STATE OF MARYLAND

BOARD OF NATURAL RESOURCES

DEPARTMENT OF GEOLOGY, MINES AND WATER RESOURCES

JOSEPH T. SINGEWALD, JR., *Director*

BULLETIN 11

THE WATER RESOURCES OF ST. MARYS COUNTY

THE SURFACE-WATER RESOURCES

By Robert O. R. Martin

THE GROUND WATER RESOURCES

By H. F. Ferguson

BALTIMORE, MARYLAND

1953

COMPOSED AND PRINTED AT THE
WAVERLY PRESS, INC.
BALTIMORE, MD., U. S. A.

COMMISSION OF GEOLOGY, MINES AND WATER RESOURCES

PREFACE

The St. Marys County report in the series of county reports of the Maryland Geological Survey was published in 1907, long before a systematic study of the water resources of the State had been started. In 1945, investigations of the ground-water resources of Southern Maryland were initiated. Bulletin 11 on the water resources of St. Marys County is the last of the reports covering the five counties of Southern Maryland. The first report on these investigations covering Charles County was published in 1948 as part of the Charles County report. Bulletin 5 on the water resources of Anne Arundel County was published in 1949, and Bulletin 8 on the water resources of Calvert County in 1951. Bulletin 10 on the geology and water resources of Prince Georges County was published in 1952.

St. Marys County maps providing useful supplementary information to Bulletin 11 are the topographic map published in 1952, the geologic map in 1903, and the soil map in 1929.

Bulletin 11 is based on investigations conducted jointly by the United States Geological Survey and the Maryland Department of Geology, Mines and Water Resources and is published with the permission of the United States Geological Survey.

The section on Surface-Water Resources was prepared by Robert O. R. Martin of the United States Geological Survey on the cooperative stream-gaging staff in Maryland. The two gaging stations in St. Marys County were established in 1946 and 1947. Four nearby stations in neighboring counties are serviceable in interpreting the flows of streams in St. Marys County. One of these was established in 1931. The other three were established in 1948 and 1949.

The section on the Ground-Water Resources was prepared by H. F. Ferguson of the United States Geological Survey on the cooperative ground-water staff in Maryland. The report lists with their locations and basic geologic and hydrologic data 480 wells in the County. Drillers' logs are given for 257 wells and detailed logs based on examination of well cuttings for 27 wells. The quality of the ground water is indicated by analyses of water samples from 30 wells. The elevations of the top of the Aquia formation, the base of the Calvert formation, and the base of the Pleistocene deposits are shown by contours. These contour maps enable well drillers and prospective well owners to determine the depths at which ground water can be obtained at any location in the County from the various water-bearing formations. Water-level fluctuations as disclosed by observation wells are discussed. Yields of small-diameter and large-diameter wells are tabulated.

The subsurface characters of the underlying geologic formations are described. The descriptions can be supplemented by earlier reports that are referred to in these descriptions and in a list of references.

JOSEPH T. SINGEWALD, JR., DIRECTOR

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THE SURFACE-WATER RESOURCES

BY

ROBERT O. R. MARTIN

Introduction

Human life and progress are closely dependent upon water, and man can exist but a few days without it. The conservation and control of water, therefore, have become one of his vital problems. The demands of an advancing civilization have placed limitations on the use of water, especially after man abandoned his nomadic way of life and established a permanent home rather than moving continually from water hole to water hole. In densely populated areas, the demand for water very often approaches the limit of supply. Areas lacking in water are generally sparsely settled because the expense of transporting water is a burden to the homemaker. An adequate water supply is a prerequisite to the growth of our cities.

With increased demand for water many complex problems arise, such as pollution and contamination from known or unknown sources within the drainage basin. Water as precipitated by rain is pure, but man has a trying task to maintain this quality. Outbreaks of sickness and epidemics have often been traced to impure drinking water. Clean, pure streams and lakes are important assets to a community for recreational purposes in addition to their value as possible sources of public water supplies.

Navigation was one of the earliest uses of surface waters, but with increased farming and industry, the use of streams for irrigation and industrial purposes has become more important. There are manifold industrial uses of surface waters in our cities for which temperature and chemical quality are important factors.

The never-ending circulation of water in various forms from ocean and land surfaces to the atmosphere by evaporation and transpiration, from the atmosphere to the land by precipitation, and then back to the ocean is called the hydrologic cycle. As water travels from the land to the ocean, a part runs off directly into the streams and a part enters ground-water storage before later appearing as streamflow.

Although streamflow is indispensable to man, excessive amounts can cause tremendous damage and even loss of life. It has been the inclination of man to establish his home on or near a stream in order to have a readily accessible supply of water or means of transportation. As river settlements grow, the usual trend is for the flood plains of the stream to be encroached upon, and even for the normal stream channel to be crowded and its carrying capacity reduced by structures of all kinds. Thus, the tendency toward flooding is aggravated, and the actual or potential flood damages are vastly increased. The problem of flood control then arises. For the proper planning of flood control works such as dams, levees, or channel improvements, and the designing of bridges with adequate waterways, records of streamflow are needed over a sufficient number of years to establish the flood-flow characteristics of the stream.

Streamflow Measurement Stations

To study systematically the range of streamflow in order to derive maximum benefits from it, the U. S. Geological Survey has installed stream-gaging stations throughout the country. In cooperation with the Maryland Department of Geology, Mines and Water Resources, and other State, Federal, and municipal agencies, many stations are in operation in Maryland. Most of these are equipped with automatic water-stage recorders, which collect a continuous record of the stage of the stream (fig. 1). In conjunction with the stage record, flow determinations must be made periodically by means of a precise instrument known as a current meter in order to correlate stage with discharge (Pl. 2, fig. 1). The discharge corresponding to a given stage can be determined by interpolation, provided the channel conditions of the stream remain unchanged.

The selection of a site for a gaging station requires a careful appraisal of the stream channel to be assured that hydraulic conditions are stable and that a fixed relation between stage and discharge will be maintained. The gage must be accessible under adverse conditions of storm and high water and the measurement of discharge of the stream must be possible at all stages. To avoid building expensive structures it is economical to benefit by the proximity of a bridge suitable for discharge measurements (Pl. 1, fig. 1). In some cases there is no alternative except to erect a cableway across a stream. This cableway is generally suspended from high A-frames on each bank and is used to support a cable car. The elevation of the cableway must be sufficient to support an engineer and his measuring equipment with clearance above the stages of anticipated floods.

Present-day construction practice favors a permanent-type recording-gage structure. The usual gage well and house in Maryland is constructed of concrete block or reinforced concrete and has inside dimensions of about 4 feet square. The structure is provided with steel doors for house and well and is connected to the stream by one or more horizontal pipes or intakes to permit the water in the well to fluctuate simultaneously with the stream. The height of the structure is governed by the height of the maximum anticipated flood (Pl. 1, fig. 1).

A continuous graphic record of stage with respect to time is obtained by

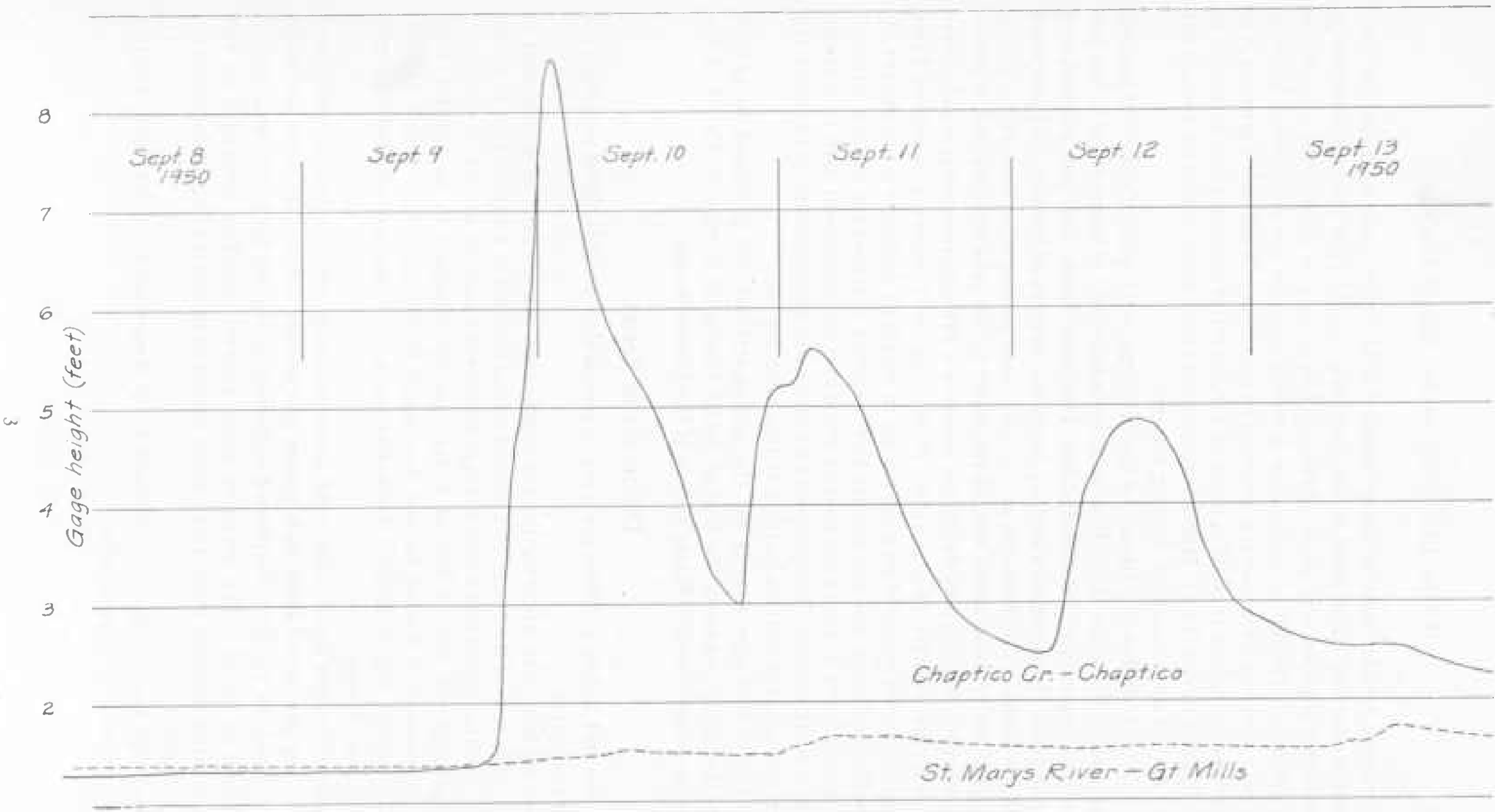

FIGURE 1. Graph of River Stage from Automatic Water-stage Recorder

means of a water-stage recorder installed in the gage house to record the fluctuations of the water level in the gage well (fig. 1). The modern water-stage recorder requires very little attention. Inspections to change the continuous recorder charts can be made once a month or even less frequently. Plate 1, figure 2, shows an automatic recorder in operation. In silt-laden streams it is necessary to clean the intake pipes by forcing water through them by means of a flushing device. In St. Marys County most of the streams contain enough silt to require an intake-pipe flushing system.

The rate of flow of a stream, or the discharge, is the quantity of water passing any point in a given time. This quantity is expressed in terms of cubic feet per second, commonly called second-feet. Discharge varies with precipitation and with basin characteristics such as depth and texture of the soils and steepness of the terrain. The discharge at any point on a stream is determined by multiplying the cross-sectional area of the water by its velocity. Streamflow measurements are made periodically by means of a Price current meter which determines the velocity of the water. Plate 2, figure 1, shows a standard Price current meter mounted on a rod for use in making a discharge measurement by wading a stream and the smaller Pygmy meter designed for shallow streams. Plate 2, figure 2, shows the heavier crane and reel equipment used to measure deep swift streams. The purpose of a discharge measurement is to define the stage-discharge relation existing at that time (fig. 2).

Daily discharge records for the gaging-stations are published in annual water-supply papers of the United States Geological Survey, in Part 1 of the series called "Surface-Water Supply of the United States."

Definitions of Terms

Several technical terms are used in stream-flow records. Brief explanations of them are:

Second-feet.—An abbreviation for "cubic feet per second." A second-foot is the rate of discharge of a stream whose channel is 1 square foot in cross-sectional area and whose average velocity is 1 foot per second.

Discharge.—A rate of flow of water, usually expressed in second-feet. One second-foot flowing for one day equals 86,400 cubic feet, equals 6[illegible]17 gallons, equals about 2.0 acre-feet (an area of one acre covered with two feet of water).

Second-feet per square mile.—An average number of cubic feet of water flowing per second from each square mile of area drained, on the assumption that the runoff is distributed uniformly as regards both time and area.

Runoff in inches.—The depth to which an area would be covered if all the water draining from it in a given period were uniformly distributed on its surface.

Drainage basin.—The area drained by a stream or stream system, usually expressed in square miles.

PLATE 1, FIG. 1. Gage House on St. Marys River at Great Mills at Downstream Side of Highway Bridge

PLATE 1, FIG. 2. Engineer Inspecting Automatic Water-Stage Recorder

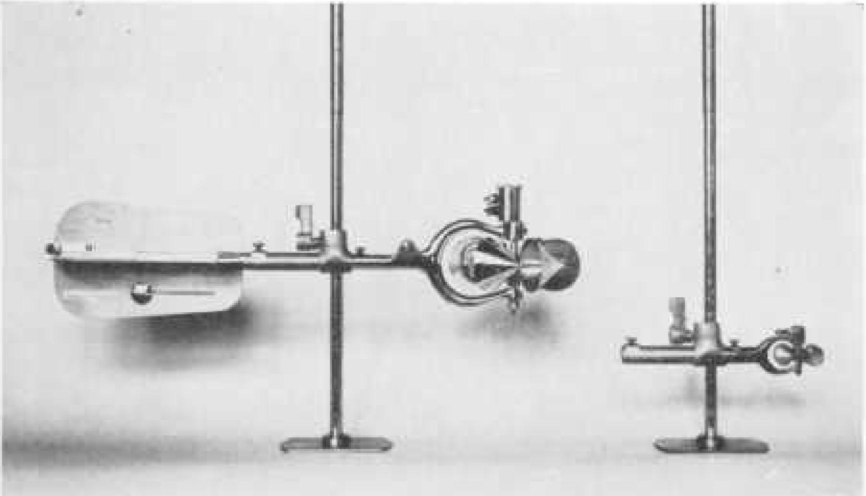

PLATE 2, FIG. 1. Standard Price Current Meter and Pygmy Meter, Suspended on Wading Rods, Used to Measure Discharge

PLATE 2, FIG. 2. Equipment Used in Making Discharge Measurements from Bridge

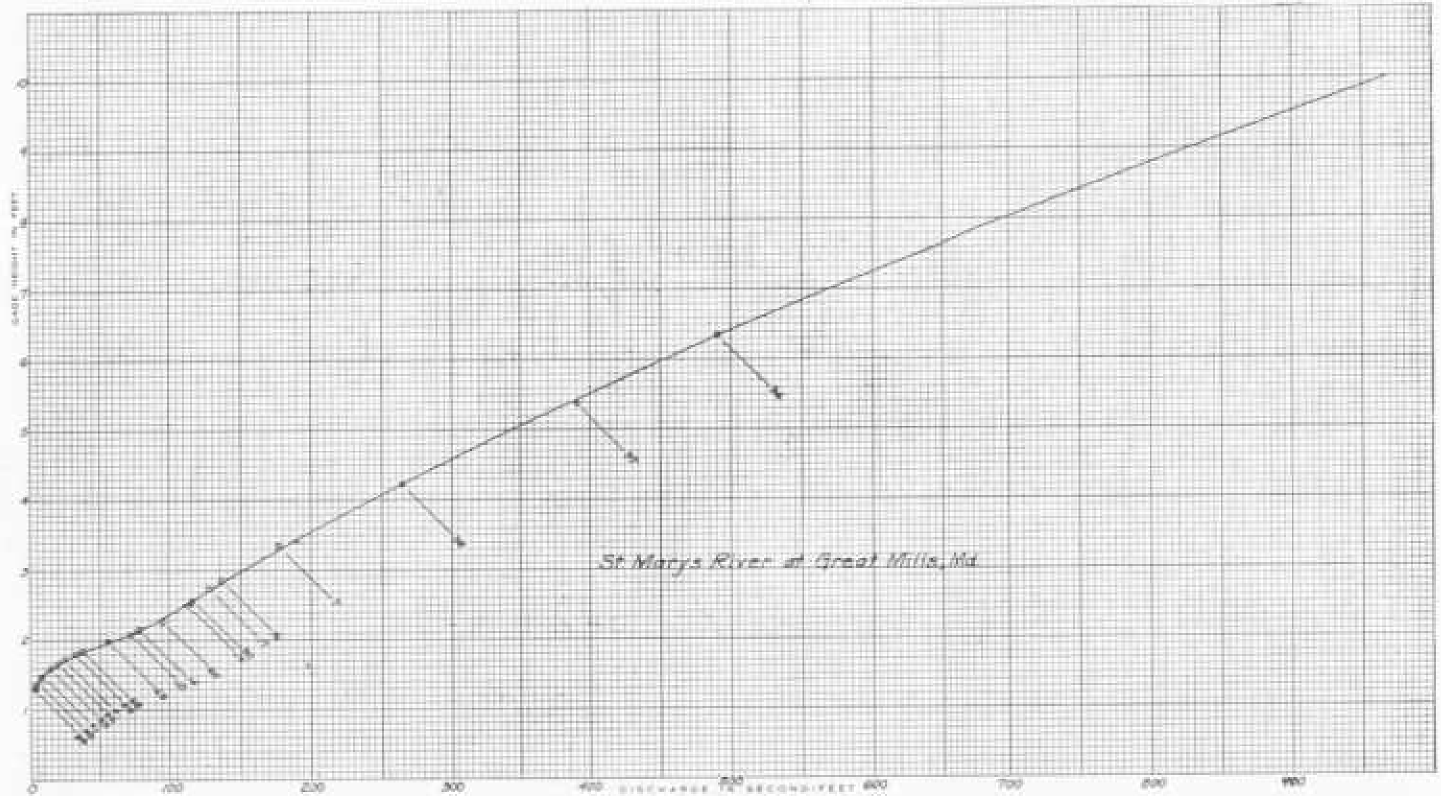

FIGURE 2. Typical Rating Curve Showing Relation between Stage and Discharge at a Stream-gaging Station

Water year.—A special annual period selected to facilitate water studies, commencing October 1 and ending September 30.

Surface-Water Resources of St. Marys County

The major streams in St. Marys County flow southward into the Potomac River. Many fairly short streams flow either northeastward into the Patuxent River or eastward into Chesapeake Bay. The divide in drainage lies approximately along the principal highway, Routes 5 and 235, running northwestward from the southern tip of the County. All streams enter tidal water and are brackish along their lower reaches. The boundaries of St. Marys County are almost entirely natural water boundaries (fig. 3), namely: Indian Creek, on the north; Patuxent River, on the northeast; Chesapeake Bay, on the east; Potomac River, on the south; Wicomico River, on the west; and Budds Creek, on the northwest. A straight line land boundary about $5\frac{1}{2}$ miles long, extends from the headwaters of Budds Creek to the headwaters of Indian Creek. St. Marys County, although practically an island, is a peninsula extending southeastward and forming the southerly tip of the western shore of Chesapeake Bay.

The topography of the county is characterized by slight rolling hills except for many marshy areas along the tidal reaches of the streams. The flow characteristics of the streams reflect this pattern of relief. Stream velocities are slow and channel erosion slight, as steep channel gradients are practically nonexistent even in the headwaters. The streams have flat and ineffective gradients and relatively slow velocities and poorly-defined channels. Some of the stream channels meander and choke owing to sandy soils that readily shift and produce sand bars and often cause overbank flooding. Practically no fresh-water natural lakes exist in the generally porous soil.

St. Marys is the oldest county in Maryland and eighth in size, but in the past there has been little interest in its surface-water supply. As the county is bounded almost entirely by water, there seemed to be no urgency for a systematic stream-gaging program. Rapid population growth in recent years, however, moved St. Marys County from 20th to 8th position in population in the decade 1940 to 1950. During this time two permanent-type gaging stations were established and continuous streamflow records started.

Sedimentation is a problem in many of the streams. Continuous records of sediment discharge are not available for estimating load of sediment carried by the streams. The sediment content and the chemical quality of the surface waters vary depending upon rainfall, use of water resources and land, the geologic characteristics of the basin, and the season of the year. Likewise little information is available about the quality of surface waters in St. Marys County.

Water for irrigation is not a primary requirement in St. Marys County, as

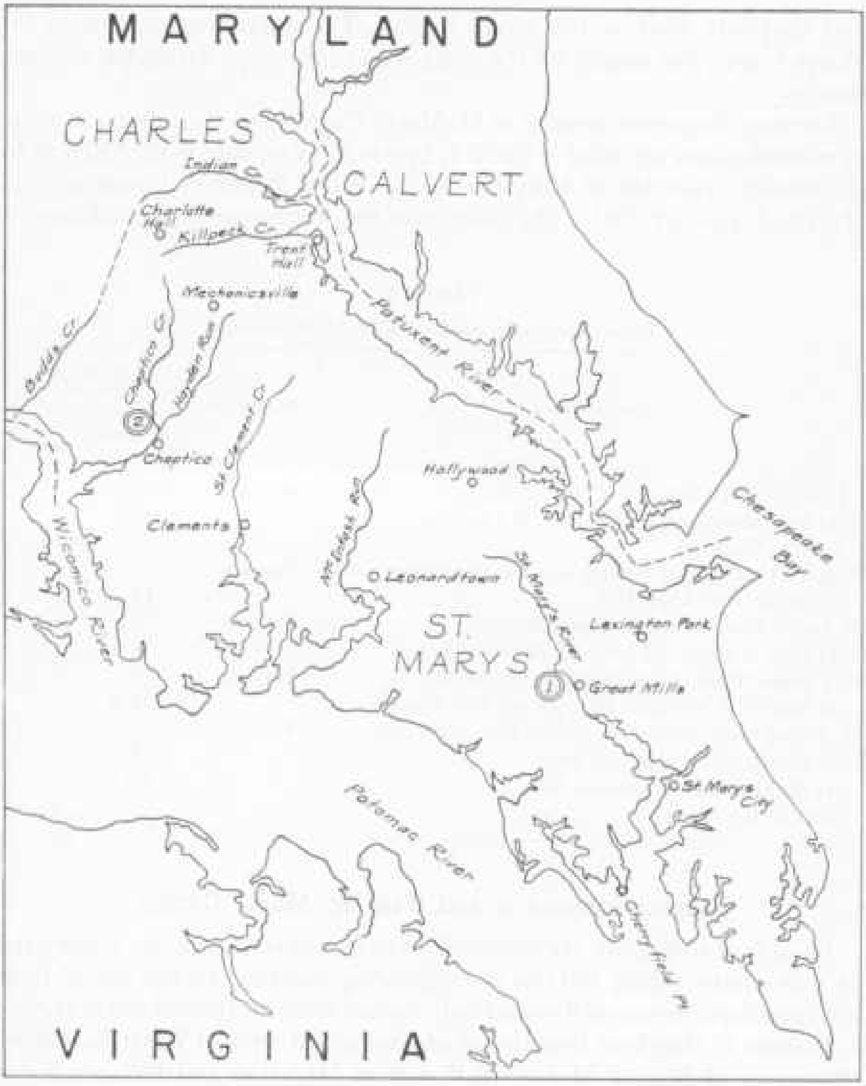

FIGURE 3. Map of St. Marys County Showing Locations of Principal Streams and the Gaging Stations

the rainfall is generally ample for farming. Long-term records at Washington, D. C., which is less than 40 miles to the north, indicate an average annual rainfall of at least 40 inches, and a monthly maximum of 17.45 inches in September 1934. In recent years Maryland farmers have been building small stock ponds in cooperation with the U. S. Soil Conservation Service in order to conserve and distribute some of this heavy rainfall. The water requirements in St. Marys County are mostly for the tobacco and corn crops during the summer months.

The more important streams of St. Marys County and their drainage areas at selected points are listed in Table 1, based chiefly on data in the "Report to the General Assembly of Maryland by the Water Resources Commission of Maryland, January 1933." The locations of the streams are shown in Figure 3.

TABLE 1

Drainage Areas of Streams in St. Marys County

Name of stream	Tributary to:	Drainage area (square miles)	
		At point	U. S. G. S. gage
Chaptico Creek (flows into Chaptico Bay):	Wicomico		
At head of estuary 0.7 mi. S.W. of Chaptico		30.7	
Gage at Chaptico			10.7
Killpeck Creek (flows directly into Patuxent River):	Patuxent		
At mouth near Trent Hall		13.1	
McIntosh Run (flows into Breton Bay):	Potomac		
At head of estuary, 0.7 mi. W. of Leonardtown		34.1	
St. Clement Creek (flows into St. Clement Bay):	Potomac		
At head of St. Clement Bay, 0.5 mi. S. of Clements		21.9	
St. Marys River (flows directly into Potomac River):	Potomac		
At mouth near Cherryfield Point		72.0	
At Highway bridge at Great Mills		28.1	
Gage at Great Mills			24.0

Gaging Stations in and Near St. Marys County

Records of streamflow are collected at two gaging stations in the county and at four nearby gaging stations in neighboring counties. All but one of these are short-term records and permit only limited interpretation of the data.

Bulletin 1, Maryland Department of Geology, Mines and Water Resources, "Summary of Records of Surface Waters of Maryland and Potomac River Basin, 1892–1943," published in 1944, gives monthly discharge records of the maximum, mean, and minimum flow, discharge in cubic feet per second per square mile, runoff in inches, and discharge in million gallons per day per square mile for all gaging stations in Maryland from their dates of establishment to September 30, 1943. The drainage areas and years of records available for the gaging stations in and near St. Marys County are presented in Table 2. The locations of the two stations in St. Marys County are shown in Figure 3.

TABLE 2

Stream-Gaging Stations

No. on map	Stream-gaging station	Drainage area (square miles)	Records available since
1	St. Marys River at Great Mills (St. Marys County)	24.0	June 21, 1946
2	Chaptico Creek at Chaptico (St. Marys County)	10.7	June 20, 1947
—	Mattawoman Creek near Pomonkey (Charles County)	57.7	Nov. 28, 1949
—	Henson Creek at Oxon Hill (Prince Georges County)	17.4	June 29, 1948
—	Western Branch near Largo (Prince Georges County)	30.1	Nov. 25, 1939
—	North River near Annapolis (Anne Arundel County)	8.5	Dec. 15, 1931

Runoff in St. Marys County

AVERAGE RUNOFF

Streamflow records are available for St. Marys County for the past 6 years only, which is too short a period to establish reliable runoff characteristics. The data thus far accumulated in St. Marys County, however, indicate that small drainage areas yield an average of slightly greater than one second-foot per square mile. This yield is consistent with streamflow records at gaging stations throughout Maryland for streams unaffected by regulation. Following is a comparison of the records of the two St. Marys County stations and two stations in neighboring counties.

Stream Gaging Station	Water Years	Drainage area sq. mi.	Mean discharge c.f.s.	c.f.s. per sq. mi.
St. Marys County				
St. Marys River at Great Mills	1947–51	24.0	24.8	1.03
Chaptico Creek at Chaptico	1948–51	10.7	11.6	1.08
Prince Georges County				
N.E.Br. Anacostia River at Riverdale	1939–50	72.8	77.7	1.07
	1947–50	72.8	87.5	1.20
Anne Arundel County				
North River near Annapolis	1933–38	8.5	12.2	1.44
	1939–50	8.5	10.9	1.28
	1947–50	8.5	11.7	1.38

The long-term records for the gaging station on North River near Annapolis should be a fairly representative expectation for St. Marys County streams because of the small size of drainage areas and similar drainage area characteristics of the streams.

MAXIMUM FLOOD RUNOFF

The maximum known flood in Maryland near St. Marys County is probably that on or about August 23, 1933, according to stream-gaging records from several distant gages with records extending back as far as 1911. This storm, although not the most severe in Maryland's history, caused the most widespread damage. At Baltimore, a rainfall of 7.62 inches for 24 hours exceeded the record since 1817 and established August 1933 as the wettest month on record for at least 133 years. Similarly, Washington, D. C., had 6.40 inches for 24 hours with high winds up to 51 miles per hour, and a monthly total of 9.91 inches, which is the highest in the past 23 years for the month of August.

On September 10, 1950 an unusually severe storm struck portions of St. Marys County. The Chaptico Creek gage had a flood peak with a frequency interval undoubtedly greater than 50 years. Reported daily rainfall of 6.24 inches at Charlotte Hall about 6 miles from the Chaptico Creek drainage basin indicates that the precipitation throughout that basin must have been of record-breaking proportions. At the gage the black-top highway from Chaptico to Mechanicsville was closed from flood waters 1,000 feet wide and up to 5 feet deep. An indirect determination of peak discharge by slope-area studies gave approximately 730 second-feet per square mile for the 10.7 square mile drainage area. The reported precipitation of 0.87 inch at Leonardtown for September 10, 1950 reveals also the wide variation in storm intensity over a comparatively small region. This marked contrast is shown on Figure 1 in which both the Chaptico Creek hydrograph and the St. Marys River hydrograph are plotted. A distance of less than 13 miles separates the two basins.

MINIMUM DROUGHT RUNOFF

Extreme drought conditions prevailed throughout Maryland from 1930 to 1934. The drought commenced in 1930 when the State annual precipitation averaged only 24 inches as compared with a 54-year average of 42 inches. For details on drought studies see U. S. Geological Survey Water-Supply Paper 680, "Droughts of 1930–1934." No gaging stations were in operation in St. Marys County during that period.

Surface-water Records of St. Marys County

POTOMAC RIVER BASIN

1. St. Marys River at Great Mills

Location.—Water-stage recorder and concrete control, lat. 38°14′36″, long. 76°30′13″, at bridge on State Highway 471 in Great Mills, St. Marys County, 0.3 mile downstream from Western Branch.

Drainage area.—24.0 square miles.

Records available.—June 1946 to September 1951.

Extremes.—Maximum discharge, 954 second-feet July 16, 1949 (gage height, 9.91 feet), from rating curve extended above 500 second-feet by logarithmic plotting; minimum, 2.3 second-feet Aug. 16, 1947 (gage height, 1.27 feet).

Remarks.—Records excellent.

Monthly discharge of St. Marys River at Great Mills

Month	Discharge in second-feet				Runoff in inches	Discharge in million gallons per day per square mile
	Maximum	Minimum	Mean	Per square mile		
1946						
June 21–30	29	5.2	9.30	0.388	0.14	0.251
July	86	3.2	9.27	.386	.45	.249
August	126	5.0	12.7	.529	.61	.342
September	447	3.9	30.2	1.26	1.40	.814
1946–47						
October	79	7.0	15.0	.625	.72	.404
November	46	9.8	17.0	.708	.79	.458
December	230	9.8	25.6	1.07	1.23	.692
January	225	25	69.5	2.90	3.34	1.87
February	23	14	18.0	.750	.78	.485
March	47	15	26.8	1.12	1.29	.724
April	184	13	41.9	1.75	1.95	1.13
May	214	11	26.9	1.12	1.29	.724
June	66	5.9	15.7	.654	.73	.423
July	20	3.9	6.27	.261	.30	.169
August	77	2.4	6.41	.267	.31	.173
September	25	2.6	4.86	.203	.23	.131
The year	230	2.4	22.9	.954	12.96	.617
1947–48						
October	13	3.9	5.16	.215	.25	.139
November	105	5.0	27.4	1.14	1.27	.737
December	144	9.3	18.1	.754	.87	.487
January	504	10	50.5	2.10	2.42	1.36
February	96	17	32.9	1.37	1.48	.885
March	187	21	44.0	1.83	2.11	1.18
April	89	14	28.2	1.18	1.31	.763
May	238	13	49.0	2.04	2.35	1.32
June	25	5.9	13.4	.558	.62	.361
July	240	4.1	20.8	.867	1.00	.560
August	696	7.4	76.3	3.18	3.66	2.06
September	29	5.9	9.49	.395	.44	.255
The year	696	3.9	31.4	1.31	17.78	.847

Monthly discharge of St. Marys River at Great Mills—*Continued*

Month	Discharge in second-feet				Runoff in inches	Discharge in million gallons per day per square mile
	Maximum	Minimum	Mean	Per square mile		
1948–49						
October	114	7.0	16.6	0.692	0.80	0.447
November	295	9.8	42.6	1.78	1.98	1.15
December	463	19	68.7	2.86	3.30	1.85
January	348	21	51.9	2.16	2.49	1.40
February	114	25	46.0	1.92	2.00	1.24
March	102	22	40.0	1.67	1.92	1.08
April	81	17	31.7	1.32	1.48	.853
May	90	12	23.8	.992	1.14	.641
June	93	5.9	14.8	.617	.69	.399
July	509	5.2	55.3	2.30	2.66	1.49
August	96	6.2	17.2	.717	.83	.463
September	17	5.9	8.80	.367	.41	.237
The year	509	5.2	34.8	1.45	19.70	.937
1949–50						
October	410	5.2	19.6	.817	.94	.528
November	304	11	30.0	1.25	1.39	.808
December	21	9.8	13.5	.562	.65	.363
January	59	8.3	15.5	.646	.74	.418
February	87	12	23.8	.992	1.03	.641
March	302	11	47.6	1.98	2.29	1.28
April	41	13	18.2	.758	.84	.490
May	174	11	36.0	1.50	1.73	.969
June	29	5.0	9.87	.411	.46	.266
July	76	4.6	15.3	.638	.73	.412
August	179	3.9	12.8	.533	.62	.344
September	18	4.4	8.33	.347	.39	.224
The year	410	3.9	20.9	.871	11.81	.563
1950–51						
October	40	5.6	9.00	.375	.43	.242
November	32	5.9	9.50	.396	.44	.256
December	50	6.0	15.7	.654	.75	.423
January	19	7.8	10.3	.429	.49	.277
February	37	8.0	16.0	.667	.69	.431
March	120	9.5	18.8	.783	.90	.506
April	61	11	20.7	.862	.96	.557
May	26	5.6	11.3	.471	.54	.304
June	194	3.9	27.2	1.13	1.26	.730
July	49	2.8	10.4	.433	.50	.280
August	245	3.9	15.3	.638	.74	.412
September	30	3.2	5.61	.234	.26	.151
The year	245	2.8	14.1	.588	7.96	.380

Yearly discharge of St. Marys River at Great Mills

Year	Year ending Sept. 30				Calendar year			
	Discharge in second-feet		Runoff in inches	Discharge in million gallons per day per square mile	Discharge in second-feet		Runoff in inches	Discharge in million gallons per day per square mile
	Mean	Per square mile			Mean	Per square mile		
1947	22.9	0.954	12.96	0.617	22.3	0.929	12.61	0.600
1948	31.4	1.31	17.78	.847	37.9	1.58	21.47	1.02
1949	34.8	1.45	19.70	.937	29.4	1.22	16.60	.789
1950	20.9	.871	11.81	.563	18.5	.771	10.45	.498
1951	14.1	.588	7.96	.380	—	—	—	—

2. Chaptico Creek at Chaptico

Location.—Water-stage recorder and concrete control, lat. 38°22′45″, long. 76°46′50″, at wooden highway bridge, 0.8 mile north of Chaptico, St. Marys County, and 0.8 mile upstream from Chaptico Bay.

Drainage area.—10.7 square miles.

Records available.—June 1947 to September 1951.

Extremes.—Maximum discharge, about 7,800 second-feet Sept. 10, 1950 (gage height, 8.56 feet), from rating curve extended above 278 second-feet by slope-area studies; minimum, 0.03 second-foot Aug. 2, 1950 (gage height, 1.16 feet).

Remarks.—Records good except those for periods of ice effect, no gage-height record, or above 500 second-feet, which are fair.

Monthly discharge of Chaptico Creek at Chaptico

Month	Discharge in second-feet				Runoff in inches	Discharge in million gallons per day per square mile
	Maximum	Minimum	Mean	Per square mile		
1947						
June 20–30	5.1	1.7	2.74	0.256	0.10	0.165
July	4.2	.6	1.23	.115	.13	.743
August	21	.1	1.73	.162	.19	.105
September	22	.6	3.72	.348	.39	.225
1947–48						
October	17	1.2	2.26	.211	.24	.136
November	63	2.3	11.6	1.08	1.21	.698
December	32	4.2	6.81	.636	.73	.411
January	114	4.7	13.9	1.30	1.50	.840
February	38	6.4	12.8	1.20	1.29	.776
March	46	10	18.4	1.72	1.98	1.11
April	47	11	17.1	1.60	1.79	1.03
May	49	8.1	17.5	1.64	1.88	1.06
June	19	2.4	7.56	.707	.79	.457
July	9.7	1.3	3.12	.292	.34	.189
August	153	3.2	18.2	1.70	1.97	1.10
September	17	2.8	4.44	.415	.46	.268
The year	153	1.2	11.1	1.04	14.18	.672
1948–49						
October	35	4.2	8.03	.750	.87	.485
November	66	4.5	11.8	1.10	1.23	.711
December	156	12	26.3	2.46	2.83	1.59
January	106	14	23.5	2.20	2.53	1.42
February	32	18	23.0	2.15	2.24	1.39
March	35	15	19.0	1.78	2.05	1.15
April	25	12	16.9	1.58	1.76	1.02
May	112	12	26.1	2.44	2.81	1.58
June	21	3.9	8.30	.776	.87	.502
July	25	2.3	7.13	.666	.77	.430
August	40	3.0	8.76	.819	.94	.529
September	15	2.8	5.21	.487	.54	.315
The year	156	2.3	15.3	1.43	19.44	.924

Monthly discharge of Chaptico Creek at Chaptico—*Continued*

Month	Discharge in second-feet				Runoff in inches	Discharge in million gallons per day per square mile
	Maximum	Minimum	Mean	Per square mile		
1949–50						
October	48	2.8	5.27	0.493	0.57	0.319
November	30	4.9	7.76	.725	.81	.469
December	13	4.5	6.60	.617	.71	.399
January	19	4.9	7.19	.672	.77	.434
February	22	5.8	9.16	.856	.89	.553
March	57	5.0	12.5	1.17	1.35	.756
April	16	6.0	7.80	.729	.81	.471
May	20	4.0	7.29	.681	.79	.440
June	8.4	.48	2.68	.250	.28	.162
July	13	.2	3.30	.308	.36	.199
August	40	.06	5.17	.483	.56	.312
September	1,140	1.2	64.5	6.03	6.73	3.90
The year	1,140	.06	11.5	1.07	14.63	.692
1950–51						
October	19	7.0	9.11	.851	.98	.550
November	100	6.6	12.6	1.18	1.31	.763
December	40	6.0	12.9	1.21	1.39	.782
January	12	6.0	7.98	.746	.86	.482
February	30	6.0	10.7	1.00	1.04	.646
March	53	6.4	11.5	1.07	1.24	.692
April	35	8.1	12.5	1.17	1.31	.756
May	15	3.2	6.59	.616	.71	.398
June	58	1.7	7.33	.685	.76	.443
July	45	1.1	4.55	.425	.49	.275
August	62	1.6	6.72	.628	.72	.406
September	10	.97	2.11	.197	.22	.127
The year	100	.97	8.70	.813	11.03	.525

Yearly discharge of Chaptico Creek at Chaptico

Year	Year ending Sept. 30				Calendar year			
	Discharge in second-feet		Runoff in inches	Discharge in million gallons per day per square mile	Discharge in second-feet		Runoff in inches	Discharge in million gallons per day per square mile
	Mean	Per square mile			Mean	Per square mile		
1948	11.1	1.04	14.18	0.672	13.3	1.24	16.93	0.801
1949	15.3	1.43	19.44	.924	13.1	1.22	16.60	.789
1950	11.5	1.07	14.63	.692	12.8	1.20	16.22	.776
1951	8.70	.813	11.03	.525	—	—	—	—

THE GROUND-WATER RESOURCES

BY

H. F. FERGUSON

Abstract

St. Marys County forms the southernmost part of the Western Shore of Maryland. Tidal water of the Chesapeake Bay and adjoining estuaries surrounds the county on the northeast, east, south, and west; Charles County adjoins it on the northwest. The county lies entirely within the Coastal Plain province and is underlain by unconsolidated sediments of Early and Late Cretaceous, Paleocene, Eocene, Miocene, and Pleistocene ages. These sediments consist chiefly of sand, clay, and gravel. With the exception of the Pleistocene deposits, which are essentially flat lying and form a thin cover over the underlying formations, the Coastal Plain formations dip gently to the east and southeast. In general, ground water occurs under water-table conditions in the Pleistocene sediments and under artesian conditions in the underlying formations.

The Coastal Plain sediments are 2,000 to 3,000 feet thick in St. Marys County and contain many water-bearing formations; however, only the water-bearing formations in the Upper Cretaceous, Eocene, and Pleistocene deposits are utilized as sources of ground water. Most of the wells are less than 500 feet deep and draw water chiefly from one or another of three aquifers, the Aquia greensand of Eocene age, the Nanjemoy formation and sediments of Jackson age, also of Eocene age, and the Pleistocene sediments. The Aquia greensand yields water to domestic and farm wells in the northern and western parts of the county and to most of the public-supply wells. The communities of Leonardtown, Lexington Park, and St. Clement Shores and the Patuxent Naval Air Station and the Naval base at Piney Point obtain a total of 1,500,000 to 2,000,000 gallons of water a day from the Aquia greensand. The Nanjemoy formation and the sediments of Jackson age yield water to domestic, farm, and some public-supply wells in the central and southern parts of the county. Approximately 1,000,000 gallons a day is pumped from this aquifer. The Pleistocene sediments yield adequate supplies of water for most domestic and farm wells in the upland parts of the county; the total pumpage is estimated at 400,000 to 500,000 gallons a day.

Water-level measurements and old records of water levels indicate that pumping has caused the artesian head of the artesian aquifers to decline in areas of heavy pumping. Water-level fluctuations in the water-table wells are caused chiefly by the seasonal and annual variations in precipitation.

The chemical character of the ground water is satisfactory for most uses. The Aquia greensand yields moderately hard calcium bicarbonate water in the northern part of the county and soft sodium bicarbonate water in the central and southern parts. The aquifer comprising the Nanjemoy formation and sediments of Jackson age yields moderately hard calcium bicarbonate water in the central part of the county and soft sodium bicarbonate water in the southern part. The Pleistocene sediments contain water usually low in total mineral content, but locally excessive in iron.

Water-bearing sands are present in formations of Cretaceous age below the Eocene formations but are tapped by few wells at present because the Eocene aquifers have furnished adequate supplies to meet the needs so far. The Cretaceous aquifers constitute an important potential source of ground water in the county.

Introduction

LOCATION OF THE AREA

St. Marys County is the southernmost county of the Western Shore of Maryland (fig. 4). It is a peninsula surrounded by tidal waters except along the northwestern boundary where it adjoins Charles County. It is bordered on the northeast by the Patuxent River, on the east by the Chesapeake Bay, on the south by the Potomac River, and on the west by the Wicomico River, a tributary of the Potomac. It lies between 38°02′ and 38°31′ north latitude and 76°18′ and 76°53′ west longitude.

PURPOSE, SCOPE, AND METHODS OF INVESTIGATION

The purpose of this investigation was to determine the factors that govern the availability of ground water in St. Marys County. These factors include the extent, thickness, depth, and water-bearing properties of the geologic formations; the chemical character of the water; and the development and use of ground-water supplies in the area.

The investigation was made under the general supervision of A. N. Sayre, Chief of the Ground Water Branch of the United States Geological Survey, and under the immediate supervision of R. R. Bennett, district geologist in charge of the cooperative ground-water investigations in Maryland.

The field work for this study was begun late in 1946 and continued into early 1947 by R. R. Meyer. The work was interrupted for a period of nearly 2 years and was resumed in May 1949 by the writer and continued intermittently through 1951.

The geologic and hydrologic data for this report were obtained from various sources. A systematic inventory was made of 480 wells in the county (listed in Table 9), and well cuttings from 27 drilled wells were examined (described in Table 11). Samples of water from all the aquifers now utilized were collected

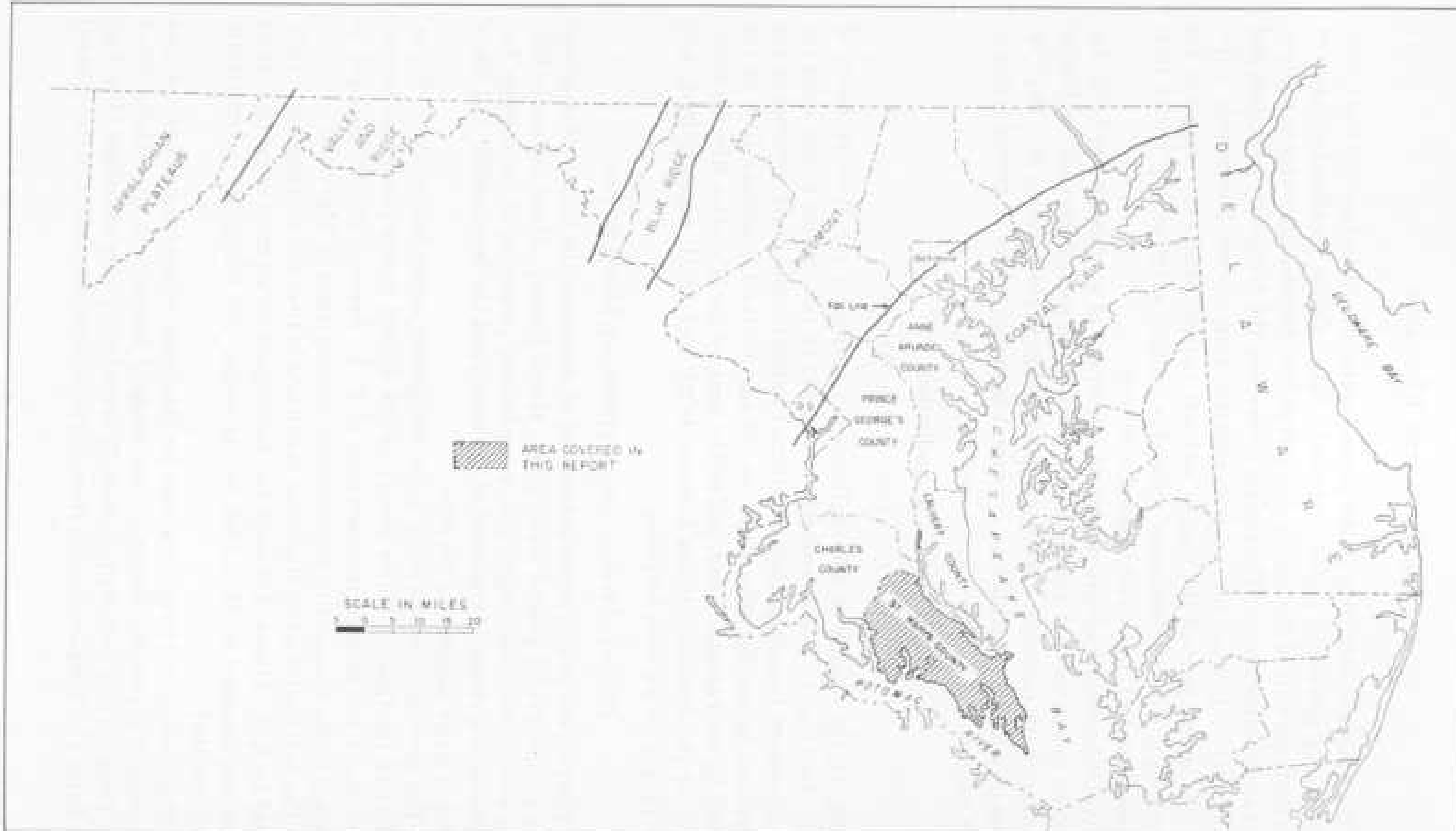

FIGURE 4. Map of Maryland Showing Physiographic Provinces and Location of St. Marys County

and chemical analyses of these samples were made by the Quality of Water Branch of the U. S. Geological Survey (Table 8). Drillers' logs (Table 10), depth of wells, length and size of casing, records of pumping tests, and data on static and pumping water levels were obtained from the well-completion reports submitted by drillers to the Maryland Department of Geology, Mines and Water Resources.

Periodic measurements were made of water levels in selected artesian and nonartesian wells during the period of the investigation, and pumpage data were collected from the chief users of ground water.

The 15-minute and 7½-minute topographic maps published by the Corps of Engineers, U. S. Army, and the U. S. Geological Survey were used in the field to plot the locations of the wells. In addition, the 1949 St. Marys County topographic map (scale 1:62,500) of the Maryland Department of Geology, Mines and Water Resources was used as a base in the preparation of the well-location map and the subsurface geologic maps (Pls. 3, 4, 5, and 7). These maps are divided into 5-minute quadrangles which are lettered from north to south in upper-case letters and from west to east in lower-case letters. The wells listed in this report are numbered consecutively within each 5-minute quadrangle in the order in which they were inventoried. Thus well 5 in quadrangle Dd (well Dd 5) is the fifth well inventoried in that quadrangle. To show that a well is in St. Marys County, the initials of that county may be placed before the coordinate letters; thus in the example given the complete well number is St. M.-Dd 5. As practically all wells in this report are in St. Marys County, the county initials are omitted.

All wells located in the field during the investigations are shown on Plate 7, and the numbers of the wells on the plate correspond to those used throughout this report.

PREVIOUS GROUND-WATER INVESTIGATIONS

The ground-water resources of St. Marys County have been studied briefly by several geologists, and their findings have been published in reports covering larger areas, or in reports in which the ground-water resources were incidental to the main subjects. Darton (1896a, pp. 127–128, 136)[1] discusses briefly the occurrence of artesian water in the county in a publication dealing with the ground-water conditions in the Atlantic Coastal Plain. The geologic folio on the Nomini quadrangle of Maryland and Virginia (Darton, 1896b) contains a summary on the ground-water supplies of southern St. Marys County and an areal geologic map including contours showing the approximate altitude of the tops of the water-bearing formations. The geologic folio on the St. Marys quadrangle (Shattuck and Miller, 1906) includes information on artesian wells in the southeastern section of the county. An early report (Miller, 1907, pp.

[1] See references, p. 188

121–124) on the economic resources of St. Marys County includes a brief summary of the water resources. Results of more detailed study of St. Marys County were published later in a report by Clark, Mathews, and Berry (1918, pp. 405–413) on the water resources of Maryland, Delaware, and the District of Columbia. The section on St. Marys County in that report includes a description of the general features of the occurrence of ground water, records of 39 wells, including 4 well logs, and a chemical analysis of a water sample from one well.

The ground-water resources at the Patuxent Naval Air Station are included in a report by Bennett (1944). The report includes information on wells, pumping-test data, and data on the hydrologic properties, extent, and thickness of the water-bearing formations utilized by wells in the area.

The ground-water resources of Charles County, which is adjacent to St. Marys County on the northwest, and of Calvert County, northeast of St. Marys County across the Patuxent River, are described in recent publications by Overbeck (1948; 1951).

ACKNOWLEDGMENTS

The collection of basic hydrologic data was aided greatly by the residents of the County who cooperated fully in providing information on their wells. Personnel at the Patuxent Naval Air Station furnished considerable information on the ground-water developments there and permitted water-level measurements to be made in their wells. Drillers of wells in the county, including J. J. Payne, J. E. Deagle, J. R. Wilson, Washington Pump and Well Co., and others were very cooperative in the collection of samples of well cuttings and in furnishing information on many of the wells drilled prior to this study.

Geography

PHYSIOGRAPHIC FEATURES

Maryland includes parts of five physiographic provinces; from west to east, the Appalachian Plateau, the Valley and Ridge, the Blue Ridge, the Piedmont, and the Coastal Plain (fig. 4). St. Marys County lies completely within the Coastal Plain province, which is a seaward-sloping, moderately dissected to flat plain, bounded on the west by the Fall Line and on the east by the Atlantic Ocean. The Atlantic Coastal Plain extends from New England southward through eastern Florida; the Gulf Coastal Plain is a similar feature extending from western Florida to Texas and Mexico. In St. Marys County the sediments of the Coastal Plain consist chiefly of unconsolidated sand, clay, and gravel.

Two principal topographic features are evident in St. Marys County. A moderately dissected upland plateau is fringed by a low, flat plain. The upland plateau, which occupies most of the central part of the county, slopes from an altitude of more than 170 feet in the northwestern part of the county to about 70 feet in the southeastern part. The lowland plain is best developed along the Wicomico and Potomac Rivers and the Chesapeake Bay; it is absent in places along the Patuxent River. In general, it lies between sea level and 50 feet above.

DRAINAGE

The Three-Notch Road, State Highways 5 and 235 (Pl. 7), marks approximately the drainage divide in the county between the Potomac River and the Patuxent River-Chesapeake Bay drainage systems. Streams draining into the Potomac River are south and west of the divide and have relatively long courses of low gradient. The larger streams, such as the Wicomico and St. Marys Rivers, are tidal for several miles from their confluence with the Potomac River. Streams such as Mill Creek and Horse Landing Creek, which flow northeast into the Patuxent River, are relatively short and occupy small valleys of steep gradient.

ECONOMY AND CULTURE

From its founding in 1637 until 1942, St. Marys County had an economy based primarily upon the agricultural and fishing industries. The establishment in 1942 of the Patuxent Naval Air Station on a broad flat near the junction of the Patuxent River and the Chesapeake Bay created employment for many thousands of persons and resulted in the growth of private businesses in the vicinity and the new town, Lexington Park, adjacent to the base. According to records of the Census Bureau, the population of the county increased from 14,676 in 1940 to 29,111 in 1950, an increase of 99 percent. A large part of the population derives, directly or indirectly, much or all of their livelihood in one way or another from the Naval Air Station.

Agriculture is still important in St. Marys County. The chief crop is tobacco; corn, small grain, and sugar beets are subordinate crops. The distribution of land use (U. S. Department of Commerce, 1946) is:

Total number of farms	1,380
Land area of county, acres	234,880
Land in farms, acres	151,490
Cropland harvested, acres	37,506
Woodland, acres	73,291
Other land, acres	7,363

Much of the county not under cultivation is forested. A number of small sawmills are engaged in cutting much of the marketable timber. Commercial fishing and oystering are relatively important industries and afford seasonal employment for many persons. During the last ten years the county has become increasingly important as a resort and numerous summer homes have been built along the shores of the county. Most of these summer communities are entirely dependent upon wells as a source of water supply, and much of the well drilling in the county is related to the resort industry.

The highway system of the county is good. The main roads and most of the secondary roads are hard-surfaced. Some secondary roads are graveled and maintained in good condition. The principal north-south road in the county is State Highway 235, extending from Charlotte Hall to Ridge. State highways 5 and 245 connect Leonardtown, the county seat, with the northern part of the county.

A single-track railroad, owned by the U. S. Navy, extends southeastward across the county connecting the Naval Air Station with Hughesville, Upper Marlboro, and the District of Columbia.

TABLE 3

Average Monthly Temperature and Precipitation at Charlotte Hall, Leonardtown, and Solomons

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Charlotte Hall												
Average temperature (°F.)	34.0	34.7	44.8	54.0	64.6	72.7	76.4	75.3	62.1	57.7	47.3	37.2
Average precipitation (in.)	3.23	3.11	3.24	3.69	3.54	3.56	5.11	3.57	3.03	2.32	2.63	2.96
Leonardtown												
Average temperature (°F.)	36.1	36.8	42.6	54.4	64.8	73.1	77.0	75.8	65.9	58.4	46.6	38.9
Average precipitation (in.)	3.06	2.92	4.07	3.06	3.23	3.67	4.64	4.10	2.32	3.21	2.84	2.85
Solomons												
Average temperature (°F.)	36.5	36.5	45.1	54.3	65.2	73.6	78.7	77.2	66.9	60.5	49.3	39.0
Average precipitation (in.)	3.06	2.86	3.28	3.18	3.14	3.41	4.58	3.95	2.97	2.70	3.20	2.75

CLIMATE

The following data on St. Marys County have been compiled from the records of the U. S. Weather Bureau.

The mean annual temperature at Charlotte Hall, based on 28 years of record, is 55.7°F.; at Leonardtown, based on 15 years of record, 56.2°F.; and at Solomons (Calvert County), based on 58 years of record, 57.3°F.

