MARYLAND GEOLOGICAL SURVEY
REPORT OF INVESTIGATIONS NO. 2

Kenneth N. Weaver, *Director*

PLEISTOCENE STRATIGRAPHY OF THE SALISBURY AREA, MARYLAND AND ITS RELATIONSHIP TO THE LOWER EASTERN SHORE: A SUBSURFACE APPROACH

By
H. J. Hansen, III

Prepared in cooperation with the Geological Survey
United States Department of the Interior
and the
Department of Public Works
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PLEISTOCENE STRATIGRAPHY OF THE SALISBURY AREA, MARYLAND AND ITS RELATIONSHIP TO THE LOWER EASTERN SHORE: A SUBSURFACE APPROACH

By H. J. Hansen, III

Abstract

The Salisbury, Maryland, water resources investigation afforded the opportunity for a detailed subsurface study of the Pleistocene Series beneath a 90-square-mile area surrounding the city. Twenty-four core holes and 15 test holes were drilled to provide the ground-water phase of the program with a geologic framework. From these new data emerged a clarification of the stratigraphic sequence which, in turn, resulted in a reasonable definition of Pleistocene history.

North of Salisbury a deep Pleistocene paleochannel was discovered. It is inferred that this ancient river, the Naylor Mill paleochannel, was incised during a low sea stand correlative with the Illinoian (?) Glaciation. Filling in and overlying this paleochannel is the "red gravelly" facies of the Salisbury Formation, a fluvial sand deposited by an aggrading river during a period of rising base-level conditions, possibly coincident with the Sangamon Interglaciation. The estuarine (?) equivalent of the "red gravelly" facies is the Beaverdam facies, a gray-white, fine to coarse-grained sand. The "red gravelly" facies is thickest north and west of Salisbury; it wedges out easterly toward Parsonsburg and southerly toward Princess Anne. Complementing this is an easterly and southerly thickening of the Beaverdam facies.

Overlying the Salisbury Formation is the Walston Formation, an extensively developed fine-grained sediment. The Walston Formation is a time transgressive unit deposited from late Sangamon (?) through early Wisconsin (?) time in a series of fringing tidal marshes. As sea level fell, these swampy areas formed west of Parsonsburg divide at progressively lower elevations. The Parsonsburg Sand, a coastal dune deposit, overlies the Walston Formation in the divide area. The Parsonsburg Sand was deposited during the high sea stand marking the transition between the Sangamon(?) Interglaciation and the early Wisconsin(?) Glaciation. The stratigraphic relationship between the Parsonsburg Sand and the Walston Formation reflects the transgressive advance of dune sand over a surrounding tidal marsh facies.

By the end of late Wisconsin time the present-day drainage network was incised into the terrane. As sea level rose during the subsequent Holocene marine transgression, intercalated fluvial gravels and marsh muds were deposited in and adjacent to present-day rivers, such as the Wicomico and Nanticoke.

Although the above sediments lack the commonly sought minerals and fuels, they appear to have more value than generally appreciated. For example, the Salisbury Formation is an excellent source of ground water. In addition, the Walston Formation may serve as a source material for clay products and the Holocene sands and gravels for building and road aggregate.

Introduction

The purpose of this report is to present and interpret geologic data from the Pleistocene series that were obtained during the Salisbury water-resources study. By clarifying the stratigraphic sequence, these data provided the basis for a reasonable reconstruction of Pleistocene history.

Salisbury, Maryland, the seat of Wicomico County, is on the lower Delmarva peninsula at the junction of U. S. Routes 50 and 13 (fig. 1). In July 1963 a water-resources study was begun, focusing on a 90-square mile area surrounding the city of Salisbury. This investigation was directed toward the evaluation of all potential surface and ground-water supplies needed for the future industrial and residential expansion of the city. The project was cooperatively supported by the city of Salisbury, the Maryland Geological Survey, and the U. S. Geological Survey.

Because the city indicated a desire to continue using ground water for its municipal supply, a major part of the project was concerned with the evaluation of the shallow Pleistocene sands and gravels of the area. At the onset of the investigation it became apparent that to achieve an understanding of the hydrologic characteristics of the Pleistocene aquifers, a workable geologic framework was required. Because natural outcrops of unconsolidated sediments are extremely limited in this Coastal Plain area, reliable subsurface data were needed. As a result, surface geology, which was restricted to the inspection of gravel pits, pipeline rights-of-way, and building excavations, supplemented the more extensive subsurface phases of the project.

Subsurface information was obtained directly from test drilling as well as from data supplied by local well drillers. By law, drillers are required to submit to the State their well-completion reports. These reports include well logs that list the kind of formation penetrated, their depth, and their thickness. A compilation of well logs submitted prior to 1955 is contained in Bulletin 16 of the Maryland Department of Geology, Mines and Water Resources[1] (Rasmussen and Slaughter, 1955, p. 379-444). During the following 10 years more than 300 well logs from the Salisbury area were received. Selected well logs from this group are included in the appendix of this report (fig. 2 and table 6). For purposes of geologic study the usefulness of these logs is limited because, in many instances, the logs lack adequate color and textural descriptions. For these and other reasons it was, therefore, necessary to supplement these data with 39 test wells, of which 24 were cored.

Analysis of the new test-hole data provided the geologic framework for the hydrologic study. The results of the hydrologic study will appear in a separate publication (Boggess and others, in preparation). Supplemented by observations from other areas of the lower Eastern Shore, the new data also provided the basis for a fresh look at the Pleistocene stratigraphy. As a result of this added knowledge of the subsurface, insight into the geologic evolution of the lower Delmarva peninsula during the Pleistocene Epoch emerged.

Because this report is a byproduct of a water-resources investigation, the basic data were not studied from as many approaches as would be desirable. To carry the geological phase of the investigation to its logical conclusion heavy mineral analysis, palynology (spores, pollen, and seeds), and carbon isotope dating should be undertaken. Nevertheless, this writer believes that by further clarifying the stratigraphic sequence a contribution has been made toward an ultimate understanding of Pleistocene history of the area.

Acknowledgments

The author has profited from discussions with the following technical associates: E. G. Otton, D. H. Boggess, and R. A. Gardner of the Water Resources Division of the U. S. Geological Survey; and K. N. Weaver, T. H. Slaughter, and E. T. Cleaves of the Maryland Geological Survey. P. C. Cooper, City Engineer of Salisbury, and his staff cooperated fully throughout the project. D. H. Boggess, project chief of the Salisbury water-resources study, was especially helpful, offering many thoughtful ideas and suggestions.

The author also wishes to acknowledge the enthusiastic assistance of Mrs. Shirley Wilkerson who typed the manuscript and Mrs. Anna A. Adamski who drafted the illustrations.

[1] Agency name changed to Maryland Geological Survey in 1964.

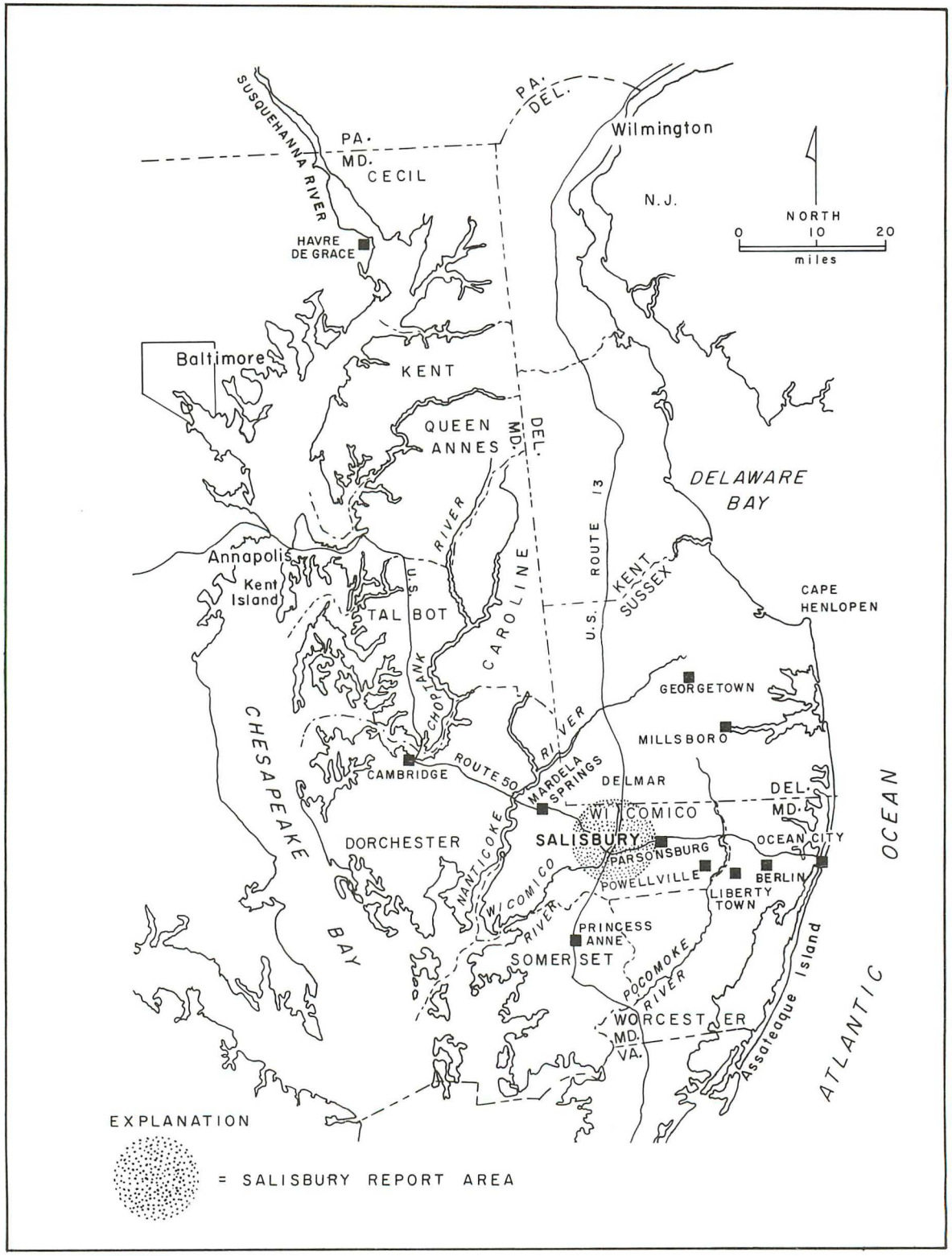


Figure 1—Map of Delmarva peninsula showing location of report area

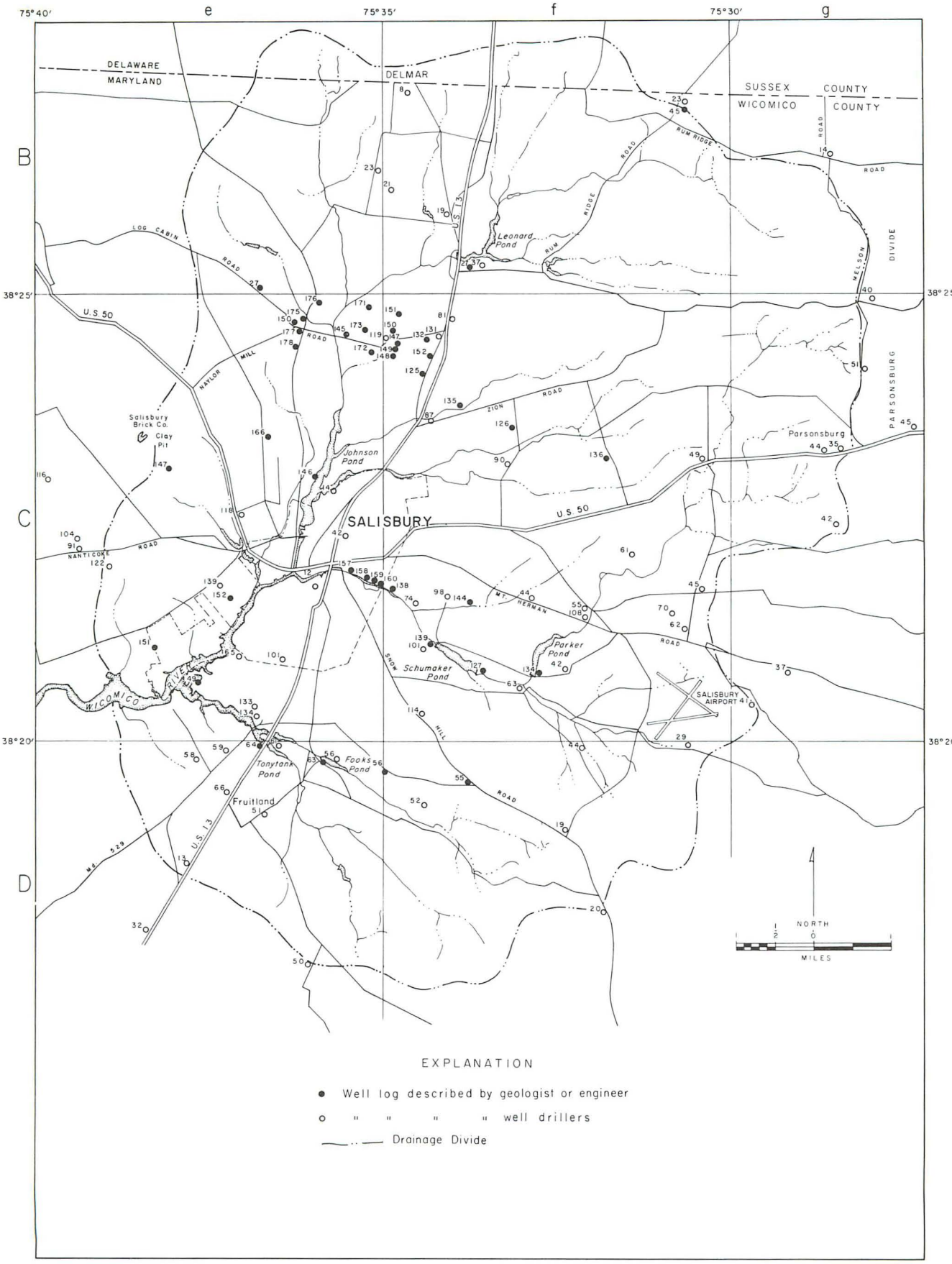


Figure 2—Well location map, Salisbury area, Maryland

Regional Structure and Stratigraphy

The Delmarva peninsula, part of the Atlantic Coastal Plain, is a portion of a seaward-dipping wedge of poorly consolidated sediments of Cretaceous, Tertiary, and Quaternary age. Beneath Salisbury the sedimentary wedge is approximately 5,500 feet thick. This conclusion is based upon information obtained from the Ohio (Marathon) Oil Company Hammond #1 well (Wi-Cg 37)[1], a deep oil test drilled in 1944 (fig. 2).

As described by Anderson and others (1948, fig. 10) this well penetrated approximately 100 feet of white and red Pleistocene sands and gravels, 1,050 feet of gray Miocene sands and clays, 200 feet of green Eocene sands and brown clays, 4,010 feet of gray-white Cretaceous sands and varicolored clays, 140 feet of brown-red Triassic(?) shales and sandstones, and 70 feet of crystalline basement rocks.

The sediments were deposited in a subsiding basin, generally referred to as the Salisbury embayment. The axis of the Salisbury embayment plunges eastward from the vicinity of Washington, D. C., to Ocean City, Maryland, where it trends offshore. It is bounded on the south by the Fort Monroe, Virginia, structural high and on the north by the Long Island structural high (Richards, 1956, fig. 3). Within the embayment the Cretaceous section thickens considerably, suggesting that the basin was subsiding most actively during Cretaceous time (Richards, 1956).

The regional strike of the Cretaceous and Tertiary sediments is northeasterly; they dip southeasterly at 10 to 75 feet per mile (Rasmussen and Slaughter, 1955, p. 23). Because the Salisbury embayment was subsiding most actively during the Cretaceous Period, the pre-Tertiary formations dip more steeply than the younger Eocene and Miocene sediments (Rasmussen and Slaughter, 1955, pl. 1). Unconformably overlying this southeasterly dipping wedge of sediments is a blanket of sands, gravels, and clays of Pleistocene age. On the lower Eastern Shore of Maryland, these deposits truncate southeasterly dipping formations of Miocene age at depths ranging from less than 10 feet below sea level (near Cambridge) to depths exceeding 120 feet below sea level (near Ocean City). Beneath Pleistocene river-channel deposits the eroded top of the Miocene may be as deep as 200 feet below sea level. In the Salisbury area the Yorktown and Cohansey Formations subcrop beneath the Pleistocene unconformity.

The Tertiary and Cretaceous stratigraphy of the Eastern Shore is discussed more fully in the following publications: Clark and others (1904), Richards (1945), Anderson (1945), Spangler and Peterson (1950), Rasmussen and Slaughter (1955), Jordan (1962), and Maher (1965). Table 1 summarizes the stratigraphy of the Tertiary and Cretaceous sediments.

Of primary concern in this publication is the physical stratigraphy and geologic history of the overlying Pleistocene deposits.

[1] The location of the wells cited in this report are plotted on figure 2 which is divided into 5-minute quadrangles of latitude and longitude. Beginning at the top of the map and extending downward, uppercase letters designate 5-minute segments of latitude; and beginning at the left and extending to the right side of the map, lowercase letters designate 5-minute segments of longitude. The wells are identified by coordinate letters and consecutive numbers. The prefix Wi- means that the wells were drilled in Wicomico County.

Table 1. Tertiary and Cretaceous stratigraphy of the Salisbury area, Maryland

(After Rasmussen and Slaughter, 1955; and Anderson and others, 1948)

System	Series	Formation	Approximate thickness (ft.)	General characteristics
			Unconformity	
Tertiary	Pliocene	None	0	Removed during Pleistocene erosion.
			Unconformity	
	Miocene	Yorktown and Cohansey	150–250	Gray sands interbedded with dark gray to blue clays. The sands are predominantly very fine to medium grained; locally coarse. Generally nonfossiliferous, but commonly contains lignitic material. Estuarine in origin consisting of four units: upper aquiclude, Pocomoke Aquifer, lower aquiclude, and Manokin Aquifer. Subcrops beneath Pleistocene sediments in Salisbury area.
		St. Marys	140	Predominantly a gray clayey silt, silty clay and very fine sand. Fossiliferous; marine in origin.
		Choptank	100	Gray and brown sand and clay, containing shell marl; marine in origin.
		Calvert	570	Gray diatomaceous silts and clays, containing lenses and thin sheets of gray sand and shell beds. The Nanticoke Aquifer at the top of the Calvert is a 50 to 75-foot calcareously cemented bed of shell detritus; it is marine in origin.
			Unconformity	
	Oligocene	None	0	An interval of erosion or non-deposition. Regional unconformity.
			Unconformity	
	Eocene	Chickahominy	100	Brown glauconitic clay.
		Piney Point	30	A white quartz sand and glauconitic greensand, grading into brown clays; marine in origin.
			Unconformity	
	Paleocene	Brightseat (?)	80	Alternate beds of gray, green, and brown clay and gray glauconitic sand.
			Unconformity	
Cretaceous	Upper Cretaceous	Monmouth	40	Dark green glauconitic sand and lead gray clay containing shells and foraminifera; marine in origin.
		Matawan	100	White, silty chalk; lead gray, glauconitic clay; basal fine sand and conglomerate; marine in origin.
		Magothy	100	White, yellow, and gray sand interlaminated with gray and brown clay, containing lignite and carbonaceous matter; nonmarine in origin.
		Raritan	700	Intercalated thin sands and clays. The sands are generally gray, fine grained, micaceous and lignitic. The clays are mottled gray-brown-red in the upper section and gray-brown in the lower; predominantly deltaic and estuarine in origin.
			Unconformity	
		Patapsco and Arundel	2100	Thick sands and clays. Sands are medium to fine grained in upper part, but coarse and gravelly in lower 600 feet. They are white in color. The clays are gray and brown in the upper part, variegated gray, red, brown, and green in the middle part, and olive green and gray in the lower part; generally nonfossiliferous; deltaic in origin.
			Unconformity	
	Lower Cretaceous	Patuxent	940	Thick sands and thin clays. Sands are fine to very coarse and gravelly; poorly sorted. They are white, occasionally limy, and feldspathic. Clays are varicolored gray, red, brown, yellow, purple, and green; possibly fluvial in origin.

