	0-14 Qp, -70 Kmv, -363 Kmr, -390 pЄ
8	27-44	27-1728	DCB-27 W. J. Levitt	415	40	S	pЄ	0-30 Kwb, -80 Kmv, -110 Km, -411 Kr, -415 pЄ
9	27-42	27-2694	Riverton-Palmyra Water Co.	76	10	D	pЄ	0-70 Qp, -76 pЄ
10	27-44	27-1579	Levitt & Sons	526	55	D	pЄ	0-20 Qp, -100 Kmv & Kwb, -123 Km, -500 Kr, -526 pЄ
11	31-03	31-3835	Riverton-Palmyra Water Co.	308	80	D	pЄ	0-6 Pleist, -306 Kmr, -308 pЄ
12	32-01	32-380	Permutit Co.	915	30	S	Kmr	0-10 Pleist., -65 Tht&Kns, -185 Kmw, -255 Kmt & Ket, -315 Ket & Kwb, -365 Kwb, -415 Kmv, -915 Kmr
13	31-03	1914	Town of Moorestown	517	10	S	pЄ	0-97 Kwb & Kmv, -164 Km, -508 Kr, -517 pЄ
14	31-05	31-4267	Norcross Sand Co.	300	50	S	Kmr	0-30 Rec,-290 Kns,Kmw,Kmt, Ket,Kwb,Kmv, -300 Kmr
15	32-01	1901	W. Irick	109	30	S	Kmw	0-9 Pleist, -50 Tvt, -101 Tht & Kns, -109 Kmw
16	32-03	1951	Trans.Gas Pipe Co., #7	908	117	S&E	Km	0-143 Tch, -213 Tkw, -260(?) Tmq&Tsr, -479(?) Tvt, -510(?) Tht, -555 Kns, -612 Kmw, -694 Kmt, -807 Ket, -879 Kwb & Kmv, -908 Km.