The mean annual precipitation at Charlotte Hall is 46.09 inches; at Leonardtown, 39.97 inches; and at Solomons, 38.20 inches.

The growing season at Charlotte Hall averages 192 days, having ranged from 173 to 213 days. The average date of the last killing frost in the spring at Charlotte Hall is April 14, and the average date of the first killing frost in the fall is October 23.

Table 3 shows that July is the warmest month of the year, having a mean temperature of 77.4°F., and that January is the coldest month, having a mean temperature of 35.5°F. July is also the wettest month of the year, the precipitation averaging 4.8 inches. The driest month of the year is October, the precipitation averaging 2.7 inches. In general, the precipitation in St. Marys County is well distributed throughout the year.

General Geology and Hydrology

St. Marys County lies entirely within the Coastal Plain province and is underlain by unconsolidated sediments consisting essentially of alternating strata of sand, clay, and gravel, which in general dip gently toward the east or southeast (Plate 6). The sediments, which overlie hard, dense crystalline rocks (bedrock) are about 2,000 feet thick in the northwestern part of the County and about 3,000 feet in the southeastern part.

The crystalline rocks, which in this report are arbitrarily considered to be of pre-Cambrian age, are composed chiefly of granite, gabbro, gneiss, and schist. These rocks, which are of igneous or metamorphic origin, crop out in the Piedmont plateau whose boundary with the Coastal Plain is approximately marked by a line joining the cities of Washington, D. C., and Baltimore. This boundary is called the Fall Line.

The sediments that underlie the Coastal Plain in St. Marys County range in age from Cretaceous at the base to Recent at the top. The sediments of Early Cretaceous and a large part of those of Late Cretaceous age were deposited in a continental environment. They were chiefly derived from the crystalline rocks west of the Fall Line. The sediments deposited during the latter part of Late Cretaceous and during Tertiary time are chiefly of estuarine or marine origin. The Pleistocene deposits are mostly of continental origin; however, during a part of the Pleistocene epoch sediments of estuarine origin were deposited.

The formations of Cretaceous and Tertiary age crop out in Prince Georges, Anne Arundel, and Charles Counties as a series of relatively wide belts that roughly parallel the Fall Line, in which the older formations are exposed at or near the Fall Line and the younger formations appear in succession to the southeast. In St. Marys County those sediments are covered by a layer of Pleistocene sand, gravel, and clay which varies in thickness from place to place and good exposures of the pre-Pleistocene formations are rare. Tertiary (Miocene) deposits may be seen only along some of the valleys of the major streams, the Pleistocene deposits completely obscuring the Tertiary deposits elsewhere.

In St. Marys County all ground-water supplies are obtained from porous and permeable sand and gravel of the Coastal Plain sediments. The chief source of ground water is drilled wells, usually less than 500 feet deep, which tap one or the other of two artesian water-bearing zones in the formations of Eocene age. These aquifers are present throughout the county, are easily reached by drilling, and yield water generally of good quality. The underlying formations of Cretaceous age include water-bearing sands, but because they lie at greater depth they have been tapped by only a few wells. They constitute potentially a large undeveloped source of ground water.

The extensive sheet-like deposits of Pleistocene age consist largely of permeable sand and gravel capable of yielding moderate supplies of water mostly to shallow dug wells. Water in these deposits generally occurs under water-table conditions, and the quantity of water in storage in them varies with fluctuations in the amount and distribution of precipitation. During extended dry periods water levels may decline and water supplies from the Pleistocene deposits may be inadequate. Most of the wells in the Pleistocene deposits are in the higher central part of the county.

The character and water-bearing properties of the geologic formations are summarized in Table 4.

Geologic Formations and Their Water-Bearing Properties

PRE-CAMBRIAN CRYSTALLINE ROCKS

The pre-Cambrian rocks are usually composed of gneiss, gabbro, granite, schist, and serpentine. The younger Coastal Plain sediments lie upon the surface of the crystalline rocks, which slopes toward the east.

At no place in St. Marys County are the pre-Cambrian rocks exposed at the surface, nor have they been reached in wells. A regional map, compiled by Anderson (1948, fig. 24) from seismic and well data, shows the altitude of the crystalline rock surface to be about 2,200 feet below sea level at the western edge of the county and about 3,400 feet in the extreme southeastern part.

The crystalline rocks yield water chiefly from joints and other fractures resulting mainly from earth movements and from openings resulting from the weathering and decomposition of the rock material. Wells ending in the crystalline rocks in the Piedmont plateau generally have yields of about 5 to 15 gallons a minute; however, some have much higher yields and a few have such small yields they are considered "dry".

The crystalline rocks are not considered a potential source of ground water in St. Marys County because they are present at relatively great depth and are overlain by several formations containing water-bearing sands and gravels which are or can be developed as sources of ground water.

CRETACEOUS SYSTEM

Cretaceous sediments in Maryland are divided into two series, Upper and Lower Cretaceous. Cretaceous sediments are not exposed in St. Marys County and only two wells are thought to have penetrated them. Only incomplete records of these wells are available and the water-bearing zones cannot be classified with certainty. The top of the Cretaceous strata in St. Marys County probably lies at depths of 500 to 700 feet.

LOWER AND UPPER CRETACEOUS SERIES

Patuxent formation, Arundel clay, and Patapsco formation.—The Patuxent, Arundel, and Patapsco formations, comprising the Potomac group, are composed of unconsolidated sand, gravel, and clay which occur as lenticular masses. The Patuxent and Patapsco formations contain excellent water-bearing sands in Prince Georges (Meyer, Gerald, 1952, pp. 94–97) and Anne Arundel (Brookhart, 1949, pp. 38–44) Counties and in the Baltimore area (Bennett and Meyer, 1952). The total thickness of the three formations in St. Marys County is estimated to be about 1,500 to 2,500 feet. As these formations have not been penetrated by wells in St. Marys County, no data are available concerning their hydrologic properties there. In view of the large yields of many wells in these sediments in a large part of the southern Maryland area, the Patuxent and Patapsco formations are a potential source of ground water in St. Marys County. However, the water may be too highly mineralized for most purposes; additional information is needed before the potentialities of these aquifers can be evaluated.

Raritan and Magothy formations.—The Raritan and Magothy formations, where identified in other areas, consist of red, gray, white, and blue-gray clay interbedded with sand and gravel of variable extent and thickness.

A well drilled in Charles County, 5 miles northwest of St. Marys County, penetrated 64 feet of sediments which belong to the Raritan and Magothy formations. Near the bottom of the well 19 feet of coarse gray water-bearing sand was penetrated which is believed to be part of the Magothy formation. A description of the samples of well cuttings from this well is given below beginning at 615 feet.

Thickness (ft.)	*Depth (ft.)*	*Description*
4	615–619	Sand, blue-white, coarse sub-angular, well-sorted; includes particles of red, gray, and white chert.
11	619–630	Clay, gray; some reddish-brown and red clay; sand coarse, as above.
19	630–649	Sand, gray, coarse, clean, contains tan, gray, and white chert; some pyrite.
30	649–679	Clay, gray and chocolate-brown; contains fossil mold a few small pellets of siderite.
	679	Bottom of well.

Individual wells having yields as high as 1,000 gallons per minute have been developed in the Raritan and Magothy formations at Annapolis (Brookhart,

TABLE 4
Geologic Formations

System	Series	Group	Formation	Thickness	General character	Water-bearing properties
Quaternary	Pleistocene		Lowland sediments	0–150	Gravel, sand, silt, and clay.	Yields water to dug wells and locally to deeper drilled wells. A potential source of artesian water from basal water-bearing gravel and sand.
			Upland sediments	0–100	Gravel, sand, silt, and clay.	Chief source of water for shallow domestic and farm wells.
Tertiary	Miocene	Chesapeake	St. Marys formation	0–50±	Fossiliferous sandy blue clay.	Probable source of water for some small domestic wells in southern part of county.
			Choptank formation	30–100±	Very fine sandy clay.	Not a water-bearing formation in St. Marys County.
			Calvert formation	150±	Gray and greenish-gray diatomaceous sandy clay. 10–20 feet of sand locally present at base.	Yields water locally from basal sand.
	Eocene		Sediments of Jackson age	0–60	Gray sand and some glauconite, with interbedded indurated calcareous layers.	Excellent source of water for small domestic wells. Main source of water for small domestic drilled wells in eastern and southern sections of county.
		Pamunkey	Nanjemoy formation	150–200	Highly glauconitic dark greenish-gray clayey sand; tough red or gray clay at base (Marlboro clay member).	Locally an excellent source of water for drilled wells. Generally forms a single water-bearing unit with overlying sediments of Jackson age.

			Aquia greensand	100+	Glauconitic yellowish-brown medium to coarse sand.	Main aquifer utilized in St. Marys County. Yields small to large quantities of water for domestic, public and industrial supplies.
	Paleocene		Brightseat formation	50±	Dark-gray, micaceous, silty and sandy clay	Not considered a water-bearing formation.
Cretaceous	Upper		Monmouth formation	100±	Gray to dark-gray, glauconitic, micaceous silty and sandy clay.	Probably not an important water-bearing formation; a few wells in adjacent counties yield moderate supplies from lenticular sands.
			Matawan formation			
			Magothy formation	500±	Irregularly-bedded sand, clay, and sandy clay.	Two wells in St. Marys County tap the uppermost part; potentially an excellent water-bearing formation.
			Raritan formation			
		Potomac	Patapsco formation	1500–2500	Sand, gravel, variegated clay, and sandy clay.	Not utilized in St. Marys County; potentially an excellent water-bearing formation.
			Arundel clay			
	Lower		Patuxent formation			
Pre-Cambrian					Chiefly schist, granite, and gneiss in outcrop area.	Not considered a water-bearing formation in St. Marys County.

1949, p. 46). However, in Charles and Prince Georges Counties the water-bearing sands in these formations are not as thick or extensive as those in the eastern and central parts of Anne Arundel County, and the average yields of wells are much smaller.

Two wells in St. Marys County, Gh 1 at the Point Lookout Hotel (depth 696 feet) and Ef 4 at the St. Marys Female Seminary (depth 661 feet), probably yield water from sands in the Raritan or Magothy formations. Both wells have hydrostatic heads more than 20 feet above mean sea level. Nearby wells yielding from sands in the overlying Eocene formations have hydrostatic heads less than 5 feet above sea level. The reported yields of wells Gh 1 and Ef 4 are 83 and 52 gallons per minute, respectively. Probably the aquifer will yield much larger quantities of water to wells designed for greater yields.

Matawan and Monmouth formations.—The Matawan and Monmouth formations consist chiefly of gray to dark-gray glauconitic, micaceous silty and sandy clay. Because of the high percentage of clay and silt in these sediments, they are not considered an important source of ground water in St. Marys County.

TERTIARY SYSTEM

PALEOCENE SERIES

Brightseat formation.—The Brightseat formation does not crop out in St. Marys County and its subsurface extent in the county is not known. Samples of drill cuttings are not available from any well in St. Marys County that has been drilled deep enough to penetrate the Paleocene deposits. This formation was named by Bennett and Collins (1952, pp. 114–116) from exposures near Brightseat, Prince Georges County, Maryland.

The Brightseat formation is a dark-gray micaceous sandy clay which can be distinguished from the overlying coarse glauconitic Aquia greensand. The lithology of the underlying Monmouth is somewhat similar to the Brightseat, but slight differences between them may be detected upon close examination.

The thickness of the Brightseat formation in Southern Maryland ranges from less than 10 feet at the outcrop to as much as 40 to 50 feet in places down the dip. Shifflett (1948, p. 11) reports 10 feet of Paleocene deposits, which probably are the Brightseat formation, in a well drilled at Hughesville in Charles County, 2 miles northwest of the St. Marys County boundary.

Because the Brightseat formation is usually a sandy clay, it is not considered an important water-bearing formation.

EOCENE SERIES

Pamunkey group.—Aquia greensand.—The Aquia greensand was named from exposures along Aquia Creek, Virginia, by Clark (1895, pp. 3–6). It does not crop out in St. Marys County but has been identified in the subsurface of most of the county by lithologic and fossil evidence.

The Aquia greensand is a fine to coarse clayey to clean yellow-brown to gray-green glauconitic quartz sand. The glauconite is generally medium to fine grained and ranges from shiny green-black to dull brown. The quartz is mostly subrounded, dull, yellow and green, coarse, clear, and subangular. Drillers' records and sample logs of wells in northern and central Calvert County, southern Prince Georges County, and western Charles County show that the middle and lower parts of the Aquia contain numerous layers of "rock" or indurated greensand. Well logs show, however, that rock layers are not common in the Aquia greensand in St. Marys County, although some were reported in well Dd 1, at Leonardtown. Samples of well cuttings from three wells (Bb 4, 1.2 miles east of Newmarket, Dd 1 at Leonardtown, and Df 22 at Lexington Park) show that the sediments in the upper 20 or 30 feet of the Aquia greensand are fine to medium grained and well sorted. Below this depth in these wells the sand is coarser and cleaner. However, in well Fe 24, at Piney Point, the upper 10 feet of the formation is moderately coarse and not clayey.

The range of thickness of the Aquia in St. Marys County is unknown, but wells for which drill cuttings were obtained penetrated 80 feet of the formation at Leonardtown (well Dd 1) and 97 feet at the Bannaker School (well Dc 36) 2 miles south of Loveville. The driller of well Dc 13, 0.6 mile north of Abell near the western edge of the county, reported 120 feet of water-bearing greensand considered to be the Aquia greensand. However, the formation is 203 feet thick at Sunderland in northern Calvert County, at least 168 feet thick at Lower Marlboro, in Calvert County, and about 160 feet thick at Bryantown in eastern Charles County.

In most places the pinkish-brown color of the overlying Marlboro clay member of the Nanjemoy formation contrasts markedly with the brown or gray-green sediments of the Aquia. Well drillers ordinarily detect this change in color and thus the top of the Aquia generally can be determined from drillers' logs.

The base of the Aquia is not readily recognized in drillers' logs, but where samples of drill cuttings are available the base may be identified by means of foraminiferal study and by slight lithologic differences. In general the underlying Paleocene or Upper Cretaceous sediments can be identified by an increase in the mica content and a decrease in glauconite.

The approximate altitude of the top of the Aquia greensand is shown by contours on Plate 3. The strike of the upper part of the formation is generally north-south in most of St. Marys County, changing to northeast in Calvert County. The top of the Aquia is at a depth of 240 feet below sea level in the vicinity of the Wicomico River, and 440 feet below sea level at the Patuxent Naval Air Station. The average dip of the Aquia is approximately 10 feet to the mile to the east, but in the vicinity of the Patuxent Naval Air Station the dip flattens markedly.

The Aquia greensand is the chief source of ground water in St. Marys County.

The public-supply wells of the communities of Leonardtown, Lexington Park, and St. Clement Shores and wells of the Naval installation at Piney Point obtain their water from water-bearing sands in the Aquia. The Patuxent Naval Air Station obtains most of its water from this formation. West of Leonardtown along St. Clement Bay, the Potomac River, and the Wicomico River, and north of Horse Landing along the Patuxent River, several hundred small-diameter jetted wells yield water from the Aquia greensand.

The artesian head in the Aquia greensand is sufficient to produce flowing wells in a number of low-lying areas in St. Marys County. The artesian head, measured during 1951, was 17 feet above mean sea level at Chaptico, 12 feet in the vicinity of Clements, 7 feet at Coltons Point, 8 feet in the vicinity of Compton, and 20 feet near Cremona along the Patuxent River.

The discharge of flowing wells along the tidewater estuaries fluctuates because of the effect of the tide. During periods of high tide the aquifer is slightly compressed by the increased weight of the overlying sea water and the hydrostatic head is increased. Some wells in the county flow only during high tides. Prior to 1940 practically all Aquia wells were drilled in the low-lying areas and were flowing wells.

In the last ten years most of the Aquia wells were drilled for domestic purposes. These wells generally are 2 inches or less in diameter. Their yields range from 5 to 22 gallons a minute and average more than 10 gallons a minute. Most of these wells were not equipped with screens and when it became necessary to pump some of them, because of local lowering of the artesian head, many collapsed.

Table 5 lists information on large-diameter wells penetrating the Aquia greensand in St. Marys County.

The average specific capacity of the seventeen large-diameter wells in the county is 1.8 gallons per minute per foot of drawdown. The values of specific capacity are based on the pumping tests made by the driller at the time the well was completed. Some of the yields reported are not the maximum yields obtainable but merely the largest obtained with the test-pumping equipment used by the driller.

Nanjemoy formation.—The Nanjemoy formation was named from surface exposures in the valley of Nanjemoy Creek in Charles County, Maryland (Clark and Martin, 1901, p. 64). It does not crop out in St. Marys County but has been identified in almost all drilled wells in St. Marys County from which samples of drill cuttings were obtained.

The formation consists chiefly of greenish-black to yellowish glauconitic clayey to clean sand. The lowermost part of the formation consists of an even-textured pinkish-brown to gray clay known as the Marlboro clay member. The pinkish-brown clay occurs generally to the north and west of Leonardtown and the gray clay to the south and east of Leonardtown.

The maximum thickness of the Nanjemoy formation in St. Marys County is 208 feet in well Bb 4, 1.2 miles east of Newmarket; the minimum thickness is 130 feet in well Fe 24 at Piney Point; the thickness is 191 feet in well Cb 5 at Chaptico, 157 feet in well Dd 1 at Leonardtown, and 148 feet in well Df 22 at Lexington Park. In general, the formation is thickest in the northern part of the county.

The Nanjemoy formation is overlain by the Calvert formation, of the Chesapeake group of Miocene age, in the area northwest of the line shown on Plate 4, and by sediments of Jackson (Eocene) age south and east of that line. Except

TABLE 5

Yield and Specific Capacity of Large-Diameter Wells Ending in the Aquia Greensand

Well No.	Location	Diameter (inches)	Length of screen (ft.)	Drawdown (feet)	Yield (gpm)	Specific capacity*
Bb 4	Newmarket	6	10	35	50	1.4
Bb 9	Mechanicsville	6	11	67	60	0.9
Bc 1	do	6	10	30	20	0.6
Db 29	Bushwood	6	10	140	40	0.3
Dc 26	St. Clement Shores	6	10	42	50	1.2
Dd 1	Leonardtown	8	20	110	150	1.3
Dd 2	do	8	—	90+	200	2.2
Df 1	Patuxent Naval Air Station	8	20	53	225	4.2
Df 3	do	10–8	20	77	257	3.3
Df 4	do	10–8	20	152	300	2.0
Df 5	do	8	20	150	300	2.0
Df 10	do	8–6	20	98	225	2.3
Ef 17	Park Hall	6	21	88	109	1.2
Fe 21	Piney Point Navy Base	6	12	108	48	0.4
Fe 23	Piney Point	8	8	70	220	3.0
Fe 24	do	6–4	5½	17	25	1.5
Ff 21	Webster Field	8	22	115	150	1.3

* Expressed as yield in gallons per minute per foot of drawdown.

in a small part of the county, the top of the Nanjemoy formation can be easily determined by differences in color and lithology.

The strike of the top of the Nanjemoy formation is northeast in the northwestern part of the county, and generally north in the rest of the county. It dips from 90 feet below sea level in well Cb 5 at Chaptico to 375 feet below sea level in well Fh 5 at Point No Point, a dip of 285 feet in about 30 miles or 9.5 feet to the mile to the southeast.

The Nanjemoy formation is a good aquifer in St. Marys County, yielding water to wells in the southeastern two-thirds of the county. The upper 80 feet of the formation contains zones of permeable sand which yield water to wells east of an irregular line connecting Horse Landing on the Patuxent River and

Breton Bay on the Potomac River. The overlying sediments of Jackson age, consisting largely of permeable sand, are usually hydrologically connected with the sands of the Nanjemoy.

Most domestic wells drilled into the Nanjemoy formation are not screened and are not cased below the base of the Calvert formation. These wells therefore draw water directly from both the Nanjemoy formation and the sediments of Jackson age. A few small-diameter wells are cased through the sediments of Jackson age and are screened in the Nanjemoy formation; among them are the following: well Dd 12, 1.5 miles northwest of Leonardtown; well Dd 22, 1.5 miles northeast of Leonardtown; and wells Ec 5 and Ec 13, at Breton Beach. Well Dd 12 is screened with 20 feet of screen and in 1951 was yielding 1.5 gallons a minute by natural flow; well Dd 22 is screened with 15 feet of mesh screen and is reported to yield 6 gallons a minute; well Ec 5 contains 20 feet of screen set 20 feet below the top of the formation and is reported to yield 6 gallons a minute; well Ec 13 is equipped with 20 feet of screen beginning 20 feet below the top of the formation and is reported to yield 9 gallons a minute with a drawdown of 15 feet.

TABLE 6

Yield and Specific Capacity of Large-Diameter Wells, Ending in the Nanjemoy Formation

Well No.	Location	Diameter (inches)	Length of screen (ft.)	Drawdown (feet)	Yield (gpm)	Specific capacity
Ce 4	Hollywood	6	9	36	45	1.2
Ce 14	do	8	11	115	50	0.4
Ce 20	do	6	5	98	60	0.6
De 3	do	6	12	50	60	1.2
De 6	California	6	12	65	30	0.4
De 7	do	6	7	105	22	0.2

Table 6 lists information on large-diameter wells screened in the Nanjemoy formation.

The specific capacities of these six wells average 0.5 gallon a minute per foot of drawdown. This is less than one-third of the average value of the specific capacity of the seventeen large-diameter wells ending in the Aquia greensand.

Sediments of Jackson Age.—Sediments of Jackson age (late Eocene) have been identified in Maryland through studies of the microfossils from wells in southern Maryland and on the Eastern Shore (Shifflett, 1948, pp. 30–34, 40). The sediments are not known to crop out in Maryland but have been traced by means of drillers' and sample logs from wells in Westmoreland and Northumberland Counties, Virginia, through Charles, St. Marys, Calvert, Somerset, and Dorchester Counties, Maryland. The driller's log of well Cb 3 at Chaptico indicates that sediments of Jackson age are present. They are absent in well

Bb 4, 1.2 miles east of Charlotte Hall, and well Bc 10 at Mechanicsville. The approximate limit of the western extent of the sediments of Jackson age is shown on Plate 4.

Cushman and Cederstrom (1945, p. 2) identified foraminifera of Jackson age in cuttings from some deep wells in York County, Virginia, and named these deposits the Chickahominy formation. The Chickahominy formation at the type wells in York County consists of clay and differs markedly in lithology from the sediments of Jackson age in southern Maryland. The latter consist of clean gray sand with hard, indurated beds, composed of quartz, glauconite, and coarse shell fragments cemented by calcium carbonate, ranging in thickness from a few inches to 18 inches. The sand between the indurated layers consists of medium to coarse quartz grains, fine-grained light-green to black glauconite, coarse shell fragments, microfossils, and some fine pyrite grains. Glauconite is scarce near the top of the deposits but is relatively abundant at the base.

The thickness of the sediments of Jackson age ranges from 10 feet in well Db 16 on the Wicomico River, 2.4 miles northwest of Avenue, to 60 feet in well Df 22 at Lexington Park. The deposits are 60 feet thick at Breton Beach also, but they thin to 20 feet at Scotland Beach in the southeast corner of the county. In well Westmoreland 37a at Ragged Point, Virginia, the sediments of Jackson age are at least 42 feet thick.

The sediments of Jackson age are underlain by the highly glauconitic sands of the Nanjemoy formation. The contact is usually marked in well-cutting samples by a color change from light-gray to dark gray-green. However, in the southern part of the county, the Jackson sediments become increasingly glauconitic with depth, and the contact is very difficult to determine because of the similarity in color. The sediments are overlain by the Calvert formation, of the Chesapeake group of the Miocene series. In most places the lowermost part of the Calvert consists of fine to medium gray-white sand; in a few places, however, it consists of light-gray diatomaceous clay.

The sediments of Jackson age are extensively utilized as a source of ground water throughout St. Marys County, except in that part of the county west of a line connecting Compton and Horse Landing, where they are thin or absent and successful wells are few. In an irregular belt extending from Breton Beach and Piney Point to Lexington Park and St. Marys City the sediments of Jackson age are about 40 to 60 feet thick and the sands are sufficiently permeable that most of the drilled wells are completed in the sediments of Jackson age without penetrating the underlying Nanjemoy formation.

The artesian head in the water-bearing sediments of Jackson age is sufficient to produce flowing wells at several localities in St. Marys County. Flowing wells have been drilled along the Patuxent River valley from Horse Landing southeast to Cuckold Creek. In that area static water levels in 1951 ranged from 12 feet above mean sea level at Horse Landing to 5 feet near Cuckold Creek.

Flowing wells also occur along the shores of Breton Bay and in the valley of McIntosh Run 1.3 miles northwest of Leonardtown. There the static water levels ranged from 9 to 18 feet above mean sea level during 1951.

The reported yields of more than ninety small-diameter wells tapping the sediments of Jackson age range from 2.5 to 23 gallons a minute and average about 12 gallons a minute. Screens are seldom used in these wells because the interbedded rock layers within the sediments prevent caving and closing of the holes. Wells drilled in the central and southern parts of the county almost always reach water-bearing sands, and in general successful wells are completed without difficulty.

Table 7, based chiefly on drillers' reports, lists information on large-diameter wells tapping the sediments of Jackson age.

TABLE 7

Yield and Specific Capacity of Large-Diameter Wells Ending in the Sediments of Jackson Age

Well No.	Location	Diameter (inches)	Length of screen (ft.)	Drawdown (feet)	Yield (gpm)	Specific capacity
Df 6	Patuxent Naval Air Station	6–4	13	50	25	0.5
Df 8	do	4	10+	40	25	0.6
Df 9	do	8	15	63	191	3.2
Df 23	California	6	9	30	40	1.3
Df 25	do	6	11	50	60	1.2
Df 30	Lexington Park	6	10	42	40	1.0
Df 35	California	6	—	60	80	1.3
Ee 4	Chingville	6	12	63	60	1.0
Ee 30	Great Mills	6	6½	—	55	—
Ef 3	do	6	12	45	20	0.5
Ef 13	do	6	9	25	30	1.2
Fh 2	Point No Point	6–4	None	20	10	0.5

The average specific capacity of these twelve wells is 1.0 gallon a minute per foot of drawdown, which is about twice the average specific capacity for six wells in the Nanjemoy formation and about half that for seventeen wells in the Aquia greensand.

MIOCENE SERIES

Chesapeake group.—The Chesapeake group of the Miocene series consists of a wedge of sediments, chiefly sandy clay and clay, which dip and thicken to the east and southeast. The group has been divided into three formations which are, in ascending order, the Calvert, Choptank, and St. Marys formations. All the units are present in St. Marys County. These formations were distinguished chiefly by their differences in fossil content. The total thickness of the Miocene series in the county, as shown by samples of well cuttings, ranges from 126 feet in well Cb 5 at Chaptico to 330 feet in well Fh 3 at Point No Point.

Calvert formation.—The Calvert formation is named from exposures along the cliffs of Calvert County, Maryland (Clark, Shattuck, and Dall, 1904, p. 69). It is exposed in St. Marys County along the banks of the Patuxent River northwest of Sandgates, along the valleys of Chaptico and St. Clements Creeks, and along the northeast bank of the Wicomico River above Chaptico Bay.

The Calvert formation is a silty to sandy diatomaceous clay containing some thin shell beds in the upper part. The basal part, known as the Fairhaven diatomaceous earth member, consists of a thick bed of yellowish-gray clay containing many diatoms. In fresh exposures the material in the diatomaceous zone is greenish-blue, but it weathers to a light yellowish-gray. The basal 10 to 20 feet of the formation consists of a zone of relatively clean, medium- to fine-grained sand containing shell fragments, some gravel, and phosphate pebbles. In St. Marys County the basal sand zone is best developed in the central and southern parts.

The Calvert formation has a rather uniform thickness in St. Marys County, ranging from 110 feet in well Fh 3 at Point No Point to 140 feet in wells Dd 1 at Leonardtown and Ee 4 at Chingville.

The Calvert formation is overlain by the Pleistocene sediments in the northern and western parts of the county and by the lithologically similar Choptank formation in the central and southern parts. However, in many places along the Wicomico and Potomac Rivers pre-Pleistocene erosion has removed all or part of the Calvert formation.

The Calvert formation dips gently to the east in most of the central part of the county and to the southeast in the southern part. The dip of the base of the formation is not uniform; in the northwestern and central parts it is as low as 5 feet to the mile, but it increases to 20 feet to the mile in the southeastern part (Pl. 4).

The Calvert formation is not an important water-bearing formation in St. Marys County. Where domestic wells of small diameter are drilled to the aquifer comprising the sands of Jackson age and of the Nanjemoy formation, the basal sand zone of the Calvert, where present, is a part of that aquifer. Some dug wells in the northern part of the county which probably end in the Calvert formation obtain small domestic supplies.

Choptank formation.—The Choptank formation, named from exposures along the Choptank River in Talbot County, Maryland, (Clark, Shattuck, and Dall, 1904, p. 88), is present throughout most of St. Marys County outside the major stream valleys. It consists of silty to sandy bluish fossiliferous clay containing sandy shell beds, and is lithologically similar to the upper part of the Calvert formation.

The thickness of the Choptank formation varies considerably in St. Marys County, ranging from 30 feet in well Ee 4 at Chingville to 140 feet in well Fh 3 at Point No Point. Locally, as in well Dd 1 at Leonardtown, the Choptank is absent, and the younger St. Marys formation directly overlies the Calvert formation.

The Choptank formation is underlain by the Calvert formation. It is overlain by the St. Marys formation throughout most of the central and southern parts of the county and by Pleistocene deposits in the northern part.

No wells in St. Marys County are known to yield water from the Choptank formation.

St. Marys formation.—The St. Marys formation was named from its exposure in St. Marys County (Clark, Shattuck, and Dall, 1904, p. 82). There are numerous exposures of the formation in central and southern St. Marys County particularly along the St. Marys River.

In surface exposures the formation is a tough blue sandy clay containing many fossil-shell fragments. In general, it is more sandy than the other formations of the Chesapeake group, and in well Dd 1 at Leonardtown the formation consists chiefly of clean fine to medium sand and shells.

The St. Marys formation has been identified in samples of well cuttings largely by the marine shells and foraminifera. It is underlain by the Choptank or the Calvert formation and is overlain by the deposits of Pleistocene age.

No drilled wells in the county are known to produce water from the St. Marys formation. The formation is believed to furnish water to a few augered wells in the vicinity of Great Mills and for a few miles to the east along State Highway 5. These wells are about 30 feet deep and a few of them have a flow. The wells have a low specific capacity, and the water is reported to be hard.

QUATERNARY SYSTEM

PLEISTOCENE SERIES

The sediments of Pleistocene age cover about 95 percent of the area of St. Marys County. In a previous publication on the geology of St. Marys County (Shattuck, 1907) the Pleistocene deposits were divided into three formations, mainly on the basis of their topographic position. These were named, from the oldest and topographically highest to the youngest and lowest, the Sunderland, Wicomico, and Talbot formations. In this report, as in that by Bennett and Meyer (1952) on the Baltimore area, for convenience in discussing their occurrence and hydrologic properties, the sediments of Pleistocene age are separated into two ill-defined units, upland and lowland, whose boundary in St. Marys County has been set arbitrarily at an elevation of about 40 feet above mean sea level.

Upland sediments.—The upland unit of the Pleistocene is a sheetlike deposit which lies on the eroded and irregular surface of the Tertiary materials throughout the higher parts of St. Marys County. The upland unit consists of yellowish-orange to pale-brown sand and gravel mixed with clay and silt. As shown by well logs, its thickness ranges from about 10 to 60 feet.

A large number of dug domestic and farm wells obtain adequate supplies of ground water from the upland Pleistocene deposits. In places these deposits are highly dissected and well drained, and the supplies obtained from wells may be inadequate, at least in long periods of dry weather. The dug wells inventoried in St. Marys County range in depth from 8 to 58 feet. The maximum yield reported from a dug well of large diameter tapping the upland deposits is 25 gallons a minute (well Bb 1 at Newmarket).

Lowland sediments.—The lowland sediments in St. Marys County lie beneath the low plains that border the major tidal estuaries and their tributary streams. On the geologic map of St. Marys County published by the Maryland Geological Survey in 1903 the deposits classed as "lowland sediments" in this report are mapped in most localities as the Talbot formation.

The lowland unit consists of clay, sand, and gravel. In many places a part of this unit contains an estuarine or marine bluish-gray clay and a basal sand and gravel. Exposures of an estuarine or marine clay containing many shells and microfossils of Pleistocene age were seen at Wailes Bluff, on Chesapeake Bay about 2½ miles south of Cedar Point, and at Cornfield Harbor, on the Potomac River about a mile south of Scotland.

The thickness of the lowland sediments, as indicated by well records, ranges from less than 10 to as much as 150 feet. In general these deposits thicken toward the center of the major estuaries, whose channels were formed prior to the deposition of these sediments. The irregular surface of the base of the lowland sediments and the general slope and thickness of the basal surface toward the Potomac River and Chesapeake Bay are shown by contours on Plate 5.

In general the lower part of the lowland deposits along the Potomac River valley south from the Wicomico River to Point Lookout and northward along the Chesapeake Bay to Cedar Point consists of a mixture of coarse sand and gravel. This basal unit consists of rounded quartz and chert pebbles and medium to coarse yellowish-gray quartzitic and feldspathic sand containing some reworked glauconite. In most wells this unit is less than 30 feet thick; however, in a few wells it attains a thickness of about 80 feet.

The water from shallow dug wells in the lowland sediments is not always satisfactory for domestic or commercial purposes. The water frequently is reported to have either a marshy taste or a high iron content or both. The basal gravel is an undeveloped source of ground water which may be useful for some purposes. One well, Ec 10, south of Breton Bay, may yield some water from this aquifer.

In the Baltimore area large quantities of ground water have been obtained from the basal sand and gravel of the lowland deposits. There has been, however, contamination of this aquifer by encroachment of salt water in some parts of that area (Bennett and Meyer, 1952). The corresponding aquifer in St. Marys County probably would become contaminated also if wells are pumped excessively near a source of brackish or salt water.

Occurrence of Ground Water

GENERAL PRINCIPLES

Ground water is water beneath the land surface in the zone of saturation. In St. Marys County it is derived from precipitation. A large part of the precipitation is carried away directly by streams and some is evaporated directly; the remainder is absorbed by the soil and underlying material. A part of this water is returned to the atmosphere by evaporation and transpiration and a part percolates downward, drawn by gravity, until it reaches the water table, the upper surface of the zone of saturation, where it becomes ground water.

POROSITY AND PERMEABILITY

The geologic formations that underlie St. Marys County are composed chiefly of deposits of sand, gravel, and clay. These sediments contain numerous interstices or pore spaces whose size, shape, and number are determined by the size, shape, degree of assortment, and cementation of the particles composing the sediments. They are said to be saturated when all their interstices are filled with water. A body of sediments capable of yielding water to wells or springs is known as an aquifer.

Although the amount of water the sediments can hold is determined by their porosity, the rate at which they will yield water to wells is determined by their permeability. The permeability of earth material is its capacity for transmitting water in response to differences in hydraulic head. The size of the openings and the manner in which they are interconnected largely determine the degree of permeability. A clayey material, having only small interconnected interstices, will transmit water slowly, but a coarse sand or gravel having large interstices will transmit water more rapidly. In nature, all gradations exist between true clay and coarse sand or gravel. Thus, rates of movement of water vary widely in rocks of various types.

WATER-TABLE AND ARTESIAN CONDITIONS

The water table is a sloping surface that shows irregularities comparable with and related to the slope of the land surface, although generally of less relief. The water table rises and falls chiefly in response to changes in the amount and intensity of precipitation. In St. Marys County the water table usually rises during the spring and declines during the summer, fall, and winter. In most places there is only one zone of saturation, but in some places the water is hindered in its downward course by an impermeable or nearly impermeable bed to such an extent that an upper zone of saturation or perched water body is formed.

Artesian conditions exist where a water-bearing bed is overlain by a less permeable or a relatively impermeable bed, and where the contained water is confined under hydrostatic pressure. The head in an artesian aquifer at a given locality is that of the unconfined or water-table water in the recharge area of the aquifer less the amount of head lost by friction as the water moves from the recharge area to that locality. A piezometric surface is an imaginary surface that coincides with the head of the water in the aquifer. In artesian aquifers the piezometric surface is above the top of the aquifer, and in areas of artesian flow it is above the land surface. The physical set-up under which water enters an aquifer and moves from areas of higher to areas of lower head is called an artesian system. It should be understood that the relatively impervious confining beds in the artesians systems in St. Marys County function imperfectly, and that leakage through them may be an important factor in determining the manner in which recharge and natural discharge occur.

In St. Marys County two artesian aquifers are the chief sources of ground water; they are (1) the Aquia greensand, which is underlain by less permeable sediments of Paleocene or Cretaceous age and overlain by the clayey sediments near the base of the Nanjemoy formation, and (2) the aquifer comprising the upper part of the Nanjemoy formation and the sediments of Jackson age, which lies between the Marlboro clay member below and relatively impervious Miocene clay above. The artesian head in the aquifers is highest in the northern and central sections of the county, where the land altitude is higher, and is lowest in the southern and shore areas of the county where the land altitude is lowest.

RECHARGE AND DISCHARGE

Recharge to the ground-water reservoirs occurs as a result of precipitation on the earth's surface. The water available for ground-water recharge is that which percolates downward to the zone of saturation after subtraction of the water returned to the atmosphere by soil evaporation and transpiration and loss through surface runoff. Those parts of the aquifers in which water-table conditions exist are recharged by direct penetration of local rainfall. The rate of recharge to the water-table aquifer in St. Marys County has not been determined. The average recharge to the principal water-table reservoir in the Salisbury area, in Wicomico County (Bennett and Meyer, 1948, p. 14), is about 30 percent of the precipitation. As the hydrologic conditions are similar to those in St. Marys County, it is reasonable to expect the average rate of recharge in St. Marys County to be of the same magnitude.

The artesian aquifers in the county are recharged by movement of water down-dip from their outcrops, the water table parts of the aquifers, or by leakage of water downward through overlying confining beds.

Ground water leaves the zone of saturation, or is discharged, by both natural and artificial means. Ground water is discharged naturally by means of evaporation at the land surface, transpiration, ground-water runoff through seeps and springs, and, from artesian aquifers, by leakage through the confining beds. Soil evaporation and transpiration are effective in ground-water discharge in areas where the water table is at shallow depth, principally during the months when the plants are growing actively. In St. Marys County this period extends from early April until late October or mid-November. The quantity of ground water returned to the atmosphere by means of evaporation and transpiration is significant. In St. Marys County probably 15 to 20 percent of the total annual precipitation is lost through evaporation and transpiration of ground water.

Springs.—Ground water is naturally discharged through springs, which can be classified on the basis of their occurrence and characteristics. The commonest springs in St. Marys County are depression and contact springs. Depression springs are those in which the dissection by streams has breached the water table and cut into permeable beds in the zone of saturation. Contact springs occur where a permeable water-bearing material is underlain by one that is relatively impermeable. The water issues from a porous zone at a point along this contact. Contact springs occur along the cliffs bordering the Patuxent River, where sand and gravel of Pleistocene age overlies relatively impermeable sandy clay of Miocene age.

The term "spring" is restricted to a definite point of discharge where the water can be seen flowing from the rocks. Seepage areas occur where the water oozes from the aquifer in small trickles. Although the discharge by seepage is not great enough to cause a noticeable flow of water at any one point, the aggregate discharge from seepage areas may be appreciable. Discharge from seeps and springs maintains the flow of the perennial streams in the county during periods of no precipitation.

Springs have long been used in St. Marys County as a source of water. Governors Springs, about a mile east of St. Marys City, furnished water for the first permanent settlement in Maryland (Miller, 1907, p. 122).

The group of springs at Charlotte Hall furnish water for the Charlotte Hall Military Academy. There the springs issue along the side of a small depression in a deposit of coarse gravel that overlies finer-grained sandy clay. The larger springs have been improved by the construction of concrete catchment basins and diversion of the flow to a reservoir from which it is pumped to the academy. In August 1950 the combined discharge of these springs was estimated to be more than 60 gallons per minute.

DISTRIBUTION OF ARTESIAN FLOW AND PUMPING

Ground water may be artificially discharged by drilled wells penetrating artesian formations that are under sufficient hydrostatic head so that the water rises above the land surface. There are many flowing wells in St. Marys County along the valleys of the streams and in the lowlands adjacent to Chesapeake Bay and the Potomac and Patuxent Rivers. Some wells have been flowing continuously for more than 50 years, and in some localities the piezometric surface has been lowered appreciably because of the discharge from flowing wells.

The number of flowing wells in St. Marys County, based on the well inventory and on field observation, is about 125. About 50 wells tapping the Aquia greensand have a total daily flow estimated at 175,000 gallons. Flows from individual wells range from less than 1 gallon a minute to as much as 8 gallons a minute. About 75 wells penetrating the sediments of Jackson age and Nanjemoy formation have a total daily flow estimated at 350,000 gallons. Flows from individual wells range from less than 1 gallon a minute to as much as 7 gallons a minute.

Water is discharged artificially also by pumping wells. Pumping from wells by municipalities is on a small scale. The total pumpage for the communities of Leonardtown, St. Clement Shores, and Lexington Park, the only public supplies in the county, was estimated to be about 350,000 gallons a day in 1949. The Aquia greensand is the source of water for these public-supply wells. In 1949 the Patuxent Naval Air Station pumped an average of 1,500,000 gallons a day from wells tapping the Aquia greensand and the Nanjemoy formation and sediments of Jackson age. The Naval base at Piney Point pumped about 50,000 gallons a day from the Aquia greensand. The combined municipal, military, and industrial pumpage in the county is estimated to have averaged about 2,000,000 gallons a day in 1949.

Approximately 22,000 persons depend upon small domestic or farm wells for their water supply. Probably an additional 5,000 or 10,000 vacationists use ground water during the summer months. On the assumption that water is used at an average rate of 40 gallons a day per person, the average quantity pumped by all domestic users is roughly 1,000,000 gallons a day.

The approximate average discharge from wells in St. Marys County is:

	Approximate average discharge (gallons a day)
Flowing wells	525,000
Public-supply wells	350,000
Military wells	1,550,000
Domestic and farm wells	1,000,000
Total	3,425,000

Inasmuch as the discharge estimates for flowing wells and for domestic and farm wells may be considerably in error, it would be more accurate to consider the total discharge from all wells in the County to be between 3,000,000 and 4,000,000 gallons a day.

HYDRAULICS OF WELLS

When a well is pumped or flows the piezometric surface or the water table declines and forms an inverted cone whose apex is at the discharging well. The area in which the decline in water level takes place is called the cone of depression. With continued pumping of the well the cone enlarges; the size and rate of growth of the cone are controlled chiefly by the hydrologic properties of the aquifer and the rate and duration of pumping. When pumping or discharge from flowing wells ceases the cone of depression tends to become smaller and disappear, and the piezometric surface or water table will assume a shape similar to that which existed before pumping began.

The yield of a well depends not only on the quantity of water available for replenishment and the thickness and permeability of the water-bearing material, but also on the diameter and efficiency of the well. In general, wells of large diameter yield more water than wells of small diameter. To obtain maximum yields from wells penetrating unconsolidated material it is usually desirable to screen the wells. The screen, a mesh-covered or slotted cylinder placed opposite the aquifer, restricts particles above a certain size from entering the well, but permits the smaller particles to be removed from the area immediately outside the screen. The removal of the smaller particles and the consequent increase in the number of larger particles near the screen constitutes a phase in the development of a well. It is usually accomplished by intermittent pumping or "surging" of the well. Yields of wells may be increased considerably by proper screening and development. However, where the aquifer consists of rock or layers of indurated material, adequate yields are frequently obtained from wells in which no screen is used.

WELLS AND PUMPS

Dug wells.—A dug well is a large-diameter well excavated with hand tools or by machine and lined with brick, stone, steel, wood, tile, or concrete. The diameters of dug wells in St. Marys County range from 2.5 to 6 feet; most of them are about 3 feet in diameter. The depth of most of the dug wells is between 10 and 40 feet. The deepest dug well inventoried was well Df 26, which is 58 feet deep. The purpose of a dug well is to furnish an adequate supply of water from a shallow source. Wells of this type are the main source of water for residents of the upland parts of St. Marys County. The large diameter of dug wells creates a reservoir which permits the storage of a considerable quantity of water. Most of the dug wells in the county penetrate sand and gravel deposits of Pleistocene age. Because of their shallowness and large diameter, dug wells are easily polluted by surface drainage, wind-blown material, and objects falling in the wells. Considerable care should be taken in the location and construction of dug wells to prevent such pollution.

Bored wells.—Wells that are constructed with hand or power augers are called bored wells. They are put down where water can be obtained at shallow depths and where the sediments are soft and can be augered easily. Augered wells range generally from 20 to 60 feet in depth. In St. Marys County there are a few wells of this type in the vicinity of Great Mills.

Drilled wells.—Jetting method.—As the unconsolidated sediments of St. Marys County afford ideal conditions for the construction of jetted wells, most of the artesian wells of the area have been drilled by jetting. In jetting wells water is pumped down a small-diameter drilling pipe and out the end of a perforated bit. To aid in cutting the formation the drill pipe is raised and lowered and rotated occasionally to assure a straight hole. The water emerging from the bit returns to the surface carrying the loosened material from the hole along the space between the drill pipe and the wall of the well. When jetting has reached the desired depth the drill pipe is removed and casing and screen are inserted in the hole. Most of the jetted wells in St. Marys County are 200 to 450 feet in depth.

Rotary method.—The hydraulic-rotary method of drilling is accomplished by rotating suitable drilling bits on the end of drill pipe. This action cuts the formation into small particles which are removed by pumping mud-laden fluid through the drill pipe and out the bit. The fluid returns to the surface in the same manner as in the jetting process and carries the particles to the surface, allowing the bit to advance down the hole. This method is generally the most efficient and quickest for drilling wells more than 4 inches in diameter in the unconsolidated sediments. Only one well, Ff 30 at St. Georges Island, has been drilled by the rotary method in St. Marys County.

Cable-tool method.—Most of the large-diameter wells in St. Marys County have been drilled by the cable-tool method. The drilling is accomplished by the cutting action of a drilling bit on the end of a cable. The club-like chisel-edged bit is alternately raised and dropped, breaking or loosening the formation into small fragments. Small amounts of water are added to the hole and the reciprocating action of the tools mixes the water and loosened earth material into a sludge which is removed periodically from the hole with a bailer. The drilling is done through casing, which is lowered into the hole as the drilling proceeds. Cable-tool wells have been drilled in the county where it is difficult to have a well jetted or where large quantities of ground water are needed.

Pumping equipment.—The type of pumping equipment used in wells in St. Marys County is determined by the lift, the diameter of the well, and the amount of water desired or available. Where the height to which water must be lifted is less than 25 feet, pumps employing the suction principle are used in the jetted artesian or the dug wells. For most domestic or farm wells of this type, small-capacity jet or suction pumps are used. Where the depth to water is more than 25 feet, deep-well pumps are used. These are of the cylinder, jet, or impeller type and are capable of lifting the water from considerable depths. Most large-capacity wells now are equipped with turbine pumps which employ the impeller principle.

WATER-LEVEL FLUCTUATIONS

Fluctuations of the ground-water levels in St. Marys County were observed in 11 wells during the course of this investigation. Periodic measurements of the depth to water in the wells were made by observers using a steel tape chalked to show the watermark. Measurements were begun in 1946 and continued to the present (1952), except during the period from June 1947 to March 1949 when the field work in the area was interrupted. The following wells have been maintained as observation wells:

Well number	Depth (feet)	Location	Type	Aquifer
Bb 2	10.9	Newmarket	Water-table	Pleistocene sediment
Db 24	9.5	Milestown	do	do
Df 23	260	2.5 miles east of California	Artesian	Sediments of Jackson age
Df 24	280	2 miles north of California	do	Nanjemoy formation and sediments of Jackson age
Df 26	58	1 mile southeast of California	Water-table	Pleistocene sediments
Ef 27	438	Portobello	Artesian	Aquia greensand
Eg 3	338	1.5 miles east of St. James	do	Nanjemoy formation and sediments of Jackson age
Fg 4	420	1.5 miles southeast of Ridge	do	do

Measurements of the water level in observation wells ending in water-table reservoirs show that the water table fluctuates almost continuously. In unpumped areas the position of the water table is related to the rate of recharge and natural discharge. During periods of heavy rainfall, when the rate of recharge exceeds the rate of natural discharge, the water table rises; and during periods of little rainfall the water table declines. In general, the water table is highest in early spring when the rate of recharge from rainfall is relatively high and the discharge from the reservoir by evaporation and transpiration is small.

The record of well Df 26, a dug well in Pleistocene sediments unaffected by pumping from nearby wells, shows a range in fluctuation of the water level of 3.8 feet in about 5 years of record. The decline of the water level in the fall and winter in 1949 and 1950 was due to the relatively low precipitation during these periods (fig. 5). The record of the water-level fluctuations in well Bb 2 (fig. 5),

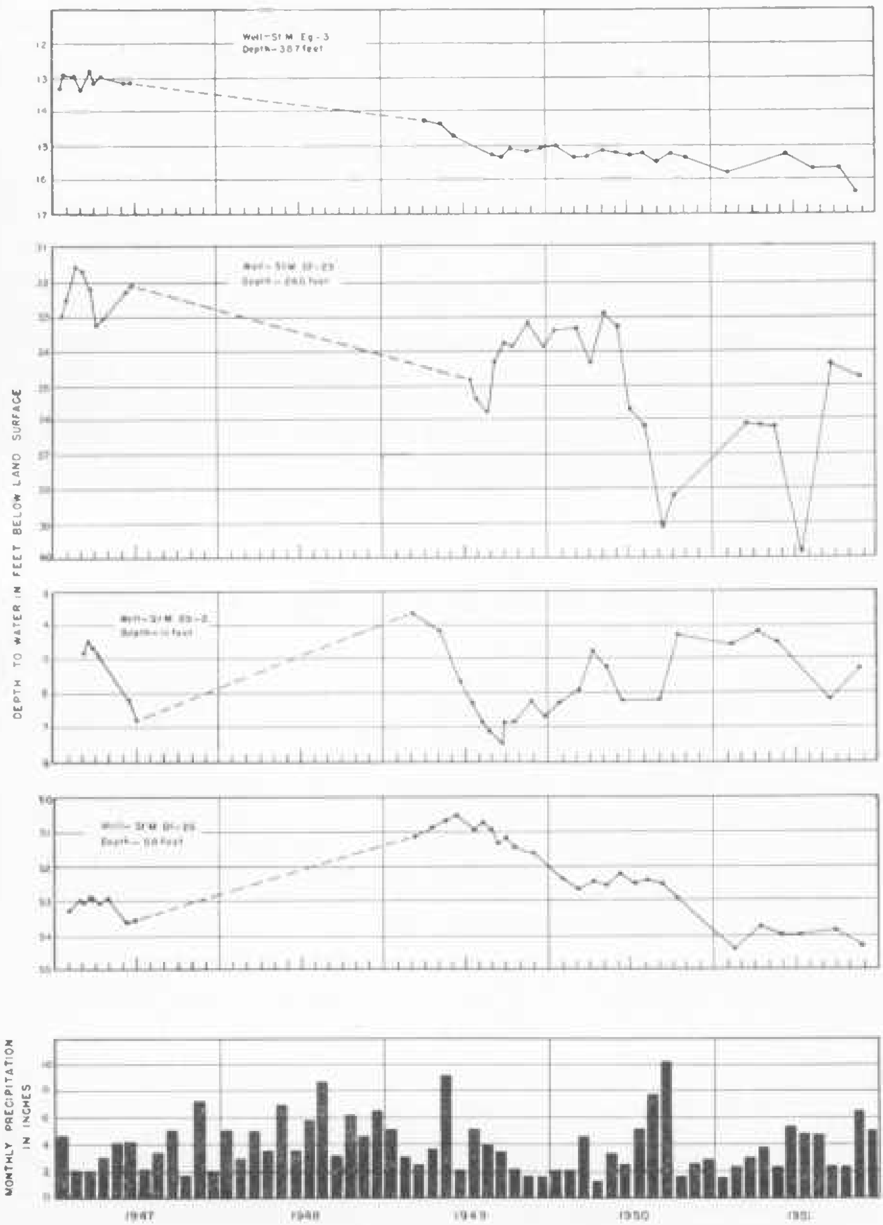

FIGURE 5. Graphs Showing the Fluctuation of Water Levels in Four Wells in St. Marys County and the Monthly Precipitation at Charlotte Hall

a shallow well in the upland sediments of Pleistocene age shows a range in water levels of 3.9 feet during the 5-year period from 1947 through 1951.

Water-level fluctuations in artesian wells in St. Marys County are due to changes in the rate of natural or artificial withdrawal of ground water from the aquifers and to a minor degree to tidal fluctuations and to changes in atmospheric pressure. Recording-gage records indicate that artesian wells near tidewater in St. Marys County have a ratio of change of water levels to the tidal fluctuations of about 1:4; that is, a 4-foot rise in sea level due to tide will produce a 1-foot rise in the static water level in a nearby artesian well.

In addition to the five artesian wells maintained as observation wells by the U. S. Geological Survey, periodic measurements are made by Naval personnel of the static water level in wells at the Patuxent Naval Air Station. Reported static water levels in some of the early wells drilled at the Air Station show there has been a decline of as much as 40 feet in the water levels in wells penetrating the Aquia greensand and the Nanjemoy formation and sediments of Jackson age since pumping at the Naval Station started in 1942. However, the data indicate that most of the decline took place during the first two years of pumping. During the summer the use of ground water at the Naval Station increases and the static water levels drop, but during the winter less ground water is used and the static water levels rise.

Well Ef 17, about 3½ miles south of Lexington Park, had a reported static water level of 35 feet below the land surface in January 1943. In November 1951 the measured static water level was 46.9 feet below the land surface. The 12-foot decline in the water level in this well during the 8-year period was caused chiefly by the increase in pumpage from the Aquia greensand.

Measurements in observation well Ef 27, penetrating the Aquia greensand have been made for two years. This well was drilled in 1909, and in 1918 Clark (Clark, Mathews, and Berry, 1918, p. 412) reported the artesian head was 10 feet above the land surface and that the well flowed 10 gallons per minute. The static water level in September 1949 was 7.7 feet below the land surface and in November 1951 it was 10.7 feet below the land surface. The 20-foot decline in the water level in this well is due chiefly to the increased pumping from the aquifer, the greatest decline probably having occurred in the past 10 years.

The static water level in observation well Df 23, penetrating the sediments of Jackson age, was 31.0 feet below the land surface in November 1946 and 34.7 feet below the land surface in November 1951. The lowest water level measured was 39.9 feet below the land surface in September 1950. The fluctuation of the water level in this well probably reflects the changes in the rate of pumpage at the Naval Air Station.

Static water-level measurements in observation well Df 24, penetrating the Nanjemoy formation and sediments of Jackson age, range from a high of 3.8 feet below the land surface in November 1946 to a low of 5.9 feet in November 1951. The water level in this well is affected only slightly by pumping at the Naval Air Station.

Water-level measurements in observation well Eg 3, penetrating the Nanjemoy formation and sediments of Jackson age, range from a high of 12.9 feet below the land surface in November 1946 to a low of 16.3 feet in November 1951. The water-level measurements in this well also show the effect of pumping from the aquifer.

QUALITY OF GROUND WATER

The chemical character of the ground water in St. Marys County varies from one aquifer to another and to some extent from one place to another within the same aquifer. In general, the mineral content is low and well within the limits suitable for most domestic and industrial uses. Chemical analyses of 30 water samples from wells in St. Marys County are shown in Table 8. The chemical analyses were made in the laboratory of the Quality of Water Branch of the U. S. Geological Survey.

CHEMICAL CONSTITUENTS IN RELATION TO USE

Dissolved solids.—The residue left after a natural water has evaporated consists of mineral matter, with which may be included some organic material and some water of crystallization. According to the U. S. Public Health Service (1946, p. 383) the dissolved solids in water of good chemical quality for public consumption on interstate carriers should not exceed 500 parts per million; however, where such water is not available a dissolved-solids content of 1,000 parts per million may be permitted. According to analyses of water from 30 wells in St. Marys County the dissolved solids range from 115 to 439 parts per million and average 250 parts per million. Only three analyses show a dissolved solid content exceeding 300 parts per million.