Previous Investigations

The geologic evolution of the Delmarva Peninsula during the Pleistocene epoch has been studied from basically three approaches. Beginning with Shattuck (1906) the geomorphic or land form approach has been extensively utilized in the hope of relating scarps and terrace levels to Pleistocene history. As further developed by Cooke (1930, 1952) this approach attempted to date Pleistocene sediments by correlating them with topographically defined terrace levels. It was believed that the proposed terraces and their associated sediments were related to Interglacial sea levels and therefore had chronological significance (Richards, 1965). However, as Jordan (1962, p 37) pointed out formations should be

defined on the basis of lithic and depositional factors, not morphologic ones. Flint (1940, 758-767) and Hack (1955, p 38-40) have also critically reviewed the geomorphic approach.

The geomorphic method by itself is insufficient to reconstruct the Pleistocene history of the lower Eastern Shore because it assumes that the surficial sediments associated with terrace levels are definitive of the complete range of Pleistocene chronology rather than events during and subsequent to the last major marine regression. As a result the geologic history of the Pleistocene epoch as reflected by the subsurface stratigraphy of its sediments is obscured. Thus it appears that aside from the difficulty of establishing the continuity of terraces and scarps in the field, their usefulness on the lower Eastern Shore is restricted because, as shall be subsequently presented, they are at best descriptive of only the last regressive phase of the Pleistocene and not the total sequence.

The second approach to the problem, employed initially by soil scientists of the Isaiah Bowman School of Geography, Johns Hopkins University (Sokoloff and Carter, 1951), has been to relate the soil-profile maturity of terrace levels to Pleistocene chronology. This pedogenetic approach, which has met with varying success, is essentially a refinement of the geomorphic method. As such its usefulness on the lower Eastern Shore is restricted to events during and subsequent to the last major, marine regression.

The third method of study has been the stratigraphic approach. Until recently it has been severely handicapped because of a general lack of subsurface information. Without the added dimension of bore hole data this approach suffers the same deficiency as the geomorphic and pedogenetic approaches. Namely that the surficial geology of Maryland's lower Eastern Shore reflects in most cases the depositional products of Wisconsin and Holocene events. The pioneering efforts of Rasmussen and Slaughter (1955, 1957) helped to remedy this. Prior to their water investigation reports, stratigraphic analysis was based on surface exposures (e.g. Cooke, 1952). As a result the stratigraphic column was inevitable associated with terrace levels. The limitations imposed by this approach obscured the totality of Pleistocene history and its associated paleogeography. Rasmussen and Slaughter (1955, 1957) recognized the deficiencies of the earlier stratigraphic nomenclature and in their tri-county reports of the Eastern Shore established a stratigraphic sequence in harmony with known subsurface relationships.

The current (1965) water-resources project in the Salisbury area has afforded an opportunity to examine in greater detail the subsurface geology of the Pleistocene sediments. The conclusions drawn from this study are presented in the following discussion.

Physical Stratigraphy of the Columbia Group

In the Salisbury area the subcropping Yorktown and Cohansey Formations of late Miocene (?) age are overlain unconformably by a series of interbedded gravels, sands, and clays which comprise the Columbia Group. The term Columbia Group, as suggested by Jordan (1962, p. 36), has historical precedence (McGee, 1886, p. 473) and is used in this publication to denote all sediments of Pleistocene age. In the Salisbury area the Columbia Group can be subdivided into three formations; from oldest to youngest, these are the Salisbury Formation, the Walston Formation, and the Parsonsburg Sand. The Salisbury Formation can be separated into two distinctive lithofacies, an orange-brown, fluvial sand ("red gravelly" facies) and a gray-white estuarine(?) sand (Beaverdam facies) (Table 2).

The two lithofacies comprising the Salisbury Formation should not be considered formal stratigraphic terms (Committee on Stratigraphic Nomenclature, 1961). They are given names merely to facilitate discussion and to allow some degree of continuity with previous work done in the area (Rasmussen and others, 1955, 1957, 1959, 1960).

Salisbury Formation

The term Salisbury aquifer was introduced initially by Heidel and Otton (1963, p. 8) to describe the post-Miocene water-bearing sands and gravels of the Salisbury well field area; they concluded that these sediments formed a natural geohydrologic unit. Earlier, Rasmussen and Slaughter (1955, p. 103–116) had subdivided the same sediments on the basis of color and texture into two geologic "formations," designating them the Beaverdam Sand of Pleistocene age and the "red gravelly" sand of Pliocene(?) age (table 3). The

Table 2. Detailed description of Pleistocene stratigraphy of Salisbury area

Series	Stage	Formation	Approximate thickness (ft)	General character
HOLOCENE	—	—	0–60	Sand, fine-grained, tan; wind-blown material; mantles interfluvial areas. Gravel, sandy, gray to tan; fluvial deposits associated with present rivers. Clay, gray to black, occasionally peat-bearing; tidal marsh deposits associated with present rivers.
PLEISTOCENE (Columbia Group)	Wisconsin Glaciation	Walston Clay	0–20	Interbedded clay, sandy to silty and sand, fine to medium-grained, very clayey, mottled gray to tan; tidal marsh deposit associated with the Wisconsin(?) fall in sea level.
		Parsonsburg Sand	0–30	Sand, fine to medium-grained, gray to tan, well-sorted. Chiefly a dune sand associated with the high stand of the Sangamon(?) sea; confined to the Parsonsburg divide area.
	Sangamon Interglaciation	Salisbury Formation: Beaverdam facies	0–115	Sand, fine to coarse-grained; silty; occasionally pebbly; whitish gray to buff, except, above water table where orange-brown; rarely contains rafted boulders; abundant deltaic cross bedding; estuarine deposit associated with the Sangamon(?) rise in sea level.
		Salisbury Formation: "red gravelly" facies	0–190	Sand, fine to very coarse grained; silty; gravel, fine to coarse grained, lensoidal; coated with iron oxide, imparting tan, brown, orange, and red coloration; contains ferruginous layers and concretions, particularly at Miocene contact; fluvial sediments deposited by aggrading river(s) during the Sangamon(?) rise in sea level.
	Illinoian Glaciation	Erosion (Miocene – Miocene)	—	Marked by a period of erosion during which the Naylor Mill paleochannel was incised into Yorktown and Cohansey Formations as sea level fell. Older Pleistocene and Pliocene(?) sediments probably eroded away.

latter unit was tentatively correlated with high-level Pliocene terrace gravels (Brandywine Formation) cropping out west of the Chesapeake Bay (Hack, 1955). Data collected during the current study, however, suggest that the two "formations" are more closely related chronologically than previously believed.

In this report the Beaverdam–"red gravelly" terminology of Rasmussen and Slaughter is retained, but reduced in rank from formation to lithofacies. Both the Beaverdam facies and the "red gravelly" facies are now considered subdivisions of a redefined geologic unit hereby designated the Salisbury Formation. In the Salisbury area the Salisbury Formation is essentially a subsurface unit. Well Wi-Cf 147, in theAllen Company Orchard south of Naylor Mill Road, and well Wi-Ce 159, in the Salisbury well field, are designated the type wells for this formation (fig. 2 and table 6). Two wells are designated because the Salisbury Formation is unusually thick (Wi-Cf 147) where it fills a deeply eroded Pleistocene river channel. Figure 3 shows the annotated electric logs of the two wells.

Table 3. Correlation chart comparing previous terminology of the Salisbury Formation

Rasmussen and Slaughter (1955)			Heidel and Otton (1963)	Terminology used in this report			
Series	Stage	Formation	Geohydrologic unit	Series	Stage		Formation
Pleistocene	Aftonian Interglaciation	Beaverdam Sand	Salisbury Aquifer	Pleistocene	Sangamon(?) Interglaciation	Salisbury Formation	Beaverdam facies
----------	Unconformity	----------					
Pliocene (?)		"red gravelly" sand (Brandywine)					"red gravelly" facies

"Red gravelly" facies

The "red gravelly" facies of the Salisbury Formation overlies and truncates the southeasterly dipping Yorktown and Cohansey Formations and underlies the Beaverdam facies of the Salisbury Formation. In the eastern and southern parts of the area the "red gravelly" facies wedges out into a thickening section of Beaverdam facies (figs. 4 and 5).

The "red gravelly" facies consists of interbedded sands and gravelly sands; the associated clays probably represent less than 10 percent of the unit. Occasionally thin, hard layers of ferruginous material are encountered, particularly near the Miocene contact. The sands consist of 90 to 95 percent subangular to subrounded quartz grains with minor admixtures of chert, feldspar, mica, and ferromagnesium minerals; magnetite or ilmenite is the most common accessory mineral. The particles are characteristically stained with limonite, imparting to the sediments a rusty-brown to orange-brown color. In some localities the basal portion of the unit consists in part of reworked gray sand of Miocene age. As a consequence the "red gravelly" facies has a grayish-tan coloration in some wells, for example, well Wi-Cf 147.

The sands of the "red gravelly" facies range from fine to very coarse grained. The median diameters obtained from sieve analyses of 132 core samples fall between an extreme high of 2.55 mm. and an extreme low of 0.18 mm. (table 5). The average median diameter is 0.51 mm., a value slightly exceeding the lower limit of coarse sand (0.50 mm.). The Trask sorting coefficient (a statistical parameter that measures the spread of the central 50 percent of the size distribution about the median) ranges between 1.11 (well sorted) and 4.33 (poorly sorted). The average Trask sorting coefficient for 132 sieve analyses is 1.62 (fig. 6).

The grain-size data were obtained primarily for the purpose of estimating permeability values for a regional ground-water transmissibility map. The details of this phase of the investigation are discussed in the hydrologic report in preparation by Boggess and others.

To aid in the stratigraphic evaluation of the grain-size data, diagrammatic sections were constructed using core holes for control points. Median diameters and Trask sorting coefficients were selected as the correlative parameters. This approach indicated the presence of two, generally continuous, zones of gravelly sand. Both zones characteristically have median diameters of 0.5 mm or more (fig. 6). The "A" horizon or top of the upper zone occurs at sea level ±10 feet, while the "B" horizon or top of the lower zone is usually encountered 20 to 30 feet deeper. Both the "A" and "B" horizons can be traced from the orange-brown "red gravelly" facies into the gray-white Beaverdam facies.

The subdivision of the Salisbury Formation into the "red gravelly" and Beaverdam facies is suggested in part by the subsurface distribution of the two units (figs. 4 and 7). In the Salisbury area the "red gravelly" facies thins appreciably both to the east and south. Figure 7, a panel diagram employing core hole data, illustrates this point.

In the three west-to-east panels the "red gravelly" facies thins from 62 feet (Wi-Cf 126) to 24 feet (Wi-Cf 136), from 50 feet (Wi-Cf 127) to 30 feet (Wi-Cf 134), and from 60 feet (Wi-Df 56) to 15 feet (Wi-Df 55). Complementing this thinning is a pronounced thickening of the Beaverdam facies. Farther east, where no core hole data are available, drillers' logs suggest that the "red gravelly" facies tongues out completely (Wi-Cg 35). The zero isopach is tentatively placed slightly west of and sub-parallel to the Parsonsburg divide, a north-south trending feature clearly shown on the Wicomico County topographic map (Maryland Department of Geology, Mines and Water Resources, 1960). The axis of this feature parallels Melson Road, a county road running north from Parsonsburg (fig. 2). Similarly, in the southern part of the area the "red gravelly" facies appears to wedge out southwest of Fruitland (fig. 4).

The "red gravelly" facies of the Salisbury Formation is thickest in a deeply incised river channel of Pleistocene age extending east-west from U. S. Route 13 to Jersey Road (figs. 4 and 8).

Because a portion of the axis of the ancient channel parallels Naylor Mill Road, it is herein named, for convenience, the Naylor Mill paleochannel. The "red gravelly" facies attains a maxi-

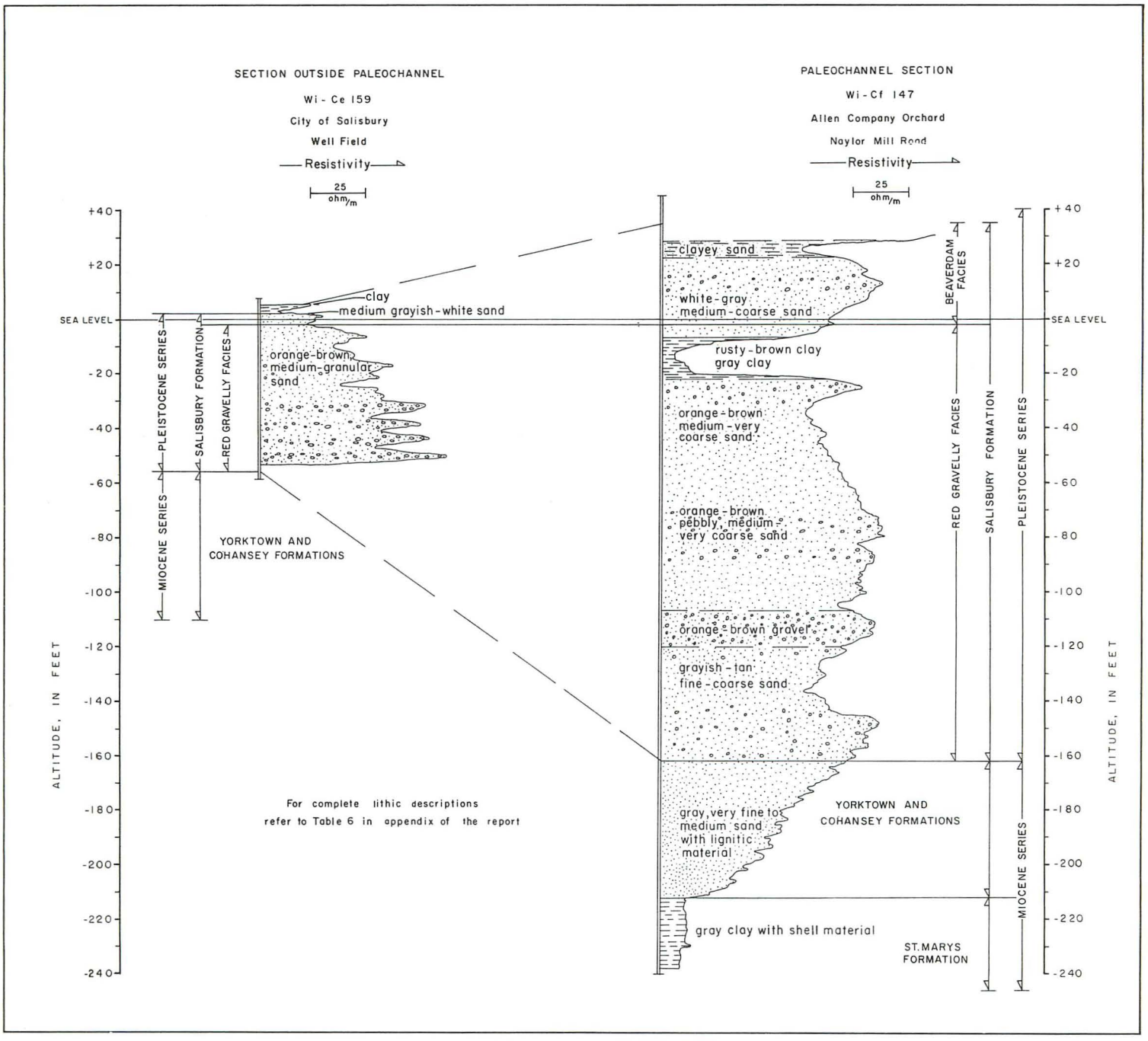


Figure 3—Annotated electric logs of well WiCf 147 and well Wi-Ce 159

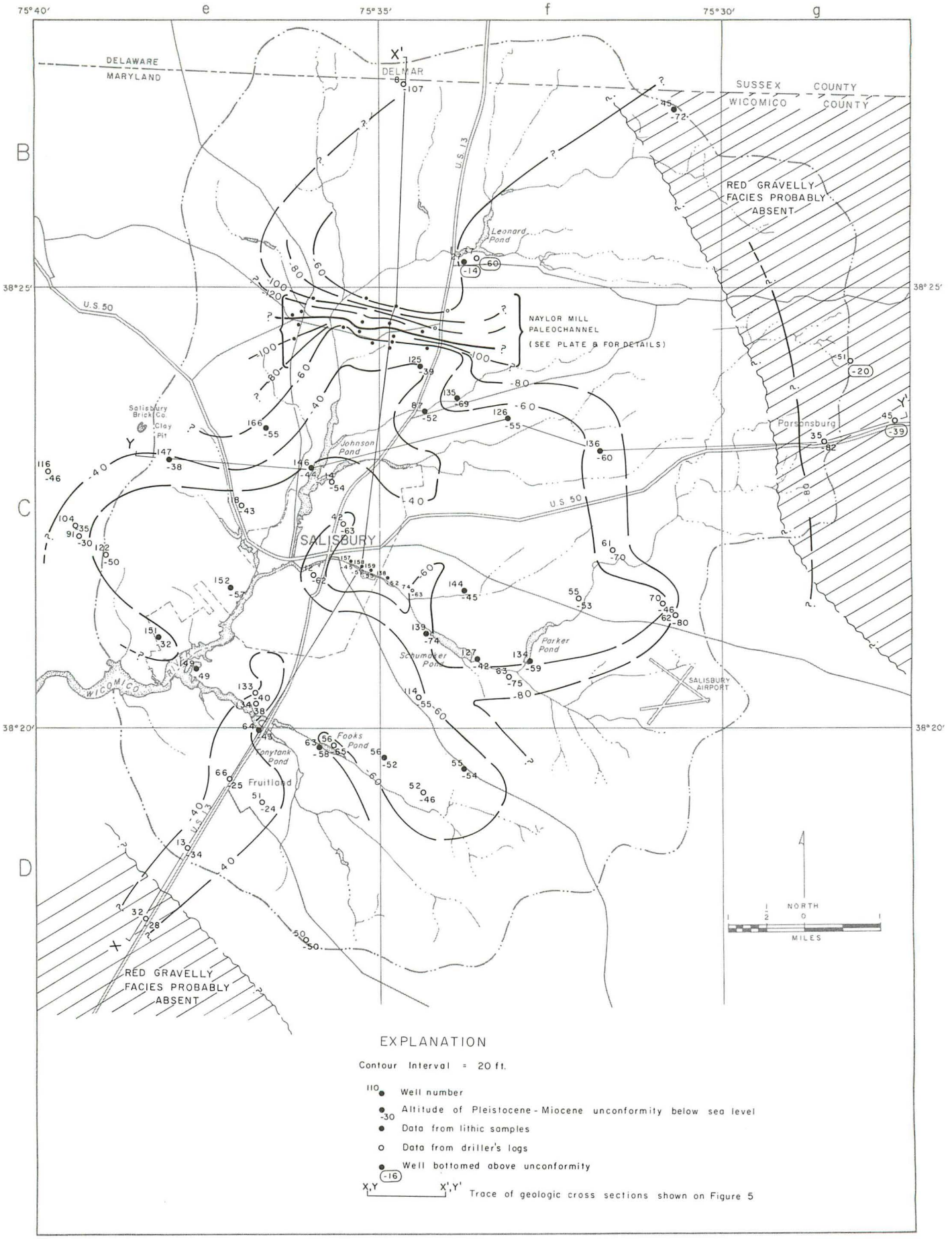


Figure 4—Structure contour map of the Pleistocene and Miocene unconformity.