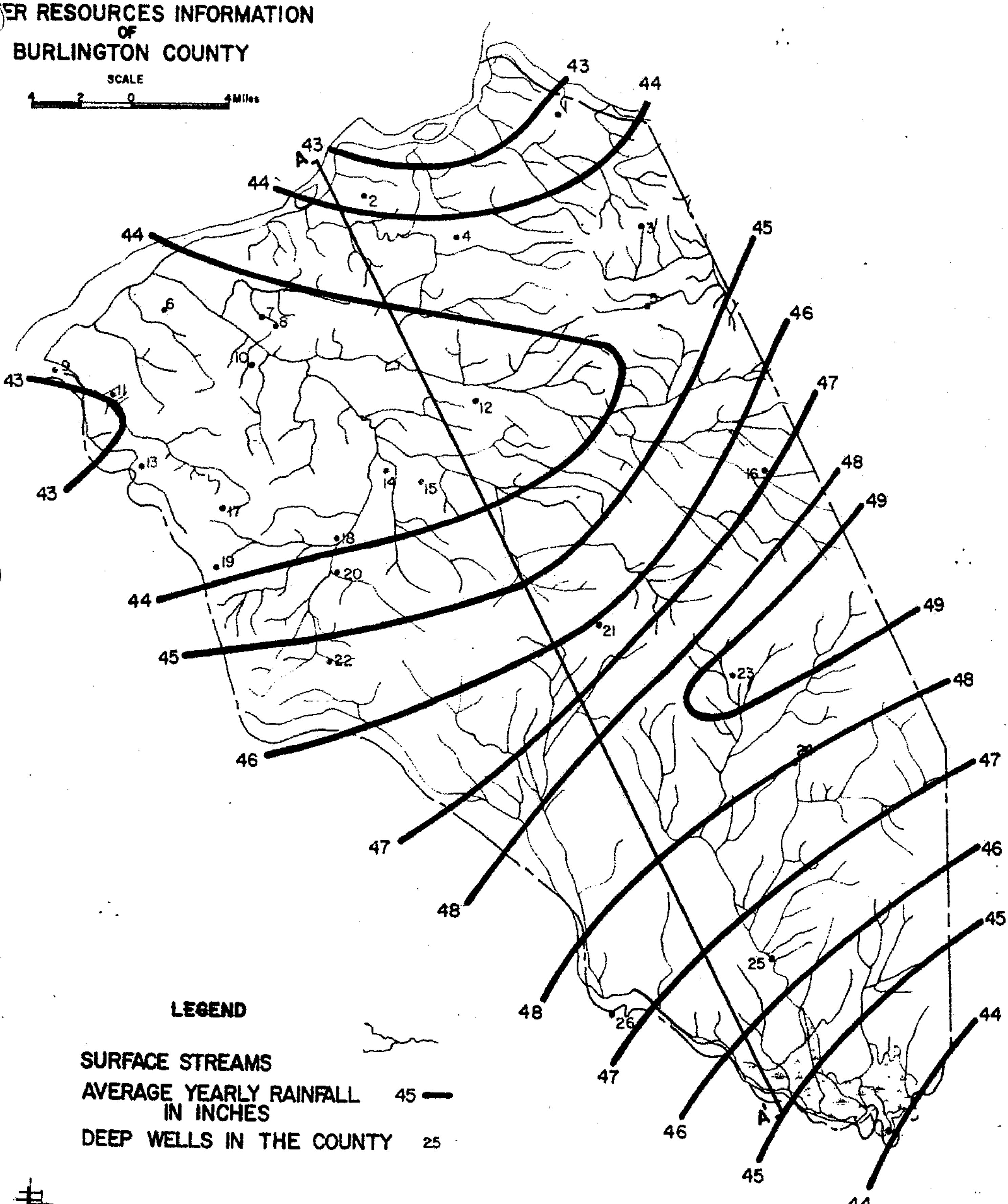
Well No.	Coord.	Permit (Year)	Owner	Depth (Ft.)	Elev. (Ft.)	Type Log	Bot. Fm.	Formation Depth
17	31-03	31-1610	Jos.Rudderow	458	50	S	Kmr	0-11 Rec, -91 Kmw, -113 Kmt, -268 Ket, Kwb & Kmv, -458 Kmr
18	31-04	31-2752	Medford Water Co.	590	50	D	Km	0-12 Pleist.,-150 Tht, Kns, & Kmw, -175 Kmt, -332 Ket, Kwb & Kmv, -590 Kmr
19	21-13	31-2780	Evesham Twp.	512	85	D	Kmr	0-16 Tvt, -73 Tht & Kns, -110 Kmw, -165 Kmt, -200 Ket, -276 Kwb, -512 Kmv & Kmr
20	31-14	1925	Medford Water Co.	535	40	S	Km	0-6 Pleist., -27 Tmq, -73 Tvt, -105 Tht & Kns, -194 Kmw, -230 Kmt, -300(?) Ket, -426(?) Kwb & Kmv, -535 Kmr
21	32-12	1951	Trans.Gas Pipe Co. #12	952	138	E	Kmr	0-165 Tch, -260 Tkw, -330 Tmq & Tsr, -465 Tvt, -510 Tht, -620 Kmw, -650 Kmt, -740 Ket, -885 Kwb & Kmv, -952 Kmr
22	31-14	1942	Burl.Co.Boy Scouts	315	80	D	Ket	0-40 Tkw, -46 Tmq(?), -110 Tvt, -147 Tht, -189 Kns, -276 Kmw, -315 Kmt, at 315 Ket
23	32-13	1951	Trans.Gas Pipe Co. #1	1147	108	S&E	Km	0-144 Tch, -334 Tkw, -436 Tmq, -498(?), -656 Tvt, -727 Tht, -742 Kns, -825 Kmw, -845 Kmt, -890 Ket, -1085 (?) Kwb & Kmr, -1147 Km
24	32-23	1951	Trans.Gas Pipe Co. #13	1519	90	S&E	Kmr	0-942 no samples, 0-415 Tch & Tkw,-453 Tmq& Tsr, -928 Kmw, -950 Kmt, -1126 (?) Ket, -1290 (?) Kwb & Kmv, -1519 Kmr
25	32-33	1951	Trans.Gas Pipe Co. #15	1701	19	S&E	Kr	0-101 Pleist., -418 Tkw, -480 (?) Tmq & Tsr, -820 (?) Tvt, -1003 Tht & Kns, -1220 Kmw, Kmt & Ket, -1312 Kwb(?) & Kmv, -1424 (?) Km, -1701 Kr
26	32-32	1948	F. Garrat	101	10	S	Tkw	0-69 Tch, -101 Tkw (?)

New Jersey Geological Survey, 1977

ER RESOURCES INFORMATION OF BURLINGTON COUNTY

SCALE

4 2 0 4 Miles



LEGEND

SURFACE STREAMS

AVERAGE YEARLY RAINFALL IN INCHES 45

DEEP WELLS IN THE COUNTY 25