Hardness.—Hardness is the capacity of water for consuming soap. Water having a high degree of hardness is objectionable in laundering because of the increased soap consumption and because sticky insoluble curds are formed before a lather is obtained. When hard water is used in steam boilers or other vessels in which water is heated or evaporated a scale or deposit is formed. Hardness is generally caused by the salts of calcium and magnesium; iron, aluminum, and manganese also produce hardness, but they are generally present in such small amounts that their hardness-producing capacity is small.

TABLE 8

Chemical Analyses of Ground Water in St. Marys County

(Chemical constituents in parts per million, except pH and specific conductance)

Well no.	Owner	Aquifer	Date collected	Depth (feet)	Dissolved solids	Silica (SiO_2)	Total Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Total hardness as $CaCO_3$	pH	Specific conductance (micromhos) at 25°C
Bb 1	E. V. Dyson	Pleistocene (upland)	Jan. 17, 1947	12	152	4.7	0.45	14	1.5	33	4.4	15	22	55	0.0	4.8	41	7.4	283
Bb 4	H. L. Norman	Aquia	Mar. 28, 1950	480	132	11	0.45	18	11	9.6	12	122	13	4.4	0.1	6.2	90	7.4	245
Bd 1	H. C. Davidson	do	Jan. 17, 1947	380	145	13	0.65	15	8.7	18	15	140[1]	10	1.2	0.1	0.2	73	8.5	251
Cb 1	S. S. Reeves	do	Jan. 17, 1947	350±	155	14	0.05	11	4.4	34	12	148[1]	9.9	1.1	0.1	0	46	8.4	258
Cc 6	L. Latham	Pleistocene (upland)	Mar. 28, 1950	31	115	7.7	0.19	11	5.6	7.5	3.1	12	22	12	0.1	27	51	7.1	165
Cd 1	N. C. Ames	Nanjemoy and Jackson	Mar. 9, 1949	230	176	43	0.23	23	11	5.5	3.0	142	8.7	3.0	0.2	0.3	103	7.9	255
Ce 14	Mervel Dean	Nanjemoy	Mar. 28, 1950	363	194	33	1.3	27	15	9.0	17	182[1]	14	2.5	0.3	0.6	130	7.8	318
Db 24	C. Downs	Pleistocene (lowland)	Mar. 28, 1950	9.5	176	8.8	2.3	34	6.1	14	8.1	121	27	16	0	2.5	111	6.7	307
Dc 12	C. Guy	Aquia	Mar. 28, 1950	326	212	50	0.08	17	7.7	31	13	181[1]	7.9	2.5	0.4	0.4	74	7.9	304
Dd 1	Town of Leonardtown	do	Mar. 9, 1949	494	148	10	0.17	3.6	1.1	49	1.9	136	8.9	2.5	0	0.6	14	8.5	236
Dd 5	Electric Co., Leonard-town	Nanjemoy and Jackson	Mar. 9, 1949	263	183	32	0.33	22	9.8	14	6.9	162	9.2	3.5	0.2	0.4	95	8.0	282
Dd 12	State Roads Garage	Nanjemoy	Mar. 28, 1950	200	185	31	0.07	8.5	3.3	46	9.9	168[1]	9.7	2.5	0.2	0.3	35	8.3	278
Df 1	Patuxent Naval Air Station	Aquia	Oct. 29, 1951	587	225	12	0.00	2.4	1.0	76	9.0	211[1]	5.5	2.5	0.5	0.2	10	8.5	316
Df 2	Do	Aquia and Jackson[2]	Oct. 29, 1951	595	213	48	0.10	25	14	14	12	184	6.0	3.5	0.3	0.2	120	8.0	299
Df 3	Do	Aquia	Oct. 29, 1951	585	204	12	0.10	3.2	0.7	72	9.0	200[1]	6.5	2.8	0.4	0.2	11	8.6	301
Df 4	Do	do	Oct. 29, 1951	547	214	15	0.00	3.2	1.0	73	8.0	202[1]	5.5	2.8	0.5	0.2	12	8.5	301
Df 5	Do	do	Oct. 29, 1951	552	206	12	0.00	2.4	1.0	73	9.0	202[1]	5.5	2.5	0.4	0.2	10	8.6	302
Df 7	Do	Aquia and Nanjemoy and Jackson[2]	Nov. 6, 1951	518	203	45	0.10	21	12	19	12	179	4.6	3.2	0.4	0.6	102	8.0	311
Df 9	Do	Nanjemoy and Jackson	Jan. 16, 1947	285	209	55	0.23	21	13	17	14	177[1]	7.8	3.2	0.5	0.3	106	8.3	298
Df 10	Do	Aquia	Jan. 16, 1947	534	196	13	0.58	2.8	1.4	65	5.7	193[1]	7.3	2.8	0.5	0.4	13	8.7	313
Df 11	Do	Aquia and Nanjemoy and Jackson[2]	Nov. 6, 1951	515	206	52	1.1	22	12	16	12	176	7.0	3.2	0.4	0.7	104	8.1	300

Df 12	Do	do	Nov. 6, 1951	487	203	40	0.10	14	7.8	37	9.4	181	7.4	3.0	0.4	0.2	67	8.1	300
Ec 10	C. Parker	Nanjemoy and Jackson	Mar. 5, 1950	133	182	35		9.9	8.3	34	13	164	4.7	9.8	0.3	1.2	62	7.6	294
Ee 4	L. R. Richardson	do	Mar. 28, 1950	310	210	56	0.39	25	12	11	16	175[1]	9.1	0.6	0.4	0.8	112	7.8	293
Ef 4	St. Marys Female Seminary	Upper Cretaceous	Jan. 16, 1947	661	192	13	0.31	1	0.7	70	3.5	188[1]	7.7	2.8	0.6	0.2	5	8.4	308
Fe 1	U. S. Navy, Piney Point	Aquia	Jan. 16, 1947	412	282	12	0.19	2.8	1.5	101	6.0	286[1]	9.5	5.0	0.9	0.4	13	8.6	460
Ff 8	J. E. Deagle	Nanjemoy and Jackson	Mar. 7, 1950	258	308	22	0.44	5.4	3.0	102	11	312[1]	8.4	3.8	0.9	0.9	26	8.0	499
Ff 30	U. S. Navy, St. Georges Island	do	Dec. 19, 1951	259	412	27	0.03[3]	10	4.4	136	12	312[1]	14	52	0.6	0.5	43	8.4	654
Fg 4	J. A. Bradburn	do	Mar. 7, 1950	420	439	24	0.33[3]	4.5	2.4	159	10	457[1]	3.6	9.8	1.4	0.8	22	8.3	712
Gh 1	Point Lookout Hotel	Upper Cretaceous	Mar. 18, 1947	696	345	12	0.35	1.8	0.5	132	6.9	340[1]	21	2.6	0.9	0.6	7	8.6	563

[1] Includes carbonate (CO_3).
[2] Well screened in Aquia greensand but yield from both aquifers.
[3] Iron in solution only.

Water is frequently classed according to the following scale of hardness (Collins and others, 1934, pp. 15–16):

Hardness range (*parts per million*)	
0–60	Soft water; hardness scarcely noticed for general household use.
61–120	Moderately soft to moderately hard water. Suitable for many purposes without treatment, but soap consumption increases. Softening of a supply in this group may be profitable for a laundry.
121–180	Hard water. Hardness noticeable. Many cities having water of a total hardness of 150 parts per million or over soften the water chemically.
180+	Very hard water. Necessary to soften for use in laundry or in steam boilers. Some supplies would be unsatisfactory even after softening.

In St. Marys County the hardness, as shown by the samples, ranges from 5 to 130 parts per million and averages 54. Of the 30 samples, 16 may be classed as soft water and 14 as moderately soft to hard.

Softening by base exchange.—Softening by base exchange occurs when the calcium and magnesium ions in water are exchanged for sodium and potassium ions in the rock material. Thus ground water may be softened naturally when water circulates through sediments containing base-exchange minerals such as zeolites, certain clay minerals, and glauconite. Glauconite is distributed abundantly throughout the Eocene and marine Upper Cretaceous formations in the Coastal Plain of Maryland. Exchange of calcium and magnesium for sodium and potassium may be slight, partial, or nearly complete. Ground water of all three types is found in the Eocene formations in St. Marys County.

Water of the calcium bicarbonate type in which only slight or partial base exchange has occurred is obtained from the following wells in the northern and central parts of the county: well Bd 1 at Cremona; Bb 4, 1.2 miles east of Newmarket; Ce 14, 0.9 mile southeast of Hollywood; and Cd 1 at Sandgates. Water of the sodium bicarbonate type, in which nearly complete base exchange has occurred, is obtained from the following wells in the southern and eastern parts of the county: well Fe 1 at Piney Point, Ff 30 on St. Georges Island, and well Gh 1 at Point Lookout. As a general rule, the softest artesian water is in the southeastern part of the county.

Iron.—Iron is one of the most objectionable constituents in natural waters. Dissolved iron in excess of few tenths of a part per million is usually precipitated from the water within a few hours after exposure to the air. The iron forms a reddish sediment which stains laundry, cooking utensils, and porcelain fixtures. Iron also is associated with the growth of certain bacteria, such as Crenothrix, in water mains and may ultimately produce clogging. Analyses of

26 samples of ground water from St. Marys County show the iron content to range from .03 to 2.3 parts per million and to average 0.38 part per million and three samples contained no iron. In only four samples was the iron content greater than 0.6 part per million. In general, iron is not a troublesome constituent in the artesian ground water in St. Marys County.

pH.—The pH, an expression of the hydrogen-ion concentration, is a quantitative measure of the alkalinity or acidity of a water. Acid water has a pH less than 7.0, neutral water has a pH of 7.0, and alkaline water has a pH of more than 7.0. Water having a pH much less than 7.0 may be corrosive. Most of the ground water in St. Marys County has a pH above 7.0. The pH in 30 water samples ranged from 6.7 to 8.7 and averaged 7.1 (approximately neutral).

QUALITY OF WATER IN THE WATER-BEARING FORMATIONS

Upper Cretaceous formations.—Chemical analyses of water from two wells (Ef 4 at St. Marys City and Gh 1 at Point Lookout), which probably end in Upper Cretaceous sand, indicate that the water is soft and of the sodium bicarbonate type; the total hardness in two samples averaged only 6.2 parts per million. The water is mildly alkaline, the pH of the two samples averaging 8.5. The dissolved solids are, respectively, 345 and 192 parts per million.

Aquia greensand.—The chemical quality of the water from the Aquia greensand is satisfactory for most purposes. Dissolved solids in 12 samples ranged from 132 parts per million in well Bb 4 at Newmarket to 282 parts per million in well Fe 1 at Piney Point and averaged 193 parts. The analyses indicate that the dissolved solids increase in the county from northwest to southeast. The water is generally soft; the total hardness ranges from a high of 90 parts per million in well Bb 4 to 10 parts per million in well Fe 1 at Piney Point and well Df 5 at the Patuxent Naval Air Station. The total hardness averaged 31 parts per million in 12 samples. The total iron content is low in most places, ranging from 0.05 to 0.65 part per million. Three samples had no iron. The chloride content of the water also is very low, averaging about 3 parts per million in 12 samples.

Nanjemoy formation and sediments of Jackson age.—Ground water from the Nanjemoy formation and sediments of Jackson age is generally of satisfactory quality for most purposes. The dissolved solids in 11 samples ranged from 176 in well Cd 1 at Sandgates to 439 parts per million in well Fg 4, 1.5 miles southeast of Ridge, and averaged 245 parts per million. The chemical analyses show the hardness to range from soft (22 parts per million in well Fg 4) to hard (130 parts per million in well Ce 14, 1.0 mile southeast of Hollywood). Analyses of water from wells in and near the Patuxent Naval Air Station show the water there to be moderately hard. The total hardness of the water from well Dd 5 at Leonardtown is 95 parts per million, whereas the hardness of the water from well Dd 12, a mile west of Leonardtown, is only 35 parts per million. The average total hardness in 11 samples was 72 parts per million. Silica ranged from 24 parts per million in well Fg 4, 1.5 miles southeast of Ridge, to 56 parts per million in well Ee 4 at Chingville. The silica content of wells yielding from the aquifer at the Patuxent Naval Air Station is more than 50 parts per million. The pH in 11 samples ranged between 7.6 and 8.4, indicating the water from the aquifer to be mildly alkaline.

Pleistocene sediments.—Only three analyses were made for wells in St. Marys County yielding from Pleistocene sediments. According to the analyses, the water is somewhat variable in mineral content, although satisfactory for most purposes.

The sample of water from a dug well near Milestown, well Db 24 penetrating the lowland deposits, contained 176 parts per million of dissolved solids and 2.3 parts per million of iron and had a total hardness of 176 parts per million. The sulfate content (27 parts per million) is relatively high for this area. Locally, some of the dug wells penetrating the lowland Pleistocene deposits are reported to yield water high in iron and having a "marshy" taste.

Chemical analyses of water from two dug wells, Bb 1, at Newmarket, and Cc 6, at Helen, ending in the upland sediments, show, respectively, dissolved solids of 115 and 152 parts per million, and a total hardness of 41 and 51 parts per million. Iron was not present in objectionable quantities in the two samples. Ground water from the upland Pleistocene sediments locally may be objectionably high in iron content. The pH values averaged 7.3. Water from one of the wells, Bb 1, had the highest chloride content (55 parts per million) of any of the water samples analyzed.

Records of Wells

Table 9 describes the wells inventoried in St. Marys County, and Plate 7 shows their locations.

The altitude of the land surface at most of the wells was taken from the $7\frac{1}{2}$- and 15-minute topographic maps with a 20-foot contour interval. The altitude of the land surface at 23 wells was determined by instrumental leveling and the altitude at some wells was determined by hand leveling from nearby bench marks or from tidewater. The altitude of the wells at the Patuxent Naval Air Station was determined by Navy personnel by instrumental leveling.

Type of well refers to the method of construction. Four types are listed: drilled (includes cable-tool, rotary, and jetted), dug, driven, and bored. The depths of most of the drilled wells are those reported by the driller, but a few were measured. The depths of the dug wells were measured or are as reported by the owner.

Depths to water were measured with a chalked steel tape wherever it was practicable to do so; these measurements are given to a hundredth of a foot.

The depths to water in many wells are those reported by the drillers; these are given to the nearest foot.

The yield shown for most of the wells is that reported by the drillers; for most wells it is less than the maximum rate at which the well could be pumped.

Table 10 contains the drillers' logs furnished by the drillers upon completion of the wells.

The logs in Table 11 were prepared from a study of the well cuttings.

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Static water level: Reported depths are designated by "a." Water levels above land surface are recorded under "Remarks."
Pumping equipment: Method of lift: B, bucket; C, cylinder; J, jet; S, suction; T, turbine; N, none; HR, hydraulic ram.
Type of power: E, electric motor; G, gasoline engine; H, hand; W, water.
Use of water: D, domestic; F, farming; C, commercial; S, school or camp; P, public; M, military; N, none.

Well number	Owner or name	Driller	Date completed	Altitude (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Depth of screen below land surface (feet)	Water-bearing formation
Bb 1	E. V. Dyson	—	1933	170	Dug	13	120	—	Pleistocene
Bb 2	U. S. Navy	—	—	170	do	10.9	—	—	do
Bb 3	E. V. Dyson	—	1925	170	do	10.5	60	—	do
Bb 4	H. L. Norman	Hagmann	1947	176	Drilled	480	6	470–480	Aquia
Bb 5	H. C. Thompson	—	1932	180	Dug	21	36	—	Pleistocene
Bb 6	A. F. Willard	Washington Pump & Well Co.	—	174	Drilled	—	6	—	Aquia
Bb 7	Unknown	—	1949	180	Dug	17	36	—	Pleistocene
Bb 8	Charlotte Hall Military Academy	—	—	—	—	—	—	—	do
Bc 1	Holmes Fowler	Washington Pump & Well Co.	1947	165	Drilled	470	6	460–470	Aquia
Bc 2	M. M. Coleman	Wilson	1947	3	do	336	2½	316–336	do
Bc 3	Do	do	1947	4	do	336	2½	316–336	do
Bc 4	D. L. Parlett	Washington Pump & Well Co.	1941	85	do	430	6	—	do
Bc 5	Lloyd O. Curtis	—	—	—	Dug	10.7	36	—	Pleistocene
Bc 6	Ed. Lyles	—	—	—	do	32	40	—	do
Bc 7	Leo Evans	—	1930	—	do	24.6	36	—	do
Bc 8	R. Parlett	—	—	—	do	22	48	—	do
Bc 9	J. Q. Cusic	—	—	—	do	15.3	24	—	do
Bc 10	Board of Education	—	—	—	do	—	36	—	do
Bc 11	Mrs. L. Harper	—	1920	—	do	26	36	—	do
Bc 12	Philip Davis	Payne	1951	18	Drilled	357	1½	337–357	Aquia
Bd 1	H. C. Davidson	Washington Pump & Well Co.	1939	3	do	350	6	—	do
Bd 2	M. M. Coleman	Wilson	1927	10	do	340	—	—	do
Bd 3	J. R. Guyther	Payne	1948	3	do	230	1½	None	Nanjemoy and Jackson
Bd 4	H. C. Davidson	—	1945	14	Dug	11	42	—	Pleistocene
Ca 1	R. H. Moreland	—	1930	17	Drilled	257	2	—	Aquia
Ca 2	C. Long	—	—	—	Dug	26.6	36	—	Pleistocene
Cb 1	S. S. Reeves	Wilson	1937	10	Drilled	350	1½	342–350	Aquia
Cb 2	S. S. Mattingly	Payne	1946	12	do	300	1½	280–300	do
Cb 3	E. F. Davis	Wilson	1947	18	do	315	2½–1½	295–315	do

.E 9

f Wells

Water level (feet below land surface)			Pumping equipment	Yield		Specific capacity (g.p.m./ft.)	Use of water	Temperature (°F).	Remarks
Static	Pumping	Date		Gallons a minute	Date				
	10.8	June 13, 1947	S, E	25	1946	5.0	C	—	See chemical analysis. Well used only in summer months.
5.13		Feb. 17, 1947							
4.86	—	Mar. 6, 1947	S, E	—	—	—	N	—	Abandoned. Used as observation well.
4.52	—	Mar. 17, 1947	N	—	—	—	N	—	
140[a]	175[a]	May 21, 1947	T, E	50[a]	May 21, 1947	—	D, F	—	See well log and chemical analysis.
15.6	—	July 19, 1949	B	—	—	—	D	—	
137.25	—	May 15, 1951	C, E	—	—	—	N	—	
12.55	—	July 19, 1949	B	—	—	—	D	—	
—	—	—	—	—	—	—	S	—	A series of springs. Total discharge on Aug. 3, 1950, estimated 60 gal. a min.
150[a]	180[a]	Nov. 17, 1947	T, E	20	Nov. 17, 1947	0.6	D	—	See well log.
—	—	—	N	—	—	—	D	—	See well log. Static water level 20 ft. above sea level. Measured flow 4 gal. a min., May 1949.
—	—	—	N	—	—	—	D	—	Measured flow 8½ gal. a min., May 1949.
85[a]	130[a]	1941	T, E	—	—	—	D	—	See well log. Screen used; position unknown.
8.5	—	July 25, 1949	S, H	—	—	—	F	62	
25.5	—	July 25, 1949	B	—	—	—	D	—	Well partly filled from caving.
19	—	July 25, 1949	B	—	—	—	D	—	
12.7	—	July 25, 1949	C, E	—	—	—	D, F	—	
13.3	—	July 25, 1949	B	—	—	—	D	—	Water cloudy.
17.65	—	Aug. 1949	C, H	—	—	—	S	—	
22.4	—	Aug. 16, 1949	B	—	—	—	D	—	
—	—	—	—	7	June 21, 1951	—	D	—	Measured flow ¾ gal. a min., June 21, 1951. See well log.
—	—	—	S, E	35	—	—	D, S	64.5	Flowing well. See well log and chemical analysis.
—	—	—	HR, W	—	—	—	D	—	Flowing well. See well log.
—	—	—	J, E	—	—	—	D	59	Do.
8.5	—	June 28, 1949	S, E	—	—	—	F	—	
4.76	—	July 9, 1951	S, E	—	—	—	D	—	Well flows into large collecting pit.
—	—	—	B	—	—	—	D	—	
—	—	—	S, E	—	—	—	D	60.5	See well log. Static level 10.74 ft. above land surface, Jan. 29, 1947. Measured flow 8½ gal. a min., Jan. 29, 1947.
—	—	—	S, E	—	—	—	D	—	Static level 7.93 ft. above land surface, Jan. 29, 1947. Measured flow 1.72 gal. a min., Jan. 29, 1947. See well log.
2[a]	15[a]	Oct. 18, 1947	S, E	10	Oct. 18, 1947	1.0	D	—	See well log.

TABLE 9

Well number	Owner or name	Driller	Date completed	Altitude (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Depth of screen below land surface (feet)	Water-bearing formation
Cb 4	Loretta Chapel Catholic Church	Wilson	1948	40	Drilled	350	4–1½	330–350	Aquia
Cb 5	D. H. Davis	do	1947	100	do	412	4–1½	392–412	do
Cb 6	B. Wilson	—	—	110	Dug	28	36	—	Pleistocene
Cb 7	B. Long	—	—	—	do	33	42	—	do
Cb 8	Lucy Nelson	—	1948	—	do	14.7	40	—	do
Cb 9	Bryan Knott	—	1935	—	do	25.8	36	—	do
Cb 10	T. Baker	—	1948	—	do	25	36	—	do
Cb 11	Budd's Creek School	—	—	—	do	19.7	36	—	do
Cb 12	A. J. Herbert	—	1949	—	do	29	36	—	do
Cb 13	E. Guy	—	—	—	do	27.8	36	—	do
Cc 1	Loretta Dickerson	—	—	—	do	25.4	36	—	do
Cc 2	J. C. Johnson	—	—	—	do	23.6	36	—	do
Cc 3	D. T. Dixon	—	—	138	do	8	36	—	do
Cc 4	Richard Bulleck	—	—	—	do	17.8	48	—	do
Cc 5	H. Young	—	—	—	do	17.8	48	—	do
Cc 6	Leonard Latham	—	1948	—	Dug	25.4	36	—	Pleistocene
Cd 1	N. C. Hines	Payne	1948	10	Drilled	230	1½	None	Nanjemoy and Jackson
Cd 2	W. J. Eastburn	do	1948	10	do	231	1½	None	do
Cd 3	Campbell H. Plugge	do	1948	4	do	230	1½	None	do
Cd 4	R. B. Parkman	do	1948	3	do	240	1½	None	do
Cd 5	Kenny Heard	—	—	80	Dug	28.7	40	—	Pleistocene
Cd 6	Sherman Joy	—	1943	130	do	41.5	36	—	do
Cd 7	Roger's Tavern	—	1946	130	do	14.5	36	—	do
Cd 8	F. N. Knight	—	1945	140	do	18.0	36	—	do
Cd 9	Campbell Plugge	—	—	30	do	26.5	48	—	do
Cd 10	Phil Dorsey	—	—	—	do	20.3	50	—	do
Cd 11	N. C. Hines	—	—	100	do	44.6	48	—	do
Cd 12	Freeman Owens	—	—	—	do	30.0	36	—	do
Cd 13	D. S. Stauffer	—	—	—	do	29.4	36	—	do
Cd 14	Mr. Tenley	Wilson	1950	25	Drilled	403	2½–1½	383–403	Aquia
Ce 1	C. K. Clark	Payne	1925	3	do	316	1½	None	Nanjemoy and Jackson
Ce 2	Do	do	1946	1	do	302	1½	None	do
Ce 3	Dr. W. H. Patrick	Clark	1946	2	do	290	6	None	do
Ce 4	John R. Long	Washington Pump & Well Co.	1947	120	do	378	6	368–378	do
Ce 5	Fulton Lewis, Jr.	Payne	1947	12	do	300	1½	None	do
Ce 6	H. W. Underwood	do	1947	16	do	312	1½	None	do
Ce 7	Mr. Habig	do	1947	8	do	294	1½	None	do
Ce 8	Philip Clark	do	1947	4	do	294	1½	None	do
Ce 9	L. F. Lloyd	do	1948	21	do	303	2½–1½	None	do
Ce 10	Paul Merzel	do	1948	4	do	294	1½	None	do
Ce 11	H. K. West	do	1948	5	do	294	1½	None	do

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Water level (feet below land surface)			Pumping equipment	Yield		Specific capacity (g.p.m./ft.)	Use of water	Temperature (°F.)	Remarks
Static	Pumping	Date		Gallons a minute	Date				
22[a]	37[a]	Apr. 15, 1947	S, E	21	Apr. 15, 1947	1.3	S	—	See well log.
65[a]	80[a]	Oct. 10, 1947	J, E	6	Oct. 10, 1947	0.4	D	—	Do.
16.5	—	July 19, 1949	B	—	—	—	D	—	
27.4	—	July 19, 1949	S, E	—	—	—	D, F	—	
10.5	—	July 22, 1949	B	—	—	—	D	64	Reported that surface water runs into well.
19.6	—	July 22, 1949	B and S, E	—	—	—	D	—	Water reported "irony."
20.6	—	July 19, 1949	B	—	—	—	D	57	
16.1	—	July 19, 1949	N	—	—	—	N	—	Well abandoned.
24.2	—	Aug. 16, 1949	B	—	—	—	D	—	
25.2	—	Aug. 16, 1949	B	—	—	—	D	—	
10.3	—	July 22, 1949	B	—	—	—	D	62	
17.0	—	July 22, 1949	S, H	—	—	—	D	—	
6.0	—	July 25, 1917	B	—	—	—	D	—	
12.4	—	July 26, 1947	B	—	—	—	D	63	
12.8	—	June 26, 1947	B	—	—	—	D	—	
24.9	—	Aug. 16, 1949	S, E	—	—	—	D	—	See chemical analysis.
—	—	—	S, E	6	May 4, 1949	—	D	59	See well log and chemical analysis. Measured flow 3 gal. a min., Apr. 28, 1948.
—	—	—	S, E	6	Oct. 21, 1948	—	D	—	Flowing well. See well log.
—	—	—	S, E	6	Aug. 30, 1948	—	D	60.5	Do.
—	—	—	N	—	—	—	D	59.5	Static water level 12.5 ft. above sea level. Estimated flow 5 to 7 gal. a min., Aug. 3, 1948. See well log.
14.5	—	July 26, 1949	B	—	—	—	D	59	
36.5	—	July 26, 1949	J, E	—	—	—	D	—	
9.0	—	July 26, 1949	S, E	—	—	—	D	—	
13.0	—	July 26, 1949	S, H	—	—	—	D	—	
—	—	—	N	—	—	—	N	—	
14.7	—	July 26, 1949	B	—	—	—	D	—	
39.6	—	July 26, 1949	B	—	—	—	D	—	
20.0	—	Aug. 12, 1949	B	—	—	—	D	—	
28.8	—	Aug. 3, 1949	C, H	—	—	—	D	—	Well went "dry" in summer of 1950.
18[a]	—	May 1950	S, E	13	May 1950	—	D	—	See well log.
—	3.75	Dec. 10, 1946	S, E	—	—	—	D, C	60.5	Estimated flow 1 gal. a min., Dec. 10, 1946. Well supplies 11 cottages and a restaurant.
—	—	—	N	3	Mar. 1947	—	D	61	See well log. Measured flow 0.95 gal. a min., Dec. 10, 1946.
—	11	March 1947	—	—	—	—	D	—	Well cased to 100 feet. Flowing well. See well log.
00.5	133	June 30, 1947	T, E	45	June 30, 1947	1.2	C	59	See well log.
5.90	18[a]	July 12, 1947	S, E	3	July 12, 1947	0.4	D	—	Do.
11[a]	17[a]	Oct. 28, 1947	J, E	5	Oct. 28, 1947	0.8	D	—	Do.
2[a]	15[a]	Aug. 21, 1947	S, E	5	Aug. 21, 1947	0.4	D	—	Do.
—	14[a]	Sept. 29, 1947	S, E	6	Sept. 29, 1947	0.4	D	—	Flowing well.
13.18	23[a]	May 19, 1948	S, E	5	May 19, 1948	0.6	D	—	See well log.
—	14	Sept. 30, 1948	N	6	Sept. 30, 1948	—	D	60	See well log. Measured flow $1\frac{3}{4}$ gal. a min., August 1949.
—	10[a]	Apr. 7, 1948	S, E	6	Apr. 7, 1948	—	D	—	Measured flow 3 gal. a min., August 1949.

TABLE

Well number	Owner or name	Driller	Date completed	Altitude (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Depth of screen below land surface (feet)	Water-bearing formation
Ce 12	Walter E. Deneale	Payne	1947	4	Drilled	294	1½	None	Nanjemoy and Jackso
Ce 13	Mr. Morrison	do	1949	10	do	281	1½	None	do
Ce 14	Mervell Dean	do	1949	85	do	363	8	353–363	do
Ce 15	Hobart L. Norman	do	1949	11	do	300	1½	None	do
Ce 16	A. T. Swan	do	1949	9	do	294	1½	None	do
Ce 17	Major Henderson	do	—	60	do	357	3½–2½	None	do
Ce 18	Miss Montgomery	do	—	—	Dug	22	36	—	Pleistocene
Ce 19	Bob Hogan	Deagle	1949	80	Drilled	330	4–1½	None	Nanjemoy and Jackson
Db 1	Ernest Hodges	Payne	1946	18	do	299	1½	279–299	Aquia
Db 2	Kerr Wilson	Wilson	1947	12	do	293	2½–1½	273–293	do
Db 3	J. S. Guy	do	1947	25	do	319	2½–1½	299–319	do
Db 4	Douglas Goode	do	1947	1	do	291	2½–1½	271–291	do
Db 5	Nancy Robbins	do	1947	145	do	422	6-4–2½	—	do
Db 6	E. Riggen	do	1947	10	do	304	2½–1½	284–304	do
Db 7	E. Young	do	1947	6	do	297	2½–1½	277–297	do
Db 8	Arthur Gatton	do	1947	17	do	312	1½	292–312	do
Db 9	Mrs. B. Chiseldine	Payne	1947	20	do	314	1½	294–314	do
Db 10	Johnson Farrell	do	1947	19	do	290	1½	270–290	do
Db 11	J. Hall and P. A. Thomas	do	1947	27	do	308	2½–1½	288–308	do
Db 12	R. P. Graves	do	1948	16	do	310	1½	290–310	do
Db 13	Tom Lacey	do	1948	17	do	310	1½	290–310	do
Db 14	Clements Chiseldine	do	1947	16	do	310	1½	290–310	do
Db 15	Mitchell Owens	Wilson	1947	6	do	299	1½	279–299	do
Db 16	Donald Chamberlin	Payne	1947	16	do	281	1½	261–281	do
Db 17	Joe Gibson	do	1949	21	do	303	1½	283–303	do
Db 18	T. C. Slingluff	Wilson	1947	5.5	do	293	2½–1½	273–293	do
Db 19	Joseph M. Wise	Payne	1947	11	do	294	1½	274–294	do
Db 20	Mrs. B. L. Blair	Wilson	1947	14	do	324	3½–2½	304–324	do
Db 21	J. C. Gatton	Payne	1947	29	do	311	3½–1½	291–311	do
Db 22	Bernard Wise	Wilson	1947	10	do	308	3½–1½	278–308	do
Db 23	Oscar Hayden	do	1947	27	do	310	3½–1½	290–310	do
Db 24	Clifton Downs	—	1947	50	Dug	9.5	30	—	Pleistocene
Db 25	S. Labar	—	—	140	do	21.5	—	—	do
Db 26	Sacred Heart Church	—	1919	—	do	29	36	—	do
Db 27	P. H. Lavin	—	1932	123	do	24.7	40	—	do
Db 28	Lloyd Lacy	Wilson	1949	18	Drilled	297	1½	277–297	Aquia
Db 29	Sacred Heart Church	Washington Pump & Well Co.	1945	140	do	410	6	400–410	do
Db 30	Clifton Downs	—	—	—	Dug	8.5	50	—	Pleistocene
Db 31	G. Kienan	—	1929	—	do	6.4	36	—	do
Dc 1	J. W. Mattingly	Payne	1946	17	Drilled	335	1½	315–335	Aquia
Dc 2	Thomas B. Johnson	do	1947	2	do	333	1½	313–333	do
Dc 3	J. W. Brown	do	1947	21	do	330	1½	310–330	do
Dc 4	C. H. Schutte	do	1946	6	do	316	1½	296–316	do

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Water level (feet below land surface)			Pumping equipment	Yield		Specific capacity (g.p.m./ft.)	Use of water	Temperature (°F.)	Remarks
Static	Pumping	Date		Gallons a minute	Date				
—	12[a]	Aug. 1949	N	5	Sept. 25, 1947	—	D	60.5	Measured flow 1 gal. a min., August 1949.
6.05	18[a]	May 28, 1949	S, H	5	May 28, 1949	0.5	D	—	See well log.
80.20	200[a]	June 16, 1949	T, E	50	June 16, 1949	0.4	D	—	See well log and chemical analysis.
6.56	14[a]	July 19, 1949	S, H	6.5	July 19, 1949	0.7	D	—	
2.40	8[a]	July 16, 1949	S, H	6.5	July 16, 1949	0.6	D	—	See well log.
—	—	—	C, E	—	—	—	D	—	
20.0	—	Sept. 21, 1949	S, E	—	—	—	D	—	
66.72	—	Oct. 5, 1950	C, E	—	—	—	D	—	See well log.
8[a]	20[a]	June 8, 1946	S, H	3	June 8, 1946	0.3	D	58	
—	21[a]	May 30, 1947	S, H	15	May 30, 1947	—	D	60	See well log. Flowing well.
14[a]	25[a]	Sept. 11, 1947	S, E	13	Sept. 11, 1947	1.2	D	—	See well log.
—	21[a]	May 1947	S, E	15	May 1947	—	D	60	See well log. Measured flow 3½ gal. a min., May 27, 1949.
28.26	—	Apr. 27, 1951	C, E	16	Nov. 11, 1947	—	D	—	See well log.
4[a]	20[a]	Sept. 9, 1947	S, H	19	Sept. 9, 1947	1.2	D	—	Do.
3[a]	20[a]	Oct. 3, 1947	S, H	20	Oct. 3, 1947	1.2	D	—	Do.
6.5[a]	24[a]	May 5, 1947	S, H and E	5	May 5, 1947	0.7	D	—	Do.
7.5[a]	20[a]	Sept. 15, 1947	S, H	5	Sept. 15, 1947	0.4	D	58	Do.
12[a]	19[a]	May 1947	S, H	5	May 1947	0.7	D	59	Do.
16[a]	22[a]	Nov. 13, 1947	S, H	5	Nov. 13, 1947	0.8	D	—	Do.
10[a]	20[a]	Apr. 22, 1947	S, H	5	Apr. 22, 1947	0.5	D	—	Do.
10[a]	20[a]	May 19, 1948	S, H	5	May 19, 1948	0.5	D	—	
7[a]	17[a]	May 2, 1947	S, H	5	May 2, 1947	0.5	D	—	See well log.
2.5[a]	18[a]	Oct. 9, 1947	S, H	20	Oct. 9, 1947	1.3	D	59	Do.
9[a]	26[a]	Aug. 16, 1947	S, E	5	Aug. 16, 1947	0.3	D	—	Do.
16[a]	24[a]	Mar. 12, 1949	S. E	4½	Mar. 12, 1949	0.5	D	—	Do.
—	10[a]	Sept. 18, 1947	N	20	Sept. 18, 1947	—	D	—	Static water level 11.75 ft. above land surface, July 10, 1951. Measured flow 3½ gal. a min., June 9, 1949. See well log.
7.57	—	May 15, 1951	S, H	5	May 1947	0.5	D	—	See well log. Static water level 3.59 ft. above sea level.
—	18[a]	May 1947							
4[a]	20[a]	Oct. 25, 1947	S, H	10	Oct. 25, 1947	0.6	D	—	See well log.
17[a]	24[a]	May 1947	S, E	4	May 1947	0.6	D	—	Do.
10[a]	22[a]	Sept. 16, 1947	S, E and H	15	Sept. 16, 1947	1.2	D	—	Do.
10[a]	30[a]	May 22, 1947	S, E	15	May 22, 1947	0.7	D	—	Do.
8.02	—	Sept. 7, 1950	C, H	—	—	—	N	—	Do.
16.8	—	July 19, 1949	S, H	—	—	—	D	—	
25	—	July 19, 1949	C, H	—	—	—	N	—	
19.5	—	July 22, 1949	B	—	—	—	D	—	Water reported high in iron.
4[a]	—	May 4, 1949	S, E and H	10	May 10, 1949	—	D	61	See well log.
30[a]	270[a]	June 11, 1945	T, E	40	—	0.3	S	—	
5.6	—	Aug. 3, 1949	B	—	—	—	D	—	
3.4	—	July 19, 1949	B	—	—	—	D	—	
10.38	20[a]	Apr. 27, 1947	S, H	4	Apr. 27, 1947	0.5	D	—	
—	—	—	N	—	—	—	D	62	See well log. Measured flow 2.1 gal. a min., Mar. 27, 1947.
11.66	20[a]	Mar. 27, 1947	S, H	5	Mar. 27, 1947	0.6	D	57	See well log.
—	18[a]	Aug. 12, 1946	S, E	3	Aug. 12, 1946	—	D	57	See well log. Measured flow ¼ gal. a min., Mar. 27, 1947.

TABLE

Well number	Owner or name	Driller	Date completed	Altitude (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Depth of screen below land surface (feet)	Water-bearing formation
Dc 5	G. T. Sperry	Payne	1948	15	Drilled	339	1½	319–339	Aquia
Dc 6	Col. Peabody	do	1947	15	do	345	1½	325–345	do
Dc 7	Norma W. Abell	do	1948	23	do	340	1½	320–340	do
Dc 8	Do	do	1949	—	do	340	1½	320–340	do
Dc 9	Wm. J. Quigley	do	1947	6	do	332	1½	312–332	do
Dc 10	James M. Hazel	do	1947	5	do	340	1½	320–340	do
Dc 11	Joseph R. Hazel	do	1947	20	do	336	1½	316–336	do
Dc 12	C. Guy	Wilson	1947	13	do	326	1½	306–326	do
Dc 13	Elliott Burch	do	1947	12	do	410	1½	390–410	do
Dc 14	Aloyisus Mattingly	Payne	1947	12	do	310	1½	290–310	do
Dc 15	Ford Mattingly	do	1949	12	do	315	1½	290–315	do
Dc 16	E. Mattingly and L. Owens	do	1947	12	do	315	1½	290–310	do
Dc 17	Ida L. Dent	do	1947	6	do	315	1½	290–315	do
Dc 18	B. Ellis	Wilson	1948	12	do	326	1½	306–326	do
Dc 19	Gilbert Ellis	Payne	—	11	do	330	1½	310–330	do
Dc 20	Francis Gibson	Wilson	1947	11	do	315	1½	295–315	do
Dc 21	Elton Hayden	Payne	1949	12	do	315	1½	295–315	do
Dc 22	Webster Owens	Wilson	1947	12	do	319	1½	299–319	do
Dc 23	W. R. Russel	—	—	—	Dug	16.7	—	—	Pleistocene
Dc 24	Robert Anderson	—	1946	25	do	14	—	—	do
Dc 25	Town of St. Clement Shores	—	1926	3	Drilled	286	1½	—	Aquia
Dc 26	Do	Washington Pump & Well Co.	1947	2	do	350	6	340–350	do
Dc 27	Do	—	1926	7	do	312	1½	—	do
Dc 28	Do	—	1926	6	do	312	1½	—	do
Dc 29	Do	—	1926	5	do	312	1½	—	do
Dc 30	W. Mathews	—	—	11	do	—	3	—	do
Dc 31	M. H. Seifert	—	1929	—	do	—	1½	—	do
Dc 32	W. Mathews	—	1947	—	Dug	16	36	—	Pleistocene
Dc 33	L. F. Cusic	—	—	—	do	36	48	—	do
Dc 34	B. I. Mattingly	Payne	1949	15	Drilled	336	2–1½	316–336	Aquia
Dc 35	Lester Cusic	do	1949	12	do	329	1½	115–120 309–329	Jackson and Aquia
Dc 36	Bannaker School	Washington Pump & Well Co.	1951	130	do	513	6	503–513	Aquia
Dd 1	City of Leonardtown	do	1926	93	do	494	8	474–494	do
Dd 2	Do	Shannahan	1921	3	do	360	—	—	do
Dd 3	Leonardtown Ice Plant	—	—	—	do	—	—	—	—
Dd 4	Do	—	—	—	do	250(?)	—	—	Nanjemoy and Jackson
Dd 5	City of Leonardtown	Rude	1907	22	do	263	1½	None	do
Dd 6	V. H. Brubaker	Payne	1946	20	do	260	2½–1½	None	do
Dd 7	Do	—	1925	24	do	300(?)	4–1½	None	—
Dd 8	J. W. Downes	—	—	—	Dug	31	30	—	Pleistocene
Dd 9	County Fair Grounds	—	1949	115	do	22.5	36	—	do

—Continued

Water level (feet below land surface)			Pumping equipment	Yield		Specific capacity (g.p.m./ft.)	Use of water	Temperature (°F.)	Remarks
Static	Pumping	Date		Gallons a minute	Date				
14[a]	20[a]	June 28, 1948	S, E	5	June 28, 1948	0.8	D	—	See well log.
15[a]	—	Oct. 25, 1947	S, E	5	Oct. 25, 1947	—	D	—	Do.
13[a]	23[a]	May 13, 1948	S, E	5	May 13, 1948	0.5	D	—	Do.
16[a]	23[a]	Feb. 28, 1949	S, E	4½	Feb. 28, 1949	0.6	D	—	Do.
—	16[a]	June 26, 1947	S, E	4½	June 26, 1947	—	D	—	Well flows at high tide.
—	20[a]	May 11, 1949	S, E	4½	May 11, 1949	—	D	—	
10[a]	19[a]	June 5, 1947	S, H	5	June 5, 1947	0.6	D	58.5	See well log.
1[a]	8[a]	Aug. 28, 1947	S, E	22	Aug. 28, 1947	3.0	D	—	See well log and chemical analysis.
6.5[a]	19½[a]	May 1947	S, E	10	May 1947	0.6	D	—	See well log.
—	—	May 1947	S, E	—	—	—	D	—	Do.
7[a]	22[a]	Aug. 8, 1948	S, E	5	Aug. 8, 1948	0.4	D	—	Do.
6[a]	16[a]	May 1947	S, E	5	May 1947	0.5	D	—	Do.
—	11[a]	June 10, 1949	S, H	15	June 10, 1949	1.3	D	—	See well log. Measured flow ¼ gal. a min., June 10, 1949.
4[a]	—	May 28, 1948	S, E and H	13	May 28, 1948	—	D	—	See well log.
—	11[a]	—	S, E and H	5	—	—	D	—	Do.
6[a]	30[a]	Apr. 28, 1947	S, E	8	Apr. 28, 1947	0.3	D	—	Do.
1.75[a]	15[a]	Apr. 2, 1947	S, E and H	5½	Apr. 2, 1947	0.4	D	—	Do.
6[a]	28[a]	May 1947	S, E and H	10	May 1947	0.4	D	—	Do.
11.14	—	July 22, 1949	B	—	—	—	D	62.5	Water cloudy.
7[a]	—	July 26, 1949	S, E	—	—	—	D	—	
—	—	—	N	—	—	—	N	—	Measured flow 1½ gal. a min., Sept. 15, 1949.
—	42½[a]	July 25, 1947	T, E	50	July 25, 1947	—	P	—	Well supplies about 80 homes. Estimated flow 2½ gal. a min. See well log.
—	—	—	N	—	—	1.2	N	—	Measured flow 1¼ gal. a min., Sept. 15, 1949.
—	—	—	N	—	—	—	N	—	Measured flow 1¾ gal. a min., Sept. 15, 1949.
—	—	—	N	—	—	—	N	—	Measured flow 2 gal. a min., Sept. 15, 1949.
2.22	—	May 17, 1951	S, H	—	—	—	D	—	Static water level 8.74 ft. above sea level. Well stopped flowing about 1946.
—	—	—	S, E	—	—	—	D	—	Estimated flow 3 gal. a min.
12[a]	—	Sept. 15, 1947	S, H	—	—	—	F	—	
30.9	—	Sept. 13, 1947	C, H	—	—	—	D	—	
9[a]	19[a]	Sept. 27, 1949	S, E	5	Sept. 27, 1949	0.5	D	—	See well log.
5[a]	18[a]	Sept. 21, 1949	S, E	6	Sept. 21, 1949	0.4	D	—	Do.
18.37	275[a]	Mar. 16, 1951	T, E	60	Mar. 16, 1951	0.4	S	—	
85.9	200[a]	Jan. 15, 1947	T, E	115	1946	1.3	P	—	See well log and chemical analysis.
—	89.5	Jan. 15, 1947	T, E	200	1947	—	P	—	Well flows at high tide.
—	—	—	S, E	—	—	—	C	—	Flowing well.
—	—	—	—	—	—	—	—	—	
—	—	—	N	—	—	—	N	—	See chemical analysis. Measured flow 1½ gal. a min., Jan. 30, 1947.
13.32	—	Mar. 26, 1947	S, E	—	—	—	D, F	—	
6.60	—	Mar. 26, 1947	N	—	—	—	N	—	
26.5	—	July 26, 1949	B	—	—	—	D	—	
18[a]	—	Aug. 11, 1949	C, H	—	—	—	P	—	

TABLE

Well number	Owner or name	Driller	Date completed	Altitude (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Depth of screen below land surface (feet)	Water-bearing formation
Dd 10	J. M. Mattingly	—	—	—	Dug	27.8	36	—	Pleistocene
Dd 11	F. C. Cecil	—	1932	14	Drilled	190	2½	None	Nanjemoy and Jackson
Dd 12	State Road Garage	Payne and Lee	1941	11	do	200	—	None	do
Dd 13	Mrs. Lee	Rude	1922	14	do	250(?)	—	None	do
Dd 14	Dr. Charles Greenwell	Payne	1949	35	do	250	2½	None	do
Dd 15	Our Lady's School	do	1949	40	do	231	2½	None	do
Dd 16	S. T. Foxwell	Foxwell	1929	4	do	220	2½	None	do
Dd 17	Camp Calvert	—	—	4	do	210	2	None	do
Dd 18	Dr. Charles Greenwell	Payne	1948	30	do	252	2½	None	do
Dd 19	Lester Mattingly	—	—	—	Dug	32.6	48	—	Pleistocene
Dd 20	Henry Head	—	—	—	do	22.5	36	—	do
Dd 21	B. T. Bennett	—	1934(?)	—	do	24.6	—	—	do
Dd 22	Aloysius Mattingly	Deagle	1950	30	Drilled	218	2½–1½	203–218	Nanjemoy and Jackson
De 1	Fred Dominic	Payne	1946	3	do	300	1½	None	do
De 2	Dr. W. H. Patrick	Gibson	1946	125	do	—	2½–1½	None	do
De 3	Myers C. Dean	Washington Pump & Well Co.	1947	107	do	363	6	251–263	do
De 4	E. R. Kirby	do	1947	17	do	290	6	283.5–290	do
De 5	O. H. Peterson	Watts	1948	2	do	265	2–1½	None	do
De 6	Weber and McCloud	Washington Pump & Well Co.	1948	120	do	341	6	330.5–336	do
De 7	D. B. McMillian	do	1947	120	do	380	6	373–380	do
De 8	St. Johns Catholic Church	do	1944	97	do	376	6	None	do
De 9	Do	—	1929	102	Dug	20	48	—	Pleistocene
De 10	Do	—	1929	104	do	20	48	—	do
De 11	Weber and McCloud	—	—	120	do	—	—	—	do
De 12	Wilfred Berry	Payne	1949	11	Drilled	300	2	None	Nanjemoy and Jackson
De 13	Weber and McCloud	Watts	1947	120	do	375	3–2	None	do
De 14	Thomas Bean	—	1915	110	Dug	35.8	36	—	Pleistocene
De 15	Francis W. Bean	—	1934	110	do	27.6	30	—	do
De 16	George Dement	—	—	115	do	31.6	40	—	do
De 17	State of Maryland	—	—	106	do	7.62	36	—	do
De 18	Joe L. Bean	Payne	1950	110	Drilled	348	3–2	None	Nanjemoy and Jackson
Df 1	Patuxent Naval Air Station	Washington Pump & Well Co.	1943	96	do	587	8	567–587	Aquia
Df 2	Do	do	1943	112	do	595	8–6	570.5–595	do
Df 3	Do	do	1943	106	do	585	10–8	565–585	do

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Water level (feet below land surface)			Pumping equipment	Yield		Specific capacity (g.p.m./ft.)	Use of water	Temperature (°F.)	Remarks
Static	Pumping	Date		Gallons a minute	Date				
13.5	—	Aug. 26, 1949	B	—	—	—	D	—	
—	—	Sept. 15, 1949	N	—	—	—	D, C	—	Measured flow 1½ gal. a min. Sept. 15, 1949.
—	—	—	S, E	—	—	—	D	—	Static water level 18.08 ft. above sea level. Measured flow 1¼ gal. a min., Sept. 12, 1949.
—	—	—	HR, W	—	—	—	D	—	Flowing well. Hydraulic ram pumps water to house.
26.37	35[a]	Aug. 10, 1949	J, E	4	—	0.5	D	—	See well log.
23.80	30[a]	Sept. 17, 1949	J, E	3	—	0.5	S	—	Do.
—	—	—	S, E	—	—	—	D	—	Measured flow 7½ gal. a min., September 1949.
—	—	—	S, E	—	—	—	S	—	Estimated flow 7 gal. a min.
21[a]	—	—	S, E	—	—	—	D	—	See well log.
26.38	—	May 16, 1950	S, E	—	—	—	D	—	
18.1	—	May 16, 1950	B	—	—	—	D	—	
23.0	—	Aug. 3, 1950	S, E	—	—	—	D	—	Water reported high in iron.
4[a]	—	Mar. 22, 1950	J, E	6	—	—	D	—	See well log.
—	—	—	N	—	—	—	D		See well log. Measured flow 1 gal. a min., Dec. 10, 1946.
108[a]	—	1946	N	—	—	—	N		Abandoned and destroyed.
85.38	130[a]	June 24, 1947	C, E	60	May 16, 1947	1.2	C	—	See well log.
15[a]	25[a]	June 1947	—	12	June 1947	0.5	D	—	Do.
—	—	—	S, E	3	1948	—	D	—	Measured flow ½ gal. a min., 1948.
125[a]	190[a]	Aug. 22, 1948	C, E	30	Oct. 22, 1948	0.5	D	—	See well log.
95[a]	200[a]	Oct. 2, 1948	J, E	22	Oct. 2, 1947	0.2	P	—	Do.
90[a]	150[a]	Nov. 15, 1948	C, E	—	—	—	S	—	Do.
17.55	—	June 30, 1949	N	—	—	—	N	—	
16.2	—	June 30, 1949	N	—	—	—	N	—	
24.3	—	June 29, 1949	N	—	—	—	N	—	Do.
5[a]	20[a]	Mar. 29, 1949	S, E	5	Mar. 29, 1949	0.3	D	—	
112	—	Nov. 27, 1949	N	8	Nov. 27, 1949	—	N	—	
30.3	—	Aug. 26, 1949	B	—	—	—	D	—	
21.4	—	Aug. 26, 1949	B	—	—	—	D	—	
28.7	—	Mar. 26, 1949	B	—	—	—	D	—	
1.78	—	Aug. 3, 1950	N	—	—	—	N	—	
76[a]	—	Mar. 8, 1950	C, E	—	—	—	D	—	See well log.
	178[a]	June 1, 1943	T, E	225	June 1, 1943	4.2	M	—	Owner's well 1 A. See well log and chemical analysis.
136.06		July 14, 1949							
110[a]	162[a]	Nov. 22, 1943	T, E	300	Nov. 22, 1943	5.0	M	—	Owner's well 2 A. Do.
	182[a]	Dec. 7, 1943	T, E	257	Dec. 7, 1943	3.3	M	—	Owner's well 3 A. Do.
143.25	—	July 14, 1949							

TABLE 9

Well number	Owner or name	Driller	Date completed	Altitude (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Depth of screen below land surface (feet)	Water-bearing formation
Df 4	Patuxent Naval Air Station	Washington Pump & Well Co.	1944	82	Drilled	547	8	527-547	Aquia
Df 5	Do	do	1944	77	do	552	8	532-552	do
Df 6	Do	do	1942	115	do	357	6-4	347-357	Nanjemoy and Jackson
Df 7	Do	do	1943	44	do	518	8-6	498-518	Aquia
Df 8	Do	do	1942	46	do	282	4	272-282	Nanjemoy and Jackson
Df 9	Do	do	1943	47	do	285	8-6	270-285	do
Df 10	Do	do	1943	46	do	534	8-6	514-534	Aquia
Df 11	Do	do	1943	46	do	515	8	495-515	do
Df 12	Do	do	1944	11	do	489	10-8	469-489	do
Df 13	Do	do	1944	20	do	490	8-6	470-490	do
Df 14	Do	do	1943	20	do	262	8	247-262	Nanjemoy and Jackson
Df 15	J. E. O'Brien	—	—	35	Dug	18.9	40	—	Pleistocene
Df 16	T. W. Davidson	Wilson	1948	24	Drilled	270	2½-1½	None	Nanjemoy and Jackson
Df 17	H. Schlosser	Watts	1947	20	do	300	4-2	None	do
Df 18	Mrs. E. Cissel	do	1947	8	do	285	2	None	do
Df 19	Kent D. Boacher	do	1948	8	do	285	3-2	None	do
Df 20	K. R. Little	—	1948	—	Dug	28	36	—	Pleistocene
Df 21	N. V. Wagner	Payne	1948	12	Drilled	280	1½	None	Nanjemoy and Jackson
Df 22	Patuxent Water Co.	Washington Pump & Well Co.	1946	111	do	606	8-6	576-606	Aquia
Df 23	G. S. Davis	Washington Pump & Well Co.	1946	22	Drilled	260	6	251-260	Nanjemoy and Jackson
Df 24	Frank Borley	Payne	1946	6	do	280	1½	None	do
Df 25	W. B. Long	Washington Pump & Well Co.	1946	110	do	360	6	349-360	do
Df 26	T. K. Clark	—	1940	110	Dug	58	48	—	Pleistocene
Df 27	Earl Lohr	Watts	1946	5	Drilled	250	2	None	Nanjemoy and Jackson
Df 28	E. H. Connick	do	1946	16	do	290	2	None	do
Df 29	Louis Plavial	do	1947	7	do	250	2	None	do
Df 30	Philip E. Gray	Washington Pump & Well Co.	—	106	do	348	6	338-348	do
Df 31	J. Q. Bean	—	—	15	Dug	—	36	—	Pleistocene
Df 32	L. C. Wilkens	—	—	18	Driven	18	1	—	do
Df 33	Do	Watts	1947	18	Drilled	290	2	None	Nanjemoy and Jackson
Df 34	Mrs. H. P. Wise	Wilson	1948	78	do	336	3½-1½	None	do
Df 35	J. E. O'Brien	Washington Pump & Well Co.	—	35	do	261	6	None	do
Df 36	C. A. Cottell	Deagle	1950	54	do	294	3½-1½	None	do
Df 37	Immaculate Heart of Mary Church	—	—	120	Dug	42	36	—	Pleistocene