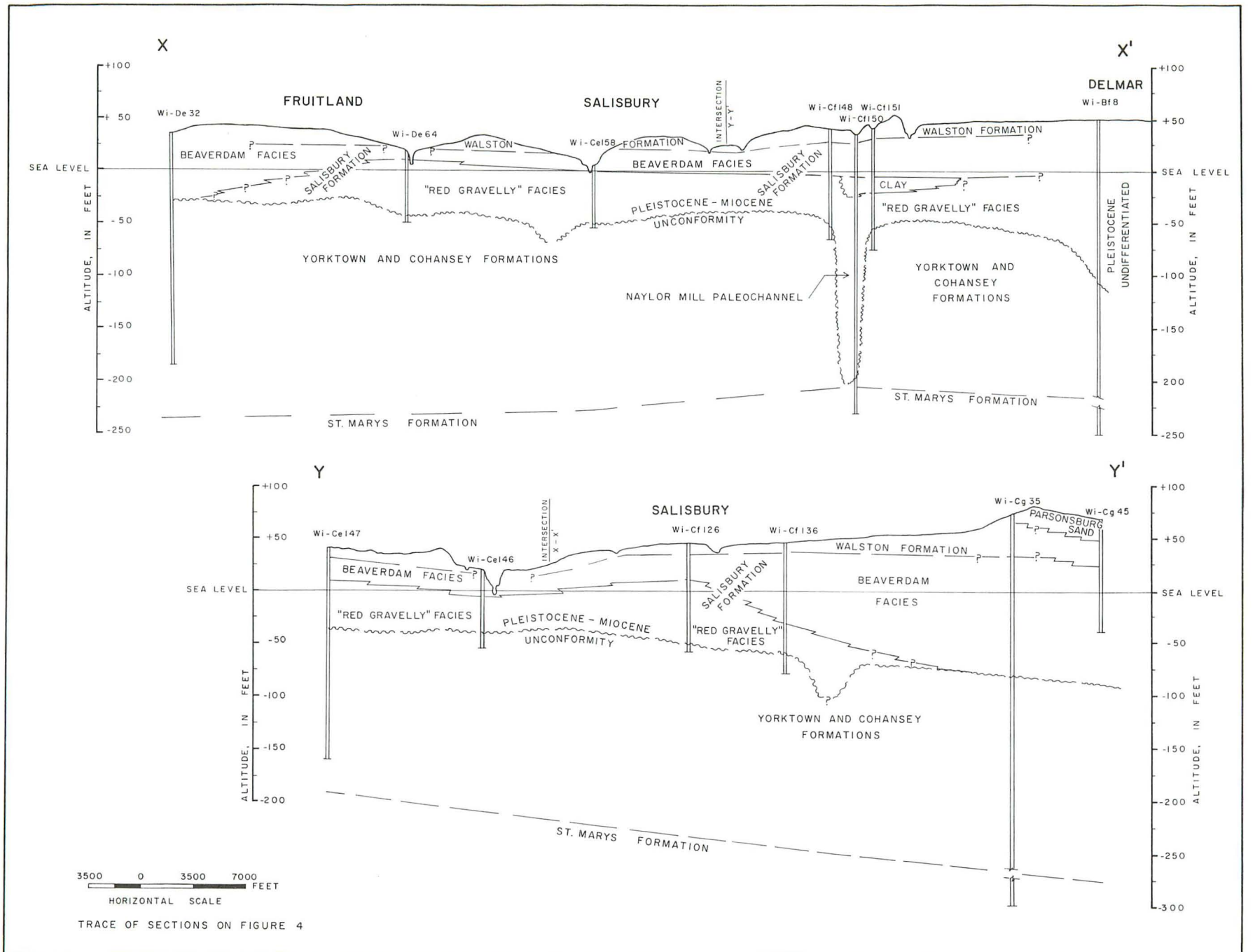


Figure 5—Geologic sections showing Pleistocene stratigraphy, Salisbury area, Maryland.

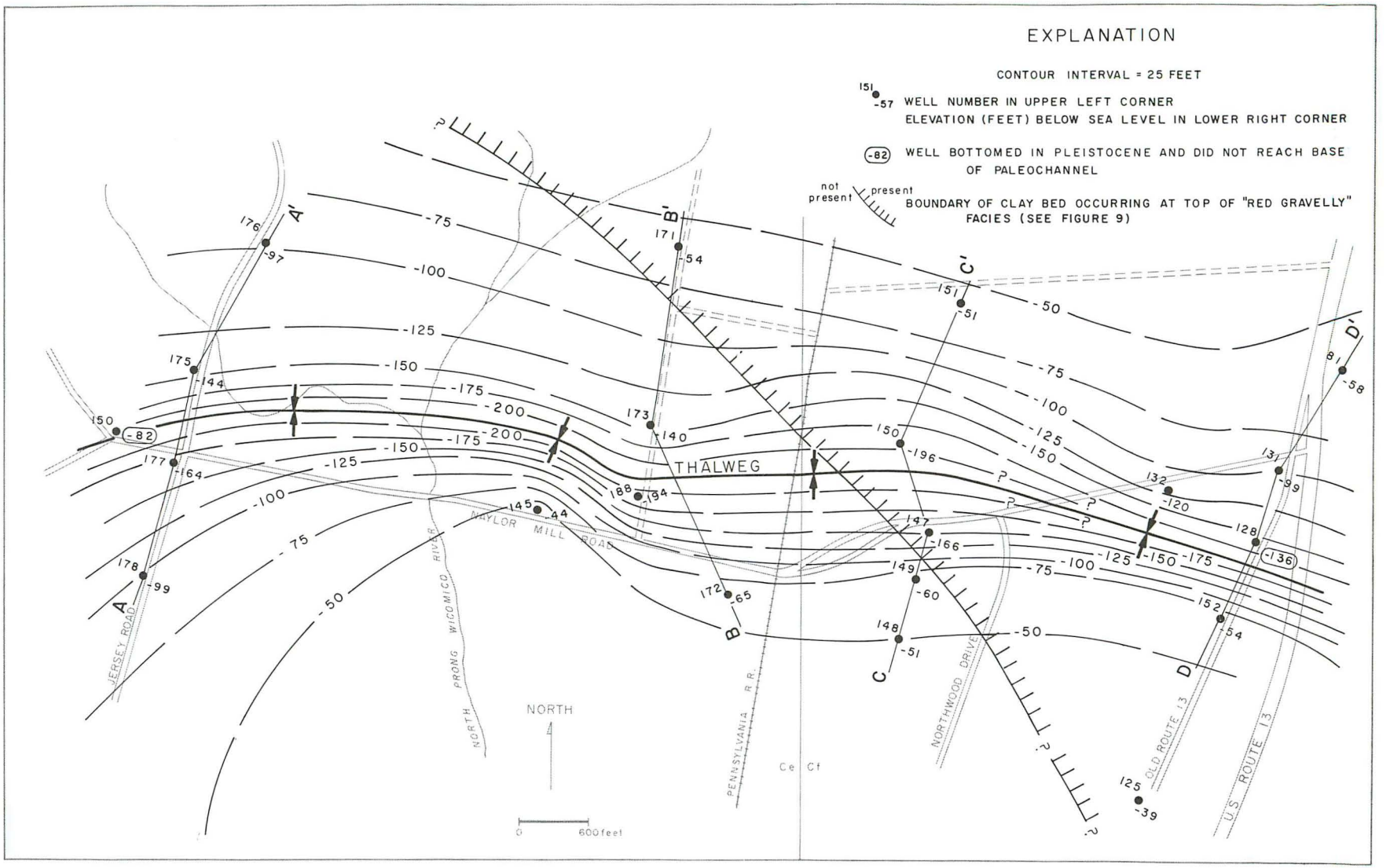


Figure 8—Detailed structure contour map of the base of Naylor Mill paleochannel.

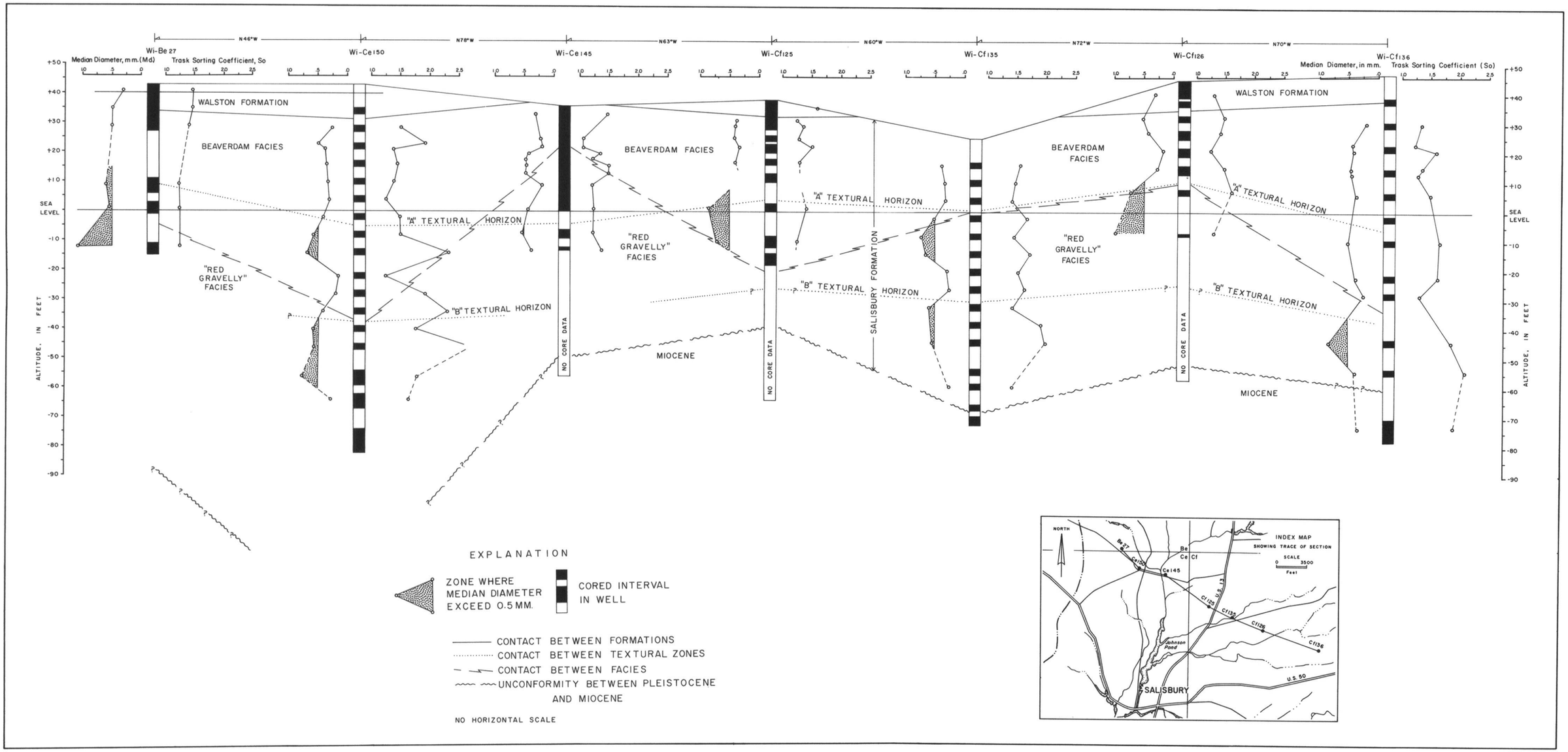


Figure 6—Stratigraphic section showing textural correlation between Beaverdam and "red gravelly" facies of the Salisbury Formation.

mum thickness of approximately 195 feet (Wi-Cf 150) in the axial part of the paleochannel (fig. 9).

Test well Wi-Cf 132 initially confirmed the existence of the paleochannel in the vicinity of the Eastern Shore Public Service Company plant on U. S. Route 13, 2.5 miles north of Salisbury (figs. 4 and 7). The top of the Miocene was encountered at a depth of 162 feet (120 feet below sea level). Because of the large ground-water potential of a feature of this magnitude, 14 additional wells were drilled to delineate its subsurface geometry. The additional data from these wells suggest that the east-west trending axis of the paleochannel is at least 230 feet below land surface at its deepest point (figs. 4 and 8). Incised to this depth, the Naylor Mill paleochannel deeply trenches the Manokin sand, the basal unit of the Yorktown and Cohansey Formations (fig. 7 and table 1). The Manokin is an artesian aquifer in the Salisbury area.

From available data it is difficult to determine the longitudinal gradient and the direction of flow of the ancient river which cut the Naylor Mill paleochannel. Further test drilling to both the east and west of the existing holes is needed before the question of stream profile can be resolved for certain.

The structure contour map of the Pleistocene and Miocene unconformity and its accompanying profiles illustrate in gross form the cross-sectional geometry of the paleochannel prior to aggradation (figs. 8 and 9). On figure 8 the base of the interfluvial area appears to be defined by the 75-foot subsea contour. Since the deepest part of the channel is at least 200 feet below sea level, it is suggested that the Naylor Mill paleochannel had approximately 125 feet of relief during the major period of its downcutting cycle. In cross section the banks of the paleochannel slope from 5° to a maximum of 17°. Using the 75-foot subsea contour as the upper limit of the channel and the thalweg as the base, the width to height ratio varies between 15 to 1 and 30 to 1. The paleochannel is widest in the vicinity of the intersection of Naylor Mill and Jersey Roads (fig. 8).

It is postulated that the Naylor Mill paleochannel was cut during the Illinoian(?) Glaciation of the Pleistocene Epoch. The "red gravelly" facies of the Salisbury Formation which fills the paleochannel was deposited during a period of rising base level conditions, possibly correlative to the Sangamon(?) Interglaciation. Evidence for these opinions is presented in the Geologic History section of this report.

Beaverdam facies

As originally defined by Rasmussen and Slaughter (1955, p. 113) the Beaverdam facies "is composed of unconsolidated, white to buff, medium grained, quartz sand with small quantities of coarse and fine sand, pebbles, and granules, and a minor admixture of white silt."

The Beaverdam facies is generally white to light gray, except within the zone of fluctuation of the water table where the sands are typically tan to orange-brown, reflecting ferric iron precipitation from interstitial ground water (Sokoloff and Carter, 1951, p. 23). In some wells (for example Wi-Cf 134) the basal part of the Beaverdam facies is tannish gray, suggesting possibly that the clastic material was locally derived and consists of reworked "red gravelly" facies.

On the basis of 101 sieve analyses the Beaverdam facies has an average median diameter of 0.41 mm, falling between an extreme high of 1.03 mm and an extreme low of 0.16 mm. The average Trask sorting coefficient, based on equivalent data, is 1.50, ranging between an extreme high of 2.92 and an extreme low of 1.09. On the basis of arithmetic mean values the Beaverdam facies is both finer and better sorted than the "red gravelly" facies. However, the statistical significance of these differences was not determined.

The "A" and "B" textural zones, which have median diameters of 0.50 mm or more, appear in both facies of the Salisbury Formation. Wells Wi-Cf 136, Wi-Cf 134, and Wi-Df 55, anchoring the eastern end of the three east-west panels in figures 6 and 7, have thick Beaverdam facies containing the "A" textural zone. In adjacent wells this zone appears in the "red gravelly" facies. The "A" textural horizon crosses the Beaverdam-"red gravelly" facies boundary in in other areas, for example, between wells Wi-Cf 150 and Wi-Be 27, and between Wi-Cf 125 and Wi-Cf 135 (fig. 6). Textural correlation between facies strongly suggests that the color difference between the "red gravelly" facies and the Beaver-

dam facies has limited chronological significance. The color change is apparently related to depositional factors.

Test drilling has shown that the Beaverdam facies varies in thickness from less than 10 feet (Wi-Cf 138) in the western part of the area to over 70 feet (Wi-Df 55) in the eastern part (fig. 7). Farther east, where the "red gravelly" facies wedges out completely, the Beaverdam exceeds 100 feet (Wi-Cg 35). Similarly, south of the pinch-out line of the "red gravelly" facies the Beaverdam facies exceeds 60 feet in thickness (Wi-De 32) (fig. 5).

The subsurface stratigraphy of the Salisbury Formation appears to suggest a much closer relationship between lithologies than Rasmussen implied when he tentatively correlated the "red gravelly sand" with Pliocene(?) gravels outcropping in Prince Georges County (Rasmussen and Andreasen, 1959, p. 33). It is postulated, albeit tentatively, that the Beaverdam facies and the "red gravelly" facies are temporally related and that both were deposited during a major rise of Pleistocene sea level, possibly correlative to the Sangamon(?) Interglaciation. The implications of this relationship are discussed more fully in the Geologic History section of this report.

Walston Formation

In 1955 Rasmussen and Slaughter (p. 116) established the Walston "silt" as a geologic unit, assigning it formational rank. It was described as a "lenticular unit of sand, silty sand, sandy silt, silt, clayey silt, silty clay, and clay, with organic material, overlying unconformably the Beaverdam Sand, and underlying unconformably the Parsonsburg Sand." However, as Jordan (1962, p. 39) pointed out, identifying in the subsurface a unit of such heterogeneity is extremely difficult. Because of this uncertainty, the Walston "silt" can no longer be considered a useful stratigraphic subdivision. In this report it is replaced by the Walston Formation, an areally extensive and easily recognizable lithologic unit that overlies the Salisbury Formation and occurs from 2 to 25 feet below land surfance. Core material shows that the Walston Formation is a mottled tan to tannish gray, intercalated clayey sand to silty clay. Although rarely "pure" clay the unit is characterized by a "sticky" or plastic nature when wet.

As previously described by other investigators, the Walston Formation often contains macerated plant material. In the Parsonsburg divide area, for example, Rasmussen and Andreasen (1959, p. 39) report the Walston "silt" containing dark organic clay and peat. Earlier Clark, Mathews, and Berry (1918, p. 320) noted that marsh gas, used domestically for a short time, was obtained from these beds.

West of the Parsonsburg divide the Walston Formation ranges in thickness from 2 to 20 feet (fig. 10). It has an average thickness of 7 to 8 feet. The base of the Walston Formation ranges from over 40 feet above sea level to less than 10 feet above sea level. As suggsted by figure 7, the formation is very widespread in distribution, occurring as a mantling or, in some cases, a step-like deposit conformable to the present topography.

To aid in the hydrologic phases of the investigation a map was prepared showing the base of the clayey deposits overlying the Salisbury Formation. The map suggests that the Walston Formation mantles the present land surface, being generally absent only in the downstream reaches of major stream valleys (fig. 10).