—*Continued*

Water level (feet below land surface)			Pumping equipment	Yield		Specific capacity (g.p.m./ft.)	Use of water	Temperature (°F.)	Remarks
Static	Pumping	Date		Gallons a minute	Date				
	250[a]	May 1944	T, E	300	May 1944	—	M	—	Owner's well 5 A. See well log and chemical analysis.
105.95	—	July 14, 1949							
100[a]	250[a]	Jan. 1944	T, E	300	Jan. 1944	2.0	M	—	Owner's well 4 A. Do.
125[a]	170[a]	1942	T, E	25	1942	0.5	M	—	Owner's well 1 R. See well log.
66[a]	155[a]	June 1, 1943	T, E	171	June 1, 1943	1.6	M	—	Owner's well 1 B. See well log and chemical analysis.
	80[a]	1942	T, E	25	1942	0.6	N	—	Owner's well 1 M. See well log.
71.27		July 21, 1949							
	150[a]	June 1, 1943	T, E	191	June 1, 1943	3.2	M	—	Owner's well 2 B. See well log and chemical analysis.
77.06		July 14, 1949							
	143[a]	June 26, 1943	T, E	225	June 26, 1943	2.3	M	—	Owner's well 3 B. Do.
75.15[a]		Dec. 22, 1949							
	180[a]	June 1, 1943	T, E	71	June 1, 1943	0.6	M	—	Owner's well 4 B. Do.
75.46		July 14, 1949							
61[a]	200[a]	April 1944	T, E	300	Apr. 1944	1.1	M	—	Owner's well 5 B. Do.
44.15		June 20, 1944	T, E	—	—	—	M	—	Owner's well 2 P.
	130	Sept. 16, 1944	T, E	165	May 31, 1943	1.0	M	—	Owner's well 1 P. See well log.
44.6		July 14, 1949							
14.5	—	June 29, 1949	S, H	—	—	—	N	—	
40[a]	50[a]	July 24, 1948	C, H	20	July 24, 1948	2.0	S	—	See well log.
22[a]	—	July 15, 1947	J, E	6	July 15, 1947	—	D	—	Do.
12[a]	—	Aug. 15, 1947	S, E, and H	10	Aug. 15, 1947	—	D	—	Do.
16[a]	—	July 26, 1948	S, E	6	July 26, 1948	—	D	—	
26.3		June 30, 1949	S, E	—	—	—	D	—	
15.4	21[a]	June 24, 1947	S, H	3	June 24, 1947	0.6	D	—	Do.
140[a]	230[a]	Oct. 10, 1946	T, E	225	Oct. 10, 1946	2.5	P	—	Do.
	60[a]	Nov. 14, 1946	J, E	40	May 1946	1.3	D	—	Static water level 14.00 feet below sea level, May 19, 1951. See well log.
33.86		Dec. 7, 1949							
	12[a]	July 19, 1946	S, H	12	July 19, 1946	0.3	D	—	See well log.
4.48		Dec. 21, 1949							
	170[a]	Mar. 20, 1946	T, E	60	Mar. 20, 1946	1.2	P	—	Do.
118.98		Nov. 14, 1946							
52.02	—	Dec. 21, 1949	N	—	—	—	N	—	
9.42	—	Dec. 10, 1946	J, E	10	—	—	P	—	Do.
18[a]	24[a]	Oct. 17, 1946	S, H	4	Oct. 17, 1946	0.7	D	—	
6.88	—	Dec. 10, 1946	S, H	6	July 27, 1946	0.7	D	—	Do.
118[a]	160[a]	May 16, 1947	T, E	40	May 16, 1947	1.0	C	—	Do.
—	—	—	—	—	—	—	—	—	
—	—	—	S, H	—	—	—	D	—	
22.18	—	June 24, 1947	S, E	4	June 24, 1947	—	D	—	Do.
83[a]	95[a]	Jan. 16, 1948	J, E	20	Jan. 16, 1948	1.6	D	—	Do.
40[a]	115[a]	—	J, E	90	—	1.2	C	—	Do.
50.68	—	Apr. 7, 1950	C, E	—	—	—	D	—	Do.
37.4	—	—	J, E	—	—	—	D	—	

TABLE 9

Well number	Owner or name	Driller	Date completed	Altitude (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Depth of screen below land surface (feet)	Water-bearing formation
Df 38	Patuxent Naval Air Station	—	—	—	Drilled	—	6	—	—
Df 39	Do	—	—	—	do	284	—	—	Nanjemoy and Jackson
Dg 1	Do	Washington Pump & Well Co.	1943	19	do	480	8	460–480	Aquia
Dg 2	Do	do	1943	11	do	486	10–8	466–486	do
Dg 3	Do	do	1943	13	do	489	8–6	469–489	do
Dg 4	Do	Payne	1949	20	do	295	2	275–295	Nanjemoy and Jackson
Dg 5	Do	Washington Pump & Well Co.	1950	18	do	494	8	474.5–494	Aquia
Dg 6	Do	—	—	—	do	489(?)	8	—	do
Eb 1	Frank Gass	Wilson	1947	12	do	324	1½	304–324	do
Eb 2	Jessie Gass	Payne	1947	12	do	318	1½	298–318	do
Eb 3	Pete Griffin	do	1948	12	do	320	1½	300–320	do
Eb 4	David Watson	do	1948	9	do	320	1½	300–320	do
Eb 5	John Shaffer	do	1948	12	do	318	1½	298–318	do
Eb 6	Arthur J. Krause	do	1947	6	do	318	1½	298–318	do
Eb 7	Clarence Hanibrose	do	1947	6	do	315	1½	295–315	do
Eb 8	Arthur Mattingly	Wilson	1948	8	do	360	1½	340–360	do
Eb 9	Marshal Bangdan	do	1947	7	do	325	1½	305–325	do
Eb 10	Mrs. Jennie Mills	Payne	1947	12	do	315	1½	295–315	do
Eb 11	Mrs. C. C. Arnold	do	1947	—	do	315	1½	295–315	do
Eb 12	Bruce Guade	Wilson	1947	7	do	304	1½	284–304	do
Eb 13	M. E. Abell	do	1947	9	do	312	1½	292–312	do
Eb 14	B. E. Fields	do	1949	4	do	308	1½	288–308	do
Eb 15	Clyde Lawrence	do	1947	11	do	300	1½	280–300	do
Eb 16	George C. Yates	do	1948	29	do	310	1½	290–310	do
Eb 17	Alfred Russell	Payne	1948	10	do	315	1½	295–315	do
Ec 1	R. H. Brubacher	Wilson	1914	10	do	365	2	None	do
Ec 2	Do	Rude	1926	2	do	365	2–1½	None	do
Ec 3	G. H. Chappelear	Payne	1946	6	do	258	1½	None	Nanjemoy and Jackson
Ec 4	Do	do	1946	3	do	258	1½	None	do
Ec 5	Morris M. Fritz	do	1949	8	do	248	1½	228–248	do
Ec 6	Minnie Anderson	do	1948	11	do	252	1½	None	do
Ec 7	Maury L. Hanson	do	1947	2	do	252	1½	None	do
Ec 8	J. H. Hall	—	—	—	Dug	14.2	48	—	Pleistocene
Ec 9	Do	—	—	—	Drilled	—	1½	—	—
Ec 10	Dr. C. Parker	Payne	1941	18	do	130	1½	None	Pleistocene
Ec 11	R. F. Sapp	do	1950	4	do	250	1½	None	Nanjemoy and Jackson
Ec 12	A. F. Higdon	Deagle	1950	4	do	230	1½	None	do

—Continued

Water level (feet below land surface)			Pumping equipment	Yield		Specific capacity (g.p.m./ft.)	Use of water	Temperature (°F.)	Remarks
Static	Pumping	Date		Gallons a minute	Date				
35.70[a]	—	—	T, E	—	—	—	M	—	Owner's well BF.
34.10	—	—	T, E	—	—	—	M	—	Owner's well 1 S.
	151[a]	Jan. 28, 1944	T, E	161.5	Jan. 28, 1944	2.5	M	—	Owner's well 1 C. See well log.
45.68		July 14, 1949							
	97[a]	Jan. 9, 1943	T, E	340	Jan. 28, 1943	4.2	M	—	Owner's well 2 C. Do.
33.68		July 14, 1949							
36.66	—	July 14, 1949	T, E	—	—	—	M	—	Owner's well 3 C. Do.
29	—	May 19, 1949	J, E	5	—	—	M	—	Owner's well, Quarters X. Do.
	200	Aug. 17, 1950	—	210	Aug. 17, 1950	1.3	M	—	Owner's well 2 Q. Do.
35.94	—	Aug. 21, 1950							
—	—	—	T, E	—	—	—	M	—	Owner's well 1 Q
4[a]	30[a]	Apr. 16, 1947	S, E and H	10	Apr. 16, 1947	0.4	D	—	See well log.
5[a]	15[a]	Apr. 22, 1947	S, E	5	Mar. 22, 1947	0.5	D	—	Do.
	18[a]	May 29, 1949	S, E	5	May 29, 1948	0.4	D	—	Do.
5.80		June 7, 1949							
	18[a]	Sept. 20, 1948	S, H	5	Sept. 20, 1948	0.3	D	—	Do.
4.00		June 7, 1949							
6[a]	18[a]	May 5, 1947	S, E	5	May 5, 1947	0.4	D	—	Do.
⅙[a]	12[a]	Apr. 16, 1947	S, E and H	5	Apr. 16, 1947	0.4	D	59	Do.
1[a]	13[a]	Apr. 30, 1949	S, E	5	Apr. 30, 1949	0.4	D	—	Do.
2.75	—	June 9, 1949	S, H	9	Aug. 15, 1948	—	D	—	Do.
1[a]	—	Apr. 21, 1947	S, E	10	Apr. 21, 1947	—	D	—	Do.
—	12[a]	July 27, 1947	S, E	5	July 28, 1947	—	D	—	Flowing well. See well log.
5[a]	16[a]	July 22, 1947	S, E and H	5	July 22, 1947	0.5	D	58.5	
3.5[a]	14[a]	Aug. 25, 1947	S, E	15	Aug. 25, 1947	1.4	D	—	
3[a]	6[a]	July 16, 1947	S, E and H	12	July 16, 1947	4.0	D	—	See well log.
4[a]	—	Apr. 1949	S, H	12	Apr. 1949	—	D	—	Do.
7[a]	24[a]	Apr. 26, 1947	S, E	14	Apr. 26, 1947	0.8	D	—	Do.
6[a]	—	May 24, 1947	S, H	12	May 24, 1947	—	D	—	Do.
7[a]	18[a]	July 24, 1948	S, E and H	5	July 24, 1948	0.5	D	—	Do.
—	—	—	—	—	—	—	D	—	
—	—	—	S, G	—	—	—	F	62	Measured flow 0.85 gal. a min., Mar. 26, 1947.
	17[a]	Aug. 5, 1946	—	3		0.2	D	—	See well log.
1.99		Mar. 26, 1947							
—	10.5[a]	Aug. 1946	—	2	Aug. 1946	0.2	D	—	See well log. Static water level 0.47 ft. above land surface, Mar. 26, 1947.
2.75[a]	13[a]	May 23, 1949	S, H	6	May 23, 1949	0.6	D	—	See well log.
3[a]	12[a]	June 18, 1948	S, H	6	June 18, 1948	0.7	D	—	
—	10[a]	Oct. 30, 1947	S, E	5	Oct. 30, 1947	—	D	—	Flowing well. See well log.
10.60	—	September 1949	S, H	—	—	—	N	—	
—	—	—	S, H	—	—	—	D	—	
8.12	—	September 24, 1949	S, H	—	—	—	D	—	See well log and chemical analysis.
—	15[a]	May 2, 1950	S, E	6	May 2, 1950	0.4	D	—	See well log. Static water level 0.70 foot above land surface, June 9, 1950.
—	12[a]	May 17, 1950	S, E	8	May 17, 1950	0.6	D	—	Static water level 0.95 foot above land surface, June 9, 1950.

TABLE

Well number	Owner or name	Driller	Date completed	Altitude (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Depth of screen below land surface (feet)	Water-bearing formation
Ec 13	Francis Wise	Payne	1950	7	Drilled	240	1½	220–240	Nanjemoy and Jackso
Ed 1	John P. Imbres	do	1946	16	do	260	1½	None	do
Ed 2	Fred G. Hess	do	1946	16	do	261	1½	None	do
Ed 3	Phillip Clark	Clarke	1945	3	do	255	1½	None	do
Ed 4	Robert M. Beal	Payne	1946	60	do	280	2½–1½	None	do
Ed 5	L. R. Richardson	Clarke	1944	16	do	—	1½	None	do
Ed 6	Do	—	—	16	Dug	9.5	36	—	Pleistocene
Ed 7	Do	—	—	—	do	18	36	—	do
Ed 8	B. M. Delashmutt	Payne	1949	7	Drilled	248	1½	None	Nanjemoy and Jackson
Ed 9	R. Wiggington	—	1930	—	do	300(?)	2½	None	do
Ed 10	T. Griffith	—	—	17	do	—	—	None	do
Ed 11	Paul Bell	—	—	—	Dug	22.6	40	—	Pleistocene
Ed 12	Warren Ott	—	—	—	do	13	36	—	do
Ee 1	J. Redman	Clarke	1946	10	Drilled	280	1½	None	Nanjemoy and Jackson
Ee 2	H. C. Dameron	Payne	1946	8	do	260	1½	None	do
Ee 3	Victor A. Orsini	Clarke	1934	2	do	280	1½	None	do
Ee 4	L. Roger Richardson	Washington Pump & Well Co.	1946	100	do	325	6	313–325	do
Ee 5	W. E. Bustein	Payne	1947	11	do	252	2½–1½	None	do
Ee 6	F. Brooks Howard	do	1947	—	do	252	1½	None	do
Ee 7	W. E. Abell	do	1947	13	do	260	1½	None	do
Ee 8	Neal Robrecht	do	1950	7	do	251	1½	None	do
Ee 9	Hannan	do	1948	6	do	241	2	None	do
Ee 10	M. A. Greeley	do	1947	6	do	260	1½	None	do
Ee 11	Roland McKay	do	1947	24	do	273	2½–1½	None	do
Ee 12	Do	do	1948	23	do	273	1½	None	do
Ee 13	J. A. McWhorter	do	1947	5	do	260	1½	None	do
Ee 14	T. L. Edmondson	do	1948	15	do	252	1½	None	do
Ee 15	J. Van Dike	do	1948	5	do	252	1½	None	do
Ee 16	Irving G. Hewitt	Deagle	1948	90	do	336	2	None	do
Ee 17	Holy Face Catholic Church	Watts	1947	90	do	375	3–2	None	do
Ee 18	C. Owens	—	—	100	Dug	33	36	—	Pleistocene
Ee 19	James S. Peck	—	1947	100	do	22.4	—	—	do
Ee 20	Ryan Eliff	—	1948	—	do	15.3	36	—	do

-Continued

Water level (feet below land surface)			Pumping equipment	Yield		Specific capacity (g.p.m./ft.)	Use of water	Temperature (°F.)	Remarks
Static	Pumping	Date		Gallons a minute	Date				
	18[a]	July 31, 1950	S, E and H	9	July 31, 1950	0.6	D	—	See well log.
2.42		Aug. 3, 1950							
	17[a]	Sept. 6, 1946	S, H	4	Sept. 6, 1946	0.7	D	—	Do.
11.00		Mar. 19, 1947							
	17[a]	Aug. 20, 1946	S, E	3.5	Aug. 20, 1946	0.5	D	—	Do.
11.08		Mar. 19, 1947							
—	—	—	S, E	—	—	—	D	61	See well log. Measured flow 1.15 gal. a min., Mar. 19, 1947.
56[a]	70[a]	July 29, 1946	J, E	3	July 29, 1946	0.2	D	—	See well log.
9.64	—	Mar. 26, 1947	S, H	—	—	—	D	58.5	
1.60	—	Mar. 26, 1947	S, H	—	—	—	D	—	
—	—	—	N	—	—	—	N	—	
1.5[a]	14[a]	May 7, 1949	S, E	6	May 7, 1949	0.5	D	—	Do.
20[a]	—	—	C, E	—	—	—	D, F	—	
12.59	—	Sept. 26, 1949	S, H	—	—	—	D	—	
17.60	—	Aug. 26, 1949	S, E	—	—	—	D	—	Water reported high in iron.
8.31	—	Aug. 26, 1949	S, E	—	—	—	D	—	
11.31	—	Mar. 19, 1947	S, E	5	Mar. 19, 1947	—	D	58	See well log.
	14[a]	July 10, 1946							
4.79		Apr. 19, 1947	S, H	3	Apr. 19, 1947	0.4	D	—	Do.
—	—	—	S, E	—	—	—	D	60	Estimated flow 1 gal. a min., March 1947. Static water level 1.74 feet above land surface, Mar. 19, 1947.
97[a]	160[a]	February 1946	C, E	60	February 1946	1.0	D	—	See well log and chemical analysis.
	17[a]	Mar. 30, 1947	N	5	Mar. 30, 1947	0.4	D	—	See well log.
8.32		April 9, 1947							
	16[a]	Apr. 1, 1947	N	5	Apr. 1, 1947	0.4	D	—	Do.
4.61		Apr. 9, 1947							
	18[a]	April 1947	S, E	5	April 1947	0.5	D	—	Do.
9.25		Apr. 10, 1947							
	14[a]	Mar. 30, 1950	S, E and H	6	Mar. 30, 1950	0.5	D	—	Do.
6.68		Aug. 21, 1950							
2[a]	14[a]	July 30, 1948	S, H	6	July 30, 1948	0.5	D	—	Do.
	14[a]	June 30, 1947	S, E	6	July 30, 1948	0.5	D	—	
3.16		May 26, 1949							
24[a]	27[a]	Mar. 27, 1948	S, E	4	Mar. 27, 1948	1.2	D	—	Do.
18[a]	26[a]	July 20, 1948	S, E	4	July 20, 1948	0.8	D	—	Do.
	16[a]	Oct. 31, 1947	S, H	5	Oct. 3, 1947	0.4	D	—	Do.
3.12		May 26, 1949							
12[a]	20[a]	July 12, 1948	S, H	5	July 12, 1948	0.6	D	—	Do.
	11[a]	Mar. 24, 1948	S, H	6	Mar. 24, 1948	0.7	D	—	Do.
2.86		Sept. 26, 1949							
90[a]	—	Sept. 29, 1948	C, E	—	—	—	D	—	Do.
75[a]	—	Sept. 1, 1947	C, E	8	Sept. 1, 1947	—	S	—	Do.
28[a]	—	June 1949	C, E	—	—	—	D	—	
20.43	—	Aug. 26, 1949	B	—	—	—	D	—	
14.50	—	Aug. 26, 1949	S, H	—	—	—	D	—	

TABLE

Well number	Owner or name	Driller	Date completed	Altitude (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Depth of screen below land surface (feet)	Water-bearing formation
Ee 21	Theodore Russell	—	—	—	Dug	—	—	—	Pleistocene
Ee 22	G. W. Redman	—	1946	100	do	17.63	36	—	do
Ee 23	State of Maryland	—	—	—	do	7.80	36	—	do
Ee 24	Do	—	—	—	do	6.40	36	—	do
Ee 25	W. E. Winters	Washington Pump & Well Co.	1949	110	Drilled	310	6-1½	305-310	Nanjemoy and Jackson
Ee 26	Harry C. Raley	Payne	1949	90	do	349	3-2	None	do
Ee 27	Roland R. McKay	do	1950	9	do	250	1½	None	do
Ee 28	John Coffey	Deagle	1950	6	do	205	1½	None	do
Ee 29	LeRoy Dyson	do	1949	20	do	265	1½	None	do
Ef 1	Philip Langley	Payne	1946	25	do	294	4-1½	None	do
Ef 2	Do	do	1940	25	Driven	14	1½	—	Pleistocene
Ef 3	Chesapeake & Potomac Telephone Co.	Washington Pump & Well Co.	1946	100	Drilled	322	6	310-322	Nanjemoy and Jackson
Ef 4	St. Marys Female Seminary	do	1936	20	do	661	8-6	647-661	Cretaceous
Ef 5	Do	—	—	—	do	—	—	—	—
Ef 6	Do	—	—	—	do	—	—	—	—
Ef 7	Charles Lenhardt	—	—	65	Dug	28	—	—	Pleistocene
Ef 8	Broome Farm	—	Before 1917	8	Drilled	185(?)	1½	—	—
Ef 9	Donald Garner	Payne	1947	213	do	285	1½	None	Nanjemoy and Jackson
Ef 10	Vera Lang	Watts	1948	110	do	380	3-2	None	do
Ef 11	F. D. Bohanan	do	1948	20	do	295	3-2	None	do
Ef 12	R. H. Pembroke	Payne	1947	19	do	300	2½-1½	280-300	do
Ef 13	B. G. Hohensee	Washington Pump & Well Co.	1948	85	do	308	6	299-308	do
Ef 14	R. J. Watts	Watts	1947	5	do	280	2	None	do
Ef 15	Oscar Lauxman	do	1947	6	do	285	2	None	do
Ef 16	Board of Education	Wilson	1949	42	do	315	4½-2	None	do
Ef 17	Heath Steele	Washington Pump & Well Co.	1943	32	do	497	6	476-497	Aquia
Ef 18	R. J. Watts	—	1944	5	Augered	27	1	—	St. Marys (?)
Ef 19	Ernest Dyson	—	1947	—	Dug	27	41	—	Pleistocene
Ef 20	Paul R. Balta	—	1946	—	do	17	36	—	do
Ef 21	J. Spence Howard	Deagle	1949	25	Drilled	285	2	None	Nanjemoy and Jackson
Ef 22	H. Mullison	—	—	—	Dug	37.7	36	—	Pleistocene
Ef 23	M. Aud	—	—	—	do	9.5	36	—	do
Ef 24	Mary Fenwick	—	—	—	do	32	36	—	do
Ef 25	Herman Coppage	—	—	—	do	4.3	36	—	do
Ef 26	Thomas Adams	—	—	—	do	27.6	36	—	do
Ef 27	J. Allen Coad	Rude	1909	1	Drilled	488	1½	None	Aquia
Ef 28	Do	Adams	1904	5	do	277	1½	None	Nanjemoy and Jackson
Ef 29	Robert Stevens	—	—	—	Dug	14	36	—	Pleistocene
Ef 30	J. C. Sheehan	Clarke	—	7	Drilled	290	1½	None	Nanjemoy and Jackson

—Continued

Water level (feet below land surface)			Pumping equipment	Yield		Specific capacity (g.p.m./ft.)	Use of water	Temperature (°F.)	Remarks
Static	Pumping	Date		Gallons a minute	Date				
39.60	—	Aug. 26, 1949	B	—	—	—	D	—	
14.28	—	Sept. 12, 1949	S, E	—	—	—	D	—	
2.48	—	Sept. 1, 1949	N	—	—	—	N	—	
2.13	—	Sept. 1, 1949	N	—	—	—	N	—	
	140	July 6, 1949	J, E	27	July 6, 1949	0.8	D	—	See well log.
100.17		July 7, 1949							
90[a]	—	Sept. 15, 1949	C, E and H	3	Sept. 15, 1949	—	D	—	Do.
6[a]	—	Mar. 24, 1950	S, E	—	—	—	D	—	Do.
4[a]	12[a]	Mar. 15, 1950	S, E	12	Mar. 15, 1950	1.5	D	—	Do.
	24	Sept. 6, 1949	S, E	5	Sept. 6, 1949	0.6	D	—	Do.
17.24		Sept. 26, 1949							
25[a]	30[a]	June 14, 1946	C, H	2½	June 14, 1946	0.5	D	58	Do.
—	—	—	S, H	—	—	—	N	—	
105[a]	150	Aug. 12, 1946	J, E	20	Aug. 12, 1946	0.5	D	—	See well log. Water has hydrogen sulfide odor.
—	160[a]	June 1936	T, E	52½	June 1936	0.3	S	—	Flowing well. See chemical analysis.
—	—	—	N	—	—	—	N	—	Well covered.
—	—	—	N	—	—	—	N	—	Do.
—	—	—	S, H	—	—	—	D	—	
—	—	—	S, E	—	—	—	D, F	—	Flowing well.
	18[a]	Apr. 10, 1947	S, E	5	April 1947	0.5	D	—	See well log.
10.07		April 1947							
—	—	—	C, E	3	June 18, 1948	—	D	—	
17[a]	—	Aug. 12, 1948	J, E	8	Aug. 12, 1948	—	D	—	Do.
22½[a]	25[a]	June 9, 1947	S, E	5	June 9, 1947	1.5	D	—	Do.
100[a]	125[a]	July 2, 1948	J, E	30	July 2, 1947	1.2	D	—	Do.
8[a]	15[a]	May 28, 1947	S, E	7	May 28, 1947	1.0	D	—	
9.48		July 24, 1951							
8[a]	15[a]	May 19, 1947	S, E	7	May 19, 1947	1.0	D	—	Do.
40[a]	50[a]	May 13, 1949	C, E	10	May 13, 1949	1.0	S	—	Do.
	123[a]	Jan. 18, 1943	T, G	109	Jan. 18, 1943	1.2	D, F	—	Do.
44.81		Oct. 4, 1950							
—	—	—	N	—	—	—	N	—	Flowing well.
23[a]	—	July 27, 1949	B	—	—	—	D	—	
15.80	—	—	S, H	—	—	—	D	—	
	28[a]	June 1, 1949	C, E	8	June 1, 1949	1.0	D	—	See well log.
20.11		Aug. 26, 1949							
32.0	—	Aug. 18, 1949	B	—	—	—	D	—	
7.0	—	Aug. 19, 1949	S, E	—	—	—	D	—	
28.30	—	Aug. 19, 1949	B	—	—	—	D	—	
22.20	—	Aug. 19, 1949	B	—	—	—	D	—	
6.81	—	Aug. 19, 1949	C, W	—	—	—	D, F	—	
7.72	—	Sept. 9, 1949	N	—	—	—	N	—	Formerly flowed 10-12 gal. a min.
—	—	—	S, E	—	—	—	D	—	Flowing well.
10.0	—	Aug. 19, 1949	S, H	—	—	—	D	—	
8[a]	—	Sept. 16, 1949	S, E	—	—	—	C	—	

TABLE 9

Well number	Owner or name	Driller	Date completed	Altitude (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Depth of screen below land surface (feet)	Water-bearing formation
Ef 31	I. G. Hewitt	—	—	10	Drilled	—	1½	None	Nanjemoy and Jackson
Ef 32	J. C. Sheehan	—	—	—	do	295	1½	None	do
Ef 33	E. Dickey	—	—	—	do	280	1½	None	do
Ef 34	Do	—	—	12	do	280	1½	None	do
Ef 35	Frank A. Booth	—	About 1850	—	Dug	14	30	—	Pleistocene
Ef 36	E. X. Thompson	Clarke	1944	—	Drilled	295	1½	None	Nanjemoy and Jackson
Ef 37	M. R. Blagojevich	—	—	—	Dug	20.4	36	—	Pleistocene
Ef 38	Do	Clarke	1939	3	Drilled	300	1½	None	Nanjemoy and Jackson
Ef 39	Luther Edwards	—	—	—	do	—	1½	None	do
Ef 40	L. L. Cobb	Deagle	1947	10	do	336	2	None	do
Ef 41	Marion B. Hopkins	do	1950	85	do	378	3–1½	None	do
Ef 42	D. M. Strickland	—	1949	10	Augered	32	6	—	St. Marys (?)
Ef 43	J. L. Dent	—	—	55	Dug	13.3	36	—	Pleistocene
Ef 44	R. L. Webb	Payne	1950	40	Drilled	305	3–2	None	Nanjemoy and Jackson
Eg 1	J. W. Elms	Deagle	1946	6	do	339	1½	None	do
Eg 2	Do	—	—	15	Dug	—	—	—	Pleistocene
Eg 3	Do	Deagle	1946	14	Drilled	387	1½	None	Nanjemoy and Jackson
Eg 4	Maggie Carroll	do	1946	10	do	388	1½	None	do
Eg 5	G. W. Wise	—	1915	9	Dug	14.3	36	—	Pleistocene
Eg 6	Do	—	1941	4	do	7	24	—	do
Eg 7	F. P. Veitch	Watts	1946	23	Drilled —	300	2	None	Nanjemoy and Jackson
Eg 8	Mr. Zimmerman	—	—	20	Dug	18	—	—	Pleistocene
Eg 9	Do	—	—	25	do	15	—	—	do
Eg 10	Do	—	—	30	do	25	—	—	do
Eg 11	E. H. Ocker	Watts	1947	10	Drilled	300	4–2	None	Nanjemoy and Jackson
Eg 12	A. L. Fish	—	1948	100	Dug	38.5	36	—	Pleistocene
Eg 13	Do	—	—	100	do	26.2	39	—	do
Eg 14	W. O. Wise	—	1948	100	do	30.1	36	—	do
Eg 15	J. R. Hammet	—	—	—	do	22.3	36	—	do
Eg 16	T. A. McInery	Payne	1950	11	Drilled	315	2½–1½	None	Nanjemoy and Jackson
Fe 1	U. S. Navy	Washington Pump & Well Co.	1942	10	do	412	6	400–412	Aquia
Fe 2	Do	do	1943	10	do	432	8	412–432	do
Fe 3	Elmer Blackwell	Payne	1946	9	do	260	1½	None	Nanjemoy and Jackson
Fe 4	Mrs. N. Puchetti	Deagle	1947	3	do	275	1½	None	do
Fe 5	Charles Bailey	Payne	1947	10	do	252	1½	None	do
Fe 6	Federal Public Housing Authority	do	1947	8	do	260	1½	None	do
Fe 7	Joe Goddard	do	1947	2	do	252	1½	None	do
Fe 8	Do	—	About 1900	7	Dug	14.9	43	—	Pleistocene

—Continued

Water level (feet below land surface)			Pumping equipment	Yield		Specific capacity (g.p.m./ft.)	Use of water	Temperature (°F.)	Remarks
Static	Pumping	Date		Gallons a minute	Date				
7.71	—	Sept. 16, 1949	N	—	—	—	N	—	
—	—	—	S, E	—	—	—	D	—	
—	—	—	S, E	—	—	—	D, F	—	Well stopped flowing about 1944.
—	—	—	S, E	—	—	—	D	—	
7.30	—	Sept. 9, 1949	S, H	—	—	—	D	—	
—	—	—	S, E	—	—	—	—	—	
18.70	—	Sept. 9, 1949	N	—	—	—	N	—	
—	—	—	S, E	—	—	—	D	—	
—	—	—	S, E	—	—	—	D	—	
6[a]	10	Sept. 25, 1947	S, E	12	Sept. 25, 1947	3.0	D	—	See well log.
90[a]	—	Apr. 21, 1950	C, E	—	—	—	D	—	Do.
2[a]	—	—	S, H	—	—	—	D	—	
9.81	—	Aug. 2, 1950	S, E	—	—	—	D	—	
40[a]	57[a]	Apr. 4, 1950	C, H	3	Apr. 4, 1950	0.2	D	—	Do.
10.36	—	Nov. 15, 1946	N	6	—	—	D	59	Do.
—	—	—	C, H	—	—	—	D	62	
12.99		Nov. 15, 1946	S, E	5	—	—	D	—	Do.
15.74		May 23, 1951							
8.36	—	Nov. 20, 1946	S, H	8	—	—	D	59	Do.
13.04	—	Nov. 20, 1946	B	—	—	—	D	—	
3.41	—	Nov. 20, 1946	B	—	—	—	D	—	
	30[a]	Aug. 6, 1946	S, H	6	Aug. 6, 1946	0.5	D	58	Do.
17.68		Apr. 18, 1947							
—	—	—	S, H	—		—	D	—	
11.78	—	Mar. 18, 1947	S, H	—		—	D	—	
—		—	—	—		—	N	—	
12[a]	—	July 1, 1947	J, E	8	July 1, 1947	—	D	—	
24.5	—	Aug. 3, 1949	B	—	—	—	D	—	
21.4	—	Aug. 3, 1949	B	—	—	—	D	—	
29.1	—	Sept. 7, 1949	S, E	—	—	—	D	—	
—		—	—	—	—	—	D	—	
18[a]	25[a]	Sept. 5, 1950	J, E	5	Sept. 5, 1950	0.7	D	—	Do.
	65[a]	1942	T, E	30	1942	0.5	M	64.5	See well log and chemical analysis.
8.66		May 18, 1950							
8[a]	150	April 1943	T, E	150	April 1943	1.0	M	—	See well log.
6	18	June 1946	S, H	3	June 1946	0.2	D	—	Do.
1.85	—	Mar. 21, 1947	S, H	10	Mar. 21, 1947	—	D	—	Do.
3.5[a]	—	Mar. 27, 1947	N	5	Mar. 27, 1947	—	D	—	Do.
1.5[a]	12[a]	Apr. 3, 1947	S, E	5	Apr. 3, 1947	0.5	D	—	Do.
	12[a]	Apr. 5, 1947	—	5	Apr. 5, 1947	0.5	D	—	Do.
0.78		Apr. 9, 1947							
3[a]	—	—	S, E	—	—	—	S	—	

TABLE 9

Well number	Owner or name	Driller	Date completed	Altitude (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Depth of screen below land surface (feet)	Water-bearing formation
Fe 9	M. D. Truitt	Deagle	1948	6	Drilled	273	1½	None	Nanjemoy and Jackson
Fe 10	James C. Burch	Payne	1947	5	do	252	1½	None	do
Fe 11	Evelyn Peyton	Deagle	1947	6	do	252	1½	None	do
Fe 12	M. D. Truitt	—	—	15	Dug	—	48	—	Pleistocene
Fe 13	Floyd Thompson	Deagle	1949	5	Drilled	252	1½	None	Nanjemoy and Jackson
Fe 14	Marie Forrest	Payne	1947	6	do	251	1½	None	do
Fe 15	Malcolm Cameron	do	1947	5	do	254	1½	None	do
Fe 16	C. B. Bradburn	—	1949	10	Dug	7.8	36	—	Pleistocene
Fe 17	R. T. Johnson	Deagle	1948	3	Drilled	252	1½	None	Nanjemoy and Jackson
Fe 18	Paul Cecil	Payne	1949	6	do	252	1½	None	do
Fe 19	Do	Deagle	1948	5	do	231	1½	None	do
Fe 20	W. C. Kloman	do	1949	7	do	245	1½	None	do
Fe 21	U. S. Navy	Washington Pump & Well Co.	1941	9	do	409	1½	None	Aquia
Fe 22	U. S. Coast Guard	Leatherbury	1945	3	do	—	2	None	Nanjemoy and Jackson
Fe 23	Curtis Steuart	Washington Pump & Well Co.	1950	4	do	405	8	391–399	Aquia
Fe 24	Do	do	1950	5	do	411	6–4	402–407.5	do
Ff 1	Albert Senior	Deagle	1947	3	do	278.5	1½	None	Nanjemoy and Jackson
Ff 2	Do	—	—	4	do	234(?)	1½	None	do
Ff 3	Unknown	—	—	−1	do	—	1½	None	—
Ff 4	Camp Merryelande	—	—	4	do	—	3–2½	None	—
Ff 5	Do	—	—	4	do	44	—	None	Pleistocene (?)
Ff 6	J. C. Byrnes	Payne	1947	10	do	256	1½	None	Nanjemoy and Jackson
Ff 7	Do	do	1946	—	do	270	1½	None	do
Ff 8	James Deagle	Deagle	1946	5	do	285	1½	None	do
Ff 9	Thomas McKay	Payne	1947	3	do	273	1½	None	do
Ff 10	Adam Bros.	—	—	—	do	—	1½	None	do
Ff 11	Joe Boothe Jr.	Payne	1948	13	do	256	1½	None	do
Ff 12	Carter Ridgell	—	—	8	Dug	9.2	30	—	Pleistocene
Ff 13	U. S. Navy (Webster Field)	—	—	9	do	6.5	60	—	do
Ff 14	W. Key	—	—	10	do	7	36	—	do
Ff 15	Dr. Goldbach	—	—	—	Drilled	530(?)	2	—	Aquia (?)
Ff 16	Do	—	—	5	do	270	—	—	Nanjemoy and Jackson
Ff 17	Do	—	—	5	do	270	—	—	do
Ff 18	Do	—	—	8	do	270	—	—	do
Ff 19	R. A. Magee	—	—	—	do	—	—	—	—
Ff 20	U. S. Navy (Webster Field)	—	—	9	do	268	1½	None	Nanjemoy and Jackson

—*Continued*

Water level (feet below land surface)			Pumping equipment	Yield		Specific capacity (g.p.m./ft.)	Use of water	Temperature (°F.)	Remarks
Static	Pumping	Date		Gallons a minute	Date				
15[a]	18[a]	July 30, 1948	S, E	11	July 30, 1948	—	D, S	—	See well log.
	13[a]	Nov. 15, 1947	S, E	5	Nov. 15, 1947	0.7	D	—	Do.
6.19		June 24, 1949							
	15[a]	June 24, 1949	S, E	12½	April 1947	1.7	D	—	Do.
7.90		April 1947							
9	—	July 1, 1949	S, H	—	—	—	D	—	
3[a]	8[a]	June 2, 1949	S, H	12	June 2, 1949	2.2	N	—	Do.
2.5[a]	9[a]	June 18, 1947	S, H	5	June 18, 1947	1.5	D	—	Do.
5[a]	17[a]	Aug. 6, 1947	J, E	5	Aug. 6, 1947	0.4	D	—	Do.
6.7	—	Sept. 12, 1947	B	—	—	—	D	—	
	6[a]	Aug. 15, 1948	S, H	15	Aug. 15, 1948	—	D	—	
2.39		Sept. 12, 1949							Do.
	16[a]	July 14, 1949	S, H	11	Sept. 12, 1949	—	D	—	Do.
4.20		Sept. 12, 1949							
4[a]	8[a]	Mar. 29, 1948	S, E	13	Mar. 29, 1949	—	D	—	Do.
	15[a]	Aug. 11, 1949	S, E	12	Aug. 11, 1949	—	D	—	Do.
7.88		Sept. 21, 1949							
	120[a]	Feb. 17, 1942	T, E	48	Feb. 17, 1941	0.3	M	—	Do.
11.44		May 17, 1950							
0.7	—	May 17, 1950	S, E	—	—	—	D	—	
2.46	72	May 16, 1950	T, G	218	May 16, 1950	3.0	C	—	Do.
	25	May 1950	T, E	25	May 1950	1.5	C	—	Do.
6.49		May 16, 1950							
2.66	20.75	Mar. 11, 1947	S, H	9.2	Mar. 11, 1947	0.4	D	—	Do.
3.08	—	Mar. 11, 1947	N	—	—	—	N	—	
—	—		N	—	—	—	N	—	
1.13	—	Mar. 19, 1947	S, E	—	—	—	D	—	
1.42	—	Mar. 19, 1947	S, H	—	—	—	D	—	
9.03	—	Mar. 31, 1947	S, H	5	Mar. 29, 1947	—	D	—	Do.
—	—	—	S, H	—	—	—	D	—	
—	—	—	S, E	—	—		D		See chemical analysis.
1.5[a]	10[a]	Apr. 11, 1947	S, H	5	Apr. 11, 1947	0.6	D		See well log.
—	—	—	N	—	—	—	N	—	
12.5[a]	21[a]	Apr. 15, 1947	S, E	5	Apr. 15, 1947	0.6	D	—	
6	—	Aug. 11, 1949	S, H	—	—	—	D	—	
5.40	—	Aug. 12, 1949	N	—	—	—	N	—	
	—								
4.0	—	Aug. 11, 1949	B	—	—	—	D	—	
1.25	—	May 22, 1951	N	—	—	—	N	—	Well about 20 feet offshore in water. Stopped flowing about 1946.
8[a]	—	Sept. 12, 1949	S, E	—	—	—	D	—	
—	—	—	—	—	—	—	F	—	
—	—	—	—	—	—	—	F	—	
—	—	—	S, E	—	—	—	D	—	
9.54	—	Sept. 14, 1949	S, E	—	—	—	N	—	

TABLE

Well number	Owner or name	Driller	Date completed	Altitude (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Depth of screen below land surface (feet)	Water-bearing formation
Ff 21	U. S. Navy (Webster Field)	Washington Pump & Well Co.	1945	10	Drilled	486	8	464-486	Aquia
Ff 22	Board of Education	Deagle	1945	3	do	265	1½	None	Nanjemoy and Jackson
Ff 23	R. Woodburn	—	—	10	Dug	11.5		—	Pleistocene
Ff 24	Linwood Henderson	Payne	1949	4	Drilled	265	1½	None	Nanjemoy and Jackson
Ff 25	Myrle Henderson	Clarke	1947	4	do	307	1½	287-307	do
Ff 26	R. Twilly	Payne	1949	5	do	263	1½	None	do
Ff 27	L. Bowles	—	1948	12	Dug	14	36	—	Pleistocene
Ff 28	Joe Goddard	Watts	1949	5	Drilled	298	1½	None	Nanjemoy and Jackson
Ff 29	J. L. Baldason	Payne	1950	10	do	262	1½	None	do
Ff 30	U. S. Navy	Layne-Atlantic	1951	4	do	265	4	250-260	do
Fg 1	C. F. Long	Deagle	1946	5	do	378	1½	None	do
Fg 2	Do	—	About 1910	2	do	—	1½	None	do
Fg 3	Raymond Wheatley	Gibson	1946	9	do	371	1½	None	do
Fg 4	John A. Bradburn	Deagle	1946	10	do	420	1½	None	do
Fg 5	W. Taft Tippett	do	1946	35	do	404	36	None	do
Fg 6	Hugh Allston	Hopewell	1945	10	Dug	15	1½	—	Pleistocene
Fg 7	W. T. Hewlett	Gibson	1946	16	Drilled	377	1½	None	Nanjemoy and Jackson
Fg 8	H. P. Trossback	Deagle	1947	5	do	420	1½	None	do
Fg 9	B. McKay	do	1947	5	do	367	1½	None	do
Fg 10	J. Carrolls Garage	—	1943	91	Dug	31.7	36	—	Pleistocene
Fg 11	W. E Carley	Deagle	1946	6	Drilled	336	1½	None	Nanjemoy and Jackson
Fg 12	Do	—	—	1	do	—	1½	None	do
Fg 13	Irene Bradburn	Deagle	1947	8	do	398	1½	None	do
Fg 14	Clarence Drury	Wilson	1947	6	do	419	1½	None	do
Fg 15	Paul Davis	Deagle	1947	70	do	460	2-1½	None	do
Fg 16	W. H. Hart	Wilson	1947	2	do	357	1½	None	do
Fg 17	Dr. J. B. Jacobs	Watts	1948	5	do	395	—	None	do
Fg 18	Ben Snyder	Deagle	1948	50	do	420	3-1½	None	do
Fg 19	H. P. Trossback	do	1947	10	do	420	1½-¾	None	do
Fg 20	E. L. Hefner	do	1947	10	do	399	1½	None	do
Fg 21	Philip H. Dorsey	Payne	1948	5	do	399	1½	None	do
Fg 22	E. E. Clark	Watts	1947	60	do	395	2½-1½	None	do
Fg 23	E F. Sheridan	Deagle	1947	5	do	420	1½	None	do
Fg 24	Stanley Raley	Wilson	1948	4	do	396	1½	None	do
Fg 25	Willard A. Mettain	Deagle	1948	20	do	420	1½	None	do
Fg 26	John S. Bean	do	1947	16	do	352	2	None	do
Fg 27	HildegardeChristensen	do	1947	4	do	420	1½	None	do
Fg 28	F. F. Speck	Gibson	1946	50	do	465	2½-1½	None	do
Fg 29	W. C. Nicholson	Deagle	1948	7	do	367	1½	None	do
Fg 30	Charles E. Davis	do	1949	11	do	358	1½	None	do
Fg 31	L. Earl Trossback	do	1948	6	do	397	1½	None	do
Fg 32	Richard White	—	—	18	Dug	9.4	36	—	Pleistocene

—*Continued*

Water level (feet below land surface)			Pumping equipment	Yield		Specific capacity (g.p.m./ft.)	Use of water	Temperature (°F.)	Remarks
Static	Pumping	Date		Gallons a minute	Date				
10[a]	125[a]	1945	T, E	150	1945	1.2	M	—	See well log.
2.5[a]	12[a]	Aug. 16, 1945	S, H	13	Aug. 16, 1945	1.3	S	—	Do.
9.30	—	Sept. 16, 1949	S, H	—	—	—	D	—	
	14[a]	July 11, 1949	S, H	6	July 11, 1949	0.6	D	—	Do.
3.18		Sept. 12, 1949							
3[a]	8[a]	May 15, 1947	S, E	7	May 15, 1947	1.4	D	—	Do.
	15[a]	July 5, 1949	S, H	6	July 5, 1949	0.5	D	—	Do.
4.27		Sept. 12, 1949							
10.6	—	Aug. 18, 1949	S, E	—	—	—	D	—	
4[a]	—	Aug. 17, 1946	S, E	8	Aug. 17, 1946	—	D	—	
10[a]	—	Mar. 11, 1950	S, E	—	—	—	D	—	Do.
—	—	—	S, E	—	—	—	D	—	Do.
	14[a]	Sept. 19, 1946	S, E	12	Sept. 19, 1946	1.2	D	—	Do.
3.12		Nov. 18, 1946							
—	—	—	N	—	—	—	N		Static water level 1.08 feet above land surface, Nov. 18, 1946.
7.66	—	Nov. 18, 1946	S, H	7	1946	—	D	59.5	See well log.
11.46	—	Oct. 14, 1950	S, E	11	1946	—	D	59.5	See well log and chemical analysis.
26[a]	—	July 24, 1946	S, E	7	July 24, 1946	—	D	—	See well log.
4.56	—	Nov. 19, 1946	S, E	—	—	—	D	—	
9.96	—	Nov. 19, 1946	S, H	8	—	—	D	—	Do.
2.65	—	Mar. 6, 1947	N	—	—	—	N	—	See well log. Well abandoned and plugged.
2.5[a]	12[a]	Feb. 1, 1947	S, H	12	Feb. 1, 1947	1.2	D	—	See well log.
26.19	—	Mar 18, 1947	S, E	—	—	—	C	—	
5.10	13[a]	Oct. 30, 1946	S, H	10	Oct. 30, 1946	1.1	D	58.5	Do.
		Mar. 27, 1947							
—	—	—	—	—	—	—	—	—	Well covered with water at high tide.
10[a]	18[a]	Apr. 15, 1947	S, H	8	Apr. 15, 1947	—	D	—	See well log.
5.8	—	June 12, 1947	S, E	18.7	June 12, 1947	—	D	—	Do.
83[a]	—	July 28, 1947	C, E	4	July 28, 1947	—	D	—	Do.
1.06	—	June 25, 1947	S, H	23	1947	1.0	D	—	Do.
12[a]	—	May 1948	S, H	6	May 1948	—	D	—	Do.
45[a]	—	Oct. 10, 1948	J, E	12	Oct. 10, 1948	—	D	—	Do.
	6[a]	Feb. 18, 1947	S, H	12.5	Feb. 18, 1947	2.5	D	—	Do.
3.34		Oct. 4, 1950							
—	—	—	S, E	12	Oct. 24, 1947	—	D	—	Flowing well. See well log.
1.5[a]	15[a]	July 15, 1947	S, E	10	July 15, 1947	0.8	D	—	See well log.
40[a]	—	Sept. 14, 1947	C, E	8	Sept. 14, 1947	—	D	—	
2.5[a]	6[a]	Dec. 15, 1947	S, E	12	Dec. 15, 1947	3.0	D	—	Do.
3[a]	—	Nov. 1, 1948	S, H	—	—	—	D	—	Do.
15[a]	18[a]	July 20, 1948	S, E and H	12	July 20, 1948	4.0	D	—	Do.
9[a]	18[a]	April 1947	S, E	12	April 1947	1.5	D	—	Do.
4[a]	7[a]	Dec. 22, 1947	S, H	12	Dec. 22, 1947	4.0	D	—	Do.
—	—	—	S, E	—	—	—	D	—	
9[a]	14[a]	Oct. 14, 1948	S, E	10	Oct. 14, 1948	2.0	D	—	Do.
7[a]	15[a]	Feb. 22, 1949	S, E	13	Feb. 22, 1949	1.6	D	—	Do.
6[a]	9[a]	Sept. 3, 1948	S, E	—	—	—	D	—	Do.
5.40	—	Sept. 7, 1949	B	—	—	—	D	—	

TABLE 9

Well number	Owner or name	Driller	Date completed	Altitude (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Depth of screen below land surface (feet)	Water-bearing formation
Fg 33	W. C. Raley	—	—	30	Dug	9.3	39	—	Pleistocene
Fg 34	Bernard Trossback	—	—	14	do	7.3	36	—	do
Fg 35	Mrs. Criwley	—	1948	11	do	—	36	—	do
Fg 36	St. Peter Claver Church	—	—	70	do	27.3	40	—	do
Fg 37	B. M. Morley	—	Before 1893	5	Drilled	365	1½	None	Nanjemoy and Jackson
Fg 38	A. P. Medley	—	—	80	Dug	32.2	38	—	Pleistocene
Fg 39	J. C. Raley	Clark	1929	16	Drilled	300–350(?)	1½	None	Nanjemoy and Jackson
Fh 1	H. G. Coughlin	Watts	1946	9	do	365	2	None	do
Fh 2	M. A. Mace	Washington Pump & Well Co.	1946	9	do	355	6–4	None	do
Fh 3	C. A. Ferris	Wilson	1949	6	do	415	1½	None	do
Fh 4	H. G. Coughlin	do	1947	6	do	405	1½	None	do
Fh 5	E. D. Easley	do	1947	5	do	419	1½	None	do
Fh 6	R. Naylor	do	1949	6	do	400	2½–1½	None	do
Gg 1	J. Linwood Trossback	Deagle	1946	6	do	420	2	None	do
Gg 2	Do	—	—	6	Dug	14	36	—	Pleistocene
Gg 3	Emel Visek	—	—	4	Drilled	300(?)	6	None	Nanjemoy and Jackson
Gg 4	J. J. Quinn	Watts	1946	3	do	360	2	None	do
Gg 5	George D. Collins	do	1946	4	do	360	2	None	do
Gg 6	H. H. Farguhur	Deagle	1947	3	do	420	1½–¾	None	do
Gg 7	Mrs. Thomas Ridgell	Wilson	1947	6	do	419	1½	None	do
Gg 8	Camp Ernest Brown	Deagle	1949	9	do	399	2	None	do
Gg 9	Do	Payne	1941	9	do	410	2½	None	do
Gg 10	Do	do	1940	7	do	410	2½	None	do
Gg 11	R. Hewlett	—	—	4	Dug	10.2	26	—	Pleistocene
Gg 12	Mrs. Dirum	Wilson	1949	6	Drilled	38.5	1½	None	Nanjemoy and Jackson
Gh 1	Point Lookout Hotel	—	1928	5	do	696.5	8	—	Upper Cretaceous
Gh 2	A. Cicimono	Deagle	1947	5	do	406	1½	None	Nanjemoy and Jackson
Gh 3	J. H. Grubb	Wilson	1948	4	do	410	1½	None	do
Gh 4	B. F. Sullivan	do	1949	3	do	420	1½–¾	None	do
Gh 5	U. S. Coast Guard	—	1930	5	do	—	—	None	do
Gh 6	R. L. Lynch	Wilson	1950	3	do	400	1½–¾	None	do
Westmoreland Co., Virginia									
37a	W. P. Campbell	A. R. Wilson	1950	23	do	231	1½	None	do
Northumberland Co., Virginia									
5a	C. H. Howell	do	1950	17	do	284	1½	None	do

—Concluded

Water level (feet below land surface)			Pumping equipment	Yield		Specific capacity (g.p.m./ft.)	Use of water	Temperature (°F.)	Remarks
Static	Pumping	Date		Gallons a minute	Date				
6.91	—	Sept. 7, 1949	B	—	—	—	F	—	
4.52	—	Sept. 7, 1949	S, H	—	—	—	D	—	
6.9	—	Sept. 7, 1949	S, E	—	—	—	D	—	Water reported high in iron.
24.8	—	Sept. 7, 1949	C, E and H	—	—	—	S	—	
—	—	—	S, G	—	—	—	—	—	Flowing well.
28.2	—	Sept. 7, 1949	B	—	—	—	D	—	
—	—	—	S, E	—	—	—	D	—	
6.62	15	Dec. 9, 1946	N	4	Dec. 9, 1946	0.5	N	59	See well log. Well abandoned.
—	—	—	S, E	10	July 1946	0.5	D	—	See well log.
7[a]	—	Sept. 1949	S, H	15	—	—	D	—	Do.
7[a]	15[a]	Dec. 4, 1947	S, E and H	20	Dec. 4, 1947	2.5	D	—	Do.
6[a]	12[a]	June 19, 1947	S, E	19	June 19, 1947	3.0	D	—	Do.
8[a]	—	July 1949	S, E and H	15	July 1949	—	D	—	Do.
3[a]	12[a]	Sept. 7, 1946	S, E	12	Sept. 7, 1946	0.8	D, F	—	Do.
—	—	—	N	—	—	—	N	—	
4.90	12	Nov. 19, 1946	S, E	—	—	—	D	—	
8[a]	20[a]	June 20, 1946	S, H	3	June 20, 1946	0.3	D	—	Do.
2[a]	18[a]	June 10, 1946	S, H	3	June 10, 1946	0.2	D	—	Do.
1[a]	8[a]	July 20, 1947	S, H	12	July 20, 1947	1.7	D	—	Do.
6[a]	12[a]	July 1947	S, E	14	July 1947	2.3	D	—	Do.
	22[a]	Sept. 7, 1949	S, H	12	Aug. 4, 1949	1.7	S	—	Do.
10.08		Aug. 4, 1949							
—	—	—	N	—	—	—	N	—	
—	—	—	S, E	—	—	—	S	—	
6.1	—	Sept. 7, 1949	B	—	—	—	D	—	
6.59	—	Sept. 7, 1949	S, H	—	—	—	D	—	Do.
-	—	—	S, E	83.4	1928	—	C	—	Well flowed 24 gal. a min. in 1928. See well log and chemical analysis. Estimated water level 15 feet above land surface, March 1947.
7[a]	20[a]	May 28, 1947	S, H	12	May 28, 1947	1.0	D	—	See well log.
4[a]	—	Oct. 14, 1948	S, H	15	Oct. 14, 1948	—	D	—	Do.
2.5	—	June 1949	S, H	15	June 1949	—	D	—	Do.
—	—	Sept. 9, 1949	S, H	—	—	—	D	—	Flowing well.
2.22	—	June 9, 1949	S, E	15	May 10, 1950	—	D	—	See well log.
	15[a]	May 22, 1950	S, E and H	—	—	—	D	—	Do.
11.45	—	Aug. 1, 1950							
12[a]	19[a]	July 3, 1950	S, E and H	16	July 3, 1950	2.3	D		Do.