As indicated by Rasmussen and Andreason (1955, p. 39), the Walston Formation appears to be a "remnant of a swamp deposit that was once extensive." The sedimentological and chronological significance of this deposit will be discussed more fully in the Geologic History section of this report.

Parsonsburg Sand

Rasmussen and Slaughter (1955, p. 118) established the Parsonsburg Sand as a geologic unit of formational rank. It was described as being composed predominantly of tan to orange-brown, coarse to fine-grained sand; occasional interbeds of gravel, silt, and clay were reported. The Parsonsburg Sand was visualized as "a veneer deposit, strewn upon the older deposits at all ranges in altitude, from below sea level to the top of the Parsonsburg divide" (Rasmussen and Slaughter, 1955, p. 119).

In this publication the term Parsonsburg Sand is restricted to the thick (25 to 30 feet) section

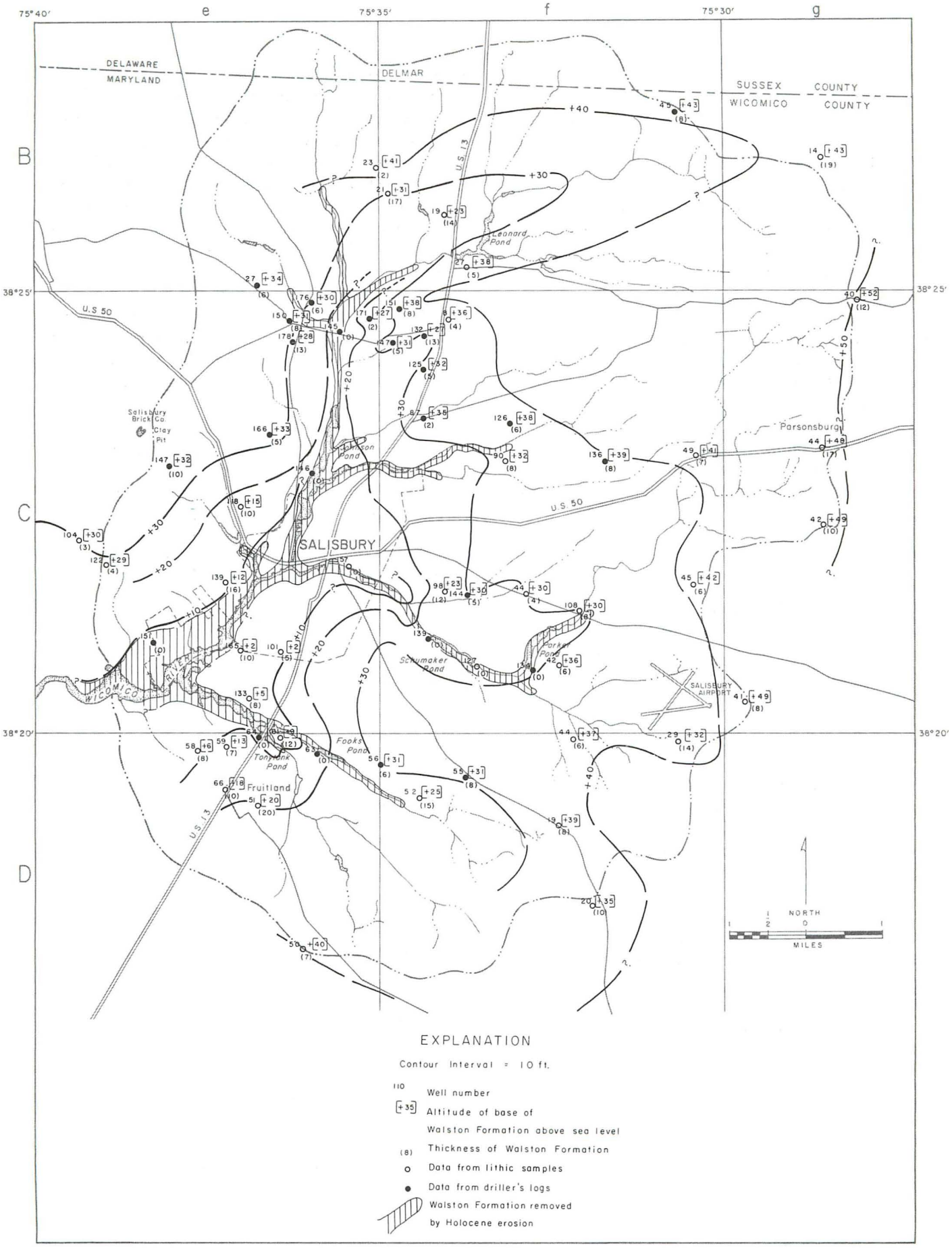


Figure 10—Generalized structure contour map of the base of the Walston Formation

of tan sand overlying the Walston Formation in the Parsonsburg divide area (fig. 5). In most other interfluvial areas the Walston Formation is overlain by relatively thin deposits of wind-blown sand. These morphostratigraphic deposits were previously assigned to the Parsonsburg Sand. However, they are neither genetically related nor stratigraphically continuous with the Parsonsburg Sand at its type locality and thus are not considered part of the Parsonsburg Sand in this report.

In summary, the Pleistocene sediments of the Salisbury area are assigned to the Columbia Group. The Columbia Group is subdivided into three formations that are easily recognized in the subsurface. These formations are, from oldest to youngest, the Salisbury Formation which includes the "red gravelly" facies and the Beaverdam facies, the Walston Formation, and the Parsonsburg Sand (table 2).

Holocene Deposits

The term Holocene [1] as used in this publication refers to "the epoch of generally rising sea levels accompanying the melting of the last great ice caps" (Shepard, 1960, p. 3). The words Recent and Postglacial are avoided because of their inherent ambiguities.

In the Salisbury area thick Holocene sediments are generally confined to present-day stream valleys (fig. 7). These fluvial deposits consist of interbedded tan to gray sand and gravel and gray to black mud and peat. They range in thickness from 0 to 60 feet or more. The gravels associated with these deposits are generally within 5 to 15 feet of the surface and are abundantly found adjacent to major streams such as the Wicomico and nearby Nanticoke Rivers. Fine-grained, wind-blown materials, locally as thick as 5 or 6 feet, may be found in interfluvial areas.

Geologic History

The physical stratigraphy described in the previous section of this report forms the basis for reconstructing the Pleistocene history of the area. A definite sequence of events is suggested by these sediments. This sequence may be related to the classic glacial and interglacial stages by means of a Pleistocene sea-level curve modified after Fairbridge (1960, p. 77; 1961, p. 133). Although more recent work by Donn and others (1962, p. 212) suggests that the Pleistocene sea-level curve of Fairbridge may need modifying, it is, for the purposes of this publication, still useful for relative, if not absolute, comparisons. Therefore, the Pleistocene stages cited during the following discussion, although justifiable within the framework of the Fairbridge sea-level curve, may be out of phase with an absolute Pleistocene chronology that is still evolving as additional isotopic dates become available.

Because "the classic glacial-interglacial sequence is based primarily on physical units consisting of four major (glacial) drift sheets and three (interglacial) soil zones" (Flint, 1957, p. 335) defined originally in central North America, it is necessary to redefine the terminology when applying it to Pleistocene sediments of non-glacial origin. In this publication the glacial and interglacial nomenclature defines periods of falling sea level and rising sea level, respectively. For example, the Illinoian(?) Glaciation refers to the time interval, undefined in absolute terms, during which sea level fell from approximately 30 feet above present sea level, as depicted on the sea level curve, to about 250 feet below present sea level. Similarly, the Sangamon(?) Interglaciation refers to the time interval during which sea level rose from about 250 feet below present sea level to about 25 feet above present sea level (fig. 11).

By restricting the Pleistocene nomenclature to specific periods of rising or falling sea level, it is hoped that the semantic confusion generally associated with the discussion of nonglacial Pleistocene sediments can be avoided.

Illinoian(?) Glaciation

The Naylor Mill paleochannel is incised into the Yorktown and Cohansey Formations of Miocene(?) age. Test drilling has demonstrated that the axis of this channel is at least 196 feet below sea level (Wi-Cf 150). According to the Fairbridge curve (1961, p. 133), sea level stood at an elevation of about 100 feet above present sea level during the first or Nebraskan(?) Glaciation and

[1] The term Holocene is not currently recognized by the United States Geological Survey in its official geologic time chart. The Maryland Geological Survey, however, recognizes the term as defined above for the purposes of this publication.

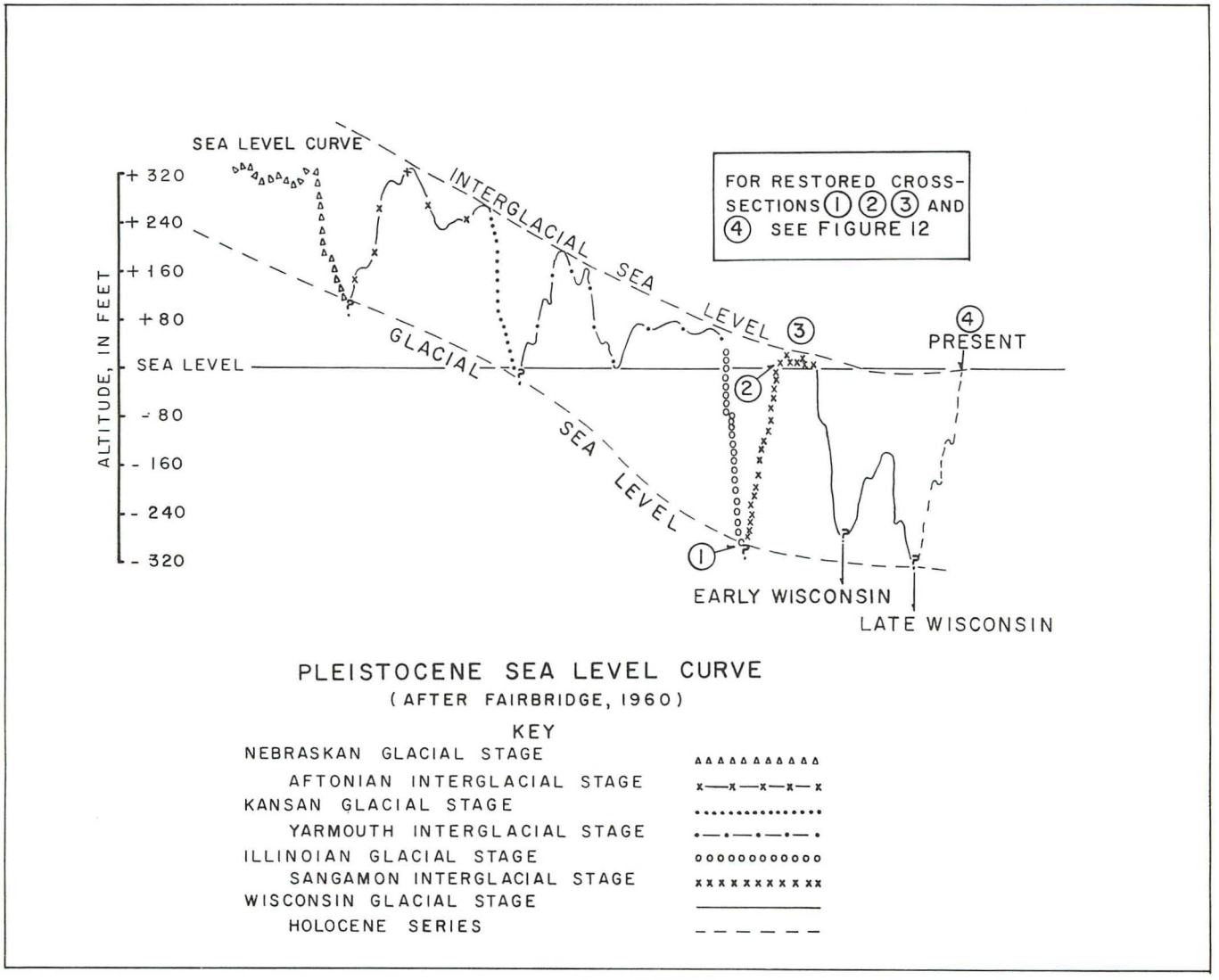


Figure 11—Pleistocene sea level curve of Fairbridge

about 15 feet below present sea level during the second or Kansan(?) Glaciation (fig. 11). The Naylor Mill paleochannel could not have been trenched during these high sea stands. It is not until the third or Illinoian(?) Glaciation that the surface of the sea fell sufficiently below its present level to allow the deeply incised Naylor Mill paleochannel to form. At its lowest level the Illinoian (?) sea stood at least 250 feet below present sea level (figs. 11 and 12). Donn, in a study relating estimated Pleistocene ice volumes to sea level lowering, suggests that the Illinoian sea may have been as much as 450 feet below present sea level (Donn and others, 1962, p. 212).

With the Illinoian shore line receding toward the edge of the continental shelf, the stream forming the Naylor Mill paleochannel had to deeply incise its bed in order to approach grade. This was probably a time of stream degradation and interfluvial erosion. As a working hypothesis, it is postulated that during the Illinoian(?) Glaciation all the older Pleistocene or Pliocene sediments that may have been present in the area were stripped off. It is further suggested that Pliocene sediments, if present at all, will be found east of the present shoreline, subcropping beneath a Pleistocene unconformity.

To date (1965) only a 2-mile reach of the Naylor Mill paleochannel has been mapped. Nevertheless it seems probable that it is merely one segment of an ill-defined, but extensive, Illinoian(?) drainage network. Other areas of abnormally thick Pleistocene sediments have been reported in Sussex County, Delaware (Rasmussen and others, 1960, p. 91), at Mardela Springs, Maryland (Rasmussen and Slaughter, 1955, p. 380, 385), and beneath Chesapeake Bay at Havre de Grace (Hack, 1957, p. 825) and Kent Island (Ryan, 1953, plate 2), suggesting the presence of additional paleochannels of possible Illinoian(?) age.

Because only a 2-mile reach of the Naylor Mill paleochannel has been delineated by drilling (fig. 8), its paleogeographic implications are moot. At this time it is not known whether the Naylor Mill paleochannel was a tributary of the ancestral Susquehanna River or a tributary of the ancestral Delaware River, or, in fact, whether it was one of the master streams itself. As a working hypothesis, however, it is conceivable that the Naylor Mill paleochannel was a segment of a consequent stream of pre-Wisconsin age that extended from Havre de Grace (fig. 1) southeastward through the Salisbury area to the edge of the continental shelf, possibly in the vicinity of the Washington submarine canyon (Uchupi, 1965). Such a stream, if it existed, would represent the ancestral Susquehanna River.

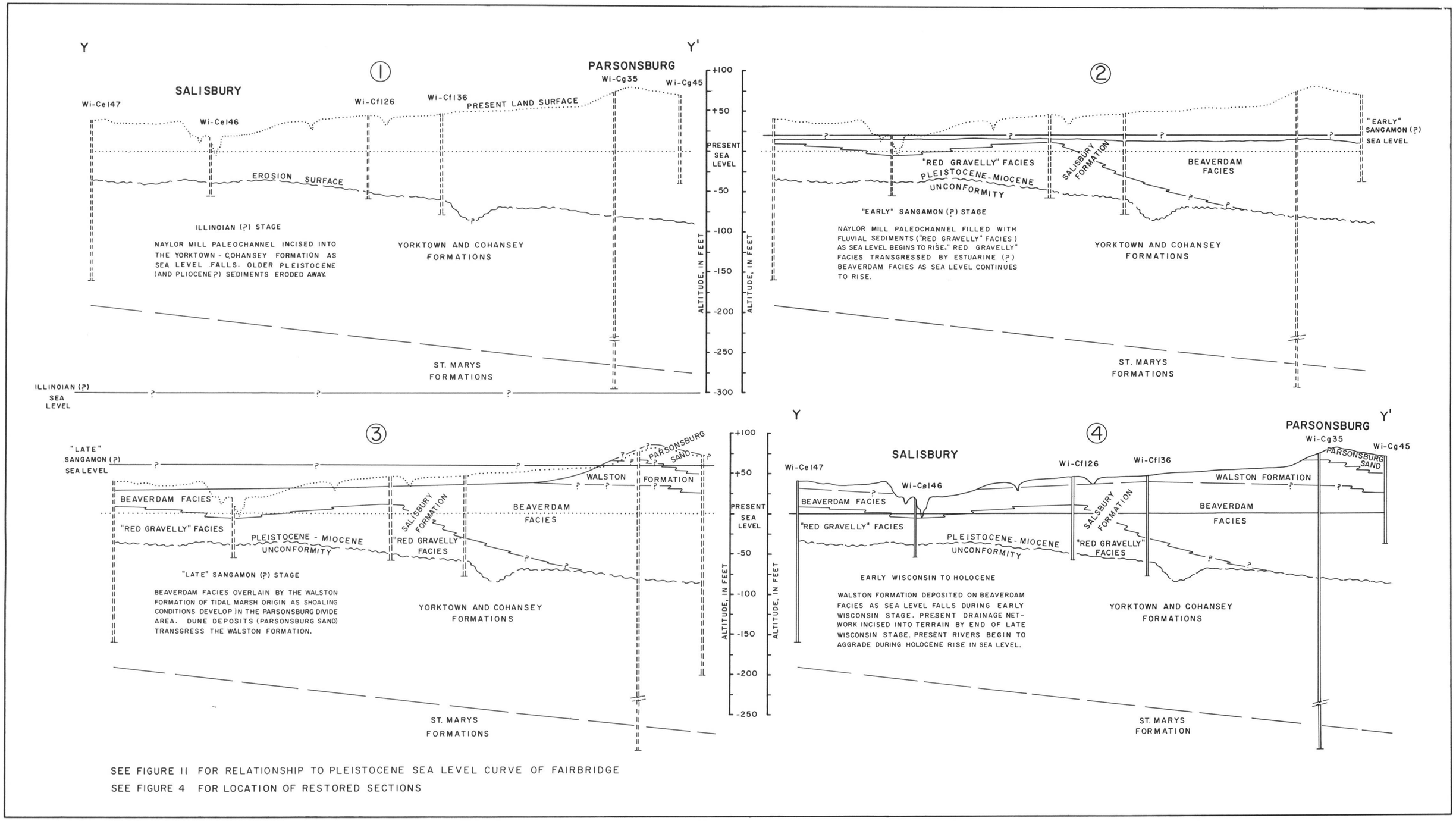
Sangamon(?) Interglaciation

With the onset of the Sangamon(?) Interglaciation sea level began to rise (figs. 11 and 12) and the deeply incised Naylor Mill paleochannel started to aggrade, gradually filling its channel with fluvial sediments, the "red gravelly" facies of the Salisbury Formation.

As the Sangamon sea continued to advance, the aggrading Naylor Mill paleochannel adjusted its channel geometry to compensate for rising base-level conditions. Because the Naylor Mill paleochannel was incised during a much lower stand of the sea (Illinoian(?)), its upstream reach had inherited an abnormally steep longitudinal profile by the time of the Sangamon(?) Interglaciation. A stream with an overly steepened slope characteristically seeks equilibrium by developing an abnormally wide (in relation to depth) channel (Rubey, 1952, p. 135; Hack, 1957, p. 828). As Leopold, Wolman, and Miller (1964, p. 292) state, the normal result of these conditions is the development of a relatively shallow channel having a braided or anastomosing character:

> "If a reach of river possessing a single channel is compared with an otherwise similar reach in which the channel is divided, the braided portion will have a steeper slope. This increase in slope is analogous to the variation of slope with discharge in a downstream direction. The undivided channel is comparable to the larger downstream channel, and each of the anabranch channels represents a stream with smaller discharge flowing on similar bed material. The ratio of slopes of divided to undivided channels was found to range from 1.4 to 2.3 in field situations. The sum of the widths of the anabranches is also greater than the width of the undivided channel, the ratio varying from 1.6 to 2.0 in field examples."

Thus, during Sangamon(?) times braided streams may have left their deeply incised Illinoian channels and deposited a blanket of sand and gravel, the "red gravelly" facies of the Salisbury Formation, over adjacent interfluvial areas (fig. 5). Streams of this nature are pictorially illustrated by Flint (1957, fig. 10–9) and Leopold and others (1964, fig. 7–34).



SEE FIGURE 11 FOR RELATIONSHIP TO PLEISTOCENE SEA LEVEL CURVE OF FAIRBRIDGE

SEE FIGURE 4 FOR LOCATION OF RESTORED SECTIONS

Figure 12—Restored geologic sections of Pleistocene and Holocene age.

The orange-brown, limonitic staining of the "red gravelly" facies is characteristic of sediments deposited by braided streams (Dunbar and Rogers, 1957, p. 210). The deposits of coalescing streams of this type are, prior to deep burial, within the aerated zone of water-table fluctuation where the precipitation of ferric hydroxide from interstial ground water normally occurs (Hem, 1959, p. 60). Cores from the "red gravelly" facies of the Salisbury Formation reveal that the more permeable, coarser-textured laminae are generally more intensely iron stained, suggesting that the rusty-brown to orange-brown coloration developed *in situ* and was not inherited from its source area.

Concurrent with the deposition of the fluvial "red gravelly" facies, the Sangamon sea was encroaching landward, depositing in estuarine(?) areas the grayish-white Beaverdam facies of the Salisbury Formation. In the Salisbury area the estuarine(?) origin of the Beaverdam facies is based on tangential evidence because of a lack of fossils. The absence of fossils may be due to the acidic nature of the ground water which dissolved any shell remains that may have been present in the original sediments. The water in the Pleistocene aquifers has an average pH of 6.4, minimum values being as low as 5.4 (Rasmussen and Slaughter, 1955, p. 162). The corrosive nature of the ground water is graphically illustrated by the deterioration of plaster-of-paris Bouyoucos blocks left in the soil for two years during a soil-moisture study (Rasmussen and Andreasen, 1959, p. 72 and pl. 9). Most of the blocks dissolved to such an extent that the electrodes were exposed.

Evidence suggesting that the Beaverdam facies of the Salisbury Formation was deposited under estuarine(?) conditions is based upon both color and textural characteristics. Except for zones above the present water table, the Beaverdam facies is white, gray, or tannish gray, suggesting that unlike the fluvial orange-brown "red gravelly" facies, it was not exposed to aerating conditions during deposition and burial. As described previously, the Beaverdam facies is both finer-grained and better-sorted than the "red gravelly" facies, the expected relationship between estuarine and fluvial sediments. The statistical significance of these values was not determined, however, during the project.

In the few exposures available for study the Beaverdam facies exhibits high angle (30°), deltaic cross-bedding, suggestive of estuarine(?) deposition (Rasmussen and Andreasen, 1959, p. 38). In a pipeline excavation along Calvin Drive in Salisbury the author observed a continuous series of southeasterly dipping, tabular cross-beds. The crossbedding was of the dune bed-roughness form characteristic of Simons' (1961, p. A–7) tranquil-flow regime. Crossbedding of this type is diagnostic of neither fluvial nor estuarine deposition because it may develop under hydraulic conditions prevailing in both environments.

Possible penecontemporaneity of the "red gravelly" and Beaverdam facies of the Salisbury Formation is suggested by both subsurface juxtaposition and mutual occurrence of straigraphically correlative textural zones. The thick "red gravelly" facies in the Salisbury area thins appreciably both eastward toward Parsonsburg and southward toward Princess Anne (figs. 4 and 5); complementing this is an eastward and southward thickening of the Beaverdam facies. The pinchout line of the "red gravelly" facies swings in an ill-defined arc from the Parsonsburg area southwesterly to a point between Fruitland and Princess Anne. This arc is inadequately controlled because of a lack of well data (fig. 5). The change in facies occurring in the Salisbury area has also been reported in Delaware. Rasmussen, Wilkens, and Beall (1960, pl. 10), working with subsurface geologic data, confined the "red gravelly" facies (their "Brandywine Formation") to western Sussex County, the zero isopach trending northeast-southwest between Georgetown and Millsboro (fig. 1). In a later study Jordan (1964, pl. 9), working with surface geologic data, apparently recognized the same facies change in Sussex County; he reported that the northeast-striking Omar Formation of Pleistocene age (in part the Beaverdam facies of this report), deposited during a marine transgression, overlapped and buried its equivalent fluvial facies (Jordan, 1964, p. 39).

Further evidence for the penecontemporaneity of the "red gravelly" and Beaverdam facies of the Salisbury Formation is suggested by the mutual occurrence of two textural zones (median diameter greater than 0.5 mm). In several places these zones trend across the facies boundary between the "red gravelly" and the Beaverdam (fig. 6);

a textural description of the two zones appears in the physical stratigraphy section of this report.

During the last phase of the Sangamon(?) Interglaciation, the Beaverdam facies of suspected estuarine(?) origin appears to have completely transgressed the fluvial "red gravelly" facies of the Salisbury Formation (figs. 11 and 12). For example, in the Salisbury area the Beaverdam facies overlies the "red gravelly" facies and varies in thickness from 10 to 70 feet (fig. 7). At this time it is postulated that the Sangamon sea was at its maximum. A similar transgressive relationship appears to exist on the present continental shelf. Off the coast of New Jersey yellow to brown iron-stained fluvial sands and gravels are overlain by gray-white sands of shallow marine origin (Schlee, 1964, p. 80). These deposits are probably younger, however, and chonologic correlation is not implied.

According to the Fairbridge sea level curve the Sangamon(?) maximum was +25 feet (1961, p. 150). However, an approximate +60-foot stand of the sea is suggested by the stratigraphy of the Parsonsburg area, assuming no significant isostatic adjustment of land elevations has taken place since deposition. Recent work by Harrison and others (1965, p. 201), however, suggests that this generally accepted assumption may no longer be valid and that late Pleistocene uplift apparently did occur, at least in the lower Chesapeake Bay area. Therefore, although the present stratigraphy indicates a high Sangamon sea level, actual deposition may have occurred at a somewhat lower altitude.

During the maximum stand of the Sangamon (?) sea the Parsonburg divide area, which at present lies at altitudes of 80 feet or more, apparently began to extend southward from the Delaware portion of the peninsula. The present divide area may have originated as a submarine bar which later developed into an emergent sand spit capped by dune deposits (Rasmussen and Slaughter, 1955, p. 32). A geomorphic feature of this description would be analogous to the present eastern shore of Virginia. It is postulated that, as this build-up progressed, shoaling conditions developed. This was accompanied by the formation of tidal marshes, particularly on the bay-side of the divide area, and the associated deposition of fine-grained organic sediments. The onset of early Wisconsin(?) Glaciation resulted in a regressive sea which no doubt accelerated this condition.

The sedimentologic sequence described above is supported by the post-Beaverdam stratigraphy of the Parsonsburg divide area. In this area the Beaverdam facies of the Salisbury Formation is overlain by the Walston Formation. It is suggested that the Walston Formation is the product of tidal swamp deposition induced by the shoaling effects of a regressive sea. Peat and mascerated planty material have been reportedly found in the formation (Rasmussen and Andreasen, 1959, p. 39). The Walston Formation is overlain by the Parsonsburg Sand creating a stratigraphic sequence that reflects the transgressive advance of a sand spit (or dune) over its fringing tidal marsh facies (fig. 5, Y–Y′). The upper part of the Parsonsburg Sand at its type locality consists of fine to medium-grained, generally well-sorted sand, and is apparently of dune origin.

Although the present Parsonsburg divide rises over 80 feet above sea level, the Sangamon(?) sea stood no higher than the top of the Walston Formation which, beneath the divide, averages 60 to 65 feet above present sea level. The overlying Parsonsburg Sand has a maximum thickness of 30 feet, suggesting that in this area the coastal dunes rose at least this high above the maximum stand of the Sangamon(?) sea. A similar present-day situation exists in the Cape Henlopen area, Delaware. South of the Cape, coastal dunes frequently rise over 40 feet above sea level (Adams, Boggess, and Davis, 1964). The evolution of the Cape Henlopen area is reported in detail by Moody (1964, p. 9, 76) who describes the migration of dunes over adjacent tidal marsh areas.

Wisconsin(?) Glaciation

The Parsonsburg divide played an important role during the marine regression that marked the early Wisconsin(?) Glaciation in this area. The surficial geology and geomorphology west of the divide reflect closed bay or estuarine conditions, while east of the divide, shore-line deposition under open marine conditions is inferred.

As sea level lowered during the early Wisconsin (?) Glaciation, west of Parsonsburg divide fring-

ing, tidal marsh areas developed under protected bay conditions analogous to the present swampy areas in lower Dorchester County (fig. 1). (Although similar environmentally, the Dorchester County swamps are related to the Holocene rise in sea level and not the early Wisconsin marine regression under discussion.)

The clayey sediments deposited in the tidal marsh areas during the early Wisconsin marine regression appear in the stratigraphic record as the Walston Formation. A series of sections across the Salisbury area reveals that the Walston Formation is widely distributed (fig. 7). Figure 10 indicates that the base of the clay tends to be conformable with present topography. This occurrence suggests that the Walston Formation was deposited at progressively lower elevations in fringing, tidal marshes as sea level fell during the early Wisconsin(?) Glaciation (figs. 11 and 12). It is, therefore, a time transgressive unit, the topographically higher clays being older than the topographically lower ones.

Overlying the Walston Formation in the Salisbury area are several isolated, 5- to 10-foot thick, elongated sand bodies. For example, on the Delmar topographic quadrangle (1:24,000) the closed, 40-foot contours north and south of Naylor Mill Road represent morphostratigraphic units of this type. These features are generally composed of well-sorted, fine-grained sand and are strongly suggestive of dune deposits. These relatively small, surficial dunes were deposited on top of the Walston Formation during and after the early Wisconsin(?) marine regression. They represent minor dune migrations on to a regressing tidal marsh area. Although younger features, they are analogous to the Parsonsburg Sand, but on a much smaller scale.

East of the Parsonsburg divide at least one ancient barrier beach is topographically expressed in the vicinity of Berlin, Maryland, paralleling the present shore line. The ancient lagoonal area immediately west of this barrier beach is now the drainage basin of the Pocomoke River, a subsequent stream that flows southwesterly into Chesapeake Bay. Recently the Soil Conservation Service, U. S. Department of Agriculture, uncovered an oyster bed in the Libertytown area (fig. 1) of the Pocomoke River Basin (R. Hull, personal communication). This greenish-gray, silty bed which occurs 15 feet above present sea level contains a typical shallow-water, possibly estuarine fauna (*Crassostrea virginica, Noetia ponderosa, Eupleura caudata*).[1] Jordan (1964, p. 33) has reported the occurrence of similar fossil communities in the surficial sediments of southeast Sussex County, Delaware.

The marine regression that occurred during late Wisconsin times lowered sea level to estimated elevations of 325 feet (Fairbridge, 1960, p. 77) to 380 feet (Donn and others, 1962, p. 212) below present sea level (fig. 11). At this time the major streams of the area, namely the Wicomico, Nanticoke, and Pocomoke Rivers, deeply incised their channels in a manner similar to the Naylor Mill paleochannel during Illinoian(?) times. Thus during this phase of the Wisconsin, it is postulated that the present-day drainage network was established. As sea level rose during the subsequent Holocene marine transgression, the Wisconsin streams began to aggrade, depositing an intercalated sequence of marsh muds and channel sands and gravels. These sediments, which may attain thicknesses of 60 feet or more in the Salisbury area, are restricted to present-day river channels and adjacent areas (fig. 7).

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[1] Dr. Horace G. Richards of the Philadelphia Academy of Natural Sciences examined the Libertytown fossils and reported the following:

GASTROPODA

Busycon Canaliculatum (L.)
Eupleura caudata (Say)
Mitrella lunata (Say)
Nassarius obsoletus (Say)
Nassarius trivittatus (Say)
Odostomia trifida Totten
Retusa canaliculata (Say)
Triphora nigrocincta C. B. Adams
Turbonilla interrupta Totten
Urosalpinx cinerea (Say)

PELECYPODA

Anadara transversa (Say)
Crassostrea virginica (Gmelon)
Mercenaria mercenaria (L.)
Mulinia lateralis (Say)
Noetia ponderosa (Say)

CRUSTACEA

Crab claws

Economic Geology

None of the minerals and fuels commonly prospected for are present in the Pleistocene sediments of the Salisbury area. The Parsonsburg "natural gas strike" reported around the turn of the century was not of economic value. The only combustible constituent was methane (19.8 percent) or "marsh gas"; nitrogen (77.9 percent) was the major constituent (Clark, Mathews, and Berry, 1918, p. 321). The gas was of local distribution and originated in near-surface sediments of Pleistocene age (Walston Formation). It did not seep upward from deeper, more extensive oil or gas-bearing sediments.

Similarly, the bog iron "ores" reported by Singewald (1911, p. 230) in the Powellville and Nassawango Creek areas are surficial occurrences and have little value under present economic conditions.

In the Salisbury area ground water is by far the most important natural resource derived from the sediments of Pleistocene age. The Salisbury Formation is an excellent aquifer with transmissibilities ranging between 50,000 and 400,000 gal/day/ft. The water is moderately irony, but low in chloride, very low in bicarbonate, and low in dissolved solids; it is soft and slightly acid. The deep Naylor Mill paleochannel containing an exceptionally thick section of coarse Pleistocene sediments forms an important ground-water reservoir and should yield large quantities of water (figs. 8 and 9) (Boggess and others, in preparation).

The Salisbury Brick Company currently operates a clay pit in the Walston Formation on Old Brick Kiln Road approximately 5 miles northwest of Salisbury (fig. 10). The usable part of the Walston Formation at this locality is 2 to 6 feet thick and has very little overburden. A mile southeast of this site are two abandoned pits that formerly produced clay of similar quality. Additional usable clay deposits in the Walston Formation may be present in or near Salisbury at workable depths.

Visual inspection of core samples suggests that, in general, the Walston Formation has sufficient iron to burn to a red color, enough fine particles to ensure proper plasticity, and enough grit to prevent excessive shrinkage in burning, if used for ceramic purposes. However, before a more detailed evaluation can be made, laboratory testing is required.[1] Nevertheless, the current investigation does indicate that the Walston Formation is readily accessible, if it should prove to have acceptable ceramic properties.

[1] Just prior to publication of this report a laboratory analysis of the ceramic properties of the Walston Formation from the clay pit site on Old Brick Kiln Road (fig. 10) was received. These data appear as table 4.

Table 4. Ceramic properties of the Walston Formation from a site on Old Brick Kiln Road, Salisbury[a]

Date Received: 11/29/65
Name: Maryland Geological Survey
Sender's Identification: HH-1
Type Material: Clay

Date Reported: 3/7/66
Address: Baltimore, Maryland
Laboratory Number: MD-1-1
Color: Tan

Raw Properties[b]
Water of Plasticity %: 22.9
Drying Defects: None

Working Properties: Moderate plasticity
% Drying Shrinkage: 2.5
Dry Strength: Good

Slow Firing Test

Temp. °F	Color	Moh's hardness	Percent total shk.	Percent abs.	Bulk dens. gm/cc
1800	Orange tan	3	5.0	14.1	1.89
1900	Orange tan	4	7.5	11.9	1.97
2000	Light brown	4	12.5	7.8	2.10
2100	Red brown	5	12.5	2.0	2.30
2200	—	—	Expanded	—	—
2300	—	—	—	—	—

Bloating Test: Negative
Other Tests: pH—5.10
Potential Use: Face brick; structural tile; drain tile.
Remarks: Good color at near zero absorption; might be satisfactory quarry tile.

[a] Analyses by Tuscaloosa Metallurgy Research Center.
[b] The data presented in this report are based on laboratory tests that are preliminary in nature and will not suffice for plant or process design.

The Holocene gravels associated with present-day rivers such as the Wicomico and Nanticoke offer an easily accessible source of aggregate. These surficial sediments, including intercalated clays, have thickness of over 60 feet but in many places lie below the water table. Before exploitation an explorative drilling program would be necessary to delineate in detail the areal extent and vertical thickness of these deposits and to determine what materials lie above the water table.

Summary and Conclusions

The Salisbury project was fundamentally a water-resources study. Because the need for a workable geologic framework was realized early in the investigation, a program of test drilling and coring was undertaken. As a consequence, the subsurface stratigraphy of the Pleistocene age sediments (Columbia Group) beneath the Salisbury area was studied in detail. From this data a reasonable definition of Pleistocene stratigraphy emerged.

In summary, the Naylor Mill paleochannel was incised during a low sea stand possibly correlative with the Illinoian Glaciation. The Salisbury Formation, consisting of the "red gravelly" facies which fills the Naylor Mill paleochannel and the Beaverdam facies, was deposited during a subsequent marine advance possibly coincident with the Sangamon Interglaciation; the former is a fluvial deposit, the latter, a shallow estuarine(?) deposit. The Walston Formation, which overlies the Salisbury Formation, is a time transgressive unit deposited during a marine regression in a series of fringing tidal marshes formed at progressively lower elevations. Overlying the Walston Formation in the Parsonsburg divide area is the Parsonsburg Sand, a deposit capped by coastal dune sands. It may have been deposited on top of the Walston Formation during the high sea stand marking the end of the Sangamon and the beginning of the Wisconsin. The stratigraphic position of the Parsonsburg Sand appears to reflect the migration of dune sands over a surrounding tidal marsh facies. By the conclusion of the late Wisconsin marine regression, the present-day drainage network was deeply incised into the terrain. As sea level rose during the following Holocene marine transgression intercalated, fluvial gravels and tidal marsh muds were deposited in and adjacent to the present-day river channels (figs. 11 and 12).

Sediments of Pleistocene age in the Salisbury area are of economic interest, particularly the Salisbury Formation which is an excellent source of ground water. Of less interest, but having some potential is the Walston Formation which offers the possibility for an expanded clay industry.

As a by-product of a water resources investigation, the geologic data were not studied from as many approaches as would have been liked. Nevertheless, it can be stated in conclusion that the geologic data accruing from the Salisbury water-resources investigation have both defined inherent problems and suggested reasonable answers. To further test these answers some additional study on a peninsula-wide basis is needed.

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Appendix

Table 5. Grain-size analyses of Pleistocene core samples from the Salisbury area, Md.