TABLE 10

Drillers' Logs of Wells

	Thickness (feet)	Depth (feet)
Well St.M.-Bb 4 (Altitude: 176 feet)		
Pleistocene sediments:		
Sand and gravel	20	20
Clay, yellow	10	30
Chesapeake group:		
Clay, sandy, blue	15	45
Oyster shells and stones (fused)	2	47
Clay, blue	13	60
Clay, blue, and oyster shells	90	150
Clay, sandy, green, and oyster shells	90	240
Nanjemoy formation:		
Marl, black, and oyster shells	200	440
Clay, red	8	448
Aquia greensand:		
Sand, black (small amount of water)	2	450
Clay, hard, green, mixture of brown clay	20	470
Sand, brownish gray (water)	10	480
Well St.M.-Bc 1 (Altitude: 165 feet)		
Pleistocene sediments:		
Gravel	10	10
Sand ("muddy")	30	40
Chesapeake group:		
Marl	220	260
Clay, gray	130	390
Clay, blue	30	420
Clay, brown	30	450
Aquia greensand:		
Sand (water)	20	470
Well St.M.-Bc 2 (Altitude: 3 feet)		
Pleistocene sediments:		
Sand, yellow	15	15
Sand, white	5	20
Gravel	6	26
Chesapeake group:		
Clay, blue	62	88
Sediments of Jackson age:		
Sand and rock, gray; shells (water)	12	100
Nanjemoy formation:		
Clay, brown	22	122
Sand and clay, black	58	180
Sand, black, little gravel, and clay (water)	20	200
Sand and clay, black	111	311
Clay, gray	1	312
Clay, red	1	313
Aquia greensand:		
Sand (water)	23	336

TABLE 10—*Continued*

Well St.M.-Bc 4 (Altitude: 85 feet)	Thickness (feet)	Depth (feet)
Pleistocene sediments:		
Clay, sandy, yellow	60	60
Chesapeake group:		
Marl	36	96
Sediments of Jackson age:		
Rock	1	97
Shells and marl	23	120
Nanjemoy formation:		
Marl	157	277
Marl, sandy, black (some water)	13	290
Clay, tough, gray	125	415
Aquia greensand:		
Sand, black and white (water)	28	443
Marl	10	453
Marl soft	5	458

Well St.M.-Bc 12 (Altitude: 18 feet)		
Pleistocene sediments:		
Sand, brown	10	10
Sand, white	10	20
Gravel and sand	10	30
Sand, white	10	40
Chesapeake group:		
Clay, greenish	60	100
Sediments of Jackson age:		
Sand, white, and rock	10	110
Nanjemoy formation:		
Sand and clay	40	150
Sand and shells	30	180
Sand (water)	10	190
Clay and sand	10	200
Sand, coarse	10	210
Sand, black, and clay	10	310
Clay, white	7	317
Clay, pink	17	334
Aquia greensand:		
Sand (water)	23	357

Well St.M.-Bd 1 (Altitude: 3 feet)		
Pleistocene sediments:		
Soil, black	3	3
Clay, yellow	5	8
Sand and gravel (little water)	19	27
Chesapeake group:		
Sand, gray, and marl	23	50
Marl, brown	20	70
Marl	32	102

TABLE 10—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Bd 1—*Continued*		
Sediments of Jackson age:		
Shells	5	107
Nanjemoy formation:		
Sand, black	33	140
Sand and shells	28	168
Marl	147	315
Clay, brown	10	325
Aquia greensand:		
Sand (water)	25	350
Well St.M.-Bd 3 (Altitude: 3 feet)		
Pleistocene sediments and Chesapeake group:		
Sand	12	12
Sand and clay	46	58
Clay	72	130
Sediments of Jackson age:		
Rock and sand	20	150
Nanjemoy formation:		
Rock and sand (water)	80	230
Well St.M.-Cb 2 (Altitude: 12 feet)		
Recent or Pleistocene sediments:		
Soil	6	6
Gravel	2	8
Chesapeake group:		
Clay	100	108
Nanjemoy formation:		
Sand and clay, black	170	278
Clay, red	2	280
Aquia greensand:		
Sand (water)	20	300
Well St.M.-Cb 3 (Altitude: 18 feet)		
Pleistocene sediments:		
Clay, yellow	15	15
Sand and gravel	7	22
Chesapeake group:		
Clay, blue	55	77
Sand, gray, and hardpan	53	130
Sediments of Jackson age:		
Rock, hard	12	142
Nanjemoy formation:		
Sand and clay, black	48	190
Clay, gray	50	240
Clay, red	10	250
Aquia greensand:		
Sand, greenish (water)	65	315

TABLE 10—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Cb 4 (Altitude: 40 feet)		
Pleistocene sediments:		
Sand and gravel	15	15
Chesapeake group:		
Clay, blue	55	70
Rock	7	77
Clay, gray	43	120
Sand, gray	20	140
Nanjemoy formation:		
Sand and clay, black	160	300
Sand, black	20	320
Clay, red	5	325
Aquia greensand:		
Sand (water)	25	350
Well St.M.-Cb 5 (Altitude: 100 feet)		
Pleistocene sediments:		
Clay, yellow, and gravel	10	10
Sand, yellow, and clay	50	60
Chesapeake group:		
Clay, gray, and sand	22	82
Clay, blue	28	110
Sand, gray	30	140
Rock	3	143
Clay, blue	19	162
Sand, gray	24	186
Clay, gray, and sand	14	200
Nanjemoy formation:		
Sand, black, shells, and clay	150	350
Clay, gray, and sand	20	370
Clay, red	10	380
Aquia greensand:		
Sand, greenish (water)	32	412
Well St.M.-Cd 1 (Altitude: 10 feet)		
Pleistocene sediments:		
Sand	10	10
Chesapeake group:		
Clay	48	58
Sand and clay	12	70
Clay	60	130
Sediments of Jackson age:		
Rock and sand	20	150
Nanjemoy formation:		
Rock and sand (water)	60	210
Sand and clay	20	230
Well St.M.-Cd 2 (Altitude: 10 feet)		
Pleistocene sediments:		
Sand	12	12

TABLE 10—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Cd 2—*Continued*		
Chesapeake group:		
Sand and clay	46	58
Clay	74	132
Sediments of Jackson age:		
Rock and sand	18	150
Nanjemoy formation:		
Rock and sand (water)	81	231
Well St.M.-Cd 3 (Altitude: 4 feet)		
Pleistocene sediments:		
Sand	10	10
Chesapeake group:		
Clay	48	58
Sand and clay	12	70
Clay	60	130
Sediments of Jackson age:		
Rock and sand	20	150
Nanjemoy formation:		
Rock and sand (water)	80	230
Well St.M.-Cd 4 (Altitude: 3 feet)		
Pleistocene sediments:		
Sand	10	10
Chesapeake group:		
Clay	48	58
Sand and clay	12	70
Clay	60	130
Sediments of Jackson age:		
Rock and sand	70	200
Nanjemoy formation:		
Sand (water)	40	240
Well St.M.-Cd 14 (Altitude: 25 feet)		
Pleistocene sediments:		
Clay, yellow	14	14
Sand, yellow	7	21
Chesapeake group:		
Clay, blue	68	89
Sand, layers of rock	16	105
Sand	55	160
Sediments of Jackson age:		
Rock layers and sand (water)	50	210
Nanjemoy formation:		
Sand and clay, black	164	374
Clay, red	4	378
Aquia greensand:		
Sand, (water)	25	403

TABLE 10—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Ce 2 (Altitude: 1 foot)		
Pleistocene sediments:		
Soil	5	5
Sand	15	20
Clay	20	40
Gravel	5	45
Chesapeake group:		
Clay and sand	155	200
Sediments of Jackson age:		
Rock and sand	82	282
Nanjemoy formation:		
Water-bearing	20	302
Well St.M.-Ce 4 (Altitude: 120 feet)		
Pleistocene sediments:		
Sand	20	20
Chesapeake group:		
Clay, blue	80	100
Sand and shells	20	120
Rock	5	125
Sand	15	140
Marl	180	320
Sediments of Jackson age:		
Rock	1	321
Marl, sandy	44	365
Nanjemoy formation:		
Sand, brown; glauconite, black and abundant	8	373
Clay, sandy, black; glauconite abundant	5	378
Well St.M.-Ce 5 (Altitude: 12 feet)		
Pleistocene sediments:		
Soil	2	2
Sand	18	20
Chesapeake group:		
Clay	160	180
Sand and clay	60	240
Clay	20	260
Sediments of Jackson age:		
Rock and sand (water)	40	300
Well St.M.-Ce 6 (Altitude: 16 feet)		
Pleistocene sediments:		
Clay, brown, and sand	20	20
Chesapeake group:		
Rock, shells, and sand	22	42
Clay and sand	152	194
Sediments of Jackson age:		
Rock; sand, white	48	242

TABLE 10—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Ce 6—*Continued*		
Nanjemoy formation:		
Rock; sand, black	18	260
Rock and sand (water)	52	312
Well St.M.-Ce 7 (Altitude: 8 feet)		
Pleistocene sediments:		
Sand, brown	21	21
Chesapeake group:		
Sand and shells	22	43
Sand and clay	37	80
Clay, greenish	116	196
Sediments of Jackson age:		
Sand, white	42	238
Rock and sand	17	255
Nanjemoy formation:		
Water-bearing	39	294
Well St.M.-Ce 9 (Altitude: 21 feet)		
Pleistocene sediments:		
Clay	5	5
Chesapeake group:		
Sand	41	46
Rock and shells	9	55
Clay	176	231
Sediments of Jackson age:		
Rock and sand	41	272
Nanjemoy formation:		
Water-bearing	31	303
Well St.M.-Ce 10 (Altitude: 3 feet)		
Pleistocene sediments:		
Sand	20	20
Gravel	12	32
Chesapeake group:		
Sand and shells	18	50
Clay and sand	97	147
Gravel and clay	42	189
Sediments of Jackson age:		
Sand	31	220
Nanjemoy formation:		
Rock and sand (water)	74	294
Well St.M.-Ce 11 (Altitude: 5 feet)		
Pleistocene sediments:		
Sand	25	25
Gravel	7	32
Chesapeake group:		
Sand, clay and shells	18	50

TABLE 10—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Cc 11—*Continued*		
Clay and sand	97	147
Clay	42	189
Sediments of Jackson age and Nanjemoy formation:		
Sand	61	250
Nanjemoy formation:		
Sand and rock (water)	44	294
Well St.M.-Cc 12 (Altitude: 3 feet)		
Pleistocene sediments:		
Sand, brown, and clay	21	21
Chesapeake group:		
Sand and shells	22	43
Sand and clay	37	80
Clay	116	196
Sediments of Jackson age and Nanjemoy formation:		
Sand, white	35	231
Sand	24	255
Water-bearing	39	294
Well St.M.-Cc 13 (Altitude: 10 feet)		
Pleistocene sediments:		
Sand, brown	21	21
Chesapeake group:		
Clay, sand, and shells	19	40
Sand	20	60
Clay, sandy	30	90
Sand	20	110
Clay	20	130
Sand	10	140
Clay, green	40	180
Chesapeake group and sediments of Jackson age:		
Sand	30	210
Sediments of Jackson age and Nanjemoy formation:		
Sand and rock	30	240
Nanjemoy formation:		
Sand (water)	41	281
Well St.M.-Cc 14 (Altitude: 85 feet)		
Pleistocene sediments:		
Soil	5	5
Sand and gravel	13	18
Chesapeake group and sediments of Jackson age:		
Clay, blue	11	29
Clay, gray	17	46
Marl	57	103
Sand, very fine, dry	73	176
Marl	129	305
Sand, white, and shells	10	315

TABLE 10—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Ce 14—*Continued*		
Sediments of Jackson age:		
Clay, gray	39	354
Nanjemoy formation:		
Sand, brown (water)	9	363
Well St.M.-Ce 16 (Altitude: 9 feet)		
Pleistocene sediments:		
Sand, brown	20	20
Chesapeake group:		
Sand and shells	19	39
Clay	89	128
Sand, white	23	151
Clay, greenish	50	201
Chesapeake group and sediments of Jackson age:		
Sand, white	47	248
Sediments of Jackson age:		
Sand and rock	16	264
Nanjemoy formation:		
Sand (water)	30	294
Well St.M.-Ce 19 (Altitude: 80 feet)		
Pleistocene sediments:		
Clay, red, and gravel	21	21
Chesapeake group:		
Sand, blue	6	27
Clay, sandy	28	55
Layers of shells and sand	29	84
Clay, sandy	21	105
Clay	84	189
Sand streaks	10	199
Clay, brown	53	252
Sediments of Jackson age:		
Layers of rock and sand	42	294
Nanjemoy formation:		
Sand (water)	36	330
Well St.M.-Db 2 (Altitude: 12 feet)		
Pleistocene sediments:		
Sand and clay	21	21
Chesapeake group:		
Clay, green	41	62
Sand and clay, gray	30	92
Nanjemoy formation:		
Sand and clay, black	163	255
Clay, red	5	260
Aquia greensand:		
Sand (water)	33	293

TABLE 10—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Db 3 (Altitude: 25 feet)		
Pleistocene sediments:		
Clay, yellow	10	10
Gravel	7	17
Chesapeake group:		
Clay, blue	88	105
Sediments of Jackson age:		
Rock and sand	30	135
Nanjemoy formation:		
Clay, sandy, black	148	283
Clay, red	1	284
Aquia greensand:		
Sand (water)	35	319
Well St.M.-Db 4 (Altitude: 1 foot)		
Pleistocene sediments and Chesapeake group:		
Sand	15	15
Sand, blue	90	105
Nanjemoy formation:		
Sand, black	105	210
Clay, red	10	220
Aquia greensand:		
Sand (water)	71	291
Well St.M.-Db 5 (Altitude: 145 feet)		
Pleistocene sediments:		
Clay, yellow	8	8
Gravel, coarse	12	20
Sand, yellow	4	24
Clay and sand, yellow	28	52
Chesapeake group:		
Sand, gray, and shells	34	86
Rock, hard	9	95
Clay, blue	63	158
Nanjemoy formation:		
Sand, black, and shells	30	188
Sand and clay, black	137	325
Clay, gray	30	355
Clay, red	8	363
Aquia greensand:		
Sand, greenish (water)	59	422
Well St.M.-Db 6 (Altitude: 10 feet)		
Pleistocene sediments:		
Clay, yellow	5	5
Gravel and sand	15	20
Mud, green	5	25
Gravel and sand	12	37

TABLE 10—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Db 6—*Continued*		
Chesapeake group (?):		
Clay, blue	15	52
Sand, gray	8	60
Mud and shells	24	84
Nanjemoy formation:		
Sand and rock, black	6	90
Sand, black, shells and clay	15	105
Sand and clay, black	144	249
Clay, red	3	252
Aquia greensand:		
Sand (water)	52	304
Well St.M.-Db 7 (Altitude: 16 feet)		
Pleistocene sediments:		
Clay, yellow	5	5
Sand, yellow	5	10
Sand, white	11	21
Sand and gravel	5	26
Chesapeake group:		
Clay, blue	46	72
Sediments of Jackson age:		
Sand, gray, and shells	11	83
Nanjemoy formation:		
Sand, black, and shells	10	93
Rock and sand	3	96
Sand, black	29	125
Sand and clay, black	136	261
Clay, red	1	262
Aquia greensand:		
Sand (water)	35	297
Well St.M.-Db 8 (Altitude: 17 feet)		
Pleistocene sediments:		
Clay, yellow	18	18
Sand, gray	10	28
Clay and sand, dark	42	70
Gravel	4	74
Chesapeake group:		
Clay, blue	18	92
Sediments of Jackson age:		
Rock and sand	28	120
Nanjemoy formation:		
Sand and clay, black	130	250
Clay, red	25	275
Aquia greensand:		
Sand (water)	37	312

TABLE 10—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Db 9 (Altitude: 20 feet)		
Pleistocene sediments:		
Sand, brown	29	29
Sand and gravel	23	52
Chesapeake group:		
Clay, blue	28	80
Sediments of Jackson age:		
Sand and rock	28	108
Nanjemoy formation:		
Rock, sand, and shells	40	148
Sand and clay	136	284
Clay, red	4	288
Aquia greensand:		
Sand (water)	26	314
Well St.M.-Db 10 (Altitude: 10 feet)		
Pleistocene sediments:		
Sand and clay	20	20
Chesapeake group:		
Clay, blue	40	60
Clay and sand	60	120
Nanjemoy formation:		
Sand and clay, black	140	260
Clay, red	4	264
Aquia greensand:		
Sand (water)	26	290
Well St.M.-Db 11 (Altitude: 27 feet)		
Pleistocene sediments:		
Clay and sand, brown	10	10
Chesapeake group:		
Clay and sand, blue	15	25
Clay, blue	67	92
Sediments of Jackson age:		
Rock, sand, and shells	43	135
Nanjemoy formation:		
Sand and clay, black	135	270
Clay, reddish	3	273
Aquia greensand:		
Sand (water)	35	308
Well St.M.-Db 12 (Altitude: 16 feet)		
Pleistocene sediments:		
Clay	25	25
Sand	10	35
Sand and gravel	19	54
Chesapeake group:		
Clay	50	104

TABLE 10—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Db 12—*Continued*		
Sediments of Jackson age:		
Sand, rock, and shells	37	141
Nanjemoy formation:		
Sand and clay	135	276
Clay, pink	3	279
Aquia greensand:		
Sand (water)	31	310
Well St.M.-Db 14 (Altitude: 16 feet)		
Pleistocene sediments:		
Rock and clay, yellow	35	35
Sand and gravel	14	49
Chesapeake group:		
Clay, greenish	43	92
Sediments of Jackson age:		
Sand, rock, and shells	34	126
Nanjemoy formation:		
Sand, black, and clay	151	277
Clay, red	5	282
Aquia greensand:		
Sand (water)	28	310
Well St.M.-Db 15 (Altitude: 6 feet)		
Pleistocene sediments:		
Clay, yellow	5	5
Sand, yellow	7	12
Sand, white	6	18
Clay, white	4	22
Sand, gray	5	27
Sand and gravel, gray	18	45
Chesapeake group:		
Clay, blue	21	66
Sediments of Jackson age:		
Sand, gray, and shells	19	85
Nanjemoy formation:		
Sand, black, and shells	5	90
Sand, black	5	95
Sand and rock, black	10	105
Sand and clay, black	156	261
Clay, red	2	263
Aquia greensand:		
Sand (water)	36	299
Well St.M.-Db 16 (Altitude: 16 feet)		
Pleistocene sediments:		
Sand	35	35
Sand and mud	15	50
Clay	20	70
Gravel	10	80
Sand, gray	30	110

TABLE 10—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Db 16—*Continued*		
Nanjemoy formation:		
Sand and clay, black	138	248
Clay, red	6	254
Aquia greensand:		
Sand (water)	27	281
Well St.M.-Db 17 (Altitude: 21 feet)		
Pleistocene sediments:		
Sand and clay	25	25
Chesapeake group:		
Clay	123	148
Sand and clay	121	269
Clay, pink	2	271
Aquia greensand:		
Sand (water)	32	303
Well St.M.-Db 18 (Altitude: 6 feet)		
Pleistocene sediments:		
Gravel	7	7
Clay, yellow	10	17
Chesapeake group:		
Clay, blue	66	83
Sand and clay	11	94
Nanjemoy formation:		
Sand and clay, black	156	250
Clay, red	3	253
Aquia greensand:		
Sand (water)	40	293
Well St.M.-Db 19 (Altitude: 11 feet)		
Pleistocene sediments:		
Clay and sand	26	26
Clay, blue	56	82
Sand and gravel	10	92
Sediments of Jackson age:		
Rock and sand	33	125
Nanjemoy formation:		
Sand and clay, black	135	260
Clay, red	4	264
Aquia greensand:		
Sand (water)	30	294
Well St.M.-Db 20 (Altitude: 14 feet)		
Pleistocene sediments:		
Clay, yellow	10	10
Sand, yellow	20	30
Mud, gray	45	75
Gravel	3	78

TABLE 10—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Db 20—*Continued*		
Chesapeake group (?):		
Mud, gray	26	104
Sediments of Jackson age (?):		
Sand, gray	21	125
Nanjemoy formation:		
Sand, black, and shells	17	142
Sand and clay, black	136	278
Clay, red	1	279
Aquia greensand:		
Sand (water)	45	324
Well St.M.-Db 21 (Altitude: 29 feet)		
Pleistocene deposits:		
Sand and gravel	15	15
Chesapeake group:		
Clay, blue	45	60
Clay, green	47	107
Sediments of Jackson age:		
Rock, sand, and shells	19	126
Nanjemoy formation:		
Sand and clay, black	157	283
Clay, red	2	285
Aquia greensand:		
Sand (water)	25	310
Well St.M.-Db 22 (Altitude: 10 feet)		
Pleistocene sediments:		
Clay, yellow	10	10
Sand and gravel	17	27
Clay, soft, dark	68	95
Sand and gravel	10	105
Sediments of Jackson age:		
Rock	3	108
Nanjemoy formation:		
Clay, sandy, black	157	265
Clay, red	2	267
Aquia greensand:		
Sand (water)	41	308
Well St.M.-Db 23 (Altitude: 27 feet)		
Pleistocene sediments:		
Clay, yellow	18	18
Chesapeake group:		
Clay, blue	103	121
Nanjemoy formation:		
Sand and clay, black	139	260
Clay, red	5	265
Aquia greensand:		
Sand (water)	45	310

TABLE 10—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Db 28 (Altitude: 18 feet)		
Pleistocene sediments:		
Clay, yellow	12	12
Sand, yellow	6	18
Clay, soft	47	65
Gravel	5	70
Chesapeake group:		
Clay, blue	30	100
Nanjemoy formation:		
Sand and clay, black	160	260
Clay, red	5	265
Aquia greensand:		
Sand (water)	32	297
Well St.M.-Dc 2 (Altitude: 2 feet)		
Pleistocene sediments:		
Clay	15	15
Sand	15	30
Marl, blue	75	105
Sand and gravel	15	120
Nanjemoy formation:		
Sand and clay, black	175	295
Clay, red	3	298
Aquia greensand:		
Sand (water)	35	333
Well St.M.-Dc 3 (Altitude: 21 feet)		
Pleistocene sediments and Chesapeake group (?):		
Clay	10	10
Sand	5	15
Clay	10	25
Sand	10	35
Marl, blue	35	70
Sand	35	105
Sediments of Jackson age:		
Sand and rock (water)	25	130
Nanjemoy formation:		
Sand and clay, black	173	303
Clay, red	2	305
Aquia greensand:		
Sand (water)	25	330
Well St.M.-Dc 5 (Altitude: 15 feet)		
Pleistocene sediments:		
Clay	14	14
Sand and clay	15	29
Clay	92	121
Gravel	12	133

TABLE 10—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Dc 5—*Continued*		
Sediments of Jackson age:		
Rock and sand	14	147
Nanjemoy formation:		
Sand and clay	166	313
Clay, pink	2	315
Aquia greensand:		
Sand (water)	24	339
Well St.M.-Dc 6 (Altitude: 15 feet)		
Pleistocene sediments:		
Sand and clay, brown	21	21
Clay, blue, and sand	65	86
Sand, white	34	120
Sand and gravel	10	130
Sediments of Jackson age:		
Sand and rock	27	157
Nanjemoy formation:		
Sand and clay, black	156	313
Clay, red	2	315
Aquia greensand:		
Sand (water)	30	345
Well St.M.-Dc 7 (Altitude: 23 feet)		
Pleistocene sediments:		
Sand and clay	30	30
Chesapeake group:		
Clay	63	93
Sediments of Jackson age and Nanjemoy formation:		
Sand and rock	55	148
Nanjemoy formation:		
Sand and clay	162	310
Clay, pink	2	312
Aquia greensand:		
Sand (water)	28	340
Well St.M.-Dc 8		
Pleistocene sediments:		
Sand	30	30
Chesapeake group:		
Clay	90	120
Sediments of Jackson age:		
Sand and rock	29	149
Nanjemoy formation:		
Sand and clay	158	307
Clay, pink	2	309
Aquia greensand:		
Sand (water)	31	340

TABLE 10—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Dc 11 (Altitude: 20 feet)		
Pleistocene sediments:		
Sand, brown, and clay	30	30
Chesapeake group:		
Clay, bluish	70	100
Sediments of Jackson age:		
Sand, shells, and rock	50	150
Nanjemoy formation:		
Clay and sand, black	155	305
Clay, red	2	307
Aquia greensand:		
Sand (water)	29	336
Well St.M.-Dc 12 (Altitude: 13 feet)		
Pleistocene sediments and Chesapeake group:		
Sand and gravel	10	10
Clay, blue	95	105
Sediments of Jackson age:		
Sand and sandstone, gray; shells (water)	10	115
Nanjemoy formation:		
Sand, black, and shells	11	126
Sand and clay	148	274
Clay, red	10	284
Aquia greensand:		
Sand, greenish-black (water)	42	326
Well St.M.-Dc 13 (Altitude: 12 feet)		
Pleistocene sediments:		
Clay, yellow, and gravel	10	10
Sand	9	19
Chesapeake group:		
Sand and clay	41	60
Clay, blue	30	90
Sediments of Jackson age:		
Rock, sand, and shells	30	120
Nanjemoy formation:		
Sand and clay, black	135	255±
Clay, red	20	275±
Aquia greensand:		
Sand (water)	135	410
Well St.M.-Dc 14 (Altitude: 12 feet)		
Pleistocene sediments:		
Clay and sand, brown	21	21
Clay, blue	26	47
Clay and gravel	5	52

TABLE 10—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Dc 14—*Continued*		
Chesapeake group:		
Clay, bluish	32	84
Rock, sand, and shell	42	126
Nanjemoy formation:		
Sand and clay, black	154	280
Clay, red	2	282
Aquia greensand:		
Sand (water)	28	310
Well St.M.-Dc 15 (Altitude: 12 feet)		
Pleistocene sediments:		
Clay	10	10
Clay and sand	80	90
Sand and gravel	15	105
Sediments of Jackson age:		
Rock and sand	21	126
Nanjemoy formation:		
Sand and clay	157	283
Clay, pink	2	285
Aquia greensand:		
Sand (water)	30	315
Well St.M.-Dc 16 (Altitude: 12 feet)		
Pleistocene sediments:		
Clay, brown	10	10
Sand, brown	7	17
Chesapeake group:		
Clay, blue	78	95
Sediments of Jackson age:		
Sand and rock	35	130
Nanjemoy formation:		
Sand, black, and rock	156	286
Clay, red	3	289
Aquia greensand:		
Sand (water)	26	315
Well St.M.-Dc 17 (Altitude: 6 feet)		
Pleistocene sediments:		
Clay, yellow	5	5
Sand, yellow	5	10
Sand and gravel	5	15
Mud, soft	15	30
Gravel	10	40
Chesapeake group:		
Clay, blue	61	101
Sediments of Jackson age:		
Sand, gray, and shells; sandstone	39	140

TABLE 10—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Dc 17—*Continued*		
Nanjemoy formation:		
Sand and clay, black	120	260
Clay, gray	4	264
Clay, red	10	274
Aquia greensand:		
Sand, greenish-black (water); rock at 326 feet	52	326
Well St.M.-Dc 18 (Altitude: 12 feet)		
Pleistocene sediments:		
Clay, yellow	20	20
Sand	2	22
Clay, soft	78	100
Gravel	3	103
Nanjemoy formation:		
Sand and clay, black	172	275
Aquia greensand:		
Sand (water)	55	330
Well St.M.-Dc 19 (Altitude: 11 feet)		
Pleistocene sediments and Chesapeake group:		
Clay, yellow	10	10
Sand, brown	6	16
Clay, blue	79	95
Sediments of Jackson age:		
Rock and sand	35	130
Nanjemoy formation:		
Sand and clay, black	160	290
Clay, red	2	292
Aquia greensand:		
Sand (water)	23	315
Well St.M.-Dc 20 (Altitude: 11 feet)		
Pleistocene sediments:		
Clay, yellow	10	10
Sand	10	20
Clay, soft, dark	60	80
Sand	10	90
Sand and gravel	25	115
Sediments of Jackson age and Nanjemoy formation:		
Sand and clay, black	120	250
Clay, red and white	25	275
Aquia greensand:		
Sand (water)	40	315
Well St.M.-Dc 21 (Altitude: 12 feet)		
Pleistocene sediments:		
Sand and clay	13	13

TABLE 10—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Dc 21—*Continued*		
Clay	77	90
Sand and gravel	15	105
Sediments of Jackson age:		
Rock and sand	31	136
Nanjemoy formation:		
Sand and clay	149	285
Clay, red	2	287
Aquia greensand:		
Sand (water)	28	315
Well St.M.-Dc 22 (Altitude: 12 feet)		
Pleistocene sediments:		
Clay, yellow	8	8
Sand and clay, dark	13	21
Clay, dark	82	103
Gravel and sand	10	113
Nanjemoy formation:		
Sand and clay, black	157	270
Clay, red	5	275
Aquia greensand:		
Sand (water)	44	319
Well St.M.-Dc 26 (Altitude: 2 feet)		
Pleistocene sediments:		
Clay, blue	20	20
Sand	10	30
Chesapeake group:		
Clay, gray	255	285
Nanjemoy formation:		
Marl, black	25	310
Sand, fine	20	330
Aquia greensand:		
Sand, medium (water)	20	350
Well St.M.-Dc 34 (Altitude: 12 feet)		
Pleistocene sediments and Chesapeake group:		
Sand and clay	45	45
Clay	41	86
Sand and clay	3	89
Clay	21	110
Sediments of Jackson age:		
Rock and sand	38	148
Sand and clay	152	300
Clay, pink	2	302
Aquia greensand:		
Sand (water)	34	336

TABLE 10—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Dc 35 (Altitude: 12 feet)		
Pleistocene sediments:		
Sand and clay	29	29
Clay, blue	78	107
Sand and gravel	8	115
Sediments of Jackson age:		
Sand and rock	31	146
Nanjemoy formation:		
Sand and clay	150	296
Clay, pink	2	298
Aquia greensand:		
Sand (water)	31	329
Well St.M. Dc-36 (Altitude: 130 feet)		
Pleistocene sediments:		
Soil	3	3
Clay, yellow	7	10
Sand and gravel	10	20
Chesapeake group:		
Marl, blue	32	52
Shells	2	54
Marl, blue	10	64
Shells	11	75
Marl	170	245
Sediments of Jackson age and Nanjemoy formation:		
Shells	3	248
Marl	62	310
Marl, sandy, sticky	107	417
Clay, blue	3	420
Aquia greensand:		
Sand, black, very fine	78	498
Sand, black, medium fine	15	513
Well St.M.-Dd 1 (Altitude: 93 feet)		
Pleistocene sediments:		
Sand and gravel	20	20
Sand, muddy	30	50
Chesapeake group:		
Sand and shells	30	80
Marl	150	230
Sediments of Jackson age:		
Sand and shells	15	245
Nanjemoy formation:		
Marl, sandy	65	310
Clay, blue	100	410
Clay, pink	17	427
Aquia greensand:		
Sand, fine	23	450
Sand, medium (water)	44	494

TABLE 10—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Dd 14 (Altitude: 35 feet)		
Pleistocene sediments:		
Sand and gravel, brown	30	30
Clay, blue	10	40
Sand, white	20	60
Chesapeake group:		
Clay	120	180
Sediments of Jackson age and Nanjemoy formation:		
Sand, rock, and shells (water)	70	250
Well St.M.-Dd 15 (Altitude: 40 feet)		
Pleistocene sediments:		
Sand and gravel	29	29
Chesapeake group:		
Sand and clay	31	60
Clay	118	178
Sediments of Jackson age and Nanjemoy formation:		
Rock and sand (water)	53	231
Well St.M.-Dd 18 (Altitude: 30 feet)		
Pleistocene sediments:		
Clay	12	12
Sand	25	37
Sand and gravel	23	60
Chesapeake group:		
Clay	130	190
Sediments of Jackson age and Nanjemoy formation:		
Sand and rock (water)	62	252
Well St.M.-Dd 22 (Altitude: 30 feet)		
Pleistocene sediments:		
Clay, white	10	10
Sand and gravel	11	21
Chesapeake group:		
Sand and fine shells	27	48
Clay, blue	78	126
Clay, brown	49	175
Sand, white, and fine shells	15	190
Sediments of Jackson age and Nanjemoy formation:		
Layers of rock	10	200
Sand (water)	18	218
Well St.M.-De 1 (Altitude: 3 feet)		
Pleistocene sediments and Chesapeake group:		
Soil	3	3
Clay	217	220
Sediments of Jackson age and Nanjemoy formation:		
Sand and mud	60	280
Nanjemoy formation:		
Sand (water)	20	300

TABLE 10—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-De 3 (Altitude: 107 feet)		
Pleistocene sediments:		
Sand	60	60
Chesapeake group:		
Clay, blue	30	90
Sand and shells	55	145
Marl	145	290
Sediments of Jackson age and Nanjemoy formation:		
Sand, muddy	20	310
Marl, sandy	35	345
Nanjemoy formation:		
Sand (water)	18	363
Well St.M.-De 4 (Altitude: 17 feet)		
Pleistocene sediments:		
Sand and gravel	20	20
Chesapeake group:		
Marl	195	215
Sediments of Jackson age and Nanjemoy formation:		
Sand and shells	15	230
Marl	45	275
Nanjemoy formation:		
Sand (water)	15	290
Well St.M.-De 6 (Altitude: 120 feet)		
Pleistocene sediments:		
Sand and gravel	20	20
Sand, yellow	20	40
Chesapeake group:		
Clay, blue	60	100
Sediments of Jackson age and Nanjemoy formation:		
Sand and shells, black	58	158
Marl, black	64	222
Marl, sandy	108	330
Nanjemoy formation:		
Sand, medium (water)	11	341
Well St.M.-De 7 (Altitude: 120 feet)		
Pleistocene sediments and Chesapeake group:		
Sand, brown	150	150
Marl, black	146	296
Sediments of Jackson age and Nanjemoy formation:		
Rock	2	298
Sand and marl, muddy	12	310
Sand and shells	20	330
Clay, gray	46	376
Nanjemoy formation:		
Sand, brown	4	380

TABLE 10—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-De 8 (Altitude: 97 feet)		
Pleistocene sediments:		
Sand and clay	30	30
Sand and gravel	15	45
Chesapeake group:		
Clay, blue	67	112
Sand	80	192
Marl	100	292
Sediments of Jackson age:		
Rock	2	294
Marl, sandy	34	328
Rock	2	330
Nanjemoy formation:		
Marl, sandy	30	360
Well St.M.-De 12 (Altitude: 11 feet)		
Pleistocene sediments:		
Sand and clay	18	18
Rock and sand	12	30
Chesapeake group:		
Clay	178	208
Sediments of Jackson age and Nanjemoy formation:		
Sand and rock	17	225
Clay	40	265
Sand and rock (water)	35	300
Well St.M.-De 18 (Altitude: 110 feet)		
Pleistocene sediments:		
Clay	17	17
Gravel	2	19
Chesapeake group (?):		
Sand	19	38
Chesapeake group:		
Sand and clay	62	100
Shells and sand	30	130
Clay	166	296
Sediments of Jackson age:		
Sand and shells	5	301
Rock and sand (water)	47	348
Well St.M-Df 1 (Altitude: 96 feet)		
Pleistocene sediments:		
Clay and gravel, yellow	12	12
Clay, sandy, yellow	23	35
Clay and sand, brown	17	52
Chesapeake group:		
Marl, black and blue	266	318
Sediments of Jackson age:		
Rock	5	323
Sand, black, and shells (water)	12	335
Sand, black and white; some shells	22	357

TABLE 10—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Df 1—*Continued*		
Nanjemoy formation:		
Marl, blue and greeen	98	455
Clay, black and blue	48	503
Clay, light gray (very sticky)	34	537
Aquia greensand:		
Sand, brown and black, fine	25	562
Sand, brown and black (water)	25	587
Well St.M.-Df 2 (Altitude: 113 feet)		
Pleistocene sediments:		
Clay, red	6	6
Sand and gravel	79	85
Chesapeake group, sediments of Jackson age, and Nanjemoy formation:		
Clay, blue	55	140
Marl and shells	140	280
Marl	60	340
Sand	60	400
Marl and clay, blue	147	547
Aquia greensand:		
Sand (water)	48	595
Well St.M.-Df 3 (Altitude: 106 feet)		
Pleistocene sediments:		
Clay, red	20	20
Sand and gravel	35	55
Chesapeake group:		
Clay, blue	80	135
Marl	183	318
Sediments of Jackson age and Nanjemoy formation:		
Rock	5	323
Clay, sandy	12	335
Sand and shells	60	395
Clay, sandy, blue	153	548
Aquia greensand:		
Sand, fine (water)	17	565
Sand, medium, coarse (water)	20	585
Well St.M.-Df 4 (Altitude: 83 feet)		
Pleistocene sediments and Chesapeake group:		
Clay, blue	100	100
Marl	200	300
Sediments of Jackson age:		
Rock	1	301
Sand	42	343
Nanjemoy formation:		
Marl and clay	175	518
Aquia greensand:		
Sand (water)	29	547

TABLE 10—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Df 5 (Altitude: 78 feet)		
Pleistocene sediments:		
Soil and clay	16	16
Sand and gravel	39	55
Chesapeake group:		
Clay, blue-black	83	138
Marl	174	312
Sediments of Jackson age and Nanjemoy formation:		
Rock	6	318
Sand and clay	12	330
Sand, gravel, and shells	60	390
Clay, blue	139	529
Aquia greensand:		
Sand and gravel, medium, coarse	23	552
Well St.M.-Df 6 (Altitude: 115 feet)		
Pleistocene sediments:		
Clay, yellow	20	20
Clay and sand	35	55
Chesapeake group:		
Marl	247	302
Marl and shells	28	330
Clay	15	345
Sediments of Jackson age:		
Rock	1	346
Sand (water)	11	357
Well St.M.-Df 7 (Altitude: 45 feet)		
Pleistocene sediments:		
Topsoil, sand, and gravel	20	20
Chesapeake group:		
Clay, blue	40	60
Sand and shells	10	70
Marl, blue	202	272
Sediments of Jackson age:		
Rock	3	275
Marl, sandy	6	281
Sand (water)	54	335
Clay and marl, black	147	482
Aquia greensand:		
Sand, black and brown (water)	36	518
Well St.M.-Df 8 (Altitude: 46 feet)		
Pleistocene sediments:		
Soil	7	7
Sand and gravel	53	60
Marl	15	75
Sand and gravel	10	85

TABLE 10—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Df 8—*Continued*		
Chesapeake group and Nanjemoy formation:		
Marl and clay	180	265
Clay, pink	10	275
Sand (water)	11	286
Well St.M.-Df 9 (Altitude: 47 feet)		
Pleistocene sediments:		
Topsoil, sand, and gravel	45	45
Marl	39	84
Sand and gravel	9	93
Chesapeake group:		
Marl, sandy, gray	97	190
Marl, greenish	70	260
Clay, sticky	10	270
Sediments of Jackson age:		
Sand (water)	55	325
Well St.M.-Df 10 (Altitude: 46 feet)		
Pleistocene sediments:		
Sand and gravel	90	90
Chesapeake group:		
Marl	185	275
Sediments of Jackson age:		
Sand (water)	55	330
Marl	158	488
Aquia greensand:		
Sand (water)	47	535
Well St.M.-Df 11 (Altitude: 46 feet)		
Pleistocene sediments:		
Topsoil, sand, and gravel	25	25
Chesapeake group:		
Clay, blue	40	65
Sand and shells	10	75
Marl, blue	195	270
Sediments of Jackson age:		
Rock	3	273
Marl, sandy	6	279
Sand (water)	50	329
Nanjemoy formation:		
Clay and marl, black	156	485
Aquia greensand:		
Sand, black and brown (water)	30	515
Well St.M.-Df 12 (Altitude: 12 feet)		
Pleistocene sediments:		
Sand and gravel	50	50

TABLE 10—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Df 12—*Continued*		
Chesapeake group:		
Marl	190	240
Sediments of Jackson age:		
Rock	2	242
Sand and gravel	8	250
Rock	2	252
Sand and shells	18	270
Marl	30	300
Nanjemoy formation:		
Clay, tough	100	400
Clay, sticky	58	458
Aquia greensand:		
Sand and gravel	31	489
Well St.M.-Df 14 (Altitude: 20 feet)		
Pleistocene sediments:		
Clay, brown	8	8
Chesapeake group:		
Clay, blue	28	36
Sand and shells	27	63
Marl, blue	107	170
Marl, sandy	20	190
Marl	45	235
Clay, blue	10	245
Sediments of Jackson age:		
Sand and shells (water)	14	259
Well St.M.-Df 16 (Altitude: 24 feet)		
Pleistocene sediments:		
Clay, yellow	10	10
Sand, yellow	5	15
Chesapeake group:		
Sand and clay, gray	90	105
Clay, blue	95	200
Sand, gray, and shells	10	210
Sediments of Jackson age:		
Sand (water)	60	270
Well St.M.-Df 17 (Altitude: 20 feet)		
Pleistocene sediments:		
Clay, sandy	35	35
Chesapeake group:		
Clay, blue	215	250
Sediments of Jackson age and Nanjemoy formation:		
Shells; sand, black (water)	50	300
Well St.M.-Df 18 (Altitude: 8 feet)		
Pleistocene sediments:		
Clay	15	15
Sand (water)	10	25

TABLE 10—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Df 18—*Continued*		
Chesapeake group:		
Clay, sandy	65	90
Clay, blue	110	200
Sediments of Jackson age and Nanjemoy formation:		
Shells, limestone, and sand	85	285
Well St.M.-Df 21 (Altitude: 13 feet)		
Pleistocene sediments:		
Soil	2	2
Sand	18	20
Chesapeake group:		
Sand and shells	20	40
Clay	200	240
Sediments of Jackson age:		
Rock and sand (water)	40	280
Well St.M.-Df 22 (Altitude: 111 feet)		
Pleistocene sediments:		
Soil	4	4
Sand	96	100
Chesapeake group:		
Clay, blue	40	140
Marl	195	335
Sediments of Jackson age:		
Sand and shells	60	395
Nanjemoy formation:		
Marl, sandy, black	125	520
Clay	23	543
Aquia greensand:		
Sand (water)	63	606
Well St.M.-Df 23 (Altitude: 22 feet)		
Pleistocene sediments:		
Sand and gravel	6	6
Clay, blue	35	41
Hardpan	4	45
Chesapeake group:		
Sand and shells	5	50
Marl	187	237
Sediments of Jackson age:		
Rock	3	240
Sand, gray (water)	20	260
Well St.M.-Df 24 (Altitude: 8 feet)		
Pleistocene sediments and Chesapeake group:		
Soil	3	3
Sand	17	20
Shells and rock	10	30
Sand and clay	130	160
Clay	50	210

TABLE 10—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Df 24—*Continued*		
Sediments of Jackson age and Nanjemoy formation:		
Rock and sand	30	240
Rock and sand (water)	40	280
Well St.M.-Df 25 (Altitude: 110 feet)		
Pleistocene sediments:		
Clay, sandy	21	21
Sand, yellow	30	51
Chesapeake group and sediments of Jackson age:		
Marl, blue	124	175
Sand, fine	49	224
Marl and shells	121	345
Nanjemoy formation:		
Sand (water)	15	360
Well St.M.-Df 27 (Altitude: 5 feet)		
Pleistocene sediments:		
Sand, gravel and limestone	40	40
Chesapeake group:		
Clay, blue	160	200
Sediments of Jackson age:		
Sand, shells, and limestone	50	250
Well St.M.-Df 29 (Altitude: 7 feet)		
Pleistocene sediments:		
Sand and gravel	24	24
Chesapeake group:		
Clay, blue	171	195
Sediments of Jackson age and Nanjemoy formation:		
Porous limestone, shells	55	250
Well St.M.-Df 30 (Altitude: 106 feet)		
Pleistocene sediments:		
Sand and gravel	60	60
Chesapeake group:		
Clay, blue	60	120
Marl, sandy, black	218	338
Sediments of Jackson age:		
Sand (water)	10	348
Well St.M.-Df 33 (Altitude: 18 feet)		
Pleistocene sediments:		
Clay	15	15
Sand (water)	10	25
Chesapeake group:		
Clay, sandy	45	70
Clay, blue	130	200
Sediments of Jackson age:		
Limestone, shells, and sand	90	290

TABLE 10—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Df 34 (Altitude: 78 feet)		
Pleistocene sediments:		
Soil	5	5
Sand, white	13	18
Sand, white and yellow	11	29
Gravel	3	32
Sand, white and yellow	10	42
Gravel	2	44
Chesapeake group (?):		
Sand, white and yellow	66	110
Chesapeake group:		
Sand and clay, gray	20	130
Clay, blue	130	260
Sediments of Jackson age:		
Sand and rock (water)	76	336
Well St.M.-Df 35 (Altitude: 35 feet)		
Pleistocene sediments:		
Sand and gravel	20	20
Chesapeake group:		
Clay, blue	20	40
Marl and shells	50	90
Marl	138	228
Sediments of Jackson age:		
Rock	1	229
Marl	11	240
Sand, gray (water)	21	261
Well St.M.-Df 36 (Altitude: 54 feet)		
Pleistocene sediments:		
Sand, white	30	30
Chesapeake group:		
Sand, blue; some shells	12	42
Clay, sandy	21	63
Sand, fine, and shells	10	73
Rock, soft	2	75
Sand	9	84
Clay, blue	120	204
Rock, soft	2	206
Clay, blue	9	215
Clay, brown	37	252
Sediments of Jackson age:		
Sand and rock	13	265
Layers of rock	8	273
Sand (water)	21	294
Well St.M.-Dg 1 (Altitude: 19 feet)		
Pleistocene sediments:		
Topsoil and sand	24	24

TABLE 10—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Dg 1—*Continued*		
Chesapeake group and sediments of Jackson age:		
Clay, sandy, blue	48	72
Marl, blue and black	193	265
Nanjemoy formation:		
Rock	4	269
Marl	19	288
Sand (water)	49	337
Clay, black (sticky)	118	455
Aquia greensand:		
Sand (water)	25	480
Well St.M.-Dg 2 (Altitude: 12 feet)		
Pleistocene sediments:		
Sand and gravel	25	25
Chesapeake group:		
Marl	229	254
Sediments of Jackson age and Nanjemoy formation:		
Rock and shells	31	285
Clay, blue, tough	73	358
Sand, very fine	2	360
Marl	90	450
Clay, blue	8	458
Aquia greensand:		
Sand, fine (water)	8	466
Sand, medium and coarse (water)	20	486
Well St.M.-Dg 3 (Altitude: 13 feet)		
Pleistocene sediments:		
Soil	10	10
Sand and gravel	15	25
Marl	15	40
Sand and gravel	15	55
Chesapeake group:		
Marl	206	261
Sediments of Jackson age:		
Rock	2	263
Sand, gravel, and shells	4	267
Rock	2	269
Sand	2	271
Rock	1	272
Sand and shells	38	310
Nanjemoy formation:		
Clay, sandy	30	340
Clay, sandy, tough	120	460
Aquia greensand:		
Sand and gravel	29	489

TABLE 10—*Continued*

Well St.M.-Dg 4 (Altitude: 20 feet)		
Pleistocene sediments:		
Clay	8	8
Sand, brown	18.5	26.5
Clay, blue	77.5	104
Sand and gravel	46	150
Chesapeake group:		
Clay, greenish	110	260
Sediments of Jackson age:		
Rock and sand	12	272
Sand (water)	23	295
Well St.M.-Dg 5 (Altitude: 18 feet)		
Pleistocene sediments:		
Sand and gravel	22	22
Chesapeake group:		
Clay, blue	18	40
Sand and shells	23	63
Marl	97	160
Shells	7	167
Marl	108	275
Sediments of Jackson age:		
Sand and shells	49	324
Nanjemoy formation:		
Clay, sandy, gray	136	460
Clay, blue	10	470
Aquia greensand:		
Sand (water)	24	494
Well St.M.-Eb 1 (Altitude: 12 feet)		
Pleistocene sediments:		
Clay, yellow	20	20
Sand, yellow	10	30
Gravel and sand	17	47
Clay, black, soft	43	90
Gravel and sand	13	103
Sediments of Jackson age:		
Rock and sand (a little water)	22	125
Nanjemoy formation:		
Sand and clay, black	150	275
Aquia greensand:		
Sand (water)	49	324
Well St.M.-Eb 2 (Altitude: 12 feet)		
Pleistocene sediments:		
Sand	40	40
Clay, blue	50	90
Sand and gravel	16	106

TABLE 10—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Eb 2—*Continued*		
Sediments of Jackson age:		
Rock, sand, and shells	40	146
Nanjemoy formation:		
Sand and clay, black	144	290
Clay, reddish	2	292
Aquia greensand:		
Sand (water)	26	318
Well St.M.-Eb 3 (Altitude: 12 feet)		
Pleistocene sediments:		
Clay and sand	20	20
Sand and gravel	27	47
Clay	44	91
Sand, shells, and gravel	14	105
Sediments of Jackson age:		
Sand and rock	44	149
Nanjemoy formation:		
Sand and clay	132	281
Clay, pink	4	285
Aquia greensand:		
Sand (water)	35	320
Well St.M.-Eb 4 (Altitude: 9 feet)		
Pleistocene sediments:		
Clay and sand	20	20
Sand and gravel	27	47
Clay	44	91
Sand, shells, and gravel	14	105
Sediments of Jackson age:		
Sand and rock	44	149
Nanjemoy formation:		
Sand and clay	132	281
Clay, pink	4	285
Aquia greensand:		
Sand (water)	35	320
Well St.M.-Eb 5 (Altitude: 12 feet)		
Pleistocene sediments:		
Clay and sand	20	20
Sand and gravel	26	46
Clay	44	90
Sand and gravel	17	107
Sediments of Jackson age:		
Sand, rock, and shells	40	147
Nanjemoy formation:		
Sand and clay	133	280
Clay, pink	4	284
Aquia greensand:		
Sand (water)	34	318

TABLE 10—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Eb 6 (Altitude: 6 feet)		
Pleistocene sediments:		
Sand	40	40
Clay, blue	40	80
Sand and gravel	28	108
Sediments of Jackson age:		
Rock, shells, and sand	40	148
Nanjemoy formation:		
Sand and clay, black	136	284
Clay, reddish	4	288
Aquia greensand:		
Sand (water)	30	318
Well St.M.-Eb 7 (Altitude: 6 feet)		
Pleistocene sediments:		
Sand	43	43
Clay, blue	37	80
Sand and gravel	28	108
Sediments of Jackson age:		
Rock, sand, and shells	40	148
Nanjemoy formation:		
Sand and clay, black	136	284
Clay, reddish	4	288
Aquia greensand:		
Sand (water)	27	315
Well St.M.-Eb 8 (Altitude: 8 feet)		
Pleistocene sediments:		
Clay and sand, yellow	20	20
Clay, gray	21	41
Sand and gravel, gray	14	55
Sand, gray	45	100
Sand and gravel, gray	22	122
Sediments of Jackson age and Nanjemoy formation:		
Sand and clay, black	168	290
Clay, red	20	310
Aquia greensand:		
Sand (water)	50	360
Well St.M.-Eb 9 (Altitude: 7 feet)		
Pleistocene sediments:		
Clay, yellow	18	18
Sand and gravel	12	30
Clay, dark, and mud	30	60
Gravel	10	70
Chesapeake group:		
Clay, gray, soft	30	100
Sediments of Jackson age and Nanjemoy formation:		
Rock and sand	125	225
Sand and clay, black	30	255
Clay, red	20	275

TABLE 10—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Eb 9—*Continued*		
Aquia greensand:		
Sand (water)	50	325
Well St.M.-Eb 10 (Altitude: 12 feet)		
Pleistocene sediments:		
Sand and clay, brown	35	35
Clay, blue	49	84
Sand and gravel	26	110
Sediments of Jackson age:		
Sand and rock	34	144
Nanjemoy formation:		
Sand and clay, black	139	283
Clay, red	2	285
Aquia greensand:		
Sand (water)	30	315
Well St.M.-Eb 13 (Altitude: 9 feet)		
Pleistocene sediments:		
Clay, yellow, and soil	19	19
Sand	15	34
Clay, soft, dark	46	80
Sand and gravel	25	105
Sediments of Jackson age:		
Sand and layers of rock	20	125
Nanjemoy formation:		
Sand and clay, black	154	279
Aquia greensand:		
Sand (water)	33	312
Well St.M.-Eb 14 (Altitude: 4 feet)		
Pleistocene sediments:		
Clay, yellow	16	16
Sand and gravel	12	28
Sand and clay, soft	52	80
Gravel	18	98
Sediments of Jackson age:		
Rock and sand	22	120
Nanjemoy formation:		
Sand and clay, black	158	278
Clay, red	5	283
Aquia greensand:		
Sand (water)	25	308
Well St.M.-Eb 15 (Altitude: 11 feet)		
Pleistocene sediments:		
Clay, yellow	10	10
Gravel and sand	15	25
Clay, soft, dark	30	55
Gravel	5	60

TABLE 10—*Continued*

Well St.M.-Eb 15—*Continued*	Thickness (feet)	Depth (feet)
Chesapeake group:		
Clay, soft, dark	38	98
Sed ments of Jackson age:		
Rock and sand	17	115
Nanjemoy formation:		
Sand and clay, black	145	260
Clay, red	15	275
Aquia greensand:		
Sand (water)	25	300
Well St.M.-Eb 16 (Altitude: 29 feet)		
Pleistocene sediments:		
Clay, yellow	10	10
Sand	8	18
Clay, soft, gray	24	42
Gravel and sand	48	90
Chesapeake group, sediments of Jackson age, and Nanjemoy formation:		
Sand and clay, black	160	250
Aquia greensand:		
Sand, black (water)	60	310
Well St. M.-Eb 17 (Altitude: 10 feet)		
Pleistocene sediments:		
Sand	35	35
Clay	61	96
Sand and gravel	19	115
Sediments of Jackson age:		
Rock and sand	30	145
Nanjemoy formation:		
Sand and clay	135	280
Clay, pink	2	282
Aquia greensand:		
Sand (water)	33	315
Well St.M.-Ec 3 (Altitude: 6 feet)		
Pleistocene sediments:		
Sand	20	20
Clay	60	80
Sand and gravel	40	120
Chesapeake group:		
Clay	110	230
Sediments of Jackson age:		
Rock and sand	10	240
Sand (water)	18	258
Well St.M.-Ec 4 (Altitude: 3 feet)		
Pleistocene sediments:		
Sand	30	30
Clay	50	80
Sand	40	120

TABLE 10—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Ec 4—*Continued*		
Chesapeake group:		
Clay	110	230
Sediments of Jackson age:		
Rock and sand	8	238
Nanjemoy formation:		
Sand (water)	20	258
Well St.M.-Ec 5 (Altitude: 8 feet)		
Pleistocene sediments:		
Soil and clay	12	12
Sand	9	21
Clay, blue	55	76
Gravel	4	80
Clay	22	102
Sand and gravel	21	123
Chesapeake group:		
Clay, green	37	160
Sand and clay	8	168
Sediments of Jackson age and Nanjemoy formation:		
Sand and rock	27	195
Sand (water)	53	248
Well St.M.-Ec 6 (Altitude: 11 feet)		
Pleistocene sediments:		
Clay	10	10
Sand	11	21
Sand and gravel	21	42
Clay	73	115
Gravel	15	130
Chesapeake group:		
Clay	70	200
Sediments of Jackson age and Nanjemoy formation:		
Rock and sand (water)	52	252
Well St.M.-Ec 7 (Altitude: 2 feet)		
Pleistocene sediments:		
Clay	5	5
Clay, blue, and sand	65	70
Clay, greenish	56	126
Chesapeake group:		
Clay and sand	19	145
Sediments of Jackson age and Nanjemoy formation:		
Sand and rock	65	210
Rock and sand (water)	42	252
Well St.M.-Ec 11 (Altitude: 4 feet)		
Pleistocene sediments:		
Sand	21	21
Clay	80	101

TABLE 10—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Ec 11—*Continued*		
Pleistocene sediments and Chesapeake group:		
Sand	39	140
Chesapeake group and Nanjemoy formation:		
Rock, shells, and sand	60	200
Nanjemoy formation:		
Sand (water)	50	250
Well St.M.-Ec 12 (Altitude: 4 feet)		
Pleistocene sediments:		
Sand, red, and gravel	42	42
Clay and ore	21	63
Clay, blue	42	105
Sand and gravel, coarse	10	115
Chesapeake group:		
Clay, brown	32	147
Sediments of Jackson age:		
Rock layers	42	189
Nanjemoy formation:		
Sand (water)	41	230
Well St.M.-Ec 13 (Altitude: 7 feet)		
Pleistocene sediments:		
Sand and clay	20	20
Clay	20	40
Shells and clay	20	60
Clay	40	100
Gravel and rock	23	123
Chesapeake group:		
Clay	27	150
Sand and gravel	40	190
Sediments of Jackson age:		
Sand and rock	30	220
Nanjemoy formation:		
Sand (water)	20	240
Well St.M.-Ed 1 (Altitude: 16 feet)		
Pleistocene sediments:		
Soil	5	5
Sand	5	10
Clay and sand	10	20
Chesapeake group:		
Sand, clay, and shells	10	30
Clay	180	210
Sand	20	230
Sediments of Jackson age:		
Rock and sand (water)	30	260
Well St.M.-Ed 2 (Altitude: 16 feet)		
Pleistocene sediments:		
Soil	8	8
Sand and gravel	10	18

TABLE 10—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Ed 2—*Continued*		
Clay	15	33
Gravel and sand	10	43
Chesapeake group:		
Clay	195	238
Sediments of Jackson age:		
Rock and sand (water)	23	261
Well St.M.-Ed 4 (Altitude: 60 feet)		
Pleistocene sediments:		
Sand and gravel	20	20
Chesapeake group:		
Clay	240	260
Sediments of Jackson age:		
Sand and rock (water)	20	280
Well St.M.-Ed 8 (Altitude: 7 feet)		
Pleistocene sediments:		
Clay and sand	20	20
Chesapeake group:		
Sand and shells	28	48
Clay	132	180
Sediments of Jackson age and Nanjemoy formation:		
Rock and sand (water)	68	248
Well St.M.-Ee 1 (Altitude: 10 feet)		
Pleistocene sediments:		
Sand and gravel	60	60
Chesapeake group:		
Marl, blue	140	200
Sediments of Jackson age:		
Sand and rock	20	220
Well St.M.-Ee 2 (Altitude: 8 feet)		
Pleistocene sediments:		
Soil	5	5
Sand and gravel	15	20
Chesapeake group:		
Clay	180	200
Clay and sand	20	220
Sediments of Jackson age:		
Rock and sand (water)	40	260
Well St.M.-Ee 4 (Altitude: 100 feet)		
Pleistocene sediments:		
Clay, red	40	40
Chesapeake group and sediments of Jackson age:		
Clay, blue	66	106
Sand and shells	34	140
Marl	140	280
Nanjemoy formation:		
Sand and gravel (water)	45	325