Well No.	Sample interval (feet below land surface)	Percentages retained by weight										Median diameter	Trask sorting coefficient
		Pebble			Granule	Very coarse sand	Coarse sand	Medium sand	Fine sand	Very fine sand	Silt and clay		
		(16mm)	(8mm)	(4mm)	(2mm)	(1mm)	(.5mm)	(.25mm)	(.125mm)	(.062mm)	(<.062mm)	(mm)	$So = \sqrt{\frac{Q_1}{Q_3}}$
Wi-Be 27	1 - 2	0.0	0.0	0.0	0.4	3.6	16.9	44.9	25.8	4.6	3.8	0.30	1.48
	8 - 9	.0	1.3	2.9	2.4	9.4	32.6	35.8	9.2	3.0	3.4	.49	1.47
	13 - 16	.0	.0	.2	.9	12.1	35.1	37.6	7.5	2.7	3.9	.49	1.41
	32 - 36	.0	.5	.1	.1	6.7	63.6	21.8	3.8	1.4	2.0	.60	1.23
	40 - 44	.0	1.6	.3	.6	8.0	51.9	29.9	4.7	1.8	1.2	.55	1.25
	54 - 58	2.8	2.7	1.4	6.7	51.2	32.5	1.4	1.1	.1	.1	1.08	1.24
Wi-Bf 27	11 - 13	.0	.0	.2	1.2	7.1	28.8	46.0	10.7	2.7	3.3	.44	1.40
	13 - 15	.0	.0	.9	1.0	14.5	35.2	32.5	8.2	3.4	4.3	.51	1.53
	15 - 18	.0	.0	.0	.3	1.6	10.7	46.7	28.2	4.4	8.1	.27	1.37
	19 - 22	.0	.0	.0	.0	.3	8.0	80.1	6.2	2.0	3.4	.42	1.09
	27 - 30	.0	.8	.0	.1	1.4	21.6	61.6	6.9	2.8	4.8	.46	1.20
Wi-Ce 145	2 - 4	.0	.0	.0	.4	2.0	15.7	42.9	23.2	7.9	7.9	.29	1.52
	10 - 12	.0	.0	.0	.0	.1	.7	14.3	77.7	6.1	1.1	.21	1.11
	12 - 14.5	.0	.0	.0	.0	.0	.2	11.2	80.1	6.3	2.2	.20	1.11
	14.5 - 16	.0	.0	.2	.5	4.3	29.6	45.7	11.6	3.4	4.7	.43	1.39
	16 - 18	.0	.0	.2	.5	3.3	33.2	48.3	7.7	2.9	3.9	.46	1.27
	18 - 20	.0	1.9	1.9	2.0	7.4	29.8	36.0	10.1	3.6	7.3	.46	1.53
	20 - 23	.0	1.0	1.9	1.7	7.4	33.8	34.5	9.2	4.0	6.5	.47	1.53
	24 - 27	.0	.0	.0	.0	.1	.6	11.6	64.4	10.5	12.8	.18	1.26
	33 - 36	.0	.9	.3	.6	2.6	23.7	57.5	8.3	2.6	3.5	.44	1.27
	42 - 45	.0	.3	2.6	2.6	10.3	51.0	30.0	2.3	.5	.4	.52	1.26
	48 - 49	5.7	1.2	1.2	1.4	2.0	17.2	49.6	13.5	3.4	4.8	.39	1.41
Wi-Ce 146	1.5 - 3.5	.0	.0	.0	.1	.7	9.8	46.7	31.0	5.5	6.2	.28	1.42
	4 - 4.5	.0	.0	.1	1.1	5.9	27.8	43.1	19.0	1.9	1.1	.42	1.45
	7.5 - 10	.0	.0	.0	.1	1.8	17.4	44.5	21.6	7.5	7.1	.31	1.52
	16 - 18	.0	.0	.0	.0	.4	5.4	54.8	33.2	3.7	2.5	.28	1.29
	21 - 24	.0	.0	.0	.2	4.5	57.3	29.4	5.2	2.0	1.4	.55	1.25
	27 - 28	.0	1.7	4.4	6.4	15.2	36.7	29.1	5.0	0.7	0.8	.60	1.64
	42 - 43	.0	.3	1.1	2.0	9.5	32.9	48.8	3.5	1.0	.9	.48	1.32

Table 5. Grain-size analyses of Pleistocene core samples from the Salisbury area, Md.--Continued

Well No.	Sample interval (feet below land surface)	Percentages retained by weight										Median diameter	Trask sorting coefficient
		Pebble			Granule	Very coarse sand	Coarse sand	Medium sand	Fine sand	Very fine sand	Silt and clay		
		(16mm)	(8mm)	(4mm)	(2mm)	(1mm)	(.5mm)	(.25mm)	(.125mm)	(.062mm)	(<.062mm)	(mm)	$So=\sqrt{\frac{Q_1}{Q_3}}$
Wi-Ce 149	20 - 22	0.0	0.0	0.0	0.0	0.1	0.3	16.6	61.4	13.9	7.7	0.16	1.28
	26 - 27	.0	.0	.0	.1	2.9	5.5	39.6	43.2	5.4	3.3	.25	1.28
	27 - 28	.0	.6	1.7	3.0	10.8	25.3	34.6	13.2	4.8	6.0	.43	1.67
	32 - 34	.0	2.0	3.8	7.7	21.1	34.1	17.6	8.9	3.4	1.4	.77	1.79
	38 - 39	1.7	.0	.7	1.3	13.9	42.6	23.2	11.0	3.8	1.8	.58	1.57
	44 - 46	.0	.2	2.1	2.1	5.0	9.9	45.2	26.8	5.2	3.5	.30	1.43
	50 - 52	.0	.0	.2	.7	3.5	6.6	31.5	47.4	7.8	2.3	.22	1.44
	56 - 58	.0	.0	.3	1.2	4.8	12.3	53.8	25.2	1.8	0.6	.32	1.34
Wi-Ce 150	14 - 16	.0	.0	.2	.6	2.7	13.6	39.6	28.7	7.5	7.1	.27	1.51
	20 - 21	.0	9.1	5.2	4.7	9.0	23.7	30.4	12.2	2.9	2.8	.51	1.93
	21 - 22	.0	.0	.1	.4	2.4	20.1	54.1	13.9	3.4	5.6	.39	1.37
	26 - 28	.0	.0	.0	.1	4.9	23.5	46.5	17.8	3.8	3.4	.37	1.44
	32 - 33.5	.0	.0	.0	.4	2.5	13.6	54.1	19.4	5.7	4.3	.34	1.37
	38 - 40	.0	.4	1.5	2.3	3.8	15.5	52.4	15.8	3.6	4.7	.31	1.24
	44 - 46	.0	.4	.8	.9	6.0	27.0	42.8	11.7	3.7	6.7	.42	1.47
	50 - 52	.0	.0	.8	2.8	14.0	41.5	31.7	5.1	1.5	2.6	.58	1.49
	56 - 58	5.7	4.1	5.6	6.6	17.2	22.3	20.7	7.1	4.3	6.4	.69	2.32
	64 - 66	.0	.0	.0	.1	.2	.2	7.2	63.9	18.4	10.0	.16	1.23
	70 - 72	.0	.3	.7	1.2	6.7	18.0	15.5	41.0	11.3	5.3	.21	1.93
	76 - 78	.0	4.3	2.4	2.8	10.4	26.3	16.1	20.0	11.0	6.7	.44	2.30
	82 - 84	.0	.0	1.4	1.5	15.3	41.1	19.1	10.5	5.1	6.0	.59	1.74
	88 - 90	.0	.5	4.4	8.6	17.2	20.5	8.9	27.1	5.8	7.0	.56	2.71
Wi-Ce 151	8 - 10	.0	.0	.8	3.8	8.1	25.1	44.5	11.8	2.4	3.5	.43	1.45
	14 - 16	.0	.0	.0	.0	.1	.6	71.6	18.4	5.6	3.7	.32	1.22
	20 - 22	.0	.0	.4	1.3	8.4	44.1	29.9	8.9	3.1	3.9	.53	1.51
	26 - 28	.0	.6	1.8	4.0	16.7	36.9	24.0	9.0	2.9	4.1	.60	1.69
	34 - 36	.0	.6	.1	.3	1.6	37.1	26.8	23.9	4.4	5.8	.37	1.76
	40 - 42	.0	.0	.6	.7	6.4	42.7	38.0	8.6	2.5	.5	.51	1.33
	46 - 48	.0	.0	1.0	1.8	7.9	23.1	22.3	32.1	7.0	4.8	.28	1.93
	52 - 54	.0	2.3	2.8	4.9	11.0	23.3	39.9	7.5	3.3	5.0	.46	1.61
	58 - 59	.0	1.5	4.4	5.5	12.1	29.7	30.7	8.4	3.4	4.3	.51	1.69

Table 5. Grain size analyses of Pleistocene core samples from the Salisbury area, Md.--Continued

Well No.	Sample interval (feet below land surface)	Percentages retained by weight										Medium diameter	Trask sorting coefficient
		Pebble			Granule	Very coarse sand	Coarse sand	Medium sand	Fine sand	Very fine sand	Silt and clay		
		(16mm)	(8mm)	(4mm)	(2mm)	(1mm)	(.5mm)	(.25mm)	(.125mm)	(.062mm)	(<.062mm)	(mm)	$So=\sqrt{\frac{Q_1}{Q_3}}$
Wi-Ce 152	15 - 16	0.0	0.0	0.3	0.8	2.9	11.2	32.9	14.6	10.1	27.2	0.23	2.46
	26 - 28	.0	5.5	3.2	3.3	8.6	34.3	30.5	8.0	3.1	3.5	.55	1.58
	32 - 34	1.6	2.3	2.6	4.1	16.8	38.2	22.0	6.1	2.8	3.5	.64	1.60
	38 - 40	.0	.0	.5	.8	7.0	33.3	36.8	9.8	4.3	7.5	.45	1.50
	44 - 66	.0	.0	.1	.3	2.4	13.3	57.1	17.3	3.0	6.5	.34	1.34
	50 - 52	.0	.0	.1	.2	1.2	8.3	51.3	25.5	4.6	8.8	.29	1.40
	56 - 58	.0	.3	.1	.7	6.0	24.6	47.0	11.3	3.5	6.5	.42	1.41
	62 - 64	.0	.0	.5	1.1	4.6	31.5	43.9	8.7	3.7	6.0	.45	1.40
	68 - 70	.0	1.6	2.4	2.3	9.7	34.0	22.8	10.5	6.3	10.4	.50	1.84
	76 - 78	.0	.7	6.9	6.9	14.6	24.0	22.0	11.3	5.1	8.5	.54	2.14
Wi-Ce 157	4 - 6	.0	.0	.7	.8	3.2	14.6	46.2	27.5	4.8	2.2	.31	1.43
	8 - 11	.0	.0	.1	.7	1.8	13.1	65.0	12.4	4.0	2.9	.37	1.23
	14 - 17	.0	.6	.4	.8	4.2	10.6	52.1	19.9	5.0	6.4	.31	1.38
	20 - 23	.0	.4	.3	.8	5.0	29.5	43.3	13.2	3.1	4.4	.42	1.46
	26 - 29	.0	5.3	3.9	3.0	9.2	29.9	36.1	5.7	2.9	4.0	.51	1.58
	32 - 35	.0	.0	.7	.7	2.8	5.4	5.3	65.0	9.9	10.2	.18	1.13
	38 - 41	.0	2.2	2.3	3.4	13.6	40.7	24.0	6.6	2.3	4.4	.59	1.56
	44 - 47	.0	1.9	1.3	3.0	15.8	45.9	19.8	5.6	2.8	3.9	.66	1.52
Wi-Ce 158	4 - 6	.0	.0	.1	.6	2.9	14.7	45.3	29.9	4.6	1.9	.28	1.42
	9 - 12	.0	.4	.4	.3	1.8	11.3	53.3	20.1	4.4	8.0	.32	1.38
	15 - 18	.9	1.6	1.7	2.9	9.6	41.1	24.6	8.7	3.5	5.4	.55	1.56
	21 - 22	.0	.7	.3	1.5	5.3	19.1	39.0	24.3	3.7	6.1	.31	1.57
	22 - 24	.0	.0	.2	.5	1.4	5.8	26.6	44.6	11.7	9.2	.22	1.41
	27 - 30	1.9	11.4	9.4	8.5	16.4	30.1	10.2	5.2	2.8	4.1	.95	2.54
	33 - 36	.0	1.5	1.8	4.1	13.4	38.9	25.5	8.5	2.5	3.8	.58	1.61
	39 - 42	.0	2.6	3.0	5.3	16.6	32.8	22.9	9.4	3.3	4.1	.60	1.74
	45 - 48	.0	4.4	4.0	5.9	14.8	28.8	22.2	12.1	3.5	14.3	.59	1.97
	51 - 54	1.1	1.2	.5	.6	6.1	49.1	28.5	6.7	3.1	3.1	.55	1.40
Wi-Ce 159	4.5 - 6	.0	.0	.0	.1	1.4	9.3	36.6	40.9	8.1	3.6	.24	1.35
	15 - 16	4.7	5.2	1.7	1.6	2.1	15.5	39.2	20.2	3.9	5.9	.35	1.63
	30 - 33	1.1	4.9	3.3	8.1	23.3	31.3	15.0	5.6	3.0	4.4	.82	1.78

Table 5. Grain size analyses of Pleistocene core samples from the Salisbury area, Md.--Continued

Well No.	Sample interval (feet below land surface)	Percentages retained by weight										Median diameter	Trask sorting coefficient
		Pebble			Granule	Very coarse sand	Coarse sand	Medium sand	Fine sand	Very fine sand	Silt and clay		
		(16mm)	(8mm)	(4mm)	(2mm)	(1mm)	(.5mm)	(.25mm)	(.125mm)	(.062mm)	(<.062mm)	(mm)	$So=\sqrt{\frac{Q_1}{Q_3}}$
Wi-Ce 159 (con't)	36 - 39	0.0	5.7	9.6	11.9	21.1	27.2	11.8	5.3	3.0	4.4	0.97	2.10
	42 - 45	.0	1.5	2.2	3.6	9.1	40.9	32.8	7.3	2.0	0.6	.54	1.41
	48 - 51	.0	1.3	1.6	2.0	8.3	26.8	38.5	13.3	3.7	4.5	.44	1.55
	54 - 57	.0	3.8	6.1	8.6	22.4	38.4	11.1	4.1	2.5	3.0	.89	1.60
	60 - 62.5	.0	.0	.3	.4	.9	1.4	25.2	56.0	9.7	6.1	.22	1.20
Wi-Ce 160	3 - 6	.0	.0	.1	.3	.7	12.0	57.8	21.9	4.1	3.1	.32	1.33
	9 - 12	.0	2.4	.7	1.8	7.6	28.0	43.0	9.0	3.0	4.5	.46	1.43
	16.5 - 18	9.1	20.3	14.9	9.2	8.9	12.0	13.4	5.7	3.1	3.4	2.55	4.33
	21 - 24	16.2	2.6	1.1	1.6	5.5	22.5	29.0	13.6	3.6	4.3	.49	2.03
	27 - 28	.0	.0	.1	.1	.3	.6	56.2	32.1	4.8	5.8	.27	1.33
	28 - 30	.0	8.1	5.2	6.7	14.3	24.8	23.0	10.0	3.4	4.5	.62	2.13
	33 - 36	.9	6.1	2.3	3.2	9.5	38.5	23.9	9.0	3.1	3.5	.60	1.65
	39 - 42	.0	.6	.8	.5	6.7	39.8	28.6	13.1	4.8	5.1	.49	1.62
Wi-Cf 125	2.5 - 4.5	.0	.0	.0	.2	1.7	12.8	39.6	26.4	8.8	10.5	.26	1.58
	6 - 7.5	.0	.0	.0	.0	1.6	16.3	64.5	11.1	3.5	3.0	.38	1.25
	8.5 - 10	.0	.0	.4	.3	2.8	23.1	52.0	12.4	4.1	4.9	.41	1.36
	12.5 - 14	.0	.0	.6	1.0	4.2	21.0	57.1	10.8	2.7	2.6	.43	1.27
	15 - 18	.0	.0	.4	1.3	6.7	14.5	46.2	17.6	3.4	9.9	.34	1.51
	20 - 22	.0	.0	.5	1.0	3.8	22.2	54.9	10.2	2.5	4.9	.41	1.29
	35 - 38	.0	.0	.0	1.6	31.2	45.0	7.8	9.1	3.4	1.9	.86	1.42
	46 - 50	.0	.0	.0	.0	4.0	74.2	14.5	3.5	1.9	1.9	.73	1.24
Wi-Cf 126	5 - 6	.0	.0	.0	.1	1.7	15.4	56.6	21.0	2.8	2.4	.32	1.31
	12 - 14	.0	.0	1.0	2.6	9.8	37.7	31.6	9.1	3.0	5.2	.51	1.48
	18 - 20	.0	.0	1.1	2.3	8.4	24.1	46.0	10.4	2.9	4.8	.42	1.41
	23 - 26	.0	.6	.2	.4	.8	2.0	4.4	67.3	16.3	8.0	.16	1.25
	29 - 32	.0	.0	.0	.3	3.6	14.3	38.4	30.1	7.5	5.8	.27	1.49
	37 - 39	.0	6.9	4.1	5.7	17.1	43.5	20.6	1.3	.5	.3	.72	1.60
	52 - 53	.0	.0	.0	8.9	37.9	43.6	9.2	.2	.1	.1	.97	1.30
Wi-Cf 127	3 - 5	.0	.7	3.1	3.4	9.8	25.0	38.4	13.5	3.1	3.0	.45	1.55
	7 - 9	.0	.0	.5	.9	9.0	39.5	36.8	6.7	3.1	3.5	.50	1.38
	9 - 11	.0	.0	.3	1.9	13.1	45.2	26.4	7.9	2.3	2.9	.57	1.47

Table 5. Grain size analyses of Pleistocene core samples from the Salisbury area, Md.--Continued