TABLE 10—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Ee 5 (Altitude: 11 feet)		
Pleistocene sediments:		
Clay	8	8
Sand, brown	4	12
Clay	20	32
Sand and gravel	10	42
Chesapeake group:		
Clay	63	105
Clay, green	85	190
Sediments of Jackson age and Nanjemoy formation:		
Rock and sand	62	252
Well St.M.-Ee 6		
Pleistocene sediments:		
Clay	8	8
Sand	4	12
Clay	21	33
Sand and gravel	10	43
Chesapeake group:		
Sand and shells	5	48
Clay, blue	57	105
Clay, green	85	190
Sediments of Jackson age and Nanjemoy formation:		
Sand and rock (water)	62	252
Well St.M.-Ee 7 (Altitude: 13 feet)		
Pleistocene sediments:		
Soil	4	4
Gravel	9	13
Clay, blue	47	60
Sand and gravel	87	147
Chesapeake group:		
Clay, greenish	43	190
Sediments of Jackson age and Nanjemoy formation:		
Sand and rock (water)	70	260
Well St.M.-Ee 8 (Altitude: 7 feet)		
Pleistocene sediments:		
Clay	11	11
Sand and gravel	38	49
Chesapeake group:		
Sand and clay	55	104
Clay	43	147
Sediments of Jackson age and Nanjemoy formation:		
Rock and sand (water)	104	251
Well St.M.-Ee 9 (Altitude: 6 feet)		
Pleistocene sediments:		
Clay and sand	25	25

TABLE 10—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Ee 9—*Continued*		
Chesapeake group:		
Sand and clay	55	80
Clay	118	198
Sediments of Jackson age and Nanjemoy formation:		
Rock and sand (water)	43	241
Well St.M.-Ee 11 (Altitude: 24 feet)		
Pleistocene sediments:		
Soil	6	6
Sand and gravel	8	14
Chesapeake group:		
Sand	5	19
Sand and clay	61	80
Clay	111	191
Sediments of Jackson age and Nanjemoy formation:		
Rock and sand (water)	82	273
Well St.M.-Ee 12 (Altitude: 23 feet)		
Pleistocene sediments:		
Clay	3	3
Sand and gravel	15	18
Chesapeake group:		
Sand and clay	68	86
Clay	112	198
Sediments of Jackson age and Nanjemoy formation:		
Sand	33	231
Rock and sand (water)	42	273
Well St.M.-Ee 13 (Altitude: 5 feet)		
Pleistocene sediments:		
Sand, brown and white	40	40
Chesapeake group:		
Clay, bluish	60	100
Clay, greenish	80	180
Sediments of Jackson age and Nanjemoy formation:		
Rock and sand (water)	80	260
Well St.M.-Ee 14 (Altitude: 15 feet)		
Pleistocene sediments:		
Sand	17	17
Clay	73	90
Sand	15	105
Clay	21	126
Sand and gravel	21	147
Chesapeake group:		
Clay	45	192
Sediments of Jackson age and Nanjemoy formation:		
Rock and sand (water)	60	252

TABLE 10—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Ec 15 (Altitude: 5 feet)		
Pleistocene sediments:		
Clay	21	21
Clay and sand	30	51
Sand and gravel	13	64
Chesapeake group:		
Clay	131	195
Sediments of Jackson age and Nanjemoy formation:		
Sand and rock	57	252
Well St.M.-Ee 16 (Altitude: 90 feet)		
Pleistocene sediments:		
Clay, red, and gravel	15	15
Water sand, coarse	10	25
Chesapeake group:		
Clay, sandy	17	42
Clay	52	94
Shells	4	98
Sand, blue, fine	22	120
Clay	90	210
Sediments of Jackson age:		
Sand	10	220
Clay, hard	74	294
Rock and sand, alternating layers	10	304
Nanjemoy formation:		
Sand (water)	32	336
Well St.M.-Ec 17 (Altitude: 90 feet)		
Pleistocene sediments:		
Clay	20	20
Gravel (water)	15	35
Clay, red, and sand (water)	25	60
Chesapeake group:		
Clay, blue	240	300
Sediments of Jackson age and Nanjemoy formation:		
Limestone, porous, and sand (water)	75	375
Well St.M.-Ec 25 (Altitude: 110 feet)		
Pleistocene sediments:		
Clay, red	30	30
Chesapeake group:		
Sand and shells	11	41
Clay, blue	61	102
Sand and shells	38	140
Marl	154	294
Sediments of Jackson age:		
Sand, medium (water)	16	310

TABLE 10—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Ee 26 (Altitude: 90 feet)		
Pleistocene sediments:		
Clay and gravel	10	10
Sand, brown	39.5	49.5
Chesapeake group:		
Sand and clay, blue	48.5	98
Sand and shells	27	125
Clay	175	290
Sediments of Jackson age:		
Sand and rock	18	308
Nanjemoy formation:		
Rock and sand (water)	41	349
Well St.M.-Ee 27 (Altitude: 9 feet)		
Pleistocene sediments:		
Clay	18	18
Sand	3	21
Clay	11	32
Sand	10	42
Chesapeake group:		
Sand and clay	58	100
Clay	100	200
Sediments of Jackson age and Nanjemoy formation:		
Rock and sand (water)	50	250
Well St.M.-Ee 28 (Altitude: 6 feet)		
Pleistocene sediments:		
Clay, white, and sand	21	21
Sand and clay, blue	10	31
Gravel	4	35
Chesapeake group:		
Clay, blue	7	42
Clay, blue, and shells	21	63
Clay, blue	72	135
Clay, brown	64	199
Sediments of Jackson age:		
Sand and fine shells	6	205
Layers of rock	10	215
Sand (water)	16	231
Well St.M.-Ee 29 (Altitude: 20 feet)		
Pleistocene sediments:		
Clay and sand, red	21	21
Chesapeake group (?):		
Sand and gravel, blue	10	31
Shells and gravel	21	52
Chesapeake group:		
Clay, sandy	11	63
Sand streaks	10	73

TABLE 10—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Ee 29—*Continued*		
Sand, fine	11	84
Clay, sandy	21	105
Clay, blue	120	225
Sediments of Jackson age:		
Layers of rock	16	241
Sand (water)	24	265
Well St.M.-Ef 1 (Altitude: 25 feet)		
Pleistocene sediments:		
Soil	10	10
Sand	5	15
Chesapeake group:		
Clay, blue	100	115
Sand	5	120
Marl, blue	140	260
Sediments of Jackson age:		
Rock and sand	34	294
Well St.M.-Ef 3 (Altitude: 100 feet)		
Pleistocene sediments:		
Clay	12	12
Chesapeake group:		
Clay, blue	48	60
Sand and shells	45	105
Clay, blue	65	170
Marl	128	298
Sediments of Jackson age:		
Rock	6	304
Sand (water)	18	322
Well St.M.-Ef 9 (Altitude: 13 feet)		
Pleistocene sediments:		
Soil	4	4
Gravel and sand	6	10
Chesapeake group:		
Clay and sand	10	20
Sand and shells	50	70
Clay, greenish	150	220
Sediments of Jackson age and Nanjemoy formation:		
Sand and rock (water)	64	284
Well St.M.-Ef 11 (Altitude: 20 feet)		
Pleistocene sediments:		
Clay, blue	30	30
Sand and gravel (water)	10	40
Chesapeake group:		
Clay	42	82
Sand	13	95
Clay	130	225

TABLE 10—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Ef 11—*Continued*		
Sediments of Jackson age and Nanjemoy formation:		
Limestone, porous; shells and sand (water)	70	295
Well St.M.-Ef 12 (Altitude: 19 feet)		
Pleistocene sediments:		
Sand and clay, brown	18	18
Chesapeake group:		
Clay and sand, blue	42	60
Sand, clay, and shells	120	180
Clay, greenish	84	264
Sediments of Jackson age:		
Rock and sand (water)	36	300
Well St.M.-Ef 13 (Altitude: 85 feet)		
Pleistocene sediments:		
Clay	12	12
Chesapeake group:		
Clay, blue	48	60
Sand and shells	45	105
Clay, blue	65	170
Marl	120	290
Sediments of Jackson age:		
Sand	18	308
Well St.M.-Ef 14 (Altitude· 5 feet)		
Pleistocene sediments:		
Sand and gravel (water)	20	20
Chesapeake group:		
Clay, sand, and shells (water)	15	35
Clay	45	80
Sand and shells (water)	10	90
Clay	160	250
Sediments of Jackson age:		
Sand and limestone (water)	30	280
Well St.M.-Ef 15 (Altitude: 6 feet)		
Pleistocene sediments:		
Sand and gravel	15	15
Chesapeake group:		
Clay, sand, and shells (water)	45	60
Clay	190	250
Sediments of Jackson age:		
Sand, shells, and limestone (water)	35	285
Well St.M.-Ef 16 (Altitude: 42 feet)		
Pleistocene sediments:		
Clay, yellow	10	10
Sand, yellow	11	21
Sand and clay, gray	10	31
Sand and gravel, gray	4	35

TABLE 10—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Ef 16—*Continued*		
Chesapeake group:		
Clay, blue	217	252
Sediments of Jackson age and Nanjemoy formation:		
Sand (water)	63	315
Well St.M.-Ef 17 (Altitude: 32 feet)		
Pleistocene sediments:		
Sand and gravel	30	30
Chesapeake group:		
Marl	230	260
Sediments of Jackson age:		
Rock	4	264
Sand and shells	51	315
Nanjemoy formation:		
Marl	142	457
Aquia formation:		
Sand (water)	40	497
Well St.M.-Ef 21 (Altitude: 25 feet)		
Pleistocene sediments:		
Sand and gravel	10	10
Chesapeake group:		
Clay, blue	11	21
Iron ore and clay	21	42
Sand and shells	10	52
Clay	11	63
Rock, soft	2	65
Clay	187	252
Sediments of Jackson age:		
Sand, coarse	21	273
Layers of rock	42	315
Nanjemoy formation:		
Sand, coarse, black (water)	35	350
Well St.M.-Ef 40 (Altitude: 10 feet)		
Pleistocene sediments:		
Sand, white	20	20
Chesapeake group:		
Sand and some clay	11	31
Sand and some shells	11	42
Clay, sandy	10	52
Clay and fine shells	10	62
Sand, blue, and shells	20	82
Sand and clay	10	92
Clay, blue	80	172
Sand, fine	17	189
Clay	73	262
Sediments of Jackson age:		
Rock	2	264
Clay	9	273
Rock	31	304

TABLE 10—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Ef 40—*Continued*		
Nanjemoy formation:		
Sand, fine, black	32	336
Well St.M.-Ef 41 (Altitude: 85 feet)		
Pleistocene sediments:		
Sand and gravel, red	31	31
Clay, pink and blue	11	42
Chesapeake group:		
Clay and sand, blue	21	63
Shells	10	73
Clay, blue	42	115
Sand streaks	11	126
Rock and sand	10	136
Clay	11	147
Clay and shells	10	157
Clay	11	168
Clay and sand	21	189
Clay, blue	63	252
Clay, brown	68	320
Sediments of Jackson age:		
Layers of rock	37	357
Nanjemoy formation:		
Sand (water)	21	378
Well St.M.-Ef 44 (Altitude: 40 feet)		
Pleistocene sediments:		
Sand	19	19
Chesapeake group:		
Clay	33	52
Sand, clay, and shells	38	90
Clay	180	270
Sediments of Jackson age:		
Rock and sand (water)	35	305
Well St.M.-Eg 1 (Altitude: 6 feet)		
Pleistocene sediments:		
Sand, white; stone 3 inches thick	21	21
Chesapeake group:		
Sand and clay, mixed	42	63
Clay and shells	42	105
Sand, clay, and small gravel	42	147
Clay, blue, hard	147	294
Sediments of Jackson age:		
Sand (water); 6 stones, very hard	30	324
Nanjemoy formation:		
Sand (water)	15	339

TABLE 10—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Eg 3 (Altitude: 15 feet)		
Pleistocene sediments:		
Sand, iron ore, and few gravel	42	42
Chesapeake group:		
Shells, clay, and sand	63	105
Clay, blue, hard	189	294
Sediments of Jackson age:		
Clay; 5 stones, 6 to 8 inches thick (some water)	42	336
Sand (water); 9 stones, 3 to 10 inches thick	21	357
Nanjemoy formation:		
Sand, black (water)	30	387
Well St.M.-Eg 4 (Altitude: 10 feet)		
Pleistocene sediments and Chesapeake group (?):		
Sand, white	21	21
Shells, some gravel and clay; hard stone 1 foot thick at 30 feet	84	105
Gravel and clay, mixture	63	168
Chesapeake group:		
Clay, blue, hard	126	294
Sediments of Jackson age:		
Clay; 4 stones, very hard	42	336
Nanjemoy formation:		
Sand, black (water)	52	388
Well St.M.-Eg 7 (Altitude: 23 feet)		
Pleistocene sediments:		
Sand and gravel	17	17
Clay, blue	56	73
Sand and shells	17	90
Chesapeake group and sed'ments of Jackson age:		
Clay, blue; limestone and shells	210	300
Well St.M.-Eg 16 (Altitude: 11 feet)		
Pleistocene sediments:		
Clay	10	10
Chesapeake group:		
Sand	10	20
Clay	20	40
Sand and shells	30	70
Sand and clay	70	140
Clay	130	270
Sediments of Jackson age:		
Sand and rock	20	290
Sand (water)	25	315
Well St.M.-Fe 1 (Altitude: 10 feet)		
Pleistocene sediments:		
Clay, yellow	15	15
Marl	10	25
Sand	20	45

TABLE 10—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Fe 1—*Continued*		
Chesapeake group:		
Marl	170	215
Sand and shells	7	222
Sediments of Jackson age and Nanjemoy formation:		
Rock	2	224
Sand and shells	8	232
Rock	2	234
Marl	126	360
Clay, blue	38	398
Aquia greensand:		
Sand (water)	14	412
Well St.M.-Fe 2 (Altitude: 10 feet)		
Pleistocene sediments:		
Soil and clay	21	21
Marl	11	32
Sand	14	46
Chesapeake group:		
Marl	175	221
Sediments of Jackson age:		
Sand and shells	12	233
Rock	2	235
Marl	20	255
Nanjemoy formation:		
Clay, blue	139	394
Aquia greensand:		
Sand (water)	38	432
Well St.M.-Fe 3 (Altitude: 9 feet)		
Pleistocene sediments:		
Soil	15	15
Sand	5	20
Chesapeake group:		
Mud	180	200
Sediments of Jackson age:		
Rock and sand	40	240
Nanjemoy formation:		
Sand (water)	20	260
Well St.M.-Fe 4 (Altitude: 3 feet)		
Pleistocene sediments:		
Sand, white, and gravel	38	38
Clay, blue, and shells	48	86
Sand, coarse; gravel; some clay	63	149
Chesapeake group:		
Clay, blue, hard	63	212
Sediments of Jackson age and Nanjemoy formation:		
Layers of soft stone, 4 to 15 inches thick (some water)	21	233
Sand, black (water)	42	275

TABLE 10—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Fe 5 (Altitude: 10 feet)		
Pleistocene sediments:		
Clay	8	8
Sand	4	12
Clay	23	35
Sand and gravel	7	42
Chesapeake group:		
Clay	58	100
Sand and gravel	4	104
Clay, greenish	96	200
Sediments of Jackson age:		
Sand and rock (water)	52	252
Well St.M.-Fe 6 (Altitude: 8 feet)		
Pleistocene sediments:		
Clay	5	5
Sand	10	15
Clay, blue	13	28
Sand	15	43
Chesapeake group:		
Sand and shells	9	52
Clay, greenish	138	190
Sediments of Jackson age and Nanjemoy formation:		
Sand and rock (water)	70	260
Well St.M.-Fe 7 (Altitude: 2 feet)		
Pleistocene sediments:		
Soil and sand	10	10
Sand and clay	25	35
Chesapeake group:		
Sand, shell, and mud	15	50
Sand and mud	50	100
Clay, greenish	100	200
Sediments of Jackson age:		
Sand and rock (water)	52	252
Well St.M.-Fe 9 (Altitude: 6 feet)		
Pleistocene sediments:		
Sand, white	10	10
Gravel	21	31
Chesapeake group:		
Clay, blue	11	42
Shells and clay	21	63
Clay, sandy	31	94
Clay, blue, hard	126	220
Sediments of Jackson age:		
Sand, white, coarse	11	231
Sand	9	240
Rock	—	240
Sand (water)	33	273

TABLE 10—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Fe 10 (Altitude: 5 feet)		
Pleistocene sediments:		
Sand and clay, brown	10	10
Clay and sand, blue	12	22
Clay, blue	81	103
Sand and gravel	12	115
Chesapeake group:		
Clay, greenish	83	198
Sediments of Jackson age:		
Rock and sand (water)	54	252
Well St.M.-Fe 13 (Altitude: 5 feet)		
Pleistocene sediments:		
Sand, yellow	21	21
Iron ore and sand	10	31
Sand and gravel	11	42
Chesapeake group:		
Sand and shells	10	52
Clay, sandy, blue	53	105
Clay, blue	115	220
Sediments of Jackson age:		
Layers of rock	11	231
Sand (water)	21	252
Well St.M.-Fe 14 (Altitude: 6 feet)		
Pleistocene sediments:		
Clay, brownish	20	20
Clay, blue	8	28
Sand and gravel	15	43
Chesapeake group:		
Sand, clay, and shells	18	61
Clay, greenish	159	220
Sediments of Jackson age:		
Sand and rock (water)	31	251
Well St.M.-Fe 15 (Altitude: 5 feet)		
Pleistocene sediments:		
Clay, yellow	9	9
Sand	12	21
Clay, blue	9	30
Sand and gravel	14	44
Chesapeake group:		
Clay, greenish	152	196
Sediments of Jackson age:		
Rock and sand (water)	58	254
Well St.M.-Fe 17 (Altitude: 3 feet)		
Pleistocene sediments:		
Gravel	10	10
Sand and gravel	21	31

TABLE 10—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Fe 17—*Continued*		
Sand, bluish	21	52
Clay	23	75
Clay and shells	19	94
Sand	11	105
Chesapeake group:		
Clay, hard	94	199
Sediments of Jackson age:		
Rock, soft, and sand	11	210
Rock, alternating layers	10	220
Sand (water)	32	252
Well St.M.-Fe 18 (Altitude: 6 feet)		
Pleistocene sediments:		
Clay	8	8
Sand, brown	11	19
Chesapeake group:		
Clay, blue	22	41
Sand and clay	19	60
Sand and shell	10	70
Sand and clay	100	170
Clay	35	205
Sediments of Jackson age:		
Sand and rock (water)	47	252
Well St.M.-Fe 19 (Altitude: 5 feet)		
Pleistocene sediments:		
Clay, white	10	10
Sand, yellow	28	38
Chesapeake group:		
Clay, sandy	14	52
Clay, sandy, and shells	4	56
Rock, soft	7	63
Clay, blue	142	205
Sediments of Jackson age:		
Layers of rock	15	220
Sand (water)	11	231
Well St.M.-Fe 20 (Altitude: 7 feet)		
Pleistocene sediments:		
Sand, red	10	10
Streaks of white sand	11	21
Clay, sandy	10	31
Sand, blue	21	52
Clay, blue	46	98
Sand, coarse	10	108
Chesapeake group:		
Clay, blue	82	190
Sand	10	200
Sand and clay	10	210

TABLE 10—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Fe 20—*Continued*		
Sediments of Jackson age:		
Layers of rock	10	220
Sand (water)	25	245
Well St.M.-Fe 21 (Altitude: 9 feet)		
Pleistocene sediments:		
Clay	12	12
Marl, blue	14	26
Quicksand	14	40
Chesapeake group:		
Marl	175	215
Sediments of Jackson age:		
Sand and shells	5	220
Rock	5	225
Sand and shells	11	236
Rock	2	238
Marl	27	265
Nanjemoy formation:		
Clay, blue	133	398
Aquia greensand:		
Sand (water)	11	409
Well St.M.-Fe 23 (Altitude: 4 feet)		
Pleistocene sediments:		
Sand and gravel	50	50
Clay, blue	48	98
Chesapeake group:		
Marl	102	200
Sediments of Jackson age:		
Sand (water)	65	265
Nanjemoy formation:		
Clay, sandy	125	390
Aquia greensand:		
Sand (water)	15	405
Well St.M.-Fe 24 (Altitude: 5 feet)		
Pleistocene sediments:		
Soil	6	6
Sand, yellow	14	20
Clay, blue	80	100
Sand, gray	15	115
Chesapeake group:		
Marl	103	218
Sediments of Jackson age:		
Sand and shells	30	248
Rock	3	251
Sand	19	270
Nanjemoy formation:		
Marl	123	393
Clay, blue	6	399

TABLE 10—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Fe 24—*Continued*		
Aquia greensand:		
Sand (water)	12	411
Well St.M.-Ff 1 (Altitude: 3 feet)		
Pleistocene sediments:		
Sand, white	5	5
Sand and white clay	10	15
Sand, yellow	11	26
Sand and gravel; some clay, blue	5	31
Chesapeake group:		
Clay, blue, and shells	16	47
Sand and shells	12	59
Clay, blue, and shells	25	89
Clay, blue, and streaks of sand	11	95
Clay, blue, and shells	4	99
Clay, bluish green, and some shells	127	226
Sand and shells	15	241
Clay, sandy, green	6	247
Sediments of Jackson age:		
Indurated sand (alternating layers of rock)	5	252
Sand, hard	26	278
Well St.M.-Ff 6 (Altitude: 10 feet)		
Pleistocene sediments:		
Sand, brown	10	10
Chesapeake group:		
Clay	4	14
Sand and shells	31	45
Clay	180	225
Sediments of Jackson age:		
Rock and sand (water)	31	256
Well St.M.-Ff 9 (Altitude: 3 feet)		
Pleistocene sediments:		
Soil	3	3
Sand	12	15
Clay, blue	42	57
Sand and gravel	40	97
Chesapeake group:		
Clay, greenish	119	216
Sediments of Jackson age:		
Sand and rock (water)	57	273
Well St.M.-Ff 11 (Altitude: 13 feet)		
Pleistocene sediments:		
Sand	12	12
Clay	9	21

TABLE 10—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Ff 11—*Continued*		
Chesapeake group:		
Sand and shells	9	30
Sand	30	60
Clay	160	220
Sediments of Jackson age:		
Sand (water)	36	256
Well St.M.-Ff 21 (Altitude: 10 feet)		
Pleistocene sediments:		
Sand and gravel	20	30
Chesapeake group:		
Marl	275	295
Sediments of Jackson age and Nanjemoy formation:		
Rock	3	298
Sand and shells	8	306
Marl	144	450
Clay	16	466
Aquia greensand:		
Sand, gray and black (water)	20	486
Well St.M.-Ff 22 (Altitude: 3 feet)		
Pleistocene sediments:		
Clay, red	10	10
Sand, white	11	21
Gravel	4	25
Chesapeake group:		
Clay	6	31
Sand	24	55
Clay	8	63
Shells	21	84
Clay, blue	63	147
Clay, brown	51	198
Sandy streaks	28	226
Clay, sandy	10	236
Sediments of Jackson age:		
Layers of rock	11	247
Sand (water)	18	265
Well St.M.-Ff 24 (Altitude: 4 feet)		
Pleistocene sediments:		
Sand	13	13
Clay	9	22
Sand and shells	38	60
Chesapeake group:		
Sand	30	90
Sand and clay	80	170
Clay	50	220
Sediments of Jackson age and Nanjemoy formation:		
Sand and rock (water)	45	265

TABLE 10—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Ff 26 (Altitude: 5 feet)		
Pleistocene sediments:		
Sand and clay, brown	16	16
Chesapeake group (?):		
Clay, blue	7	23
Sand and shells	23	46
Sand and clay	52	98
Clay, greenish	121	219
Sediments of Jackson age and Nanjemoy formation (?):		
Sand and rock (water)	44	263
Well St.M.-Ff 29 (Altitude: 10 feet)		
Pleistocene sediments:		
Clay and sand	18	18
Clay	18	36
Sand	18	54
Chesapeake group:		
Sand and clay	52	106
Clay	124	230
Sediments of Jackson age and Nanjemoy formation (?):		
Sand and rock (water)	32	262
Well St.M.-Ff 30 (Altitude: 5 feet)		
Pleistocene sediments:		
Sand and gravel	17	17
Chesapeake group (?):		
Clay, soft blue	8	25
Streak of clay, sand, and shells	34	59
Chesapeake group:		
Clay, blue, soft, shells in spots	111	170
Clay, blue, medium hard	55	225
Sand, fine to coarse	12	237
Clay, soft, gray	9.5	246.5
Sediments of Jackson age:		
Rock, shells	13	259.5
Well St.M.-Fg 1 (Altitude: 5 feet)		
Pleistocene sediments and Chesapeake group:		
Sand and clay	42	42
Clay and shells	42	84
Sand, blue, and shells, large	42	126
Clay, black, soft, muddy; some small gravel	84	210
Clay, blue, hard	105	315
Sediments of Jackson age:		
Clay (one stone 3 inches thick)	21	336
Three stones 3 to 6 inches thick (some water)	20	356
Nanjemoy formation:		
Sand, black (water)	22	378

TABLE 10—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Fg 3 (Altitude: 9 feet)		
Pleistocene sediments:		
Soil; sand, white; gravel	21	21
Chesapeake group:		
Sand, mixed with blue clay	63	84
Sand, mixed with clay and shells	21	105
Clay, blue; 2 thin limestones	21	126
Clay and shells	84	210
Clay, blue, hard	105	315
Sediments of Jackson age and Nanjemoy formation:		
Clay; stones, very soft (6 inches thick)	30	345
Sand, black (3 hard stones 3 to 6 inches thick) (water)	26	371
Well St.M.-Fg 4 (Altitude: 10 feet)		
Pleistocene sediments:		
Sand, white; gravel; iron ore	42	42
Chesapeake group:		
Sand and clay	42	84
Sand, clay, and shells	84	168
Clay, blue, hard	168	336
Sediments of Jackson age:		
(10 stones 3 to 12 inches thick; some water)	42	378
Nanjemoy formation:		
Sand, black (water)	42	420
Well St.M.-Fg 5 (Altitude: 35 feet)		
Pleistocene sediments and Chesapeake group:		
Sand, white, and gravel	21	21
Clay, blue, and shells, mixed	63	84
Clay, with sand mixed with small white gravel	84	168
Clay, blue, hard	168	336
Sediments of Jackson age and Nanjemoy formation:		
Clay; 3 stones 3 to 6 inches thick	21	357
Sand, black; 5 stones 3 to 12 inches thick, very soft, white (water)	47	404
Well St.M.-Fg 7 (Altitude: 16 feet)		
Pleistocene sediments:		
Sand and gravel, white	63	63
Chesapeake group:		
Clay and sand, mixed with shells	42	105
Clay and stone (6 inches thick)	21	126
Clay, blue, hard	189	315
Sediments of Jackson age:		
Clay (with stone, soft, 4 to 12 inches thick)	42	357
Nanjemoy formation:		
Sand, black (water)	20	377
Well St.M.-Fg 8 (Altitude: 5 feet)		
Pleistocene sediments:		
Clay, yellow	10	10
Sand, yellow	10	20
Gravel, some sand, clear to brown	7	27

TABLE 10—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Fg 8—*Continued*		
Chesapeake group:		
Sand, blue, and shells	26	53
Clay, blue, and sand (clay in streaks)	20	73
Clay, blue and pink	11	84
Clay, blue	10	94
Sand and some shells	21.5	115.5
Rock	1.5	117
Sand and some shells	29	146
Clay	59	205
Clay, blue	35	240
Clay, blue, and fine sand	16	256
Clay, blue	88	344
Sediments of Jackson age:		
Rock	2	346
Sand	21	367
Rock, soft	10	377
Rock and sand	22	399
Nanjemoy formation:		
Sand (water)	21	420
Well St.M.-Fg 9 (Altitude: 5 feet)		
Pleistocene sediments:		
Clay and sand, white	21	21
Sand, black, fine	42	63
Chesapeake group:		
Clay and sand, blue	21	84
Clay, blue	21	105
Sand and clay, blue (rock 12 inches thick)	21	126
Clay, blue, hard	189	315
Sediments of Jackson age:		
Clay (2 rocks 8 to 12 inches thick; some water)	21	336
Sand (rock 3 to 10 inches thick) (water)	21	357
Nanjemoy formation:		
Sand, black (water)	10	367
Well St.M.-Fg 11 (Altitude: 6 feet)		
Pleistocene sediments:		
Clay and sand, yellow	21	21
Clay and shells	42	63
Clay, shells, and sand	63	126
Sand, white, coarse; some gravel	42	168
Chesapeake group, sediments of Jackson age, and Nanjemoy formation:		
Clay, blue, hard	105	273
(4 stones 2 to 6 inches thick)	21	294
Sand, black (6 stones 3 to 10 inches thick) (water)	42	336
Well St.M.-Fg 13 (Altitude: 8 feet)		
Pleistocene sediments:		
Clay, yellow, and gravel	5	5

TABLE 10—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Fg 13—*Continued*		
Gravel, small	26	31
Sand, black	16	47
Chesapeake group (?):		
Clay, sandy, blue	16	63
Clay and shells	21	84
Clay, sandy	15	99
Sand, black	22	121
Rock	2	123
Clay, sandy	97	220
Clay, blue, hard	95	315
Sediments of Jackson age:		
Sand, fine, and rock (water)	42	357
Nanjemoy formation:		
Sand, black, hard (water)	41	398
Well St.M.-Fg 14 (Altitude: 6 feet)		
Pleistocene sediments:		
Clay, yellow	10	10
Chesapeake group:		
Sand	30	40
Clay, sandy, dark	50	90
Sand, shells, and clay	60	150
Sand and clay	80	230
Clay, blue	90	320
Sediments of Jackson age and Nanjemoy formation:		
Sand, soft	10	330
Rock	4	334
Rock and sand in layers, gray	33	367
Rock and sand, green (layers farther apart)	42	409
Sand, green, hard	10	419
Well St.M.-Fg 15 (Altitude: 70 feet)		
Pleistocene sediments:		
Sand, yellow	10	10
Sand, white	10	20
Sand and gravel	30	50
Chesapeake group:		
Clay, blue	33	83
Clay and shells	20	103
Clay, sandy	70	173
Rock	2	175
Clay, sandy	50	225
Clay, blue, hard	163	388
Sediments of Jackson age:		
Layers of rock	53	441
Nanjemoy formation:		
Sand, black, hard (water)	5	446

TABLE 10—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Fg 16 (Altitude: 2 feet)		
Pleistocene sediments:		
Shells	4	4
Clay and sand, yellow	12	16
Chesapeake group:		
Clay, dark; little sand	49	65
Sand	13	78
Clay, sandy, gray	82	160
Clay, blue	121	281
Sediments of Jackson age:		
Sand	17	298
Rock	2	300
Sand, gray (layer of rock)	21	321
Nanjemoy formation:		
Sand, green, hard	36	357
Well St.M.-Fg 17 (Altitude: 5 feet)		
Pleistocene sediments:		
Clay, blue, and soft mud	50	50
Clay, blue, and sand (water)	90	140
Chesapeake group, sediments of Jackson age, and Nanjemoy formation:		
Clay, blue; shells; sand, black	255	395
Well St.M.-Fg 18 (Altitude: 50 feet)		
Pleistocene sediments:		
Clay, white, and gravel	10	10
Chesapeake group:		
Sand, blue	21	31
Clay, blue	42	73
Clay and shells	11	84
Clay, sandy	21	105
Clay	10	115
Streaks of sand and clay	42	157
Clay, blue	205	362
Sediments of Jackson age and Nanjemoy formation:		
Layers of soft rock	26	388
Sand (water)	32	420
Well St.M.-Fg 19 (Altitude: 10 feet)		
Pleistocene sediments:		
Clay, yellow	10	10
Sand, yellow, and gravel	17	27
Chesapeake group:		
Sand and shells	26	53
Clay, blue	20	73
Clay, blue and pink	11	84
Clay, blue	10	94
Sand and some shells	21.5	115.5

TABLE 10—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Fg 19—*Continued*		
Rock	1.5	117
Sand and some shells	29	146
Clay, blue	94	240
Clay, blue, and sand, fine	16	256
Clay, blue	88	344
Sediments of Jackson age:		
Rock	2	346
Sand, hard	4	350
Sand, medium	17	367
Rock, soft	10	377
Rock and sand	20	397
Nanjemoy formation:		
Sand, black (water)	23	420
Well St.M.-Fg 20 (Altitude: 10 feet)		
Pleistocene sediments:		
Clay, white	10	10
Sand and gravel, white	10	20
Chesapeake group:		
Sand, fine, and shells	20	40
Clay, blue	75	115
Rock, soft	2	117
Clay, sandy	80	197
Clay, blue	129	326
Sediments of Jackson age and Nanjemoy formation:		
Rock	31	357
Layers of rock and hard sand (water)	42	399
Well St.M.-Fg 21 (Altitude: 5 feet)		
Pleistocene sediments and Chesapeake group:		
Sand and clay	210	210
Clay	102	312
Sediments of Jackson age and Nanjemoy formation:		
Rock and sand (water)	87	399
Well St.M.-Fg 23 (Altitude: 5 feet)		
Pleistocene sediments:		
Clay, white	21	21
Sand and clay, yellow	21	42
Chesapeake group:		
Clay, blue, and shells	21	63
Clay, blue	42	105
Sand, white, coarse	5	110
Clay, blue	37	147
Streaks of sand and clay	63	210
Clay, sandy	42	252
Clay, blue, hard	84	336
Sediments of Jackson age:		
Rock, soft, in layers	42	378

TABLE 10—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Fg 23—*Continued*		
Nanjemoy formation:		
Sand (water)	42	420
Well St.M.-Fg 24 (Altitude: 4 feet)		
Pleistocene sediments:		
Clay, yellow	10	10
Sand, yellow	11	21
Chesapeake group (?):		
Mud, gray	19	40
Sand and mud, gray	44	84
Sand, gray	21	105
Chesapeake group:		
Clay, blue, soft	40	145
Sand and clay, black	191	336
Sediments of Jackson age and Nanjemoy formation:		
Sand, gray, and shells	15	351
Sand and rock (water)	45	396
Well St.M.-Fg 25 (Altitude: 20 feet)		
Pleistocene sediments:		
Sand and clay, white	10	10
Sand, blue, and clay	21	31
Sand, yellow	11	42
Sand and clay, yellow	10	52
Chesapeake group:		
Clay, blue, and shells	21	73
Rock, soft	2	75
Clay, blue	40	115
Sand, blue, fine	11	126
Clay, blue	220	346
Sediments of Jackson age and Nanjemoy formation:		
Alternating layers of rock	32	378
Sand (water)	42	420
Well St.M.-Fg 26 (Altitude: 16 feet)		
Pleistocene sediments:		
Clay, yellow	10	10
Clay, sandy, blue	11	21
Chesapeake group (?):		
Clay, sandy	52	73
Sand and shells	32	105
Clay, sandy	84	189
Clay, blue, hard	105	294
Sediments of Jackson age and Nanjemoy formation:		
Rock, soft, in layers	21	315
Sand, black, hard	37	352
Well St.M.-Fg 27 (Altitude: 4 feet)		
Pleistocene sediments:		
Clay, white	10	10

TABLE 10—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Fg 27—*Continued*		
Chesapeake group:		
Sand and clay	11	21
Sand, black, hard	52	73
Clay, blue, hard	51	124
Clay and shells	10	134
Clay	116	250
Sand (layers)	21	271
Clay, blue, hard	73	344
Sediments of Jackson age:		
Rock (layers)	42	386
Nanjemoy formation:		
Sand (water)	34	420
Well St.M.-Fg 29 (Altitude: 7 feet)		
Pleistocene sediments:		
Clay, white	10	10
Sand and clay	11	21
Sand, blue, and shells	10	31
Gravel and shells	11	42
Chesapeake group (?):		
Clay	52	94
Sand, fine	11	105
Chesapeake group:		
Clay, blue	31	136
Sand, fine	11	147
Clay, blue	136	283
Rock, soft	6	289
Clay	15	304
Sediments of Jackson age and Nanjemoy formation:		
Rock, soft, in layers	26	330
Rock, very hard	6	336
Sand (water)	31	367
Well St.M.-Fg 30 (Altitude: 11 feet)		
Pleistocene sediments:		
Clay, white	10	10
Chesapeake group:		
Sand, blue	32	42
Sand and clay (streaks)	42	84
Clay, blue	21	105
Sand	10	115
Clay, blue	202	317
Sediments of Jackson age:		
Rock (layers)	21	338
Nanjemoy formation:		
Sand (water)	20	358

TABLE 10—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Fg 31 (Altitude: 6 feet)		
Pleistocene sediments:		
Clay, white	10	10
Clay and sand, white	11	21
Sand and iron ore	10	31
Chesapeake group:		
Sand, blue	11	42
Clay	21	63
Shells	10	73
Clay, sandy	42	115
Rock, soft (alternating layers)	5	120
Clay	111	231
Sand, fine	10	241
Clay, blue, hard	84	325
Sediments of Jackson age:		
Rock (alternating layers)	42	367
Nanjemoy formation:		
Sand (water)	30	397
Well St.M.-Fh 2 (Altitude: 9 feet)		
Pleistocene sediments:		
Clay, yellow	15	15
Chesapeake group:		
Clay, blue	10	25
Sand and shells	45	70
Clay, blue	45	115
Sand and shells	40	155
Marl	188	343
Sediments of Jackson age:		
Rock	2	345
Sand (water)	10	355
Well St.M.-Fh 3 (Altitude: 6 feet)		
Pleistocene sediments:		
Soil; sand, yellow	10	10
Chesapeake group:		
Sand, greenish	10	20
Sand and clay, gray	35	55
Clay, gray and red	35	90
Sand; little clay	20	110
Shells and sand	20	130
Clay, blue, and shells	10	140
Clay, blue	191	331
Sand	11	342
Sediments of Jackson age and Nanjemoy formation:		
Rock	4	346
Rock, in layers; sand, gray	24	370
Sand, green, hard	49	419

TABLE 10—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Fh 4 (Altitude: 6 feet)		
Pleistocene sediments:		
Clay, white and yellow	10	10
Sand, white	11	21
Chesapeake group:		
Sand, gray; clay and shells	106	127
Clay, greenish	209	336
Sediments of Jackson age and Nanjemoy formation:		
Sand and rock (water)	69	405
Well St.M.-Fh 5 (Altitude: 5 feet)		
Pleistocene sediments:		
Sand, yellow and red	10	10
Chesapeake group:		
Sand, greenish	10	20
Sand and clay, gray	35	55
Clay, red and gray	25	80
Sand; little clay	30	110
Sand and shells	20	130
Clay, blue, and shells	10	140
Clay, blue	191	331
Sand	11	342
Sediments of Jackson age and Nanjemoy formation:		
Rock	4	346
Rock, in layers; sand, gray	24	370
Sand, green, hard	49	419
Well St.M.-Fh 6 (Altitude: 6 feet)		
Pleistocene sediments:		
Clay, yellow	10	10
Sand, yellow	10	20
Chesapeake group:		
Sand, gray; little clay	22	42
Sand, gray, and shells	21	63
Mud, gray, and shells	42	105
Clay, blue, soft	231	336
Sediments of Jackson age and Nanjemoy formation:		
Sand and shells, gray	21	357
Sand and rock (water)	43	400
Well St.M.-Gg 1 (Altitude: 6 feet)		
Pleistocene sediments:		
Sand and clay, mixed	42	42
Clay, blue; few shells	21	63
Sand, blue	42	105
Chesapeake group:		
Clay, sand, and shells (mixed)	63	168
Clay and sand	42	210
Clay, blue, hard	105	315

TABLE 10—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Gg 1—*Continued*		
Sediments of Jackson age and Nanjemoy formation(?):		
Sand and rock	63	378
Sand, black (water)	42	420
Well St.M.-Gg 4 (Altitude: 3 feet)		
Pleistocene sediments:		
Sand and gravel (water)	35	35
Clay blue	25	60
Sand and gravel (water)	90	150
Chesapeake group:		
Clay, blue	200	350
Sediments of Jackson age and Nanjemoy formation:		
Limestone; shells; and sand, black	10	360
Well St.M.-Gg 5 (Altitude: 4 feet)		
Pleistocene sediments:		
Sand and gravel (water)	25	25
Clay, blue	25	50
Sand and gravel (water)	80	130
Chesapeake group:		
Clay, blue	170	300
Sediments of Jackson age and Nanjemoy formation:		
Limestone; shells; and sand, black	60	360
Well St.M.-Gg 6 (Altitude: 3 feet)		
Pleistocene sediments:		
Clay and sand, white	21	21
Sand, white, and boulders	17	38
Chesapeake group:		
Clay and shells	25	63
Clay, blue	168	231
Sand, fine, in layers	21	252
Clay, blue	84	336
Sediments of Jackson age and Nanjemoy formation:		
Clay and rock, soft, in layers	42	378
Rock and sand, black, in layers	21	399
Sand, black, hard (water)	21	420
Well St.M.-Gg 7 (Altitude: 6 feet)		
Pleistocene sediments:		
Sand and clay, in layers	56	56
Clay, soft	65	121
Sand and gravel	30	151
Chesapeake group:		
Clay, blue	191	342
Sand	19	361
Sediments of Jackson age and Nanjemoy formation:		
Rock	2	363

TABLE 10—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Gg 7—*Continued*		
Layer of rock; sand, gray	17	380
Layer of rock; sand, green	10	390
Sand, green, hard	29	419
Well St.M.-Gg 8 (Altitude: 9 feet)		
Pleistocene sediments:		
Sand and gravel	21	21
Sand and clay	21	42
Clay blue	84	126
Sand, coarse	10	136
Chesapeake group:		
Rock, soft, in layers	11	147
Clay	199	346
Sediments of Jackson age and Nanjemoy formation:		
Rock, in layers	20	366
Sand (water)	33	399
Well St.M.-Gg 12 (Altitude: 6 feet)		
Pleistocene sediments:		
Clay, yellow	16	16
Sand, gray	14	30
Clay, gray, soft	70	100
Sand and shells	20	120
Chesapeake group:		
Clay, blue	216	336
Sediments of Jackson age and Nanjemoy formation:		
Rock and sand, gray (water)	49	385
Well St.M.-Gh 1 (Altitude: 5 feet)		
Pleistocene sediments:		
Clay, brown	0.3	0.3
Clay, sandy	17.7	18
Sand, fine	11	29
Sand, coarse (water)	16	45
Chesapeake group (?):		
Clay, blue	97	142
Chesapeake group:		
Clay, sandy, blue	55	197
Clay, sandy, blue, very hard	73	270
Clay, sandy, brown, hard	25	295
Clay, sandy, blue, sticky	15	310
Clay, sandy, blue, and shells	11	321
Sand, fine (water—10 g.p.m.)	6	327
Clay, sandy, brown	7	334
Clay, blue (10 inches rock)	7	341
Clay, sandy, blue	4	345
Sediments of Jackson age:		
Rock	1	346
Clay, sandy, and rock	5	351

TABLE 10—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Gh 1—*Continued*		
Clay, sandy, blue	7	358
Sandstone	1.5	359.5
Clay, sandy, blue	3.5	363
Sandstone	1.5	364.5
Clay, sandy, brown	9	373.5
Clay, sandy, blue	13	386.5
Clay, sandy, blue, and rock	6	392.5
Nanjemoy formation and Aquia greensand:		
Clay, sandy, yellow, very hard	19	411.5
Clay, sandy, blue	8	419.5
Clay, sandy, brown	10.5	430
Clay, sandy, blue	11	441
Clay, sandy, blue and black	30	471
Clay, sandy, blue and black, very sticky	51	522
Clay, gray	19	541
Clay, blue, very sticky	47	588
Clay, sandy, black	2	590
Sand, black (water)	4	594
Clay, green	5	599
Clay, sandy, black	12	611
Clay, blue and black	9	620
Cretaceous (?) sediments:		
Clay, red	4	624
Clay, brown	11	635
Clay, sandy, brown	18	653
Sand, white (water)	11	664
(Flows at top 6 g.p.m.; pump 96 feet, 40 g.p.m.)		
Clay, blue	7	671
Clay, sandy, blue	1	672
Sand, white (water)	24.5	696.5
(Flows at top 24 g pm.; pump test 40 hours, 83.4 g.p.m.)		
Well St.M.-Gh 2 (Altitude: 5 feet)		
Pleistocene sediments:		
Clay, white	21	21
Clay, sandy	14	35
Sand and gravel	20	55
Clay, blue	60	115
Chesapeake group:		
Sand, fine	83	198
Clay, blue	136	334
Sediments of Jackson age:		
Rock, soft, in layers	23	357
Nanjemoy formation:		
Sand, black (water)	43	400
Well St.M.-Gh 3 (Altitude: 4 feet)		
Pleistocene sediments:		
Clay and sand	20	20

TABLE 10—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Gh 3—*Continued*		
Clay, gray	40	60
Sand and mud, gray	45	105
Sand and gravel, gray	15	120
Chesapeake group:		
Mud, gray	20	140
Clay, blue, soft	175	315
Sediments of Jackson age and Nanjemoy formation:		
Sand, gray; shells; rock	21	336
Sand (water)	74	410
Well St.M.-Gh 4 (Altitude: 3 feet)		
Pleistocene sediments:		
Clay, yellow	10	10
Sand, yellow	10	20
Mud, gray, soft	10	30
Sand	10	40
Sand and gravel	4	44
Clay, gray, soft	101	145
Gravel	2	147
Chesapeake group:		
Clay, blue	183	330
Sediments of Jackson age and Nanjemoy formation:		
Sand, rock, and shells (water)	27	357
Sand and rock (water)	63	420
Well St.M.-Gh 6 (Altitude: 3 feet)		
Pleistocene sediments:		
Clay, yellow	10	10
Sand, yellow	10	20
Clay, gray	10	30
Sand	30	60
Clay, soft	60	120
Sand, gray	20	140
Chesapeake group:		
Clay, blue, soft	160	300
Sediments of Jackson age:		
Sand and shells	40	340
Nanjemoy formation:		
Sand and rock (water)	60	400
Well 5a Northumberland Co., Virginia (Altitude: 17 feet)		
Pleistocene sediments:		
Sand, yellow	10	10
Sand, mud, yellow	11	21
Sand, brown	10	31
Sand, white, (water)	11	42
Mud and shells	53	95
Mud, shells and sand	10	105
Sand, gray (water)	10	115

TABLE 10—*Continued*

Well 5a Northumberland Co., Virginia—*Continued*		
Chesapeake group:		
Clay, blue, and shells	105	220
Sediments of Jackson age and Nanjemoy formation:		
Sand, shells rock (water)	64	284
Well 37a Westmoreland County, Virginia (Altitude: 23 feet)		
Pleistocene sediments:		
Sand, yellow	10	10
Sand and gravel	21	31
Sand, bluish	11	42
Chesapeake group:		
Clay, blue, shells	11	53
Clay and shells, blue	136	189
Sediments of Jackson age:		
Sand and rock layers	12	201
Rock, hard	—	201
Rock layers and sand (water)	30	231

TABLE 11

Logs of Wells from Which Cuttings Samples Were Obtained

Well St.M.-Bb 4 (Altitude: 176 feet)	Thickness (feet)	Depth (feet)
Pleistocene sediments:		
Sand and gravel, dark yellowish-orange, clayey; contains some large reworked glauconite	10	10
Clay, tan, silty; fragments of black rock	10	20
Silt, gray to buff, clayey	10	30
Chesapeake group:		
Same as above, and fragments of light-gray clay and shell fragments	15	45
Sand, coarse and fine, gray; shell fragments abundant	2	47
Sand, gray, very fine, clayey, and shell fragments	3	50
Same and a few shell fragments	10	60
Sand, medium fine, gray, slightly clayey; contains a few pelecypod and other shell fragments; diatoms rare	10	70
Sand, as above	10	80
Same, shell fragments; diatoms common, several species	10	90
Same, silty; diatoms common	10	100
Silt, gray, clayey; almost no shells	10	110
Clay, gray, silty, and some fine sand	10	120
Same, less sand	10	130
Same as above	10	140
Sand, very fine, gray, clayey; fossils and shell fragments abundant	10	150
Clay, gray, silty	10	160
Silt, gray, clayey, diatomaceous	10	170

TABLE 11—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Bb 4—*Continued*		
Clay, light gray	10	180
Clay, as above	10	190
Same, contains one fragment of black glassy mineral	10	200
Clay, gray, slightly silty; rounded black phosphate nodules common (up to ⅜ inch max. diameter); one ostracod noted; diatoms present	10	210
Sand, gray, silty; contains a few phosphate pebbles; diatom fragments common	10	220
Sand, gray, silty; diatoms common	10	230
Same, no phosphatic pellets; diatoms	10	240
Nanjemoy formation:		
Sand, gray, silty; consists of rounded grains green quartz and small amount glauconite; fine mica plates abundant	10	250
Silt, gray, glauconitic, micaceous, sandy	10	260
Same as above	10	270
Sand, dark gray, glauconitic, clayey	10	280
Clay, sandy, glauconitic	10	290
Same; abundant fine mica plates	10	300
Clay, silty, gray-green; rounded quartz common	5	305
Same as above	5	310
Clay, silty, glauconitic, sandy, dark gray	10	320
Sand, "salt and pepper"; subrounded clear quartz and large dark-green glauconite (glauconite 50 to 60 per cent of sample)	10	330
Sand, finer, gray-green, highly glauconitic, clayey	10	340
Same as above	10	350
Same, clayey and highly glauconitic	10	360
Same as above	10	370
Same, with one pelecypod shell	10	380
Clay, sandy and glauconitic	10	390
Sand, clayey, highly glauconitic	10	400
Clay, sandy and silty, gray; large subrounded quartz grains	10	410
Sand, gray, clayey, glauconitic	10	420
Clay, glauconitic, gray, smooth; some rounded clear quartz grains	5	425
Same, gray to gray-buff	13	438
Aquia greensand:		
Sand, "salt and pepper," clean, highly glauconitic, medium-grained; dark-green, brown, and olive-green large glauconite	2	440
Sand, green, clayey, fine to medium-grained	10	450
Same, finer-grained, clayey, glauconitic	10	460
Sand, "salt and pepper," fine to medium-grained, brown and green glauconite, clean; quartz mostly tan and brown to clear, transparent, subangular	20	480
Well St.M.-Bc 1 (Altitude: 165 feet)		
Pleistocene sediments:		
Sand, dark yellowish-orange, clayey and gravelly	10	10
Same, with less gravel	10	20
Same, very clayey, dark yellowish-orange	10	30
Same, with coarse sand grains up to ⅛ inch in diameter	10	40

TABLE 11—*Continued*

Well St.M.-Bc 1—*Continued*	Thickness (feet)	Depth (feet)
Chesapeake group:		
Clay, silty, gray; fine clear quartz and dark phosphate; diatoms common	10	50
Clay, as above, yellowish-gray to pale olive; diatom fragments common	10	60
Clay, as above, silty, pale olive; diatoms common	10	70
Silt, dark-gray, sandy, glauconitic; glauconite fine and dark green	10	80
Clay, light olive-gray, silty, nonglauconitic; diatoms	10	90
Same as above, silty, light olive-gray; diatoms common	10	100
Clay, same as above; a few weathered shell fragments; diatom fragments common	10	110
Sample missing	10	120
Clay, light olive-gray	10	130
Clay, same as above	10	140
Clay, same as above	10	150
Clay, same as above	10	160
Clay, slightly silty; diatoms common	10	170
Silt, dark-gray, abundantly micaceous; a few large rounded blue quartz pebbles and a couple small pelecypod shells	10	180
Same, slightly glauconitic	10	190
Same, slightly sandy, nonglauconitic	10	200
Clay, silty, nonglauconitic; few phosphate fragments	10	210
Nanjemoy formation:		
Silt, sandy and clayey, dark gray; finely micaceous; glauconite abundant	10	220
Silt, as above	10	230
Silt, dark gray, as above	10	240
Same; fine mica flakes common	10	250
Same, more clayey	10	260
Clay, silty, lighter gray; glauconite less prominent; fine mica flakes	10	270
Clay, as above	10	280
Sample missing	10	290
Clay, silty, darker in color, glauconitic	10	300
Clay, as above, slightly sandy	10	310
Silt, clayey, darker in color, glauconitic	10	320
Sand, clayey, dark green-gray, glauconitic; quartz largely rounded, clear to light green	10	330
Silt, same as above	10	340
Same, gray-green	10	350
Sample missing	10	360
Silt, dark gray, very clayey, glauconitic	10	370
Silt, same as above	10	380
Same as above	10	390
Marlboro clay member:		
Clay, light gray, slightly glauconitic, slightly sandy	10	400
Clay, same, with thin streaks of dark-gray clay	10	410
Clay, as above, finely glauconitic	10	420
Clay, pink, slightly glauconitic and sandy	10	430

TABLE 11—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Bc 1—*Continued*		
Clay, pink, as above	10	440
Clay, pink, less glauconite	10	450
Aquia greensand:		
Sand, clean, medium-grained, highly glauconitic; quartz and glauconite highly vitreous; glauconite, brown and green; tan quartz common	10	460
Sand, as above	10	470
Well St.M.-Cb 5 (Altitude: 100 feet)		
Pleistocene sediments:		
Sand and gravel, dark yellowish-orange; largely coarse angular pebbles of quartz, most are fragmentary, all are oxidized; some chert fragments; some weathered glauconite	10	10
Sand, fine, and gravel, grayish-orange; largely fine oxidized and clear, well-rounded quartz, containing limonitic fragments; glauconite and chert	11	21
Chesapeake group (?):		
Sand, fine, pale yellowish-orange; consists of fine angular, clear, frosted and oxidized quartz; trace of glauconite	10	31
Sand, fine, pale yellowish-orange; similar to above, except it contains carbonaceous material	11	42
Sand, slightly clayey, pale yellowish-orange; similar to above, except with fewer oxidized grains	10	52
Sand, slightly clayey, pale yellowish-orange; similar to above	11	63
Chesapeake group:		
Sand, silty, fine, yellowish-gray; consists of angular quartz, and a little carbonaceous material	10	73
Sand, medium, clayey, yellowish-gray; similar to above, except some glauconite, yellow quartz, and sponge spicules	11	84
Clay, sandy, diatomaceous, light olive-gray; much carbonaceous material; trace of glauconite	11	95
Clay, sandy, diatomaceous, light olive-gray; similar to above	10	105
Sand, fine, clayey, light olive-gray; consists of fine angular, lustrous to dull quartz containing inclusions	11	116
Sand, fine, clayey, light olive-gray; similar to above, except contains phosphate pellets	10	126
Sand, fine, clayey, light olive-gray; similar to above	11	137
Sand, fine, clayey, light olive-gray; similar to above, except glauconite is common	10	147
Clay, silty, diatomaceous, yellowish-gray; fine quartz common; some glauconite and phosphatic material	10	157
Clay, silty, diatomaceous, yellowish-gray; similar to above	11	168
Sand, coarse to medium, yellowish-gray; coarse to medium, clear, lustrous, angular, fragmental quartz; bone, carbonaceous and phosphatic material	10	178
Sand, coarse to medium, clayey, yellowish-gray; similar to above	11	189
Nanjemoy formation:		
Clay, glauconitic, light olive-gray; large amount of coarse, dark-green glauconite and coarse quartz; forams common	11	200

TABLE 11—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Cb 5—*Continued*		
Clay, glauconitic, light olive-gray; similar to above, except larger amount	10	210
Sand, coarse to fine, glauconitic, and gravel, greenish gray; abundant well-rounded milky to yellow quartz pebbles; brown, dark- and light-green glauconite; some forams	11	221
Sand, fine to coarse, glauconitic, clayey, greenish-gray; similar to above, except less coarse material	10	231
Sand, fine to coarse, glauconitic, clayey, greenish-gray; similar to above	10	241
Sand, fine to coarse, glauconitic, clayey, greenish-gray; similar to above	11	252
Sand, fine to coarse, glauconitic, clayey, greenish-gray; largely fine, dark-green glauconite; quartz, coarse, yellow, rounded grains to fine, angular, clear grains	11	263
Sand, fine to coarse, glauconitic, clayey, greenish-gray; similar to above, except green quartz is common	10	273
Sand, fine to coarse, glauconitic, clayey, greenish-gray; similar to above, except less yellow quartz	11	284
Sand, fine to coarse, glauconitic, clayey, greenish-gray; similar to above	10	294
Sand, fine to coarse, glauconitic, clayey, greenish-gray; similar to above	11	305
Sand, fine to coarse, glauconitic, clayey, greenish-gray; similar to above	10	315
Sand, fine to coarse, glauconitic, clayey, greenish-black; similar to above	10	325
Sand, fine to coarse, glauconitic, clayey, greenish-black; similar to above, except more coarse quartz	11	336
Sand, medium and coarse, glauconitic, clayey, greenish-black; similar to above	11	347
Sample missing	10	357
Sand, fine to medium, glauconitic, clayey, olive-gray; similar to above; about 50 per cent glauconite and 50 per cent quartz	10	367
Marlboro clay member:		
Clay, sandy, glauconitic, pale yellowish-brown ("red clay" of drillers), similar to above, but also contains indurated clay fragments and some small worm tubes	11	378
Aquia greensand:		
Sand, medium, pale yellowish-brown, contains about 70 per cent quartz, mostly yellow and milky, mostly rounded and irregular; glauconite brown, shiny, dark-green, botryoidal; some cemented rock fragments	11	389
Sand, medium, pale yellowish-brown, similar to above	23	412
Well St.M.-Cd 1 (Altitude: 10 feet)		
Pleistocene sediments:		
Sand, fine, clean, slightly glauconitic, grayish-orange; quartz, fine; glauconite, rare; diatom fragments	10	10

TABLE 11—*Continued*

Well St.M.-Cd 1—*Continued*	Thickness (feet)	Depth (feet)
Chesapeake group:		
Clay, light olive-gray, silty; fine, angular, clear quartz of silt size; some mica; phosphatic material; foraminifera rare; diatoms common	10	20
Clay; similar to above, with pyritized medium-green glauconite; diatoms abundant	10	30
Silt, light olive-gray, clayey; mostly clear, fine, angular quartz; glauconite, rare, olive-green; sponge spicules; phosphatic fragments common; diatoms common	10	40
Silt, light olive-gray, clayey; similar to above, with a few shell fragments; diatoms common	10	50
Sand, very fine, clayey, light olive-gray; similar to above; diatoms	10	60
Silt and fine sand, clayey, light olive-gray; fine, angular to subangular quartz grains; minute particles phosphatic material; few macrofossil fragments; diatoms common	10	70
Silt and fine sand, clayey; similar to above; diatoms common	10	80
Clay, pale olive, slightly silty; phosphatic material; some glauconite; diatoms abundant	10	90
Clay, pale olive; similar to above; few fine macrofossil fragments; diatoms abundant	10	100
Clay, pale olive, diatomaceous, dense; phosphate common; diatoms abundant	10	110
Clay, dense, pale olive; glauconite; diatoms abundant	10	120
Clay, pale olive, dense; phosphatic fragments; glauconite rare; diatoms abundant	10	130
Sand, fine to medium-grained, grayish, slightly clayey; mostly semi-vitreous, medium quartz; fine glauconite, dark-green; small amount broken phosphatic plates; diatoms rare	10	140
Sediments of Jackson age:		
Sand, slightly clayey, some calcite fragments, fine to coarse; quartz; broken macrofossil fragments; hard fragments dark olive-gray clay; fine green-black glauconite common	10	150
Sand, fine to medium, grayish-olive, glauconitic, clayey; quartz, subangular, clear, tan, and green; glauconite, abundant, light to dark green and brown; few grains pyrite	10	160
Nanjemoy formation:		
Sand, light olive-brown, medium, highly glauconitic; clear to pale-brown quartz; some green glauconite	10	170
Sand, as above, somewhat finer-grained, highly glauconitic; similar to above	10	180
Sand; similar to above, but finer-grained; 50 to 60 per cent glauconite	10	190
Sand, fine, grayish-olive, well-sorted, highly glauconitic; similar to above; increase in amount of green glauconite; macrofossil fragments; small pelecypod shells	10	200
Sand, fine to medium, glauconitic; fossil fragments; fine to medium glauconite and quartz; several pelecypod shells	10	210

TABLE 11—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Cd 1—*Continued*		
Sand, similar to above, darker in color, highly glauconitic, small fossil fragments	10	220
Sand, similar to above	10	230
Well St.M.-Ce 13 (Altitude: 10 feet)		
Pleistocene sediments:		
Sand, fine, some gravel, pale yellowish-orange; 90 per cent of sample is fine white quartz; some very fine glauconite, weathered; trace bone fragments; some sand grains stained yellowish-orange	10	10
Sand, fine, some gravel, pale yellowish-orange; few shell fragments; quartz subangular to subrounded, clear; bone fragments	10	20
Chesapeake group:		
Sand and clay, light olive-gray; large shell fragments; many bone fragments; forams scarce; diatoms common	10	30
Sand and clay, light olive-gray; sand, fine; fair amount of coarse shell fragments; much fine bone fragment material; diatoms common	10	40
Silt and clay, shells, pale olive-gray; 85 per cent very fine quartz grains; few grains brown and green glauconite, weathered; very coarse shell fragments common; forams scarce; diatoms common	10	50
Same as above	10	60
Silt and clay, few shells, yellowish-gray; 50 per cent very fine quartz; many fine bone fragments; some shell fragments; trace of glauconite; forams scarce; diatoms rare	10	70
Sand, fine, and clay, grayish-olive; medium and fine quartz; many fine bone fragments; some shell fragments; diatoms abundant	10	80
Sand and clay, grayish-olive; quartz about 80 per cent of sample; bone fragments; few shell fragments; diatoms common	10	90
Sand, medium, some clay, pale-olive; medium quartz 85 per cent of sample; many bone fragments; diatoms common	10	100
Sand, medium, some clay, grayish-olive; quartz medium, clear, angular to subangular; many bone fragments; diatoms common	10	110
Clay, slightly silty, pale olive; many medium and fine bone fragments; diatoms common	10	120
Clay, slightly silty, pale olive; some very fine bone fragments; diatoms abundant	10	130
Clay, slightly silty, pale olive; some bone fragments; diatoms abundant	10	140
Clay, diatomaceous, pale greenish-yellow; forams common	10	150
Clay, diatomaceous, pale olive; bone and trace of glauconite; forams rare	10	160
Clay, diatomaceous, pale greenish-yellow; little quartz; little bone; forams rare	10	170
Clay, diatomaceous, pale greenish-yellow; little bone; forams abundant	10	180
Sand, medium, yellowish-gray; quartz, 90 per cent of sample; bone fragments; trace of fine glauconite, light-green; some very coarse		

TABLE 11—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Ce 13—*Continued*		
quartz grains and phosphatic pellets; some shell fragments; diatoms very rare	10	190
Sand, medium, and clay, pale olive; similar to above	10	200
Sediments of Jackson age:		
Sand and shell fragments, coarse, little clay, pale olive; large shell fragments abundant; some calcite-cemented quartz and glauconite; coarse and medium quartz and hard shell fragments about 80 per cent of sample; quartz transparent, subrounded; glauconite medium to very fine, dark green to light green; some pyrite crystals	10	210
Nanjemoy formation:		
Sand, medium, some clay, grayish-olive; quartz, clear and pale-brown; glauconite coarse to very fine, comprises about 40 to 60 per cent of sample, dark brown to light green; trace of mica; forams scarce	10	220
Sand, medium, moderate olive-brown; similar to above; more coarse yellow quartz; more dark glauconite	10	230
Sand, coarse to medium, moderate olive-brown; coarse to medium quartz, clear to tan, angular to subrounded; glauconite, 70 per cent of sample, dark green to dark brown, irregular to ovoid; forams scarce	10	240
Sand, medium, grayish-olive; similar to above, except finer in size; forams rare	10	250
Sand, medium, and hard shell, grayish-olive; similar to above, except hard shell fragments, lime-cemented glauconite grains; forams scarce	10	260
Sand, coarse to medium, light olive-brown; similar to above, some mica	10	270
Sand, coarse to medium, light olive-brown; same as above; quartz coarser	10	280
Well St.M.-Ce 19 (Altitude: 80 feet)		
Pleistocene sediments:		
Sand, coarse to fine, grayish-orange; some feldspar	10	10
Same as above, sightly coarser	11	21
Chesapeake group (?):		
Sand, fine, grayish-orange	10	31
Chesapeake group:		
Sand, very fine, yellowish-gray; calcite fragments	11	42
Clay and coarse sand, light olive-gray; abundant phosphatic material; shell fragments	10	52
Sand and shell fragments, coarse, clayey, olive-gray	11	63
Sand and clay, pale olive; shell and phosphatic fragments	10	73
Same as above	11	84
Sand and shell fragments, clayey, light olive-gray; foraminifera	10	94
Same as above	11	105
Clay, silty, yellowish-gray, shell fragments and foraminifera	10	115
Same as above	11	126

TABLE 11—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Cc 19—*Continued*		
Same as above, except less shell fragments	10	136
Same as above	11	147
Same as above	10	157
Same as above	11	168
Same as above	10	178
Sand and clay, light olive-gray; shell fragments	11	189
Sand, medium, clayey, light olive-gray	10	199
Same as above	11	210
Clay, silty, light olive-gray; shell fragments	10	220
Same as above	11	231
Same as above	10	241
Same as above	11	252
Sand, medium to coarse, clayey, light olive-gray; some carbonaceous fragments	10	262
Same as above	11	273
Sediments of Jackson age:		
Sand, medium clayey, light olive-gray; some light-green to brown glauconite; calcite-cemented fragments common; coral fragments, pyrite and shell fragments	10	283
Same as above	11	294
Nanjemoy formation:		
Sand, glauconitic, medium, clayey, pale yellowish-brown; about 50 per cent green to brown dull glauconite; foraminifera common; yellow quartz	10	304
Same as above, except more glauconite and yellow quartz	11	315
Same as above	10	325
Same as above	11	336
Well St.M.-Db 2 (Altitude: 12 feet)		
Pleistocene sediments:		
Sand, fine, yellowish-orange; almost entirely slightly oxidized, angular quartz; some green, weathered glauconite	10	10
Sand, fine to medium, grayish-orange; similar to above, except less oxidized quartz	10	20
Chesapeake group:		
Clay, sandy, pale olive-gray; fine, irregular quartz; fine phosphatic material; coarse bone fragments	10	30
Clay, silty, diatomaceous, dark yellowish-gray; small bone fragments; glauconite; a few forams	10	40
Clay, silty, diatomaceous, yellowish-gray; similar to above	10	50
Clay, silty, diatomaceous yellowish-gray; similar to above	10	60
Sand, medium silty, light gray; lustrous, angular, clear and milky quartz; a few shell fragments	10	70
Sediments of Jackson age:		
Sand, fine to coarse, clayey, olive-gray; mostly medium lustrous, subangular, clear quartz; fine, dark- and light-green glauconite; forams and small shell fragments common	10	80

TABLE 11—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Db 2—*Continued*		
Sand, coarse, olive-gray; similar to above, except almost no glauconite	10	90
Sand, coarse, and shell fragments, olive-gray; clear and milky quartz; glauconite common, green; coarse shell fragments and forams common	10	100
Nanjemoy formation:		
Sand, coarse, clayey, glauconitic, black, greenish-gray; irregular, angular, clear and yellow quartz; glauconite, mostly green, some brown; garnet; pyrite	10	110
Sand, coarse, clayey, glauconitic, dark greenish-gray; similar to above	10	120
Sand, fine to coarse, glauconitic, dark greenish-gray; similar to above, except more shell fragments	10	130
Sand, coarse, clayey, glauconitic, dark greenish-gray; similar to above, except glauconite more abundant	10	140
Sand, medium to fine, clayey, glauconitic, dark greenish-gray; similar to above, except material is finer	10	150
Sand, medium to fine, highly glauconitic, grayish olive-green; about 80 per cent fine greenish-black glauconite; 20 per cent clear to milky subrounded quartz	10	160
Sand, fine glauconitic, clayey, grayish olive-green; similar to above; about 90 per cent glauconite	10	170
Sand, fine, glauconitic, clayey, grayish olive-green; similar to above	10	180
Sand, fine, glauconitic, clayey, grayish olive-green; similar to above	10	190
Sand, fine, glauconitic, clayey, grayish olive-green; similar to above	10	200
Sand, fine, glauconitic, grayish olive-green; similar to above	10	210
Sand, fine to medium, glauconitic, grayish olive-green; similar to above, except some green angular quartz	10	220
Sand, fine to coarse, glauconitic, dark greenish-gray; similar to above	10	230
Sand, fine to coarse, glauconitic, dark greenish-gray; similar to above	10	240
Sand, fine to medium, glauconitic, dark greenish-gray; similar to above	10	250
Marlboro clay member:		
Sand, medium, and clay, light brownish-gray, red clay particles; first appearance of light-brown quartz and glauconite	10	260
Aquia greensand:		
Sand, fine, clayey, dark greenish-gray; similar to above, but more brown quartz and glauconite	10	270
Sand, fine, clayey, olive-gray; fine well-sorted sand; quartz, clear to brown; glauconite, green to brown	10	280
Sand, fine, clayey, olive-gray; similar to above, except more brown quartz and glauconite	13	293

TABLE 11—*Continued*

Well St.M.-Db 14 (Altitude: 16 feet)	Thickness (feet)	Depth (feet)
Pleistocene sediments:		
Sand, fine, clayey, yellowish-brown; quartz, fine, angular, clear, and tan; some feldspar; glauconite, fine, green	10	10
Sand, fine, clayey, moderate yellowish-brown; as above, somewhat coarser; mica; arkosic material common	10	20
Sand, fine, slightly clayey, pale-olive; quartz and chert, clear to gray; angular; arkosic material; glauconite, light- to dark-green; coarse mica plates	10	30
Sand, pale-olive; similar to above, arkosic material common; glauconite, fine	10	40
Sand, pale-olive (gravel reported by driller); as above, with slight increase in amount of glauconite and clear, angular, fine quartz; few plant fragments	10	50
Chesapeake group:		
Clay, yellowish-gray, dense; diatoms common	10	60
Clay, yellowish-gray, as above; diatoms abundant	10	70
Clay, yellowish-gray to pale olive, dense; similar to above; diatoms abundant	10	80
Clay, pale olive to grayish-olive; fragments macrofossils, phosphatic plates and pellets common; diatoms abundant	10	90
Clay, sandy, fossil fragments abundant; quartz, fine to medium; phosphatic plates and pebbles; glauconite, black to dark-green	10	100
Sediments of Jackson age:		
Sand, very clayey, grayish-olive; glauconite, green-black; quartz, subangular, clear and pale green; sponge spicules; some calcite fragments	10	110
Sand, grayish-olive, clayey, glauconitic; clear, medium to coarse quartz and green-black glauconite; macrofossil fragments common; ostracods common; a few small pelecypods	10	120
Sand, coarse, slightly clayey, grayish-olive; subrounded, clear quartz grains common; coarse, green-black glauconite abundant; pyrite; fossil fragments	10	130
Sand, coarse, fairly clean; quartz rounded to subrounded, clear to gray; few macrofossil fragments; some glauconite	10	140
Nanjemoy formation:		
Sand, clayey, medium- to fine-grained; fossil fragments; quartz clear and pale-green; glauconite fine, olive-green, brown and black	10	150
Sand, clayey, grayish-olive, glauconitic; quartz grains as above, mostly fine; glauconite as above	10	160
Sand, clayey, glauconitic, olive-gray; quartz tan and clear, subangular; glauconite, brown, black, and olive-green	10	170
Sand, clayey; similar to above	10	180
Sand, as above, olive-gray, coarser, cleaner; clear, green, gray quartz; glauconite green (60 to 70 per cent)	10	190
Sand, fine to coarse, olive-gray, slightly clayey; as above, with greater proportion coarse quartz grains	10	200

TABLE 11—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Db 14—*Continued*		
Sand, glauconitic, fairly clean, slightly clayey; similar to above	10	210
Sand, clayey, glauconitic, dark greenish-gray; similar to above	10	220
Sand, clayey, glauconitic, dark greenish-gray; similar to above; glauconite 50 to 60 per cent	10	230
Sand, clayey, glauconitic, dark greenish-gray; glauconite fine, green-black to olive-green; few grains pyrite; few macrofossil fragments	10	240
Sand, slightly less clayey; similar to above; glauconite darker and coarser	10	250
Sand, more clayey; similar to above; glauconite somewhat finer grained; phosphatic plates and fragments	10	260
Sand, clayey, glauconitic; similar to above	10	270
Sand, light olive-brown, medium-grained, glauconitic; tan, clean, and pale-green quartz; glauconite, olive-green and brown; (driller reports 5 feet red clay from 277–282)	10	280
Aquia greensand:		
Sand, fine to medium, moderate olive-brown to grayish-olive; brown and clear quartz; brown, green-black and olive-green glauconite	10	290
Sand, as above, slightly clayey; similar to above, with decrease in amount of glauconite; brown glauconite common	10	300
Sand, as above; glauconite mostly green-black, coarser than above	10	310
Well St.M.-Db 16 (Altitude: 16 feet)		
Pleistocene sediments:		
Sand, fine, grayish-orange; 95 per cent quartz; many iron oxide-stained grains; trace of glauconite	10	10
Sand, fine, dark yellow-orange; similar to above, more iron oxide-stained grains; muscovite flakes	10	20
Sand, fine, very pale-orange; similar to above, less iron oxide-stained grains; some bone fragments	10	30
Sand and silt, clayey, dark yellow-brown; fine to very fine quartz, transparent, subangular, numerous oxidized grains; bone and lignitized wood common	10	40
Silt, some clay, dark yellowish-brown; quartz; some green glauconite; bone and lignitized wood common	10	50
Silt, some clay and gravel, dark yellowish-brown; very coarse chert and angular quartz; some are weathered; other material coarse to very fine; bone fragments common; trace of green glauconite; diatoms rare	10	60
Clay, silty, dark yellowish-brown; some chert and angular quartz; some very fine quartz grains and bone fragments; diatoms abundant	10	70
Chesapeake group:		
Sand, coarse, and shell fragments, yellowish-gray; quartz, subrounded, clear to opaque; coarse bone fragments; diatoms abundant	10	80

TABLE 11—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Db 16—*Continued*		
Sediments of Jackson age:		
Sand, some gravel and phosphatic pebbles, dark greenish-gray; pebbles to medium quartz; very little fine material; glauconite about 70 per cent, large to medium; large pebbles of rounded phosphate and angular chert; large shell and bone fragments	10	90
Nanjemoy formation:		
Sand, clayey, greenish-gray; very coarse to fine quartz; shell fragments; glauconite coarse to fine	10	100
Sand, medium, clayey, light olive-gray; very coarse to fine quartz; glauconite, light to dark-green	10	110
Sand, clayey, dark greenish-gray; shell fragments abundant; most quartz very coarse to medium, clear to opaque; glauconite, light- to dark-green, some light-brown	10	120
Sand, clayey, dark greenish-gray; similar to above	10	130
Sand, fine, clayey, dark greenish-gray; similar to above; much more glauconite, about 80 per cent	10	140
Sand, fine, clayey, dark greenish-gray; similar to above; lime-cemented fragments	10	150
Sand, medium, clayey, dark greenish-gray; abundant glauconite, light- to dark-green, shiny; quartz mostly coarse	10	160
Sand, fine, clayey, dark greenish-gray; similar to above	10	170
Sand, fine, clayey, dark greenish-gray; mostly medium glauconite and quartz; similar to above	10	180
Sand, coarse, clayey, dark greenish-gray; glauconite abundant, dark-green; quartz coarse, clear, some green-stained	10	190
Sand, medium, clayey, dark greenish-gray; similar to above	10	200
Sand, medium, clayey, dark greenish-gray; similar to above; more green-stained quartz	10	210
Sand, clayey, dark greenish-gray; similar to above; much more glauconite	10	220
Sand, greenish-black; chiefly coarse and medium; glauconite, irregular, dark-green	10	230
Sand, greenish-black; similar to above	10	240
Marlboro clay member:		
Clay, sandy, pale-red; glauconite abundant	10	250
Aquia greensand:		
Sand, medium, olive-gray, chiefly coarse to medium; coarse quartz, yellow; much glauconite, olive-brown and light to dark green	10	260
Sand, medium, olive-gray; similar to above; glauconite abundant	10	270
Sand, medium, olive-gray; similar to above	10	280
Well St.M.-Dc 12 (Altitude: 13 feet)		
Pleistocene sediments:		
Sand, fine, very pale-orange; quartz, angular to subrounded, clear to opaque; small amount of grains iron-stained; some bone fragments; few weathered brown glauconite grains	10	10

TABLE 11—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Dc 12—*Continued*		
Clay, slightly gravelly, grayish-yellow; quartz, white, clear, pink, violet, and yellow; few pieces gray flint; small amount fine mica; few plant fragments	11	21
Chesapeake group:		
Clay, sandy, pale-olive; quartz, angular, clear to pale-gray; green-black glauconite; fine mica; diatoms common	10	31
Clay, silty, pale-olive; quartz, fine, angular, as above; diatoms common	11	42
Clay, pale-olive; similar to above	10	52
Clay, pale-olive; similar to above	11	63
Clay, sandy, grayish-olive; quartz, medium to very fine	10	73
Clay, sandy, light olive-gray; similar to above	11	84
Clay, silty, pale olive; similar to above; diatoms abundant	10	94
Clay, sandy, light olive-gray; some very coarse, rounded, clear quartz; bone fragments abundant; trace of green glauconite; diatoms common	11	105
Sediments of Jackson age:		
Sand, coarse to fine, gravel, pale-olive; medium quartz, angular, transparent to translucent, pitted; dark-green glauconite; lime-cemented sand grains; very fine light-green glauconite; shell fragments common	10	115
Nanjemoy formation:		
Sand, coarse, glauconitic, clayey, olive-gray; glauconite abundant; very little fine-grained material; a few coarse shell fragments; forams scarce	11	126
Sand, silty, light olive-gray; similar to above; green glauconite, very fine, micaceous	10	136
Sand, silty, grayish-olive; similar to above; yellow quartz grains, sparse	12	148
Sand, silty, grayish-olive; similar to above; light-brown glauconite, sparse	10	158
Sand, medium, light olive-gray; similar to above	10	168
Sand, pale olive; similar to above	10	178
Sand, silty, grayish-olive; similar to above	11	189
Sand, coarse, glauconitic, clayey, olive-gray; quartz, subrounded, with greenish inclusions and stains; glauconite, dark-green; few shell fragments	10	199
Sand, coarse, glauconitic, clayey, olive-gray; similar to above, not so coarse	11	210
Sand, coarse, glauconitic, clayey, olive-gray; similar to above; coarser; more green-stained quartz	11	221
Sand, clayey, glauconitic, olive-gray; similar to above; finer; more glauconitic	10	231
Sand, medium, glauconitic, olive-gray; similar to above	10	241
Sand, glauconitic, medium, clayey, olive-gray; similar to above; more shell fragments	11	252
Sand, glauconitic, clayey, olive-gray; similar to above	11	263

TABLE 11—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Dc 12—*Continued*		
Sand, coarse, glauconitic, olive-gray, coarse to medium; glauconite 75 per cent; some very coarse quartz and glauconite	10	273
Marlboro clay member:		
Clay, sandy, olive-gray	10	283
Sand and clay, light brownish-gray; quartz very coarse to medium; glauconite abundant	11	294
Aquia greensand:		
Sand, fine, and clay, light olive-gray; about 60 per cent medium to coarse quartz; much yellow quartz; glauconite, light-to dark-green, some brown; trace of pyrite; some muscovite	10	304
Sand, fine, light olive-gray; similar to above	11	315
Sand, coarse, pale yellowish-brown; 90 per cent quartz, much yellow-stained; glauconite, dark green and brown	11	326
Well St.M.-Dc 20 (Altitude: 11 feet)		
Pleistocene sediments:		
Clay, sandy, pale yellowish-orange; fine, angular, clear, gray-white and yellow quartz; fine mica; feldspar	10	10
Sand, fine, grayish-orange; similar to above with very little coarse quartz; small amount very fine green glauconite	10	20
Clay, tough, sandy, pale yellowish-brown; some clear, white, yellow, violet, and iron-cored subangular quartz; pieces mineralized plant fragments; broken shell fragments common	10	30
Clay, tough, sandy, pale yellowish-brown; similar to above with lesser amounts of quartz and shell fragments	10	40
Clay, sandy, pale yellowish-brown; fine to coarse, vari-colored, angular to subangular quartz and chert; satiny shell fragments; few pieces vivianite	10	50
Clay, tough, light olive-gray; similar to above; abundance of pelecypod shell fragments	10	60
Clay, tough, light olive-gray; similar to above; abundance of pelecypod shell fragments	10	70
Clay, similar to above; pelecypod and gastropod fragments	10	80
Clay, as above; shell fragments common; some whole small pelecypod shells	10	90
Clay, as above	10	100
Sand, fine, even-textured, mottled yellowish-gray; clear, gray, white, and pale-yellow quartz; 5 to 10 per cent green, fine glauconite; one piece gray flint	10	110
Sand, coarse, clean, mottled light-gray; clear, white, yellow, pale-pink, violet, and pale-green, coarse, angular quartz and chert; few coarse grains glauconite	10	120
Sediments of Jackson age:		
Sand, shelly, slightly clayey, mottled-gray; fine to coarse quartz; few coarse, black, rounded phosphatic pebbles; some fine glauconite; pieces fine glauconite cemented by calcite (rock); shell fragments	10	130

TABLE 11—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Dc 20—*Continued*		
Sand, calcareous and glauconitic, fine to medium; clear quartz; green-black and light-green glauconite; shell fragments; (50 per cent of sample is fossil remains)	10	140
Sand, fine to medium, mottled olive-gray; similar to above, with increase in glauconite; forams abundant; ostracods; glauconite 60 to 70 per cent	10	150
Nanjemoy formation:		
Sand, very clayey, light olive-gray; green-black and green botryoidal glauconite common; forams and shell fragments abundant, including corals and ostracods; several fragments of fine glauconite cemented by calcite	10	160
Sand, clayey, light olive-gray; fine to medium, clear and pale-green, subangular to subrounded quartz; glauconite, green, botryoidal, irregular, abundant; forams common	10	170
Sand, clayey, grayish-olive	10	180
Sand, slightly clayey, light olive-gray	10	190
Sand, clayey, grayish-olive	10	200
Sand, clayey, grayish-olive	10	210
Sand, clayey, olive-gray	10	220
Sand, clayey, light olive-gray	10	230
Sand, very clayey, grayish-olive to light olive-gray	10	240
Sand, clayey, as above	10	250
Sand, medium, glauconitic, moderately clean	30	280
Aquia greensand (275 feet, driller's log):		
Sand, light olive-gray; brown quartz and glauconite common	10	290
Clay, sandy, mottled pale-olive	10	300
Sand, medium, mottled light olive-brown	10	310
Sand, as above	5	315
Well St.M.-Dc 34 (Altitude: 15 feet)		
Pleistocene sediments:		
Clay, dark yellowish-orange, slightly sandy; plant fragments; angular, dull, iron oxide-stained quartz; green botryoidal glauconite, rare	10	10
Sand, fine to medium, dusky-yellow, clayey, poorly sorted, slightly arkosic; quartz, angular, white, gray, and pale-pink; small amount fine glauconite	10	20
Sand, olive-gray, clayey, micaceous; plant fragments common; poorly sorted; similar to above	10	30
Sand, fine, clayey, light olive-gray; similar to above	10	40
Sand, fine, well-sorted, slightly arkosic, light olive-gray; clear to white, fine, angular quartz and chert; feldspar; small amount fine glauconite; some mica plates	10	50
Clay, tough, olive-gray; a few rounded chert pebbles	10	60
Clay, tough, light and dark olive-gray, gravelly; megafossil fragments; vivianite, rare	10	70
Clay, light olive-gray, sandy, tough; poorly sorted; quartz	10	80

TABLE 11—*Continued*

Well St.M.-Dc 34—*Continued*	Thickness (feet)	Depth (feet)
Clay, olive-gray, tough; sand and gravel; clear, pink, and blue-gray quartz and chert; small amount of glauconite; fragments of pelecypods and gastropods abundant	10	90
Sand, olive-gray, very clayey; sand medium to fine-grained; clear, gray, and pale-pink quartz grains; glauconite, fine-grained, dark to light green; few plates of iron oxide	10	100
Chesapeake group (?):		
Clay, light olive-gray, tough; similar to above; more glauconite; forams; sponge spicules; diatoms abundant	10	110
Sand, olive-gray, clayey, fossiliferous; vitreous, clear, subangular quartz; phosphatic plates and fragments common; shell fragments; forams scarce; diatoms rare	10	120
Sediments of Jackson age:		
Sand, as above; megafossil fragments abundant; phosphatic material; glauconite rare, light-green	10	130
Sand, fine to medium, slightly clayey, abundantly glauconitic, olive-gray to dark greenish-gray; glauconite, fine, pale green to dark green (about 25 to 35 per cent); limestone fragments common; few plates phosphatic material	10	140
Sand, glauconitic, clayey, fossiliferous, mottled greenish-gray; clear, fine-subangular quartz; glauconite, dark to pale green, fine; few limestone fragments; sponge spicules common; abundance of coral	10	150
Nanjemoy formation:		
Sand, dark greenish-gray, clayey, fine to medium; clear, tan, and green quartz; glauconite, black to pale-green (40 to 50 per cent); pyrite	10	160
Sand, olive-gray, glauconitic, fine; yellow and clear quartz; glauconite, brown and green, fine	10	170
Sand, very fine, dark greenish-gray to olive-gray, glauconite (50 to 60 per cent)	10	180
Sand, coarser, cleaner, olive-gray, less glauconite	10	190
Sand, fine- to medium-grained, glauconitic, olive-gray	10	200
Sand, fine, glauconitic	10	210
Sand, as above	10	220
Sand, as above, with more coarse quartz	10	230
Sand, as above; glauconite, dark green, coarser	10	240
Sand, salt and pepper, as above, clayey; quartz, subrounded to subangular, clear to green	10	250
Sand, as above; glauconite 60 to 75 per cent	10	260
Sand, as above, less clayey; glauconite 70 to 80 per cent	10	270
Sand, medium- to coarse-grained, as above; glauconite 50 to 60 per cent	10	280
Sand, fine, more clayey, glauconitic, as above; at least 50 per cent glauconite; phosphatic plates	10	290
Sand, fine to medium, glauconitic; as above, with more fine glauconite; pyrite	10	300

TABLE 11—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Dc 34—*Continued*		
Aquia greensand:		
Sand, fine to medium, salt and pepper; few small fragments pale-brown clay (driller reports 2 feet red clay from 300-302)	10	310
Sand, fine to coarse, olive-gray; quartz, highly vitreous, clear and tan; glauconite, medium to coarse, brown, green-black	10	320
Sand, as above; tan quartz and brown glauconite common	10	330
Sand, as above, fine to medium, clean	6	336
Well St.M.-Dd 1 (Altitude: 93 feet)		
Pleistocene sediments:		
Clay, sandy, light olive-gray; small amount of clear, fine quartz, some smoky; glauconite rare	10	10
Sample missing	10	20
Clay; same as sample 0–10 feet	10	30
Clay, slightly sandy, olive-gray; fine, clear to smoky quartz, some iron-stained	10	40
Clay, sandy, yellowish-gray; quartz, fine, mostly angular and fractured, some polished and rounded; some glauconite; some iron-stained quartz	10	50
Chesapeake group:		
St. Marys formation:		
Sand, medium, clean, olive-gray; quartz clear, medium to fine; shell fragments abundant; foraminifera common	10	60
Sand, fine, light olive-gray; quartz, coarse to fine, angular, lustrous; shell fragments abundant; foraminifera common	10	70
Sand; same as above	10	80
Calvert and Choptank formations:		
Clay, sandy, yellowish-gray; small amount clear, fine, angular quartz; foraminifera rare	10	90
Clay; same as above	10	100
Clay; same as above	10	110
Clay; same as above	10	120
Clay; same as above	10	130
Clay; same as above	10	140
Clay; same as above	10	150
Clay; same as above	10	160
Clay; same as above, except less quartz	10	170
Clay; same as above	10	180
Clay; same as above	10	190
Clay, pale-olive; more quartz than above	10	200
Clay; same as above	10	210
Clay, pale-olive	10	220
Sand, clayey, light olive-gray; quartz, clear, angular to rounded and polished, some cemented grains; shell fragments abundant	10	230
Sediments of Jackson age:		
Sand, clean, light gray; quartz, clear, medium to coarse, lustrous, abundant; glauconite, green, common; quartz and glauconite cemented by calcite; phosphate pellets; shell fragments	10	240

TABLE 11—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Dd 1—*Continued*		
Sand; same as above, except more clayey and more glauconite	10	250
Sample missing	10	260
Nanjemoy formation:		
Sand, clayey, olive-gray; quartz, clear, brown, yellow, subangular to subrounded, abundant; glauconite, green, brown, abundant, fine; coarse mica	10	270
Sand; same as above	10	280
Sand; same as above	10	290
Sand; same as above, except more coarse	10	300
Sand; same as above	10	310
Sand; same as above	10	320
Sand; same as above	10	330
Clay, sandy, pale-olive; some fine sand, some cemented with calcite; glauconite less abundant	10	340
Clay; same as above	10	350
Sand, clayey, grayish-olive; abundant glauconite; quartz common, green to clear	10	360
Clay, sandy, pale-olive; clear to green, fine to coarse quartz; glauconite, green-black to brown; some pyrite	10	370
Sand, clayey, grayish-olive; quartz and glauconite similar to above	10	380
Clay, sandy, pale-olive; similar to above	10	390
Clay; same as above	10	400
Sand, clayey, pale-olive; glauconite abundant; quartz, clear, green and yellow	10	410
Marlboro clay member:		
Clay, slightly sandy, yellowish-gray; glauconite abundant; red clay fragments common	10	420
Clay, light-brown; similar to above	10	430
Aquia greensand:		
Sand, clean, mottled greenish-brown; green, clear, yellow and brown, lustrous quartz; glauconite abundant, brown to green-black	10	440
Sand; same as above	10	450
Sample missing	10	460
Sand, clean, mottled greenish-brown; medium to coarse, clear, green, yellow, and brown, lustrous quartz; glauconite, green to green-black to brown; sand well sorted	10	470
Sand; same as above	10	480
Sand; same as above	10	490
Sand; same as above	10	500
Sand; same as above	10	510
Well St.M.-Dd 14 (Altitude: 35 feet)		
Pleistocene sediments:		
Sand and gravel, coarse, grayish-orange; most grains are oxidized and iron-stained, angular	10	10
Gravel, grayish-orange; 98 per cent gravel; some very coarse and coarse quartz; most material is angular and oxidized	10	20
Sand and gravel, grayish-orange; gravel and granule-sized quartz		

TABLE 11—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Dd 14—*Continued*		
grains predominate; very poorly sorted; most of material oxidized	10	30
Clay, yellowish-gray; vivianite common; bone fragments common	10	40
Chesapeake group:		
Sand, medium, yellowish-gray; medium and fine quartz 80 per cent; few large fragments of shells; bone common	10	50
Sand, medium, yellowish-gray; same as above	10	60
Clay, yellowish-gray; diatoms common	10	70
Clay, yellowish-gray; small forams common; bone fragments; diatoms common	10	80
Clay, yellowish-gray; similar to above, except a fair amount of brown cellular material, may be bone; diatoms common	10	90
Clay, yellowish-gray; same as above; diatoms common	10	100
Clay, yellowish-gray; similar to above, except more and larger forams; more bone fragments; diatoms common	10	110
Clay, yellowish-gray; same as above, diatoms common	10	120
Clay, yellowish-gray; same as above; diatoms common	10	130
Clay, yellowish-gray; same as above; diatoms common	10	140
Clay, yellowish-gray; same as above; diatoms common	10	150
Clay, sandy, yellowish-gray; some quartz; abundant forams; much bone; diatoms abundant	10	160
Clay, sandy, yellowish-gray; same as above; diatoms common	10	170
Clay, sandy, yellowish-gray; same as above; diatoms abundant	10	180
Note: Driller calls end of clay at 180.		
Sand, coarse, clayey, light olive-gray; much very coarse, coarse, and medium quartz; bone and shell fragments abundant; diatoms common	10	190
Sediments of Jackson age:		
Sand, coarse, clayey, light olive-gray; large amount of granular-sized shells, phosphatic pebbles, quartz pebbles, and bone fragments; some cemented sand and glauconite	10	200
Sand, very coarse, and rock, light olive-gray; large amount calcium carbonate-cemented quartz and glauconite; quartz grades from granules to medium; grains subrounded to well rounded; some are yellow- and green-stained; glauconite common, brown and green; pyrite common; shell fragments	10	210
Sand, very coarse, and rock, light olive-gray; similar to above, except brown glauconite is abundant	10	220
Sand, very coarse, and rock, light olive-gray; similar to above	10	230
Nanjemoy formation:		
Sand, coarse, and rock, light olive-gray; similar to above, except less pyrite; much more glauconite; more yellow- and greenish-stained quartz	10	240
Sand, coarse, light olive-gray; same as above	10	250
Well St.M.-Df 22 (Altitude: 105 feet)		
Pleistocene sediments:		
Sand, medium to fine, clayey, pale yellowish-orange; medium quartz,		

TABLE 11—*Continued*

Well St.M.-Df 22—*Continued*	Thickness (feet)	Depth (feet)
subangular, opaque, pitted; many grains oxidized and iron-stained	10	10
Sand, coarse, clayey, pale yellowish-orange; grades from gravel to very fine; medium size most abundant; quartz mostly opaque, oxidized, iron-stained; some chert	10	20
Sand, coarse, clayey, pale yellowish-orange; similar to above	10	30
Sand, medium, clayey, very pale-yellowish orange; similar to above	10	40
Sand, medium, clayey, pale yellowish-orange; medium to very fine; most quartz grains oxidized and iron-stained; some fine and very fine organic material	10	50
Sand, medium, clayey, pale yellowish-orange; similar to above	10	60
Sand, medium, clayey, pale yellowish-orange; similar to above	10	70
Sand, medium, clayey, pale yellowish-orange; similar to above	10	80
Sand, medium, clayey, pale yellowish-orange; similar to above	10	90
Sand, medium, clayey, pale yellowish-orange; similar to above	10	100
Chesapeake group:		
Clay, sandy, yellowish-gray; some fine quartz, angular, pitted with dark inclusions, opaque; megafossils (fragments), little bone; mica; echinoderm spicules; forams rare; diatoms common	10	110
Clay, silty, yellowish-gray; similar to above; forams rare; diatoms abundant	10	120
Clay, silty, yellowish-gray; similar to above, except no shell or bone fragments; diatoms abundant; forams rare	10	130
Clay, silty, yellowish-gray; similar to above	10	140
Clay, silty, yellowish-gray; similar to above	10	150
Clay, silty, yellowish-gray; similar to above	10	160
Clay, silty, yellowish-gray; similar to above	10	170
Clay, silty, yellowish-gray; some fine and very fine quartz and clay nodules; a little mica; a little organic material; no forams; diatoms common	10	180
Clay, silty, yellowish-gray; similar to above, except diatoms abundant	10	190
Clay, silty, yellowish-gray; very small amount of fine and very fine quartz; few bone fragments; few small forams; abundant large diatoms	10	200
Clay, silty, yellowish-gray; similar to above	10	210
Clay, silty, yellowish-gray; similar to above	10	220
Clay, silty, yellowish-gray; similar to above	10	230
Clay, silty, light olive-gray, as above	10	240
Clay, light olive-gray; abundant large diatoms	10	250
Clay, light olive-gray; similar to above	10	260
Clay, yellowish-gray; similar to above	10	270
Clay, yellowish-gray; similar to above	10	280
Clay, yellowish-gray; similar to above; diatoms common	10	290
Clay, yellowish-gray; similar to above	10	300
Clay, yellowish-gray; similar to above	10	310
Clay, yellowish-gray; similar to above; diatoms abundant	10	320

TABLE 11—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Df 22—*Continued*		
Clay, yellowish-gray; similar to above, except diatoms very abundant	10	330
Sediments of Jackson age:		
Sand, medium, and rock fragments, greenish-gray; much calcium-cemented quartz and glauconite; quartz pebbles and fragments of coral; quartz, very coarse to very fine; glauconite comprises about 10 per cent, mostly dark-green, some pale-green; pyrite common, much is with cemented material; forams common, medium in size	10	340
Sample missing	10	350
Sand, medium; rock fragments, greenish-gray; similar to above; forams common	10	360
Sand, medium; rock fragments, greenish-gray; similar to above; forams common	10	370
Sand, medium; rock fragments, greenish-gray; similar to above; forams common	10	380
Sand, medium; rock fragments, greenish-gray; similar to above; forams rare	10	390
Nanjemoy formation:		
Clay, glauconitic, dark greenish-gray; glauconite, very coarse to very fine, dark green; very little quartz; forams very abundant; micaceous	10	400
Clay, glauconitic, dark greenish-gray; similar to above, except some cemented fragments; very different from previous cemented material; bone; pyrite common	10	410
Clay, glauconitic, dark greenish-gray; similar to above, except no bone or teeth	10	420
Clay, glauconitic, dark greenish-gray; similar to above	10	430
Clay, glauconitic, dark greenish-gray; similar to above	10	440
Clay, glauconitic, dark greenish-gray; similar to above	10	450
Clay, glauconitic, dark greenish-gray; similar to above, except more forams; ostracods very abundant	10	460
Clay, glauconitic, dark greenish-gray; similar to above	10	470
Clay, glauconitic, dark greenish-gray; similar to above	10	480
Clay, glauconitic, dark greenish-gray; similar to above	10	490
Clay, glauconitic, dark greenish-gray; similar to above	10	500
Clay, glauconitic, greenish-gray; similar to above, except for appearance of yellow quartz and some brown glauconite; forams less abundant	10	510
Clay, glauconitic and arenaceous, greenish-gray; similar to above, except there is much yellow quartz and light-brown glauconite	10	520
Clay, glauconitic and arenaceous, yellowish-gray; similar to above; very micaceous	10	530
Clay, glauconitic and arenaceous, yellowish-gray; quartz abundant, well-rounded, lustrous	10	540

TABLE 11—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Df 22—*Continued*		
Aquia greensand:		
Sand, medium, clayey, moderate olive-brown; glauconite about 80 per cent, light greenish-brown to dark green; quartz, yellow to clear, well-rounded	10	550
Sand, medium, moderate olive-brown; similar to above	10	560
Sand, coarse, dusky-yellow; yellow quartz about 60 per cent; coarse grains are very well-rounded	10	570
Sand, coarse, dusky-yellow; similar to above	10	580
Sand, coarse, dusky-yellow; similar to above	10	590
Sand, coarse, dusky-yellow; similar to above	10	600
Sand, coarse, dusky-yellow; similar to above	6	606
Well St.M.-Eb 2 (Altitude: 12 feet)		
Pleistocene sediments:		
Sand, fine, grayish-orange; angular, clear, and yellow quartz; very fine mica, sparse; little green glauconite	10	10
Sand, fine, grayish-orange; similar to above, with slight increase in grain size	10	20
Sand, fine, slightly clayey, grayish-orange; similar to above; more fine glauconite	10	30
Sand, clayey, grayish-orange; medium to coarse, clear, white, pink, violet, and yellow, angular and subangular quartz; chert fragments; feldspar common	10	40
(Base oxidized zone)		
Clay, sandy, yellowish-gray; angular to subangular quartz and chert; green-black glauconite; few very small fragments vivianite; shell fragments abundant	10	50
Clay, slightly sandy, yellowish-gray; similar to above	10	60
Clay, silty, yellowish-gray; similar to above	10	70
Clay, as above	10	80
Clay, as above	10	90
Clay, sandy, light olive-gray; medium to coarse, vari-colored, angular quartz; feldspar common, yellow to pink; glauconite rare	10	100
Sand, clayey, shells, light olive-gray; medium to coarse, clear, gray, subangular quartz, abundant; phosphatic material; glauconite, very rare; pelecypod shell fragments very abundant	10	110
(Note: Driller reports sand and gravel 90 to 106.)		
Sediments of Jackson age:		
Sand, coarse, and rock, clayey, greenish-gray; 50 per cent calcium carbonate-cemented quartz and glauconite; quartz, very coarse to fine; glauconite common, coarse to very fine, green, botryoidal; phosphate pebbles; foraminifera common	10	120
Nanjemoy formation:		
Sand, glauconitic, medium, dark greenish-gray; glauconite 80 per cent, dark-green; shell fragments; small forams	10	130
Sand, glauconitic, fine, dark greenish-gray; less glauconite than above; more fine quartz	10	140

TABLE 11—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Eb 2—*Continued*		
Sand, coarse, clayey, olive-gray; very coarse and coarse quartz abundant, well rounded; glauconite, about 10 per cent	10	150
Sand, coarse, and clay, olive-gray; quartz, very coarse to fine; little glauconite; forams; shell fragments	10	160
Sand, coarse, and clay, olive-gray; coarse quartz abundant; glauconite abundant, brownish to dark green	10	170
Sand, medium, and clay, olive-gray; same as above; much yellow quartz	10	180
Sand, medium, and clay, olive-gray; same as above	10	190
Sand, medium, glauconitic, and clay, dark greenish-gray; 90 per cent medium glauconite	10	200
Sand, medium, glauconitic, and clay, dark greenish-gray; same as above	10	210
Sand, coarse, light olive-gray; coarse quartz abundant, well-rounded and milky; glauconite	10	220
Sand, coarse, light olive-gray; same as above	10	230
Sand, coarse, clayey, light olive-gray; same as above	10	240
Sand, coarse, clayey, light olive-gray; same as above	10	250
Sand, coarse, glauconitic, greenish-gray; 90 per cent glauconite, dark-green, unusually large size; pyrite	10	260
Sand, coarse, glauconitic, greenish-gray; same as above	10	270
Sand, medium, glauconitic, dark greenish-gray; same as above	10	280
Marlboro clay member:		
Sand, medium, and clay, reddish, light olive-gray	10	290
Aquia greensand:		
Sand, medium, light olive-gray; largely medium quartz and glauconite; quartz, coarse to fine; glauconite, brown and dark green, coarse to very fine; well sorted	10	300
Sand, medium, light olive-gray; same as above	10	310
Sand, medium, light olive-gray; same as above	10	320
Well St.M.-Ec 11 (Altitude: 4 feet)		
Pleistocene sediments:		
Sand, fine, clayey, yellowish-orange; limonite nodules and lignitized wood	10	10
Same as above	10	20
Clay, light olive-gray, blocky, dense; trace of vari-colored quartz; a few large angular quartz and feldspar fragments; glauconite; pyrite and mica	10	30
Clay, light olive-gray; same as above, but smaller in amount	10	40
Same as above	10	50
Same as above	10	60
Clay, light olive-gray; few shell fragments and abundant carbonaceous material, some pyritized; a trace of vivianite	10	70
Same as above	10	80
Same as above, but smaller in amount	10	90
Same as above	10	100

TABLE 11—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Ec 11—*Continued*		
Sand, medium, clean, yellowish-gray; quartz, clear, frosted, pink, gray, angular to subrounded; glauconite, fresh and reworked; few weathered, feldspathic fragments	10	110
Similar to above, but more coarse material and more vari-colored quartz	10	120
Sand, medium to coarse, yellowish-gray, as above	10	130
Sand, medium to coarse, slightly clayey, light olive-gray; as above, but more feldspathic material	10	240
Sediments of Jackson age:		
Sand, gravel and rock fragments, clean, greenish-gray; glauconite abundant, mostly light green, some dark green to black; calcite-cemented glauconite and quartz fragments very abundant; pyrite common; shell fragments, pelecypods, and forams common; gravel generally of pebble size; rounded quartz or phosphate	10	150
Same as above	10	160
Same as above, except abundant fine black shiny glauconite; coral fragments; more yellow quartz	10	170
Sand; similar to above except brown glauconite very common	10	180
Sand; similar to above; forams	10	190
Sand; similar to above, forams abundant	10	200
Nanjemoy formation:		
Sand, glauconitic, fine, clayey, olive-gray; abundant glauconite, green, black, brown, irregular, ovoid, botryoidal; quartz, clear, yellow, green, milky, angular to rounded; shell fragments, rare	10	210
Sand; similar to above, except quartz more abundant and rounded and brown	10	220
Similar to above, less glauconite	10	230
Similar to above	10	240
Well St.M.-Ed 1 (Altitude: 16 feet)		
Pleistocene sediments:		
Sand, fine, clean, grayish-orange; clear and yellow dull quartz; feldspar common; few pieces of dull-gray chert	10	10
Chesapeake group:		
Sand, medium, clean, light olive-gray; mostly clear and gray, angular quartz grains; phosphatic plates; sponge spicules; small pelecypods and shell fragments common	10	20
Sand, yellowish-gray, shelly; clear and gray quartz; most of sample whitish shell fragments, pelecypods, and corals; aragonite	10	30
Clay, silty, fossiliferous, greenish-gray	10	40
Clay, greenish-gray, silty	10	50
Clay, greenish-gray, as above	10	60
Clay, yellowish-gray, slightly silty	10	70
Clay, yellowish-gray, as above	10	80
Clay, yellowish-gray, as above	10	90
Clay, yellowish-gray to pale olive	10	100
Clay, as above	10	110
Clay, as above	10	120

TABLE 11—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.8 Ed 1—*Continued*		
Clay, yellowish-gray to pale olive	10	130
Clay, yellowish-gray to pale olive	10	140
Clay, yellowish-gray to pale olive, as above	10	150
Clay, yellowish-gray to pale olive	10	160
Clay, yellowish-gray, as above	10	170
Clay, yellowish-gray, as above	10	180
Sand, clayey, yellowish-gray; fine to medium quartz grains; phosphatic material, rare to frequent; few shell fragments	10	190
Sand, slightly clayey, light olive-gray; medium to coarse, subrounded to subangular, clear and gray quartz; few small pebbles of black phosphatic material; shell fragments rare	10	200
Sediments of Jackson age:		
Sand, calcareous, mottled light olive-gray; quartz, medium to coarse; glauconite, green-black and brown; some fine glauconite cemented by calcite (rock); shell fragments very abundant; few corals	10	210
Sand, calcareous, mottled light olive-gray	10	220
Nanjemoy formation:		
Sand, slightly clayey, mottled olive-gray; quartz, medium to fine, yellow, pale green, and clear; glauconite, green, olive-green, and brown, abundant	10	230
Sand, as above, mottled olive-gray	10	240
Sand, clean, medium to coarse, mottled dusky-yellow	10	250
Sand, as above	10	260
Well St.M.-Ee 26 (Altitude: 90 feet)		
Pleistocene sediments:		
Clay, sand, and gravel, dark yellowish-orange; rounded chert and quartzite pebbles up to 1 inch in diameter; few plant fragments present; clay constitutes less than 20% of sample	10	10
Sand, dark yellowish-orange, fine-grained, clean; largely yellow, tan, and clear quartz with some feldspar	10	20
Sand, as above, but coarser; increase in amount of chert	10	30
Sand, finer grained than above (similar to sample 10–20 feet)	10	40
Sand, as above, dark yellowish-orange to pale yellowish-orange	10	50
Chesapeake group:		
Sand, yellowish-gray, very fine to medium; scattered fragments of red silt; phosphate fragments; larger quartz grains, mostly rounded and blue-gray or clear	10	60
Silt or very fine sand, light olive-gray; slightly micaceous; rounded blue-gray quartz grains	10	70
Silt, as above	10	80
Clay, sandy, light olive-gray, fine, micaceous; quartz, subangular, clear; fossil fragments common; minute phosphatic plates; small amount dark-green glauconite	10	90
Sand, light olive-gray, fine, clayey; subangular, tan, clear, and pink quartz grains; fossil fragments common; fragments of iron oxide	10	100
Sand, as above; no diatoms	10	110

TABLE 11—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Ee 26—*Continued*		
Sand, fine-grained, as above, with lesser amount of fossil fragments; few shell fragments	10	120
Clay, greenish-gray, silty; shiny phosphatic plates; fine sand, clear; sponge spicules; diatoms; numerous small broken and whole gastropods	10	130
Clay, greenish-gray; fossil fragments; phosphatic material; diatoms common, several species	10	140
Clay, as above; diatoms common	10	150
Clay, as above, silty; clear, angular quartz; pelecypod and gastropod fragments; phosphatic plates; diatoms common	10	160
Clay, as above, silty	10	170
Clay, as above	10	180
Clay, as above, very silty	10	190
Clay, as above	10	200
Clay, as above, less silty	10	210
Clay, greenish-gray, as above; silt content not great; a few forams	10	220
Clay, silty, similar to above	10	230
Clay, silty, as above	10	240
Clay, silty, greenish-gray, as above; angular and subangular quartz; phosphatic fragments abundant; sponge spicules common	10	250
Clay, greenish-gray, as above, slightly silty	10	260
Clay, as above, greenish-gray; similar to above	10	270
Clay, as above, greenish-gray; residue similar to above	10	280
Clay, as above, slightly sandy; mostly clear, angular to subangular quartz; few small grains brown botryoidal glauconite	10	290
Sediments of Jackson age:		
Sand, medium to coarse, greenish-gray; limestone fragments; subangular, medium quartz; small amount pyrite in limestone fragments; glauconite, small, irregular, medium to light green	10	300
Clay, sandy, greenish-gray; limestone fragments; clear quartz; abundance of small green to black glauconite; pyrite	10	310
Sand, fine to medium, medium-gray; limestone, glauconitic; quartz, clear, pink and green; glauconite, as above	10	320
Sand, light-gray, medium; some limestone; as above	10	330
Sand, as above	10	340
Nanjemoy formation:		
Sand, olive-gray to brownish-gray, clean, highly glauconitic; clear, tan, and brown, subrounded, medium to coarse quartz; glauconite, brown, coarse to fine, some green; 50 to 60 per cent	9	349
Well St.M.-Ef 12 (Altitude: 19 feet)		
Pleistocene sediments:		
Sand, medium, pale yellowish-orange; quartz, medium to fine, pitted, clear to opaque, subrounded; many oxidized grains; fine bone fragments	10	10
Sand, medium, pale yellowish-orange, as above; shell fragments; trace of light-green glauconite	10	20

TABLE 11—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Ef 12—*Continued*		
Chesapeake group:		
Sand, fine, and shells, clayey, light olive-gray; fine green glauconite common; forams abundant; muscovite common	10	30
Silt and clay, shells, light olive-gray; shell fragments and small megafossils; fine and very fine quartz; glauconite, dark green	10	40
Clay, silty, shells, light olive-gray; fine green glauconite common; fine muscovite common	10	50
Clay, silty, shells, light olive-gray; many bone fragments; abundant coarse shell fragments and bone, weathered	10	60
Sand, clayey, shells, light olive-gray; similar to above; diatoms	10	70
Sand, clayey, shells, light olive-gray; similar to above; diatoms common	10	80
Sand, medium, clayey, pale-olive; quartz, angular to subangular, pitted, clear to opaque; little bone; little shell fragments; diatoms	10	90
Sand, clayey, shell fragments, light olive-gray; similar to above; diatoms	10	100
Sand, clayey, shell fragments, light olive-gray; similar to above; shell fragments more abundant; diatoms	10	110
Sand, clayey, shell fragments, light olive-gray; similar to above; forams rare; fine mica common	10	120
Sand, clayey, shell fragments, light olive-gray; similar to above; diatoms abundant	10	130
Sand, clayey, shell fragments, pale-olive, fine and very fine; coarse quartz, clear to opaque, pitted, with dark inclusions; glauconite common, green; bone fragments, rare; diatoms common	10	140
Sand, fine, clayey, pale-olive; similar to above; no glauconite; diatoms	10	150
Sand, fine, clayey, pale-olive; similar to above; diatoms common	10	160
Sand, fine, clayey, pale-olive; similar to above; diatoms common	10	170
Sand, fine, clayey, pale-olive; similar to above; diatoms common	10	180
Sand, fine, clayey, pale-olive; similar to above; more fine material; diatoms common	10	190
Silt, clayey, yellowish-gray; fine quartz; some coarse shell and bone fragments; diatoms common	10	200
Silt, clayey, yellowish-gray; similar to above; less shell and bone fragments; wood, rare; diatoms abundant	10	210
Silt and clay, yellowish-gray; shell fragments; diatoms common	10	220
Clay, silty, yellowish-gray; similar to above; diatoms common	10	230
Clay, silty, yellowish-gray; similar to above; diatoms common	10	240
Clay, silty, yellowish-gray; similar to above; diatoms common	10	250
Clay, silty, yellowish-gray; similar to above; diatoms common	10	260
(Note: Driller calls end of clay at 264 feet.)		
Sand, medium, silty, light olive-gray; quartz clear; bone fragments rounded, abundant; shell fragments; diatoms common	10	270
Sediments of Jackson age:		
Sand and shells, medium, light olive-gray; quartz, clear to opaque, subrounded; calcite-cemented quartz and glauconite; abundant glauconite, light to dark green	10	280