Well No.	Sample interval (feet below land surface)	Percentages retained by weight										Median diameter	Trask sorting coefficient
		Pebble			Granule	Very coarse sand	Coarse sand	Medium sand	Fine sand	Very fine sand	Silt and clay		
		(16mm)	(8mm)	(4mm)	(2mm)	(1mm)	(.5mm)	(.25mm)	(.125mm)	(.062mm)	(<.062mm)	(mm)	$So=\sqrt{\frac{Q_1}{Q_3}}$
Wi-Cf 127 (con't)	12 - 15	0.0	1.4	0.8	1.9	7.5	23.1	47.2	11.3	2.8	4.0	0.44	1.37
	15 - 18	.0	.0	.4	.1	4.8	41.7	38.2	9.1	2.6	3.1	.48	1.36
	18 - 21	.0	.0	.0	.1	1.2	28.6	56.4	7.6	2.2	3.9	.44	1.25
	23 - 26	.0	.0	.4	.1	.3	4.3	49.5	33.9	4.9	6.6	.26	1.35
	26 - 29	.0	.0	.0	.1	1.5	37.2	49.5	5.0	2.3	4.4	.47	1.21
	32 - 35	.0	.0	.0	.0	.9	56.6	34.4	4.3	1.6	2.2	.51	1.22
	35 - 38	.0	.0	.1	.2	4.1	37.8	46.8	5.9	1.9	3.2	.48	1.18
	38 - 41	.0	.0	.0	.0	.0	.3	26.5	53.9	10.2	9.1	.22	1.30
Wi-Cf 134	8 - 9	.0	.0	.0	.5	1.5	19.0	45.6	20.6	6.7	6.1	.33	1.48
	15 - 16	.0	.2	.4	1.3	8.4	23.5	33.4	20.4	6.2	6.2	.35	1.73
	20 - 22	.0	.1	.7	2.6	3.4	6.2	55.9	17.3	5.0	8.8	.34	1.38
	26 - 27	.0	.0	.5	1.8	7.3	27.4	44.2	9.1	3.7	6.0	.44	1.41
	32 - 34	.0	.0	.5	1.1	6.3	31.1	42.4	8.9	3.4	6.3	.45	1.40
	38 - 40	.0	.4	.3	1.6	4.9	18.8	42.1	18.1	5.8	8.0	.34	1.59
	45 - 46	.0	.0	.3	2.6	9.1	23.5	34.6	21.1	3.6	5.2	.38	1.69
	51 - 52	.0	.0	.0	.2	1.7	5.0	15.9	59.7	9.9	7.6	.20	1.29
	59 - 60	.0	.0	2.0	1.6	10.2	27.8	29.5	12.0	6.3	10.6	.42	1.85
	78 - 80	.0	5.0	3.5	8.7	17.9	27.1	21.5	8.2	3.4	4.7	.68	1.96
Wi-Cf 135	8 - 10	.0	.0	.2	.7	7.1	30.0	37.2	16.2	3.7	4.9	.40	1.55
	14 - 16	.0	.0	.0	.4	4.4	20.8	46.6	21.0	3.0	3.8	.35	1.46
	20 - 22	.0	.0	.9	.8	2.4	10.3	54.6	18.4	4.1	8.5	.33	1.41
	26 - 28	.0	1.2	1.6	4.2	13.4	30.4	31.3	9.0	3.0	5.9	.51	1.66
	32 - 34	.0	1.5	3.8	4.5	19.0	48.1	9.4	7.7	2.6	3.4	.74	1.43
	38 - 40	.0	3.8	4.3	4.5	13.8	38.1	18.1	7.3	4.0	6.1	.66	1.72
	44 - 46	.0	.0	.3	1.0	4.9	12.3	46.5	20.0	5.3	9.7	.31	1.52
	50 - 52	.0	.2	.1	.5	3.0	16.7	31.7	32.4	5.4	10.0	.26	1.62
	56 - 58	.0	1.8	1.5	2.1	10.3	49.9	23.4	5.0	2.6	3.4	.61	1.41
	62 - 64	.0	2.8	1.8	3.9	17.6	31.2	20.4	11.1	4.5	6.7	.58	1.90
	68 - 70	.0	5.8	2.4	3.0	13.0	31.3	18.9	11.8	5.7	8.1	.56	1.96
	83 - 85	.0	.0	.0	.0	.6	5.1	52.6	31.7	4.8	5.2	.27	1.40
Wi-Cf 136	17 - 18	.0	.0	.0	.0	0.5	4.6	18.6	54.4	11.8	10.1	.21	1.33

Table 5. Grain size analyses of Pleistocene core samples from the Salisbury area, Md.--Continued

Well No.	Sample interval (feet below land surface)	Percentages retained by weight										Median diameter	Trask sorting coefficient
		Pebble			Granule	Very coarse sand	Coarse sand	Medium sand	Fine sand	Very fine sand	Silt and clay		
		(16mm)	(8mm)	(4mm)	(2mm)	(1mm)	(.5mm)	(.25mm)	(.125mm)	(.062mm)	(<.062mm)	(mm)	$So=\sqrt{\frac{Q_1}{Q_3}}$
Wi-Cf 136 (con't)	24 - 25	0.0	0.0	0.0	0.1	1.7	22.1	61.3	10.9	2.0	1.9	0.43	1.23
	25 - 26	.0	1.0	.0	.5	5.5	29.3	37.9	16.4	4.7	4.7	.41	1.57
	32 - 33	.0	.0	.3	1.5	7.8	35.0	44.1	7.4	1.8	2.1	.47	1.35
	33 - 34	.0	.3	.1	.1	.9	31.9	50.9	7.3	3.3	5.2	.45	1.27
	40 - 42	.0	.2	.7	1.1	4.5	24.1	45.0	15.7	4.0	4.7	.38	1.48
	56 - 58	.0	.0	1.7	4.0	12.0	33.0	29.0	9.9	4.4	6.0	.51	1.64
	68 - 70	.0	.0	.8	1.4	4.0	25.8	38.8	12.7	7.4	9.1	.38	1.60
	74 - 76	.0	.7	.0	.1	1.0	4.0	26.1	52.2	9.0	6.9	.23	1.30
	90 - 92	4.4	6.8	7.0	5.8	16.2	40.6	13.6	3.5	1.2	.9	.85	1.82
Wi-Cf 138	9 - 12	.0	.3	.7	2.2	9.8	40.9	30.9	7.9	2.8	4.5	.52	1.46
	15 - 17	.0	.1	1.6	3.3	13.1	37.0	30.2	7.3	2.7	4.7	.54	1.58
	17 - 18	.0	.0	.1	.2	1.6	15.1	60.8	14.3	4.0	3.9	.35	1.36
	22 - 24	.0	.0	2.9	6.7	14.0	26.5	30.8	14.5	2.6	2.0	.50	1.76
	27 - 30	.0	.2	.2	.1	.2	1.0	67.8	20.8	3.8	5.9	.30	1.20
	33 - 34	18.5	3.6	2.4	2.2	6.7	21.1	29.7	9.7	2.6	3.5	.55	3.34
	34 - 36	.0	.0	.0	.1	.3	3.2	48.6	35.4	5.1	7.3	.26	1.30
	39 - 42	.0	3.8	2.6	4.3	12.7	36.4	26.0	7.3	3.1	3.8	.57	1.64
	45 - 48	.0	2.1	2.0	3.2	12.5	38.1	26.3	8.2	3.4	4.2	.55	1.55
	57 - 59	.0	.0	.2	.4	.5	1.1	51.3	39.3	3.7	3.5	.26	1.20
	59 - 59.5	.0	.0	.0	.0	.4	.8	42.1	47.3	5.7	3.7	.24	1.25
Wi-Cf 139	9 - 12	1.0	6.2	2.6	2.2	5.3	16.9	43.9	10.9	4.4	6.6	.42	1.53
	16 - 18	.7	3.7	8.0	10.9	21.1	35.4	11.6	4.5	2.2	1.9	.93	1.78
	21 - 24	.0	.0	.2	.4	2.2	11.8	45.3	29.6	4.6	5.9	.28	1.40
	28 - 29.5	.0	.0	.6	.6	4.2	41.1	39.0	6.5	3.3	4.7	.48	1.34
	34 - 36	.0	.5	.3	.4	2.5	33.7	38.6	14.8	3.9	5.3	.42	1.53
	39 - 42	.0	3.5	3.2	3.3	10.0	34.6	31.0	7.2	2.8	4.4	.53	1.54
	45 - 48	.0	.5	.3	.3	.8	11.8	66.0	11.2	3.4	5.7	.40	1.27
	51 - 54	.0	.0	.1	.3	.2	.5	29.7	45.8	12.8	10.6	.21	1.40
	57 - 60	.0	2.2	1.7	4.5	16.9	45.5	18.7	4.9	2.2	3.4	.71	1.51
	63 - 66	.0	1.9	4.8	9.2	22.7	36.9	13.8	4.5	2.4	3.8	.82	1.62
	69 - 72	.0	1.9	1.4	3.8	12.9	41.2	16.6	14.5	3.5	4.2	.62	1.78
	75 - 78	.0	1.7	1.2	2.3	10.8	40.3	28.4	7.5	3.1	4.7	.54	1.49

Table 5. Grain size analyses of Pleistocene core samples from the Salisbury area, Md.--Continued

Well No.	Sample interval (feet below land surface)	Percentages retained by weight										Medium diameter	Trask sorting coefficient
		Pebble			Granule	Very coarse sand	Coarse sand	Medium sand	Fine sand	Very fine sand	Silt and clay		
		(16mm)	(8mm)	(4mm)	(2mm)	(1mm)	(.5mm)	(.25mm)	(.125mm)	(.062mm)	(<.062mm)	(mm)	$So=\sqrt{\frac{Q_1}{Q_3}}$
Wi-Cf 139 (con't)	81 - 84	0.8	1.8	1.0	1.1	6.3	40.9	32.8	8.1	3.0	4.2	0.51	1.41
	87 - 89	.0	2.6	1.9	3.8	16.2	44.3	17.0	6.7	3.3	4.2	.67	1.55
	93 - 93.5	.0	6.5	6.5	6.9	18.6	33.6	19.5	5.3	1.4	1.7	.78	1.82
Wi-De 63	8 - 9	.0	3.3	1.2	.6	8.8	36.8	30.0	9.1	3.2	7.0	.51	1.52
	14 - 16	.0	2.1	1.7	2.2	5.7	29.4	39.6	9.9	3.7	5.7	.44	1.48
	20 - 22	.0	6.6	2.5	2.2	3.3	18.8	34.6	22.5	4.4	5.1	.35	1.75
	26 - 28	5.8	11.7	9.1	13.9	13.6	15.0	14.3	7.2	3.6	5.8	1.17	3.31
	32 - 34	.0	.0	.1	.1	.4	2.3	29.3	49.7	7.1	11.0	.21	1.29
	38 - 40	.7	6.3	4.2	4.1	6.4	14.6	42.0	12.9	3.3	5.5	.37	1.88
	44 - 46	.0	.0	.3	1.8	6.8	23.6	34.5	18.1	5.8	9.1	.34	1.73
	50 - 52	.0	.9	1.4	2.3	10.1	27.3	36.8	10.4	5.0	5.8	.46	1.57
	56 - 58	3.0	4.2	5.2	10.8	22.6	22.0	14.3	8.4	4.0	5.5	.88	2.29
	62 - 64	.0	2.8	5.4	9.9	23.8	27.3	12.4	8.4	3.7	6.3	.84	2.06
Wi-De 64	8 - 9	.0	.0	.0	.0	1.5	8.9	33.0	39.5	10.9	6.2	.23	1.45
	9 - 10	.0	.0	.0	.0	3.1	20.3	49.7	24.3	1.8	.8	.36	1.41
	14 - 16	.0	.0	.0	.2	1.5	4.4	33.1	42.9	9.6	8.3	.22	1.41
	20 - 22	.0	1.2	.8	.7	2.3	20.9	49.6	18.7	3.0	2.8	.38	1.41
	26 - 28	.0	.0	1.1	5.5	27.6	35.6	12.0	8.1	4.2	5.9	.78	1.79
	32 - 34	.0	1.3	2.1	2.6	9.7	29.1	30.8	12.6	4.0	7.8	.45	1.76
	38 - 40	.0	.0	.3	1.7	7.5	28.4	33.2	16.1	4.9	7.9	.40	1.73
	44 - 46	.0	.3	3.0	3.4	7.7	32.9	32.6	10.6	4.0	5.5	.48	1.61
	50 - 52	4.2	3.6	2.6	3.2	7.8	27.8	32.3	8.3	4.1	6.1	.50	1.76
	56 - 58	4.1	1.5	1.3	2.4	3.7	6.4	58.2	13.3	3.6	5.5	.33	1.27
Wi-Df 55	26 - 28	.0	.0	.0	.1	1.0	8.2	46.1	29.8	5.5	9.3	.26	1.41
	32 - 34	1.3	.3	.9	2.0	7.1	21.0	36.5	19.1	4.8	7.0	.36	1.69
	39 - 40	.0	.0	.0	.1	.2	.8	32.1	43.3	9.9	13.6	.20	1.44
	44 - 46	.0	2.0	.6	2.5	18.2	36.4	20.7	8.7	4.8	6.1	.60	1.72
	50 - 52	3.1	.0	.1	.4	2.7	11.2	34.4	34.0	5.9	8.2	.26	1.48
	56 - 58	.0	.0	.7	2.3	9.2	33.3	27.6	13.1	6.1	7.7	.46	1.71
	62 - 64	.0	1.8	2.0	3.1	14.6	33.5	24.5	7.7	5.1	7.7	.54	1.70
	68 - 70	.0	17.5	8.4	10.1	14.1	27.1	11.1	5.4	3.0	3.3	1.02	2.83

Table 5. Grain size analyses of Pleistocene core samples from the Salisbury area, Md.--Continued

Well No.	Sample interval (feet below land surface)	Percentages retained by weight										Median diameter	Trask sorting coefficient
		Pebble			Granule	Very coarse sand	Coarse sand	Medium sand	Fine sand	Very fine sand	Silt and clay		
		(16mm)	(8mm)	(4mm)	(2mm)	(1mm)	(.5mm)	(.25mm)	(.125mm)	(.062mm)	(<.062mm)	(mm)	$So=\sqrt{\frac{Q_1}{Q_3}}$
Wi-Df 55	74 - 76	0.0	1.2	11.6	13.0	13.9	18.1	16.1	9.6	7.7	8.8	.65	2.92
	82 - 84	.0	1.3	8.3	13.8	28.3	19.0	10.6	7.1	4.7	6.9	1.03	2.23
	88 - 90	.0	2.3	3.3	4.0	12.8	41.4	21.9	10.5	3.2	.6	.62	1.58
Wi-Df 56	8 - 10	.0	.0	.1	.1	1.4	13.7	29.6	28.2	17.6	9.3	.22	1.78
	14 - 16	.0	.0	.0	.2	1.7	6.4	34.6	36.3	9.5	11.3	.23	1.51
	20 - 22	.0	.0	.1	.9	2.6	8.9	33.9	34.0	10.0	9.6	.24	1.55
	26 - 27	.0	.0	.0	.0	.5	16.0	57.9	21.3	2.7	1.6	.32	1.28
	27 - 28	.0	1.0	.6	1.7	5.9	18.5	48.4	12.6	4.5	6.8	.37	1.44
	32 - 34	.0	.2	.6	.3	3.3	27.3	44.1	12.5	4.0	7.7	.40	1.44
	38 - 39	.0	.0	.2	.6	3.6	27.8	53.0	10.2	1.8	2.8	.44	1.32
	39 - 40	.0	.0	.6	.4	3.0	25.9	48.1	12.3	4.4	5.3	.41	1.41
	50 - 52	4.0	6.8	2.8	2.7	3.7	9.2	46.2	13.5	4.4	6.7	.35	1.55
	56 - 58	.0	.8	.6	1.6	6.4	28.0	37.1	12.0	6.0	7.5	.42	1.54
	68 - 70	2.9	7.7	5.5	8.6	15.9	18.8	18.6	8.5	5.4	8.1	.70	2.68
	74 - 76	.0	8.4	6.8	4.8	8.5	26.0	24.9	8.5	5.2	6.9	.55	2.10
	80 - 82	.0	.0	1.4	1.8	5.3	13.8	53.5	12.3	5.1	6.8	.35	1.39
	86 - 88	.0	.0	.9	1.3	4.3	24.9	45.4	12.3	4.8	6.1	.39	1.45

Table 6. Logs of wells, Salisbury Area, Maryland

The altitude, in feet above sea level, of land surface at each well is given in parenthesis. This value was obtained in most instances from topographic maps. The field descriptions of the sediments recovered during drilling were made by personnel associated with the Cooperative Program or by drillers whose names appear after the altitude of the well. Twenty-four of the wells drilled by the Cooperative Program were also cored. The wells and their cored intervals are indicated below by (C). Augered, jetted and rotary drilled wells are indicated by (A), (J), and (R) respectively.

Well	Thickness (feet)	Depth to base (feet)
Wi-Bd 11 (Rasmussen and Slaughter, 1955, p. 380)		
Wi-Bd 45 (Rasmussen and Slaughter, 1955, p. 384)		
Wi-Be 23 (Altitude: 48 ft.) E. P. Schultz (J)		
Holocene series:		
Top soil, sandy loam	1	1
Sand, coarse, yellow	4	5
Pleistocene series:		
Walston Formation:		
Clay, gray	2	7
Salisbury Formation (undifferentiated):		
Sand, fine, clayey	14	21
Missing	24	45
Sand, medium, yellow, some clay	15	60
Sand, fine, clayey, light gray	10	70
Sand, coarse to fine gravel	13	83
Wi-Be 27 (Altitude: 42 ft.) Cooperative Program (C&A)		
Holocene series:		
Soil, organic, sandy, dark gray (core)	1	1
Sand, medium, gray (core)	1	2
Pleistocene series:		
Walston Formation:		
Clay, brownish-gray, sticky and sand, fine, gray (core)	1	3
Sand, fine-medium, reddish-tan in sticky clay matrix (core)	1.5	4.5
Sand, medium, brownish-tan, in minor clay matrix (core)	2	6.5
Clay, gray, sticky and sand, fine, clayey (core)	1.5	8
Salisbury Formation:		
Beaverdam facies:		
Sand, medium, grayish-tan (core)	1	9
Sand, fine-medium, tan (core)	2.5	11.5
Sand, fine, silty, tannish-gray (core)	1	12.5
Sand, fine-medium, whitish-gray (core)	.5	13
Sand, medium-coarse, white	3	16
Sand, fine-medium, silty, white	12	28
Sand, medium-coarse, silty, tannish-white	4	32
Sand, medium, some pebbles, tannish-white "clean" (core)	4	36
Sand, as above	11	47
"Red Gravelly" facies		
Sand, very coarse-pebbly, rusty-red	7	54
Sand, very coarse-granular, rusty-red (core)	4	58
Wi-Bf 8 (Rasmussen and Slaughter, 1955, p. 386)		
Wi-Bf 19 (Altitude: 45 ft.) E. P. Schultz		
Holocene series:		
Top soil	1	1
Sand	7	8
Pleistocene series:		
Walston Formation:		
Clay, hard gray	14	22
Salisbury Formation (undifferentiated):		
Sand, fine, tan	8	30
Sand, and small gravel	15	45
Sand, medium	20	65
Sand, fine	10	75
Sand and gravel	15	90
Wi-Bf 21 (Altitude: 47 ft.) E. R. Kauffman (R)		
Top fill	1	1
Pleistocene series:		
Walston Formation:		
Clay, brown, sandy	17	18
Salisbury Formation (undifferentiated):		
Gravel and sand	4	22
Sand, clayey	8	30
Gravel and sand	2	32
Clay	2	34
Sand and gravel	66	100
Wi-Bf 23 (Altitude: 54 ft.) E. P. Schultz (J)		
Holocene series:		
Top soil	1	1
Sand, clayey	9	10
Pleistocene series:		
Walston Formation:		
Clay	5	15
Salisbury Formation (undifferentiated):		
Sand and clay streaks	25	40
Sand, clayey	20	60
Sand and clay	20	80
Sand and small gravel	20	100
Wi-Bf 27 (Altitude: 48 ft.) Cooperative Program (C&A)		
Holocene series:		
Sand, fine to medium, silty brown, organic material (core)	3	3
Sand, medium, silty, brown (core)	1.5	4.5
Pleistocene series:		
Walston Formation:		
Clay, fine, sandy, sticky, brown (core)	2	6.5
Sand, fine-medium, clayey matrix, brown (core)	1.5	8
Sand, fine, clayey matrix brown (core)	1	9
Salisbury Formation:		