TABLE 11—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Ef 12—*Continued*		
Sand and calcite fragments, medium, clayey, light olive-gray; quartz, clear to opaque, subrounded to rounded; shell fragments abundant; calcite-cemented grains of glauconite and quartz; glauconite common; light-green to green-black	10	290
Sand, medium, glauconitic, dark greenish-gray; as above; glauconite 50 per cent; calcite-cemented grains of glauconite and quartz; pyrite very abundant throughout	10	300
Well St.M.-Eg 16 (Altitude: 11 feet)		
Pleistocene sediments:		
Sand, fine, clayey, very pale-orange; some coarse, angular, varicolored quartz; feldspathic rock fragments; much of the material oxidized	10	10
Chesapeake group:		
Sand, fine, clayey, yellowish-gray, shell fragments; some fine worn glauconite grains; shell fragments	10	20
Clay, sandy, light bluish-gray; forams common; a gastropod; glauconite; smooth, flat, gravel-size rock	10	30
Clay, light bluish-gray; as above; abundant carbonaceous matter	10	40
Sand and clay, shell fragments, greenish-gray; fine, clear, subangular quartz; small shell fragments common	10	50
Sand, fine, clayey, shell fragments, greenish-gray; as above, but abundant phosphatic material	10	60
Clay, sandy, light bluish-gray	10	70
Same as above	10	80
Same as above	10	90
Sand, medium, clayey, light bluish-gray	10	100
Sand, fine, clayey, yellowish-gray	10	110
Sand, medium, clayey, yellowish-gray	10	120
Clay, diatomaceous, yellowish-gray; large diatoms very abundant	10	130
Clay, diatomaceous, yellowish-gray; as above	10	140
Clay, diatomaceous, yellowish-gray; as above	10	150
Clay, diatomaceous, yellowish-gray; large diatoms	10	160
Clay, diatomaceous, yellowish-gray	10	170
Clay, diatomaceous, yellowish-gray	10	180
Clay, diatomaceous, yellowish-gray	10	190
Clay, diatomaceous, yellowish-gray, silty	10	200
Clay, diatomaceous, yellowish-gray	10	210
Clay, diatomaceous, yellowish-gray, abundant	10	220
Clay, diatomaceous, yellowish-gray	10	230
Clay, diatomaceous, yellowish-gray	10	240
Clay, diatomaceous, yellowish-gray	10	250
Clay, sandy, diatomaceous, yellowish-gray; abundant phosphatic material	10	260
Clay, sandy, yellowish-gray; as above	10	270
Sediments of Jackson age:		
Sand, medium, greenish-gray; glauconite fine, mostly green-black,		

TABLE 11—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Eg 16—*Continued*		
some light-green; pyrite rare; calcite-cemented fragments of quartz, glauconite, and pyrite rock	10	280
Sand, medium, and rock fragments, greenish-gray; abundant cemented fragments of shells, quartz, glauconite and pyrite; shell fragments common; glauconite not common	10	290
Sand, coarse, rock fragments, greenish-gray; quartz, rounded, clear, yellowish and greenish; glauconite rare, small, and dark-green; calcite fragments common	10	300
Sand, coarse, and rock fragments, greenish-gray; as above	10	310
Sand, coarse, greenish-gray; as above, but less rock fragments	5	315
Well St.M.-Ff 24 (Altitude: 4 feet)		
Pleistocene sediments:		
Sand, fine, dark yellowish-orange; much oxidized material and yellowish-stained quartz; lignitized wood	10	10
Clay, yellowish-gray; some cemented ironstone and a few quartz grains	10	20
Sand and shells, light olive-gray; large shell fragments common; gravel and very coarse quartz; trace of glauconite; small bone fragments; sponge spicules common	10	30
Sand, medium, pale-olive; medium quartz about 95 per cent; coarse shell fragments; little fine and very fine material; sponge spicules, rare	10	40
Sand and shells, pale-olive; coarse shell fragments abundant; medium quartz grains abundant; some coarse, little fine and very fine material; some gravel; sponge spicules common	10	50
Sand and shells, pale-olive; very coarse shell fragments common; a few gravels, 6 to 11 mm. size; quartz grades from gravel-size down to very fine; large sizes mostly fragmental, milky; sponge spicules common; bone fragments common	10	60
Chesapeake group:		
Sand, fine, and shells, greenish-gray; fine quartz 90 per cent; very coarse shell fragments; diatoms rare	10	70
Sand, fine, greenish-gray; same as above, but less shells; diatoms rare	10	80
Sand, fine, clayey, greenish-gray; same as above; diatoms common	10	90
Sand, fine, clayey, yellowish-gray; same as above; more shells; diatoms common	10	100
Sand, fine, and clay, yellowish-gray; fine quartz, 80 per cent; coarse shell fragments; bone fragments common; diatoms common	10	110
Sand, fine, and clay, yellowish-gray; shell fragments; small forams common; sponge spicules common; diatoms common	10	120
Sand, fine, and clay, yellowish-gray; mostly fine quartz; bone fragments; forams; muscovite; diatoms common	10	130
Sand, fine, and clay, yellowish-gray; as above	10	140
Sand, fine, and clay, yellowish-gray; same as above; diatoms rare to common	10	150

TABLE 11—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Ff 24—*Continued*		
Clay, silty, yellowish-gray; a few medium bone fragments; little fine quartz; diatoms common	10	160
Same as above	10	170
Clay, yellowish-gray; trace of glauconite; diatoms common to abundant	50	220
Sand, coarse, and shell, yellowish-gray; coarse and medium quartz predominate; shell fragments; diatoms rare	10	230
Sand, medium, clayey, yellowish-gray; medium quartz 80 per cent; coarse shell fragments and quartz; no diatoms	10	240
Sediments of Jackson age:		
Sand, coarse, and rock fragments, greenish-gray; large fragments of calcium carbonate-cemented quartz and glauconite grains (rock); glauconite scarce to common, mostly dark-green; a little pyrite; diatoms common to abundant	10	250
Sand, coarse, and rock fragments, greenish-gray; medium quartz predominates; coarse rock fragments and quartz grains common; glauconite common, very dark- to light-green; pyrite, rare; few yellow quartz grains; diatoms rare	10	260
Sand, coarse, and rock, greenish-gray; same as above sample, except much more glauconite and pyrite	5	265
Well St.M.-Fh 3 (Altitude: 6 feet)		
Pleistocene sediments:		
Sand, fine, pale yellowish-orange; quartz, angular to subrounded; bone fragments common; most of quartz grains slightly yellow-stained	10	10
Chesapeake group:		
Sand, shells, medium to coarse, clayey, pale-olive; most grains subangular, pitted, dull with dark-green inclusions; large shell and bone fragments common	10	20
Sand, fine, clayey, pale-olive; quartz; same as above	10	30
Sand, fine, clayey, shells, pale-olive; same as above	10	40
Sand, fine, clayey, shells, pale-olive; same as above	10	50
Sand, fine, clayey, light olive-gray; same as above	10	60
Sand and shells, clay, light olive-gray; very heavy shell bed; abundant macro- and microfossils; quartz, pitted, with dark inclusions, pink and yellowish-green; fine bone fragments; mica, rare	10	70
Clay and shells, sandy, light olive-gray; coarse shell fragments; pink and yellowish-green quartz very common; mica, rare	10	80
Clay and shells, light olive-gray; same as above, fewer shell fragments	10	90
Sand, medium, clayey, light olive-gray; most quartz transparent, glossy, subrounded, some pitted, with dark inclusions; some shell fragments; bone fragments common; trace of fine green glauconite	10	100
Sand, medium, clayey, light olive-gray; same as above	10	110
Sand and shells, clayey, light olive-gray; quartz, clear, subrounded; macrofossil fragments; trace of very fine glauconite; diatoms rare	10	120

TABLE 11—*Continued*

Well St.M.-Fh 3—*Continued*	Thicbness (feet)	Depth (feet)
Sand, fine, and shells, clayey, pale-olive; fine quartz 80 per cent; most subangular, pitted, with dark inclusions; coarse shell fragments; diatoms scarce	10	130
Clay and shells, sandy, pale olive; same as above; diatoms common	10	140
Clay and shells, sandy, pale olive; same as above; more very coarse shell fragments; diatoms rare	10	150
Clay, shells, sandy, yellowish-gray; fine quartz, subangular, pitted; few coarse shell fragments; diatoms rare	10	160
Clay and sand, yellowish-gray; same as above; diatoms common	10	170
Clay, sandy, yellowish-gray; same as above; diatoms rare	10	180
Clay, sandy, yellowish-gray; same as above, except a larger amount; diatoms rare	10	190
Clay, sandy, pale olive; same as above; diatoms rare	10	200
Clay, sandy, yellowish-gray; same as above; diatoms rare	10	210
Clay, sandy, yellowish-gray; same as above; diatoms common	10	220
Clay, sandy, yellowish-gray; same as above; diatoms common	10	230
Clay, sandy, light olive-gray; same as above; diatoms common	10	240
Clay, sandy, yellowish-gray; same as above; diatoms abundant	10	250
Clay, sandy, yellowish-gray; same as above; diatoms abundant	10	260
Clay, silty, yellowish-gray; diatoms common	10	270
Clay, silty, yellowish-gray; same as above; diatoms common	10	280
Clay, silty, yellowish-gray; same as above; diatoms common	10	290
Clay, silty, yellowish-gray; same as above; diatoms abundant	10	300
Clay, silty, yellowish-gray; same as above; diatoms common	10	310
Clay, sandy, yellowish-gray; coarse and medium quartz; many bone fragments; diatoms abundant	10	320
Clay and sand, yellowish-gray; same as above; diatoms common	10	330
Sand, clayey, yellowish-gray; coarse and medium quartz; a few phosphatic pellets; lime-cemented sand; a little very fine glauconite, light-green; shell and bone fragments common; diatoms rare	10	340
Sediments of Jackson age:		
Sand, medium, and rock fragments, greenish-gray; quartz, subangular, clear to milky; glauconite common, light green; pyrite common, finely disseminated; calcite-cemented quartz and glauconite common; very coarse muscovite flakes	10	350
Sand, medium, and rock, greenish-gray; same as above, except no pyrite or muscovite	10	360
Sand, medium, greenish-gray, and rock; same as above, except some yellow quartz	10	370
Sand, fine, clayey, and rock, light olive-gray; same as above; much cemented material	10	380
Nanjemoy formation:		
Sand, medium, clayey, dusky-yellow; quartz, clear to yellow, most clear, angular to subangular; calcite fragments yellow-stained and give sample a very yellowish appearance; glauconite common, dark greenish-brown	10	390

TABLE 11—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Fh 3—*Continued*		
Sand, medium, dusky-yellow; quartz, clear, milky, and yellow-stained; abundant calcite fragments, most yellow-stained; glauconite common, most dark-green, some brown	10	400
Sand, medium, dusky-yellow; same as above, except more medium-sized material	10	410
Sand, medium, dusky-yellow; same as above	10	420
Well St.M.-Gg 1 (Altitude: 6 feet)		
Pleistocene sediments:		
Clay, sandy, pale greenish-yellow; quartz grades from granules to silt size, most well rounded and milky; some oxidized material; traces of glauconite and mica; lignitized wood	10.5	10.5
Clay, silty, yellowish-gray; similar to above	10.5	21
Clay, silty, yellowish-gray; same as above	10.5	31.5
Sand, medium, clayey, yellowish-gray; quartz, very coarse to very fine, buff to milky, some smoky, most subangular to rounded; coarse feldspar	10.5	42
Clay, silty, fossiliferous, light olive-gray; much arkosic material and some chert fragments; quartz, mostly fragmental, yellowish to milky-blue; coarse shell fragments	10.5	52.5
Clay, silty, pale-olive, very small amount; diatoms present	10.5	63
Clay, pale-olive	10.5	73.5
Clay, sandy, yellowish-gray; mostly medium and coarse quartz, clear to cloudy, some rose and blue; fragment of jasper; trace of vivianite	10.5	84
Clay, sandy, yellowish-gray; similar to above	10.5	94.5
Clay, sandy, yellowish-gray; similar to above	10.5	105
Chesapeake group:		
Clay, sandy, fossiliferous, light olive-gray; glauconite, fine, ovoid; mica	10.5	115.5
Clay, sandy, fossiliferous, light olive-gray; similar to above	10.5	126
Clay, sandy, fossiliferous, light olive-gray; similar to above; diatoms	10.5	136.5
Clay, silty, fossiliferous, light olive-gray; similar to above; diatoms	10.5	147
Clay, sandy, light olive-gray; medium and fine quartz, mostly subrounded, some angular, cloudy, dull, some pink; coarse arkosic material; little mica; little vivianite; bone; few shell fragments; trace of glauconite	10.5	157.5
Sand, medium, clayey, light olive-gray; coarse, medium, and fine quartz, similar to above but larger amount; diatoms	10.5	168
Sand, medium, clayey, light olive-gray; similar to above; very fine pyrite; diatoms	10.5	178.5
Sand, fine, and clay, yellowish-gray; mostly fine quartz; coarse shell fragments; trace of glauconite; diatoms	10.5	189
Sand, fine, and clay, yellowish-gray; similar to above; diatoms	10.5	199.5
Clay, sandy, yellowish-gray; similar to above; diatoms	10.5	210

TABLE 11—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Gg 1—*Continued*		
Clay, sandy, yellowish-gray; similar to above; large flakes of mica; trace of glauconite; diatoms abundant	10.5	220.5
Clay, sandy, yellowish-gray; quartz, angular to rounded, most cloudy; abundant shell fragments; trace of glauconite; diatoms abundant	10.5	231
Clay, yellowish-gray, diatomaceous	10.5	241.5
Clay, yellowish-gray; as above	10.5	252
Clay, yellowish-gray; similar to above; forams common; diatoms	10.5	262.5
Clay, yellowish-gray; diatoms	10.5	273
Clay, yellowish-gray; similar to above; diatoms	10.5	283.5
Clay, yellowish-gray, similar to above; diatoms	10.5	294
Clay, sandy, yellowish-gray; coarse and medium quartz abundant, most subrounded, clear; much bone; very fine glauconite; forams rare; diatoms	10.5	304.5
Clay, sandy, olive-gray; diatoms	10.5	315
Clay, light olive-gray; diatoms	10.5	325.5
Sand, medium, clayey, light olive-gray; quartz abundant; subangular to subrounded, clear; bone common; diatoms	10.5	336
Sand, medium, clayey, light olive-gray; similar to above	10.5	346.5
Sediments of Jackson age:		
Sand, medium, clayey, rock, light olive gray; subrounded quartz, most clear, some cloudy; calcite-cemented grains of quartz and glauconite abundant; shell fragments common; black ovoid glauconite	10.5	357
Sand, medium, clayey, light olive-gray; similar to above, except abundant irregular dusky-yellow glauconite	10.5	367.5
Sand, medium, clayey, light olive-gray; similar to above	10.5	378
Nanjemoy formation:		
Sand, medium, clayey, light olive-gray; similar to above, except much brown and green glauconite	10.5	388.5
Sand, medium, glauconitic, light olive-gray; similar to above	10.5	399
Sand, medium, glauconitic, light olive-gray; similar to above	10.5	409.5
Sand, medium, glauconitic, light olive-gray; similar to above	10.5	420
Well St.M.-Gh 6 (Altitude: 3 feet)		
Pleistocene sediments:		
Clay, sandy and gravelly, pale yellowish-orange; quartz, fine, clear, yellow and pale-violet, angular to subangular; lumps of iron oxide frequent;feldspar	10	10
Clay, very sandy, mottled grayish-orange; similar to above; few coarse, dull, yellow-brown, subrounded quartz grains	10	20
Clay, tough, slightly gravelly; pale yellowish-brown; fine, clear and white, angular quartz, and small gravel pebbles; white and yellow chert	10	30
Sand, fine, well-sorted, yellowish-gray; fine, angular, clear, gray, and white quartz; feldspar, fine; mica, fine; green mica or chlorite; few fine grains green glauconite	10	40

TABLE 11—*Continued*

Well St.M.-Gh 6—*Continued*	Thickness (feet)	Depth (feet)
Sand, even-textured, light olive-gray; quartz, angular, clear, gray, gray-white, white, yellow, and pink; feldspar	10	50
Sand, clayey, light olive-gray; similar to above, but somewhat finer grained	10	60
Clay, light-gray, smooth, tough, gravelly; pink, gray and yellow-gray, rounded pebbles of chert and metamorphic rocks; few pebbles of re-cemented fine quartz sand	10	70
Clay, light-gray, smooth, tough, same as above; small amount feldspar; few fine grains of glauconite	10	80
Clay, light-gray, tough, smooth; one small piece of vivianite	10	90
Clay, tough, smooth, light gray to yellowish-gray; similar to above, with a few coarse pebbles of dull-pink and white quartz; fine lumps of vivianite	10	100
Clay, tough, smooth, light olive-gray; very fine, angular, gray and clear quartz; very fine green glauconite; fine vivianite frequent	10	110
Clay, tough, gravelly, light olive-gray; fine to coarse, gray, clear, white, yellow, and pale-pink angular quartz; few gravel pebbles up to ½-inch diameter; fine feldspar	10	120
Sand, slightly clayey, light olive-gray; mostly coarse, dull, angular and subangular quartz, similar to above in color	10	130
Sand, slightly clayey, light olive-gray; similar to above	10	140
Chesapeake group:		
Clay, yellowish-gray, soft, sandy; quartz, fine to coarse, angular to subangular, mostly clear; brown and black phosphatic plates; few lumps of indurated silt	10	150
Clay, silty, light olive-gray, fossiliferous; same as above	10	160
Clay, light olive-gray; same as above	10	170
Clay, light olive-gray; same as above	10	180
Clay, light olive-gray; same as above	10	190
Clay, light olive-gray; same as above	10	200
Clay, as above, slightly silty	10	210
Clay, light olive-gray, silty	10	220
Clay, light olive-gray, silty	10	230
Clay, as above, light olive-gray	10	240
Clay, as above, light olive-gray	10	250
Clay, as above, light olive-gray	10	260
Clay, as above, light olive-gray	10	270
Clay, as above, light olive-gray	10	280
Clay, sandy, light olive-gray; clear and white, medium, angular quartz grains; phosphate common	10	290
Clay, silty, light olive-gray; as above	10	300
Sand, mottled light-gray, clean; mostly clear, medium to coarse, subangular quartz; shell fragments abundant; small pelecypods; phosphate frequent	10	310
Sand, mottled light-gray, clean; similar to above; no glauconite	10	320
Sediments of Jackson age:		
Sand, light-gray, medium to coarse; similar to above; few pieces of		

TABLE 11—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.-Gh 6—*Continued*		
coral; pieces of gray calcite common; fine green glauconite cemented by calcite; small amount of pyrite	10	330
Sand, clean, mottled light-gray; similar to above, with microgranular pyrite common; glauconite, light-green, irregular, rare	10	340
Nanjemoy formation:		
Sand, clean, mottled dusky-yellow; fine to coarse, clear, yellow, and white, angular and subangular quartz; glauconite, fine, black and brown; lumps of fine black glauconite cemented by quartz, frequent	10	350
Sand, clean, mottled dusky-yellow; similar to above	10	360
Sand, clean, mottled dusky-yellow; coarse, brown, yellow-brown, and clear, subrounded quartz abundant; brown and black, coarse glauconite common; pieces of yellow and light-gray calcite common to abundant; forams rare to frequent	10	370
Sand, as above	10	380
Sand; similar to above, with increase in brown glauconite	10	390
Sand; similar to above, but finer grained	10	400
Well 37a, Westmoreland Co., Virginia (Altitude: 23 feet)		
Pleistocene sediments:		
Sand, fine, angular, grayish-orange; quartz fine, clear angular, pale-yellow; feldspar, dull, fine, pink and white; glauconite, green, very fine and rare	10	10
Sand, angular, fine to medium, light olive-gray; quartz, clear and gray, fine to medium, angular to subangular; glauconite, green, oblate, rare; feldspar, white, fragments; a few coarse chlorite and biotite fragments; grains of gray flint	11	21
Sand, medium, angular, yellowish gray, as above, but coarser, with coarse, angular, violet and pink quartz and fragments of brown limestone	10	31
Chesapeake group:		
Sand, fine, light olive-gray; mostly fine and medium, clear, angular quartz grains; glauconite rare, fine, oblate, green; feldspar, fine, rare; gray dull flint	11	42
Sand, very clayey, greenish-gray; fine to medium, clear, angular quartz; fine mica; black phosphate fragments; a few ostracods and pelecypods	11	53
Sample questionable	10	63
Clay, silty, soft, pale-olive; some clear, subangular, fine and medium quartz, black and brown phosphatic fragments and a few grains, green, glauconite; a few small foraminifera	10	73
Clay, silty, pale-olive; a few small foraminifera; fish teeth and sponge spicules	11	84
Clay, silty, pale-olive; fine, clear and gray angular quartz and a few small foraminifera	11	95
Clay, silty, pale-olive; small amount of coarse to fine, clear and white angular quartz; a few foraminifera and fish teeth	10	105

TABLE 11—*Continued*

Well St.M.- 37a—*Continued*	Thickness (feet)	Depth (feet)
Clay, silty, pale-olive; some quartz as above and a few small foraminifera; phosphatic material common	10	115
Clay, silty, pale-olive; similar to above	11	126
Clay, silty, pale-olive; similar to above	10	136
Clay, silty, grayish-olive	11	147
Clay, silty, yellowish-gray to grayish-olive	11	158
Clay, silty, mostly yellowish-gray, similar to above; sponge spicules very abundant; small foraminifera frequent	10	168
Clay, sandy, grayish-olive to pale-olive; mostly clear, angular, fine quartz; some fine black phosphatic material; sponge spicules and shell fragments common	10	178
Clay, very sandy, grayish-olive; similar to above; some coarse subrounded clear quartz grains; light-green fine glauconite more common; several small black phosphatic pebbles	11	189
Sediments of Jackson age:		
Sand, slightly clayey, mottled greenish-gray; quartz, fine to medium, clear, angular; glauconite, common, light-green to green, fine, oblate to irregular; pyrite, microgranular, rare	10	199
Sand, medium, mottled greenish-gray; similar to above	11	210
Sand, light-gray, clean; mostly clear, subangular, medium to coarse quartz; fine black glauconite; shell fragments and foraminifera common	10	220
Sand, clean, light-gray; similar to above, with a slight increase in amount of glauconite	11	231
Well 5a, Northumberland Co., Virginia (Altitude: 17 feet)		
Pleistocene sediments:		
Sand, clean, medium, grayish-orange; mostly subangular and angular, clear white, pale-gray and pale-yellow quartz; some limonite and feldspar fragments	10	10
Sand, and clay, pale yellowish-brown; sand medium to coarse, dull vari-colored, subangular quartz; limonite fragments and a few rounded black glauconite grains	11	21
Sand, medium, grayish-orange; mostly medium, dull, subangular, white, yellow and iron-stained quartz grains	10	31
Sand, medium, grayish-orange; similar to above	11	42
Clay, sandy, pale yellowish-brown to light olive-gray; medium to coarse, angular gray, pale-yellow, violet and clear quartz; vivianite; a few shells and brown plant fragments	10	52
Clay, sandy, olive-gray; quartz as above; several pieces vivianite; coarse pelecypod fragments; black, soft plant fragments and a few pieces of reddish limonite	11	63
Clay, sandy, olive-gray; pale-violet and dull-gray subangular, medium quartz grains; vivianite; a few carbonized plant fragments and a few shell fragments	10	73
Clay, sandy, olive-gray; similar to above	11	84
Clay, slightly sandy, light olive-gray; small amount of medium to		

TABLE 11—*Continued*

	Thickness (feet)	Depth (feet)
Well St.M.- 5a—*Continued*		
coarse quartz, as above; a few pieces of shell and vivianite; grains of dull gray-black flint	11	95
Clay, slightly sandy, light olive-gray; similar to above, except mostly medium to coarse quartz grains and a few coarse shell fragments	10	105
Sand, fine, clean, yellowish-gray; angular clear, pale-yellow and green quartz and fine to very fine irregular glauconite; well-sorted	10	115
Chesapeake group:		
Clay, silty and sandy, light olive-gray; coarse, sub-rounded gray-green quartz; pieces of chert and jasper; vivianite; pieces of indurated brown silt; coarse pelecypod and shell fragments and a few foraminifera	11	126
Clay, very sandy, light olive-gray; foraminifera identified as Miocene Calvert	10	136
Clay, sandy, light olive-gray	11	147
Clay, sandy, light olive-gray	11	158
Sand, fine, clayey, light olive-gray; fine to medium, sub-angular, clear, gray and pale-green quartz grains; abundant phosphate fragments; foraminifera and shell fragments	10	168
Clay, slightly sandy, light olive-gray; similar to above	11	179
Clay, sandy, light olive-gray; fine to coarse, mostly clear and gray, some yellow-green and dull quartz grains; shell fragments; a few sponge spicules and bone fragments	10	189
Clay, slightly sandy, light olive-gray; similar to above	13	202
Clay, slightly sandy, light olive-gray; similar to above	8	210
Clay, slightly sandy, light olive-gray; similar to above	11	221
Sand, medium, light olive-gray; clear and gray subangular quartz grains; shell fragments and phosphate plates	10	231
Sand, medium, mottled light olive-gray; similar to above; shell fragments more common	11	242
Sediments of Jackson age:		
Sand, calcareous, medium, light-gray; fine to medium, clear, pale-yellow and gray quartz; medium, irregular to botryoidal green and light green glauconite; fragments gray calcareous rock and abundant shell fragments	10	252
Sand, medium, calcareous, light-gray; similar to above; some pyrite	11	263
Sand, medium, light-gray; similar to above, but much more calcareous rock fragments	10	273
Sand, medium, light-gray; similar to above, but contains some brown, medium oblate glauconite	11	284

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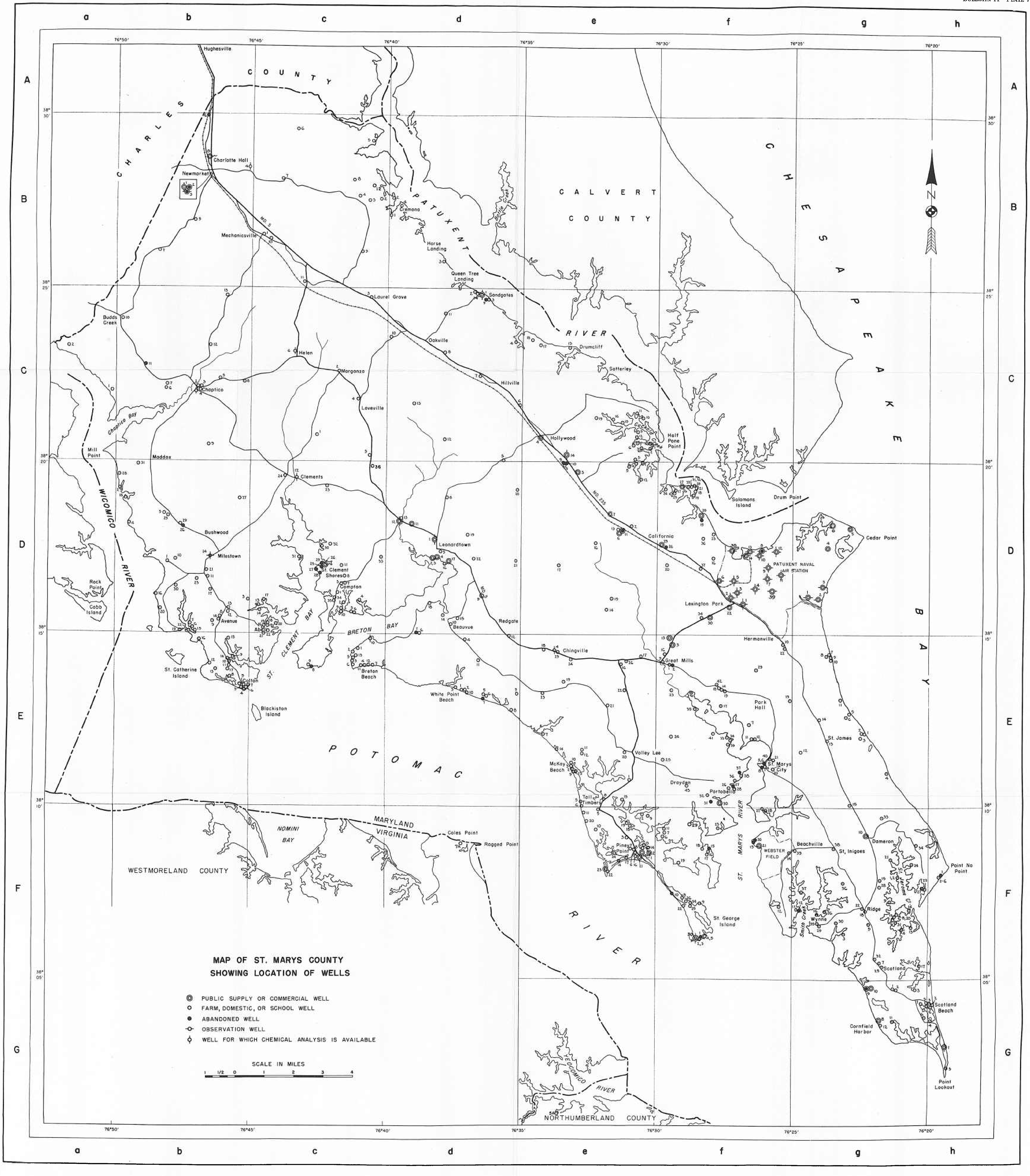
* Page numbers in **boldface** indicate detailed descriptions.


MAP OF ST. MARYS COUNTY
SHOWING LOCATION OF WELLS
PUBLIC SUPPLY OR COMMERCIAL WELL
FARM, DOMESTIC, OR SCHOOL WELL
ABANDONED WELL
OBSERVATION WELL
WELL FOR WHICH CHEMICAL ANALYSIS IS AVAILABLE
SCALE IN MILES
1 1/2 0 1 2 3 4
CHARLES COUNTY
CALVERT COUNTY
WESTMORELAND COUNTY
NORTHUMBERLAND COUNTY
PATUXENT RIVER
CHESAPEAKE BAY
POTOMAC RIVER
WICOMICO RIVER
ST. MARYS RIVER
ST. CLEMENT BAY
BRETON BAY
NOMINI BAY
MARYLAND
VIRGINIA
PATUXENT NAVAL AIR STATION
WEBSTER FIELD
MD. 5
MD. 235
Hughesville
Charlotte Hall
Newmarket
Mechanicsville
Cremona
Horse Landing
Queen Tree Landing
Sandgates
Laurel Grove
Budds Creek
Helen
Oakville
Drumcliff
Sotterley
Morganza
Chaptico
Hillville
Loveville
Hollywood
Half Pone Point
Mill Point
Maddox
Clements
Solomons Island
Drum Point
Bushwood
Milestown
Leonardtown
California
Cedar Point
St. Clement Shores
Compton
Rock Point
Cobb Island
Avenue
Abell
Lexington Park
Redgate
Beauvue
Hermanville
Chingville
Great Mills
St. Catherine Island
Colton
Breton Beach
Blackiston Island
White Point Beach
Park Hall
St. James
Valley Lee
McKay Beach
St. Marys City
Droyden
Portobello
Tall Timbers
Coles Point
Ragged Point
Piney Point
Beachville
St. Inigoes
Dameron
Point No Point
Ridge
Wynne
St. George Island
Smith Creek
Scotland
Scotland Beach
Cornfield Harbor
Point Lookout
76°50'
76°45'
76°40'
76°35'
76°30'
76°25'
76°20'
38° 30'
38° 25'
38° 20'
38° 15'
38° 10'
38° 05'
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C
D
E
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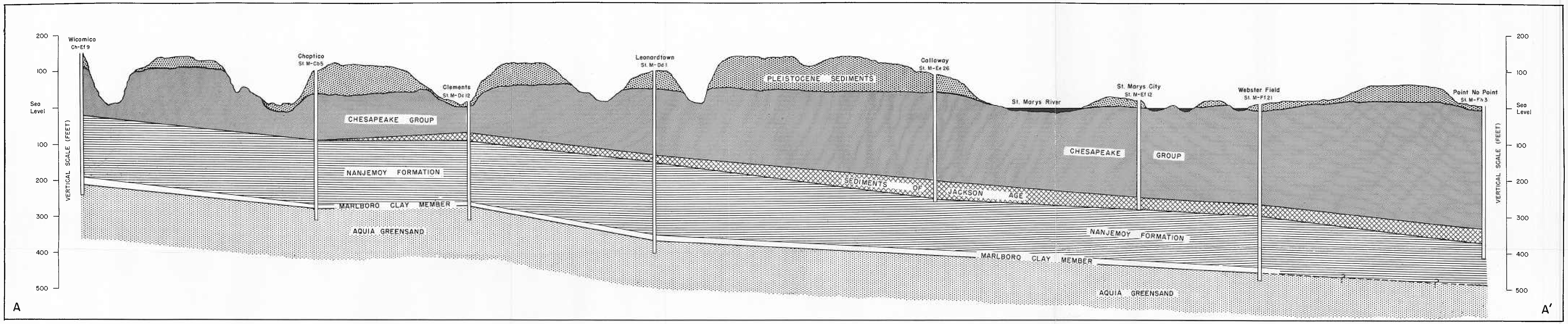
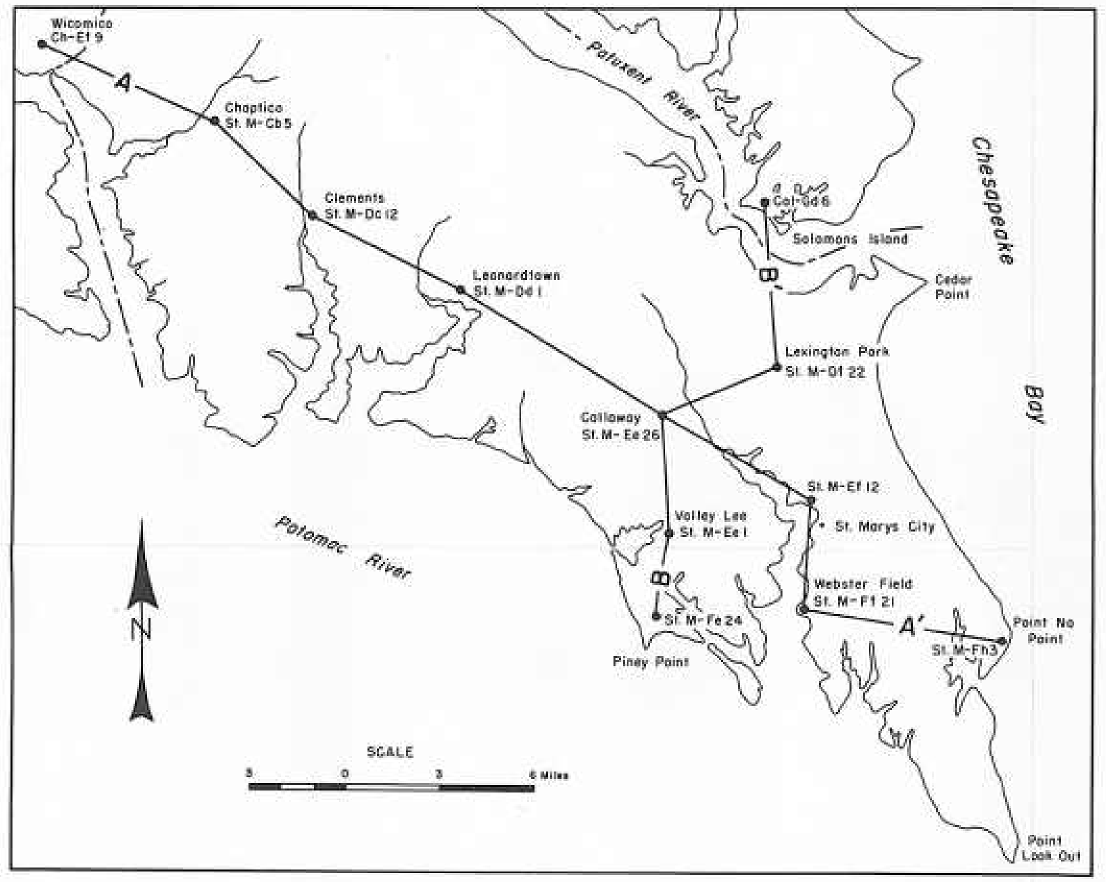
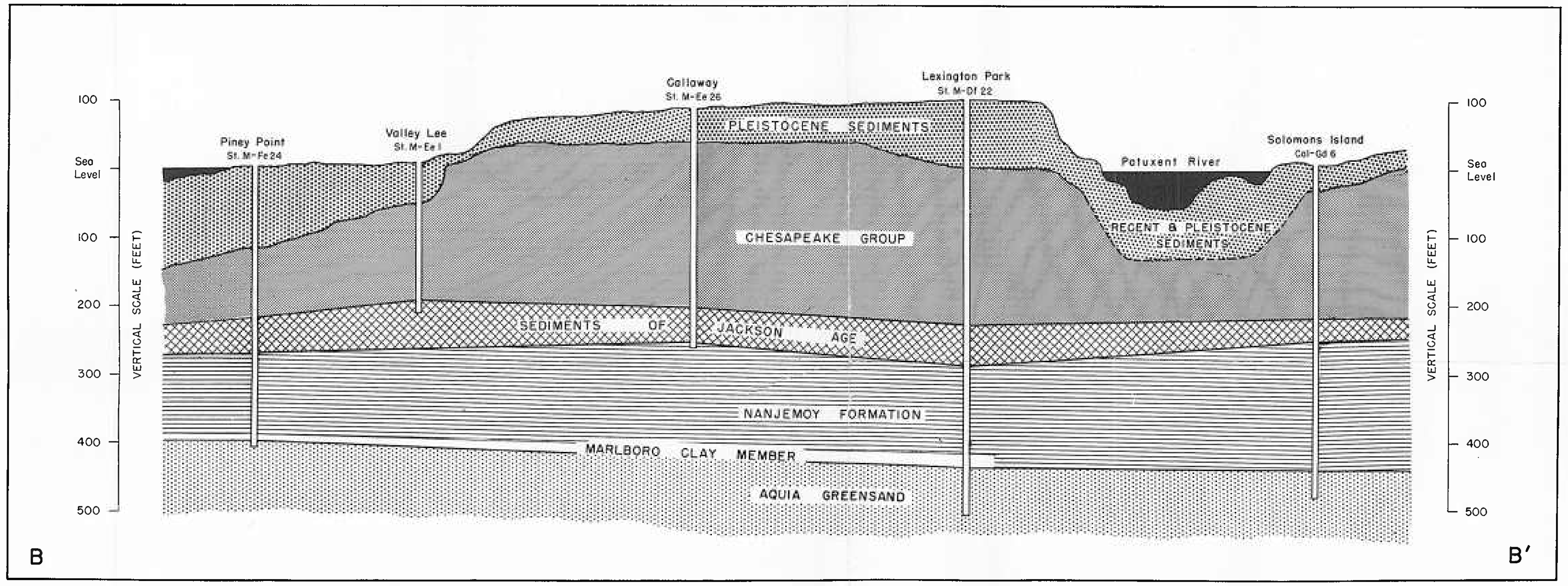
G





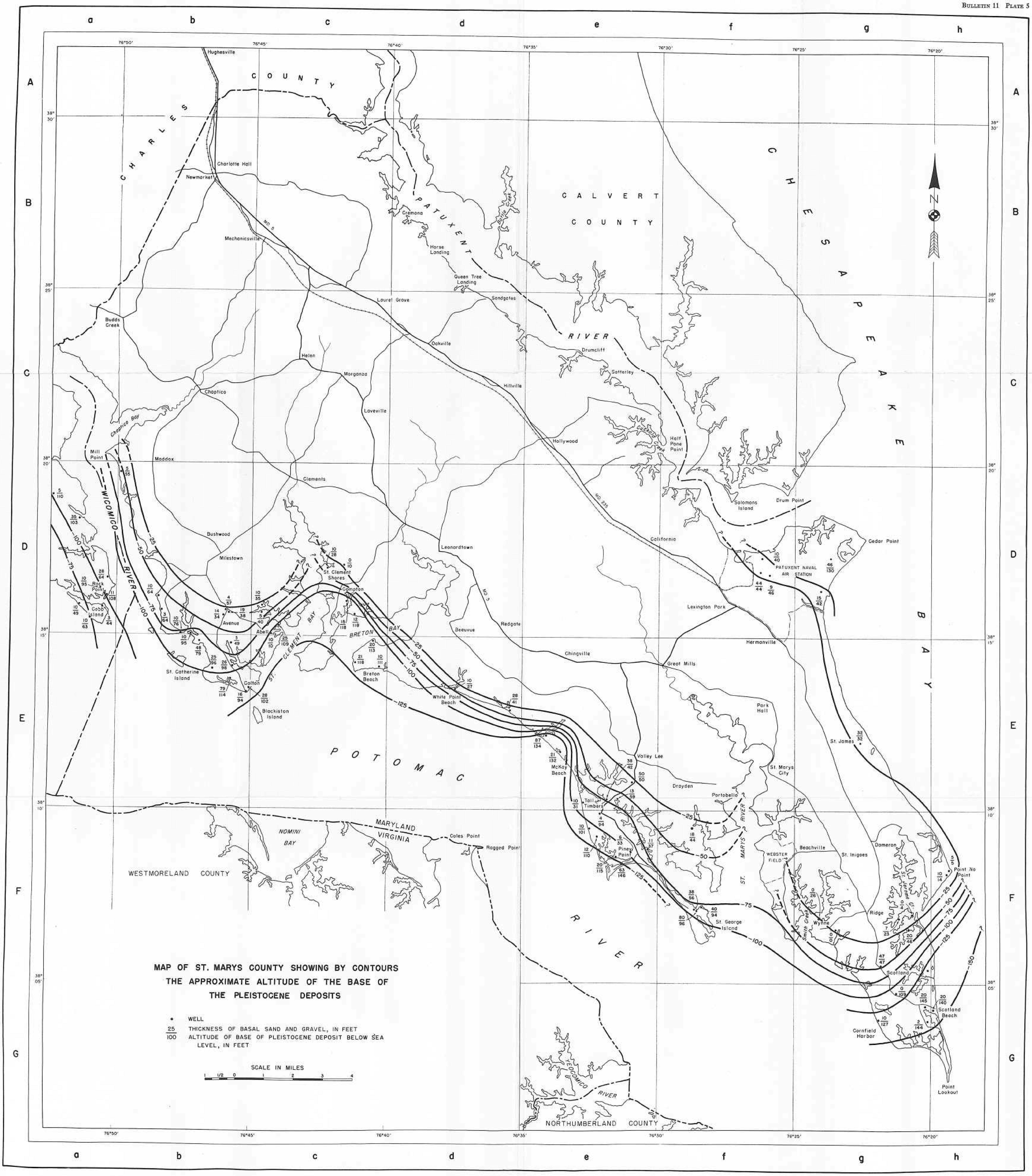
MAP SHOWING THE LOCATION OF WELLS USED IN GEOLOGIC SECTIONS

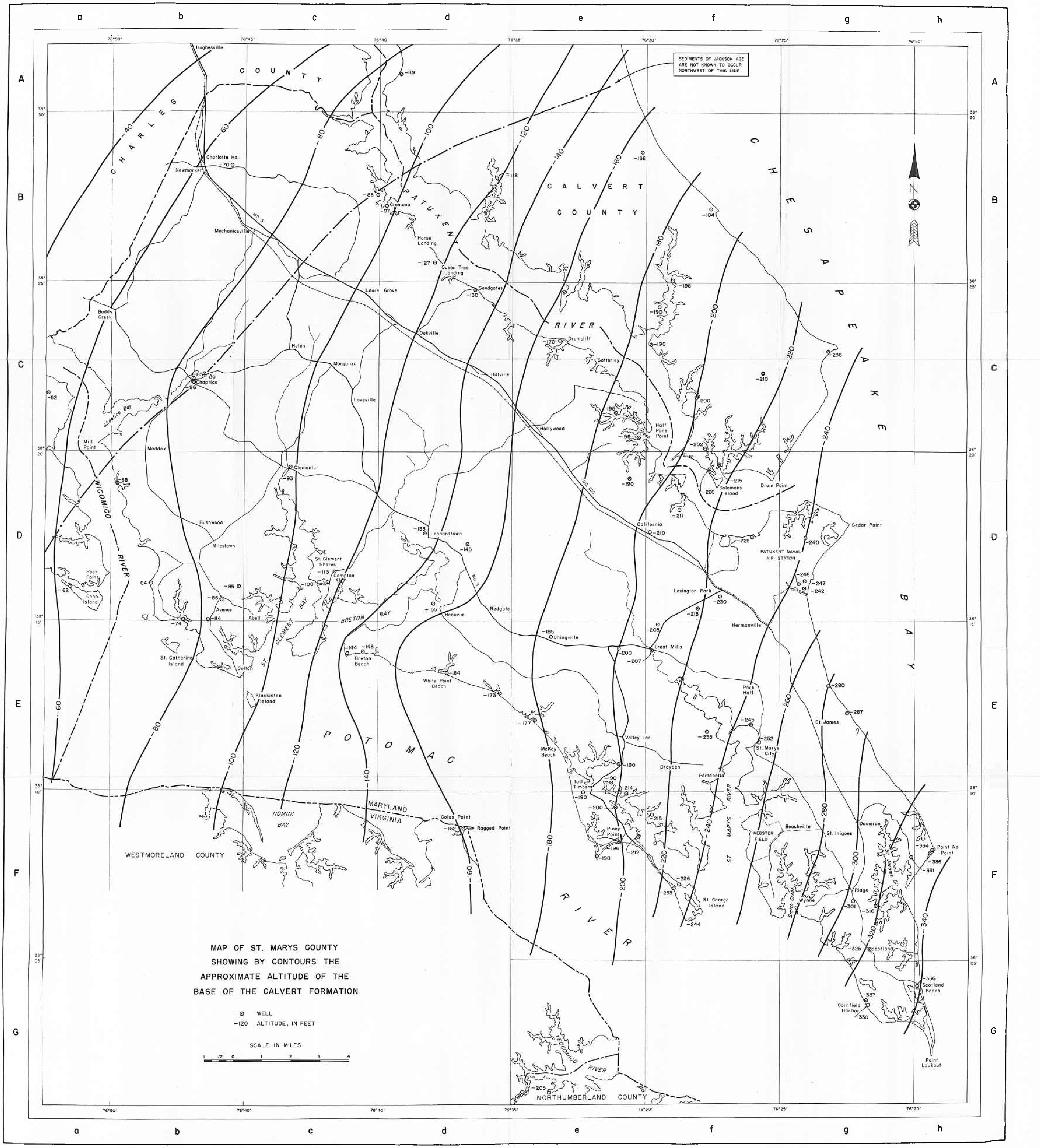


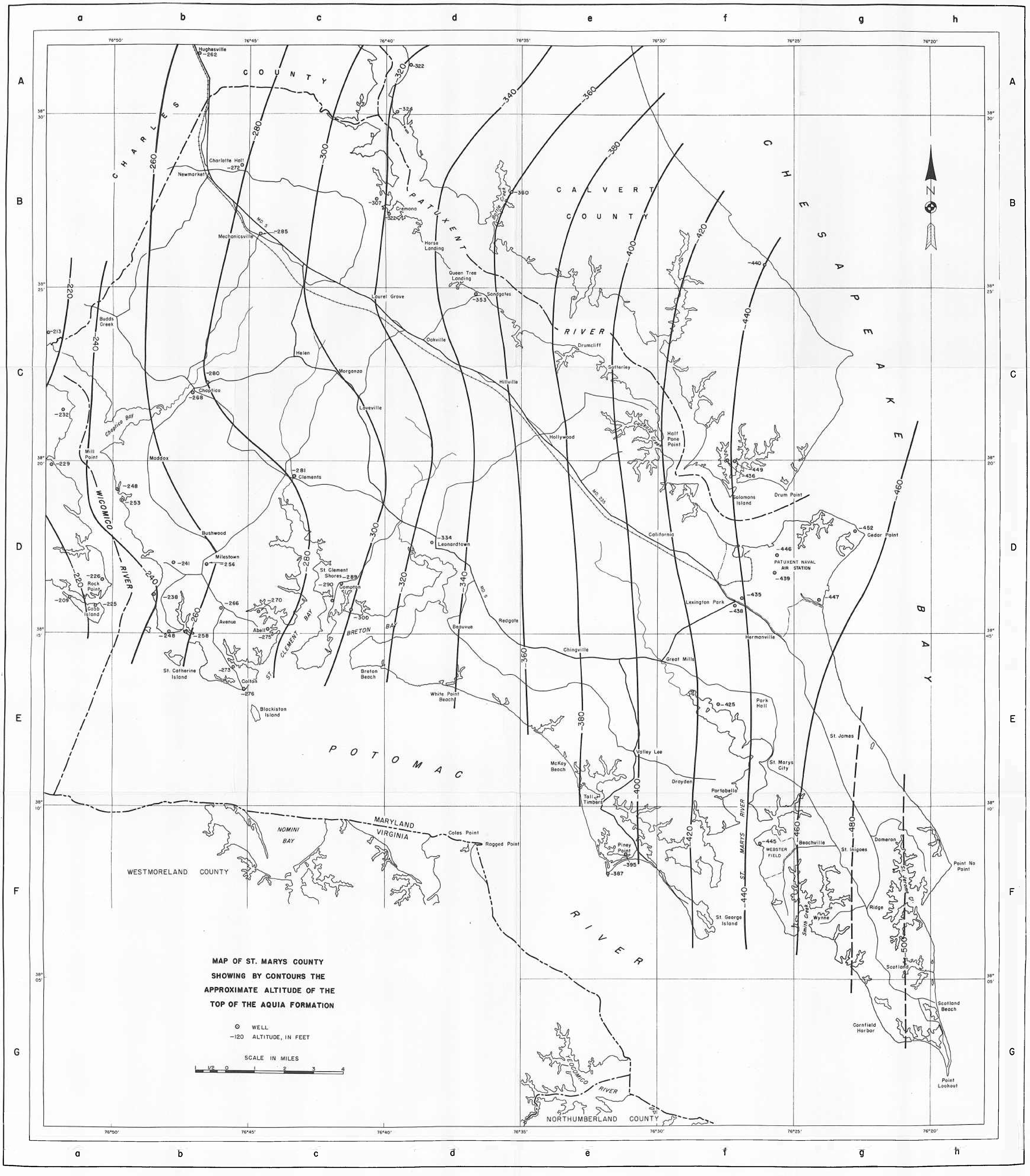
GEOLOGIC SECTIONS OF THE COASTAL PLAIN IN ST. MARYS COUNTY

HORIZONTAL SCALE

1 1/2 0 1 2 3 Miles


CHARLES COUNTY
CALVERT COUNTY
CHESAPEAKE BAY
PATUXENT RIVER
POTOMAC RIVER
WICOMICO RIVER
ST. CLEMENT BAY
BRETON BAY
ST. MARYS RIVER
NOMINI BAY
MARYLAND
VIRGINIA
WESTMORELAND COUNTY
NORTHUMBERLAND COUNTY
YEOCOMICO RIVER
PATUXENT NAVAL AIR STATION
WEBSTER FIELD
Hughesville
Charlotte Hall
Newmarket
Mechanicsville
Cremona
Horse Landing
Queen Tree Landing
Laurel Grove
Sandgates
Budds Creek
Oakville
Helen
Morganza
Chaptico
Chaptico Bay
Loveville
Hillville
Drumcliff
Sotterley
Half Pone Point
Hollywood
Mill Point
Maddox
Clements
Solomons Island
Drum Point
Bushwood
Leonardtown
California
Cedar Point
Milestown
St. Clement Shores
Compton
Rock Point
Cobb Island
Avenue
Abell
Lexington Park
Redgate
Beauvue
Hermanville
Chingville
Great Mills
St. Catherine Island
Colton
Breton Beach
White Point Beach
Blackiston Island
Park Hall
St. James
Valley Lee
McKay Beach
St. Marys City
Drayden
Portobello
Tall Timbers
Piney Point
St. George Island
Coles Point
Ragged Point
Beachville
St. Inigoes
Dameron
Point No Point
Smith Creek
Wynne
Ridge
Scotland
Scotland Beach
Cornfield Harbor
Point Lookout
MD. 5
MD. 235
76°50′
76°45′
76°40′
76°35′
76°30′
76°25′
76°20′
38° 30′
38° 25′
38° 20′
38° 15′
38° 10′
38° 05′
a b c d e f g h
A B C D E F G
25
50
75
100
125
150
MAP OF ST. MARYS COUNTY SHOWING BY CONTOURS THE APPROXIMATE ALTITUDE OF THE BASE OF THE PLEISTOCENE DEPOSITS
WELL
25 THICKNESS OF BASAL SAND AND GRAVEL, IN FEET
100 ALTITUDE OF BASE OF PLEISTOCENE DEPOSIT BELOW SEA LEVEL, IN FEET
SCALE IN MILES
1 1/2 0 1 2 3 4


MAP OF ST. MARYS COUNTY
SHOWING BY CONTOURS THE
APPROXIMATE ALTITUDE OF THE
BASE OF THE CALVERT FORMATION
WELL
-120 ALTITUDE, IN FEET
SCALE IN MILES
SEDIMENTS OF JACKSON AGE ARE NOT KNOWN TO OCCUR NORTHWEST OF THIS LINE
CHARLES COUNTY
CALVERT COUNTY
CHESAPEAKE BAY
PATUXENT RIVER
POTOMAC RIVER
WICOMICO RIVER
ST. MARYS RIVER
WESTMORELAND COUNTY
NORTHUMBERLAND COUNTY
MARYLAND
VIRGINIA
NOMINI BAY
BRETON BAY
ST. CLEMENT BAY
Chaptico Bay
Hughesville
Charlotte Hall
Newmarket
Mechanicsville
Cremona
Horse Landing
Queen Tree Landing
Sandgates
Laurel Grove
Budds Creek
Oakville
Helen
Morganza
Chaptico
Hillville
Loveville
Drumcliff
Sotterley
Hollywood
Half Pone Point
Mill Point
Maddox
Clements
Solomons Island
Drum Point
Bushwood
Milestown
Leonardtown
California
Cedar Point
PATUXENT NAVAL AIR STATION
Rock Point
Cobb Island
St. Clement Shores
Compton
Lexington Park
Avenue
Abell
Redgate
Beauvue
Hermanville
Chingville
Great Mills
St. Catherine Island
Colton
Breton Beach
White Point Beach
Blackiston Island
Park Hall
St. James
McKay Beach
Valley Lee
St. Marys City
Drayden
Portobello
Tall Timbers
Coles Point
Ragged Point
Piney Point
WEBSTER FIELD
Beachville
St. Inigoes
Dameron
Point No Point
St. George Island
Ridge
Wynne
Smith Creek
Scotland
Scotland Beach
Cornfield Harbor
Point Lookout
Yeocomico River


CHARLES COUNTY
CALVERT COUNTY
CHESAPEAKE BAY
PATUXENT RIVER
POTOMAC RIVER
WICOMICO RIVER
ST. MARYS RIVER
ST. CLEMENT BAY
BRETON BAY
NOMINI BAY
MARYLAND
VIRGINIA
WESTMORELAND COUNTY
NORTHUMBERLAND COUNTY
Hughesville
Charlotte Hall
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Laurel Grove
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Beachville
St. Inigoes
Dameron
WEBSTER FIELD
Point No Point
St. George Island
Ridge
Wynne
Smith Creek
Scotland
Scotland Beach
Cornfield Harbor
Point Lookout
MAP OF ST. MARYS COUNTY
SHOWING BY CONTOURS THE
APPROXIMATE ALTITUDE OF THE
TOP OF THE AQUIA FORMATION
WELL
-120 ALTITUDE, IN FEET
SCALE IN MILES