Table 6. Logs of wells, Salisbury Area, Maryland--Continued

Well	Thickness (feet)	Depth to base (feet)
Beaverdam facies:		
Sand, fine-medium, silty, brown (core)	1.5	10.5
Sand, medium-coarse, silty, grayish-white (core)	.5	11
Sand, coarse-very coarse, white, (core)	4	15
Sand, medium-coarse, white (core)	3	18
Missing	1	19
Sand, medium-coarse (core)	3	22
Missing	5	27
Sand, coarse, white (core)	3	30
Sand, coarse, white	10	40
Sand, coarse, pebbly, tan	8	48
"Red Gravelly" facies:		
Clay, tan	2	50
Clay, blue-gray	12	62
Wi-Bf 37 (Altitude: 50 ft.) E. P. Schultz (J)		
Holocene series:		
Top soil	1	1
Sand	9	10
Pleistocene series:		
Walston Formation:		
Clay, sandy	5	15
Salisbury Formation (undifferentiated):		
Sand, fine	15	30
Sand and gravel	15	45
Sand, clayey	10	55
Clay, hard, blue	10	65
Sand, fine and clay streaks	30	95
Sand and small gravel, brown	10	110
Wi-Bf 45 (Altitude: 55 ft.) M. P. Brittingham (J)		
Holocene series:		
Top soil	1	1
Sand, medium, tan	3	4
Pleistocene series:		
Walston Formation:		
Silt, mottled tan and white, and very fine sand	4	8
Clay, mottled tan and white	4	12
Salisbury Formation:		
Beaverdam facies:		
Sand, very poorly sorted, white, some silt and gravel	4	16
Sand, poorly sorted, tan	2	18
Sand, poorly sorted, white, silty	3	21
Clay, mottled tan and white	3	24
Sand, medium-coarse, white	4	28
Sand, medium-coarse, white; large number of white clay particles similar to sand sizes	16	44
Silt and sand, white	3	47
Sand, poorly sorted, white; silty	8	55
Sand, fine-medium white; silty; few pebbles	3	58
Sand, medium, white; white clay grains	2	60
Sand, very poorly sorted, white; silty	2	62
Clay, white and gravel	1	63
Sand, medium-coarse, white; some gravel	2	65
Same, but grading to tan color	2	67
Sand, very poorly sorted, tan and gravel	11	78
Same, except nearly white color	3	81
Sand, fine-medium, white	4	85
Sand, medium, white	3	88
Sand, medium-very coarse, white	8	96
Sand and gravel, white	5	101
Same, except coarser	4	105
Sand, coarse, white	5	110
Sand, fine-medium, tan	16	126
Miocene series:		
Yorktown-Cohansey Formation:		
Sand, fine, mixture of tan and gray; some woody fragments	7	133
Sand, fine, gray; wood fragments	11	144
Wi-Bg 14 (Altitude: 63 ft.) E. P. Schultz (J)		
Top soil	1	1
Pleistocene series:		
Walston Formation:		
Clay, sandy	19	20
Salisbury Formation:		
Beaverdam facies:		
Sand, medium	5	25
Sand, clayey	8	33
Sand, clayey and gravel	7	40
Sand, fine	26	66
Sand and gravel	10	76
Wi-Ce 12 (Rasmussen and Slaughter, 1955, p. 397)		
Wi-Ce 14 (Rasmussen and Slaughter, 1955, p. 397)		
Wi-Ce 91 (Rasmussen and Slaughter, 1955, p. 400)		
Wi-Ce 101 (Rasmussen and Slaughter, 1955, p. 402)		
Wi-Ce 104 (Rasmussen and Slaughter, 1955, p. 402)		
Wi-Ce 116 (Altitude: 36 ft.) E. R. Kauffman (R)		
Top soil	1	1
Pleistocene series:		
Walston Formation:		
Clay, sandy	4	5
Salisbury Formation (undifferentiated):		
Sand and clay layers	15	20
Sand, brown	12	32
Sand, tan	15	47
Sand, gray	19	66
Sand, brown and iron layers	16	82
Miocene series:		
Yorktown-Cohansey Formation:		
Clay, blue	3	85

Table 6. Logs of wells, Salisbury Area, Maryland--Continued

Well	Thickness (feet)	Depth to base (feet)
Wi-Ce 118 (Altitude: 25 ft.) N. Shannahan (R)		
Pleistocene series:		
Walston Formation:		
Clay, sandy, brown	10	10
Salisbury Formation (undifferentiated):		
Sand, coarse, medium brown	10	20
Sand, clay streaks	6	26
Sand, coarse, medium brown	42	68
Miocene series:		
Yorktown-Cohansey Formation:		
Clay, tough, gray	32	100
Wi-Ce 122 (Altitude: 38 ft.) E. R. Kauffman (R)		
Holocene series:		
Sand	5	5
Pleistocene series:		
Walston Formation:		
Clay, yellow	3	8
Sand and clay	1	9
Salisbury Formation (undifferentiated):		
Sand and gravel	32	41
Clay and sand	5	46
Sand and iron layers	21	67
Gravel and rocks	1	68
Sand	20	88
Miocene series:		
Yorktown-Cohansey Formation:		
Clay, gray	1	89
Wi-Ce 133 (Altitude: 20 ft.) E. P. Schultz (J)		
Holocene series:		
Top soil	1	1
Sand	6	7
Pleistocene series:		
Walston Formation:		
Sand, clayey	8	15
Salisbury Formation (undifferentiated):		
Sand and clay streaks	30	45
Sand, coarse and small gravel	10	55
Sand, muddy	5	60
Miocene series:		
Yorktown-Cohansey Formation:		
Clay, dark gray	20	80
Sand, clayey, gray	2	82
Clay, dark gray	23	105
Wi-Ce 134 (Altitude: 20 ft.) P. W. Hubbert (J)		
Fill dirt and sand	5	5
Pleistocene series:		
Walston Formation:		
Clay	4	9
Salisbury Formation (undifferentiated):		
Sand, fine, white	19	28
Sand, fine to coarse, light gray	15	43
Sand, fine, yellow	15	58
Miocene series:		
Yorktown-Cohansey Formation:		
Clay	2	60
Sand, fine, gray	20	80
Wi-Ce 139 (Altitude: 30 ft.) E. P. Schultz (J)		
Top soil	2	2
Pleistocene series:		
Walston Formation:		
Clay	16	18
Salisbury Formation (undifferentiated):		
Sand	6	24
Clay, sandy	16	40
Sand and gravel	15	55
Clay, sandy	14	69
Sand and gravel	14	83
Wi-Ce 145 (Altitude: 36 ft.) Cooperative Program (C&A)		
Pleistocene series:		
Salisbury Formation:		
Beaverdam facies:		
Sand, fine to medium, grayish-tan (core)	2	2
Sand, fine to medium, reddish-tan (core)	2	4
Sand, fine, silty, grayish-tan (core)	3	7
Sand, very fine, gray-white (core)	3	10
Sand, fine, white (core)	4.5	14.5
"Red Gravelly" facies:		
Sand, fine to medium, orange-brown (core)	1.5	16
Sand, medium to coarse, some gravel orange-brown (core)	2	18
Sand, coarse to very coarse, some gravel orange-brown (core)	5	23
Sand, fine and silt, orange-brown (core)	1	24
Sand, fine, silty, orange-brown (core)	3	27
Sand, fine to very fine, silty, orange-brown	3	30
Sand, very fine to fine, orange-brown, 6" clay layer at about 31-31.5 ft. (core)	3	33
Sand, coarse, reddish-brown (core)	3	36
Sand, coarse, reddish-brown	6	42
Sand, coarse-granular, some pebbles, reddish brown (core)	3	45
Missing	3	48
Sand, medium-pebbly, reddish-brown (core)	1	49
Sand, medium-granular, orange-brown to reddish brown	16	65
Clay, fine sandy, reddish-gray	3	68
Sand, fine-medium, orange-brown	12	80
Miocene series:		
Yorktown-Cohansey Formation:		
Sand, fine-medium, drak gray, clay matrix	5	85
Clay, fine sandy, dark gray	7	92

Table 6. Logs of wells, Salisbury Area, Maryland--Continued

Well	Thickness (feet)	Depth to base (feet)
Wi-Ce 146 (Altitude: 25 ft.) Cooperative Program (C&A)		
Pleistocene series:		
Salisbury Formation:		
Beaverdam facies:		
Soil, dark gray, fine sandy, (core)	0.5	0.5
Soil, brown, fine-medium, sandy (core)	1	1.5
Sand, fine, brownish (core)	2.5	4
Sand, medium-coarse, whitish, tan (core)	.5	4.5
Sand, fine-medium, rusty brown, clay matrix (core)	1	5.5
Silt, mottled rusty-gray and sand, fine, gray (core)	2	7.5
Sand, gray fine, slightly silty (core)	2.5	10
Missing	2	12
Sand, fine-medium, light gray	2	14
Sand, medium, grayish-white (core)	2	16
Sand, medium, gray-white (core)	2	18
Missing	3	21
Sand, medium-coarse, white (core)	3	24
"Red Gravelly" facies:		
Sand, coarse-granular, orange-brown	3	27
Sand, coarse-pebbly, orange-brown (core)	1	28
Sand, coarse-granular, orange-brown	14	42
Sand, coarse-pebbly, orange brown (core)	1	43
Sand, medium-pebbly, orange-brown	7	50
Sand, fine, silty and clayey, orange-brown	9	59
Miocene series:		
Yorktown-Cohansey Formation:		
Clay, fine, sandy, bluish-gray	13	72
Wi-Ce 147 (Altitude: 42 ft.) Paul White (J)		
Pleistocene series:		
Walston Formation:		
Clay, gray, gritty	5	10
Salisbury Formation:		
Beaverdam facies		
Sand, medium-coarse, pebbly, white	23	33
"Red Gravelly" facies:		
Sand, coarse-granular, tannish-brown	12	45
Sand, very fine-fine, tannish-brown	5	50
Sand, fine, tannish-brown	10	60
Sand, coarse-pebbly, tannish-brown	5	65
Sand, coarse-pebbly, orange-brown	10	75
Sand, fine-medium, tannish-brown	4.5	79.5
Ferruginous layer, hard	.5	80
Miocene series:		
Yorktown-Cohansey Formation:		
Clay, sticky, dark gray	20	100
Sand, very fine, silty, gray, lignitic fragments	20	120
Sand, very fine, silty, gray, and clay laminae, gray, minor lignitic material	40	160
Sand, fine-medium, gray	20	180
Sand, medium, gray	10	190
Sand, medium-coarse, gray	10	200
WiCe 149 (Altitude: 12 ft.) Cooperative Program (C&A)		
Holocene series:		
Sand, fine-medium, tan (core)	4	4
Sand, medium-coarse, pebbly, tan (core)	4	8
Clay, fine sandy, mottled gray-brown (core)	2	10
Missing	4	14
Clay, fine sandy, mottled gray-brown (core)	2	16
Missing	4	20
Pleistocene series:		
Salisbury Formation:		
"Red Gravelly" facies:		
Sand, fine, clayey, tan (core)	2	22
Missing	4	26
Sand, fine, tan (core)	1	27
Sand, fine-medium, granular, tan (core)	1	28
Missing	4	32
Sand, very coarse-granular, pebbly, rusty-brown (core)	2	34
Missing	4	38
Sand, very coarse-granular, pebbly, rusty-brown (core)	1	39
Sand, fine, clayey, pebbly, mottled gray-brown (core)	1	40
Missing	4	44
Sand, fine-medium, granular, tan (core)	2	46
Missing	4	50
Sand, very fine-fine, grayish tan (core)	2	52
Missing	4	56
Sand, very fine-fine, grayish tan (core)	2	58
Missing	4	62
Miocene series:		
Yorktown-Cohansey Formation:		
Clay, dark gray (core)	2	64
Missing	4	68
Clay, dark gray (core)	2	70
Wi-Ce 150 (Altitude: 43 ft.) Cooperative Program (C&A)		
Holocene series:		
Sand, fine-medium, tan	2	4
Pleistocene series:		
Walston Formation:		
Clay, fine-medium sandy, tan	4	8
Clay, fine-medium sandy, tan (core)	2	10
Missing	4	14
Salisbury Formation:		
Beaverdam facies:		
Sand, medium, whitish-gray (core)	2	16
Missing	4	20
Sand, coarse-pebbly, grayish-white (core)	1	21
Sand, fine-medium, white (core)	1	22
Missing	4	26
Sand, medium, white (core)	2	28
Missing	4	32
Sand, fine-medium, grayish-white (core)	2	34
Missing	4	38

Table 6. Logs of wells, Salisbury Area, Maryland--Continued

Well	Thickness (feet)	Depth to base (feet)
Sand, medium, tannish-white (core)	2	40
Missing	4	44
Sand, medium to coarse, tannish-white (core)	2	46
Missing	4	50
Sand, very coarse-granular, tannish-gray (core)	2	52
Missing	4	56
Sand, very coarse-pebbly, tannish-gray (core)	2	58
Missing	4	62
Sand, medium, gray	2	64
Sand, very fine-fine, tannish-white (core)	2	66
Missing	4	70
Sand, medium-coarse, tannish-white (core)	2	72
Missing	4	76
Sand, medium, pebbly, tannish-white (core)	2	78
Missing	4	82
"Red Gravelly" facies:		
Sand, very coarse-granular, orange-brown (core)	2	84
Missing	4	88
Sand, very coarse-granular, orange-brown (core)	2	90
Missing	7	97
Sand, very coarse-pebbly, orange-brown (core)	5	102
Missing	3	105
Sand, fine-medium, small pebbles, tan (core)	5	110
Missing	7	117
Sand, medium-coarse, brownish-red (core)	8	125
Wi-Ce 151 (Altitude: 27 ft.) Cooperative Program (C&A)		
Pleistocene series:		
Salisbury Formation:		
Beaverdam facies (?):		
Sand, medium-coarse, tannish-brown	6	8
"Red Gravelly" facies:		
Sand, coarse-granular, orange-brown (core)	2	10
Missing	4	14
Sand, fine-medium, silty, tan (core)	2	16
Missing	4	20
Sand, coarse-very coarse, orange-brown (core)	2	22
Missing	4	26
Sand, coarse, pebbly, orange-brown (core)	2	28
Missing	6	34
Sand, medium, dark brown; highly ferruginous (core)	2	36
Missing	4	40
Sand, medium-coarse, orange-brown (core)	2	42
Missing	4	46
Sand, fine-medium, silty, orange-brown (core)	2	48
Missing	4	52
Sand, medium-coarse, granular, orange-brown (core)	2	54
Missing	4	58
Ferruginous layer, hard (core)	1	59
Miocene series:		
Yorktown-Cohansey Formation:		
Clay, fine sandy, dark gray (core)	1	60
Missing	4	64
Sand, very fine, clayey, dark gray (core)	2	66
Wi-Ce 152 (Altitude: 23 ft.) Cooperative Program (C&A)		
Holocene series:		
Sand, medium, silty, tannish-gray	2	4
Sand, medium, clayey, grayish-tan	4	8
Clay, gritty, mottled gray-brown (core)	2	10
Missing	4	14
Clay, gritty, tannish-gray (core)	1	15
Sand, very fine-fine, whitish gray (core)	1	16
Missing	4	20
Clay, fine-sandy, whitish gray (core)	1.5	21.5
Pleistocene series:		
Salisbury Formation:		
"Red Gravelly" facies:		
Sand, very fine, orange-brown (core)	.5	22
Missing	4	26
Sand, very coarse-granular, pebbly, orange-brown (core)	2	28
Missing	4	32
Sand, medium-granular, tannish-white (core)	1.5	33.5
Sand, coarse, orange-brown (core)	.5	34
Missing	4	38
Sand, medium-coarse, silty, orange-brown (core)	2	40
Missing	4	44
Sand, fine-medium, silty, orange-brown (core)	2	46
Missing	4	50
Sand, fine-medium, silty, orange-brown (core)	2	52
Missing	4	56
Sand, medium, silty, orange-brown (core)	2	58
Missing	3	61
Sand, medium, fine pebbly, orange-brown (core)	2	63
Missing	5	68
Sand, coarse-granular, tan (core)	2	70
Missing	6	76
Sand, medium-coarse, rusty-brown ferruginous, laminae (core)	2	78
Missing	4	82
Miocene series:		
Yorktown-Cohansey Formation:		
Clay, fine sandy, dark gray (core)	2	84
Wi-Ce 157 (Altitude: 4.3 ft.) Cooperative Program (C&R)		
Holocene series:		
Fill	3	3
Lignitic material, dark gray (core)	1	4
Sand, medium-coarse, white and lignitic material, dark gray (core)	2	6
Pleistocene series:		
Salisbury Formation:		
Beaverdam facies:		
Sand, medium-coarse, white	2	8
Sand, fine-medium, clayey, tannish-gray (core)	3	11
"Red Gravelly" facies:		
Sand, medium-coarse, tan	3	14

Table 6. Logs of wells, Salisbury Area, Maryland--Continued

Well	Thickness (feet)	Depth to base (feet)
Sand, fine-medium, silty, orange-brown (core)	3	17
Sand, medium-coarse, orange-brown	3	20
Sand, medium, silty, orange-brown (core)	3	23
Sand, coarse, orange-brown	3	26
Sand, medium-coarse, very silty, orange-brown (core)	3	29
Sand, coarse, pebbly, orange-brown	3	32
Sand, very fine-fine, orange-brown (core)	3	35
Missing	3	38
Sand, coarse-very coarse, silty, orange-brown (core)	3	41
Sand, coarse-very coarse, orange-brown	3	44
Sand, coarse-pebbly, orange-brown (core)	3	47
Sand, coarse-pebbly, orange-brown	2	49
Miocene series:		
Yorktown-Cohansey Formation:		
Clay, gritty, dark gray	1	50
Clay, fine sandy, dark gray	3	53
Wi-Ce 158 (Altitude: 6.2 ft.) Cooperative Program (C&R)		
Fill	3	3
Holocene Series:		
Organic material, dark gray (core)	1	4
Pleistocene series:		
Salisbury Formation:		
Beaverdam facies:		
Sand, fine-medium silty, white (core)	2	6
Sand, medium-coarse, white	2	8
"Red Gravelly" facies:		
Sand, medium-coarse, orange-brown	1	9
Sand, fine-medium, very silty, orange-brown (core)	3	12
Sand, medium, orange-brown	3	15
Sand, medium-coarse, very silty, orange-brown (core)	3	18
Sand, medium-coarse, orange-brown	3	21
Sand, medium-coarse, fine pebbles, orange-brown (core)	1	22
Sand, very fine-fine, silty, orange-brown (core)	2	24
Sand, fine-coarse, orange-brown	3	27
Sand, very coarse-granular and gravel orange-brown (core)	3	30
Sand, very coarse-granular, orange-brown	3	33
Sand, coarse-very coarse, fine pebbles, orange-brown (core)	3	36
Sand, coarse-very coarse, orange-brown	3	39
Sand, coarse-fine gravelly, silty, orange-brown (core)	3	42
Sand, coarse-very coarse, orange-brown	3	45
Sand, coarse-granular, orange-brown (core)	3	48
Sand, coarse-very coarse, orange-brown	3	51
Sand, medium-coarse, silty, orange-brown (core)	3	54
Sand, coarse, orange-brown	3	57
Clay, very fine sandy, rusty-brown (core)	1	58
Miocene series:		
Yorktown-Cohansey Formation:		
Sand, very fine-fine, clayey, dark gray (core)	2	60
Wi-Ce 159 (Altitude: 7.0 ft.) Cooperative Program (C&R)		
Fill		
Holocene series:		
Organic material, very sandy, dark gray (core)	1.5	4.5
Pleistocene series:		
Salisbury Formation:		
Beaverdam facies:		
Sand, medium, grayish-white (core)	1.5	6
Sand, medium-granular, grayish white	3	9
"Red Gravelly" facies:		
Sand, coarse-very coarse, and gravel, tan (core)	3	12
Sand, medium-very coarse, orange-brown	3	15
Sand, fine-medium, silty, tan (core)	1	16
Sand, very fine, clayey, tan (core)	2	18
Sand, medium-coarse, orange-brown	3	21
Sand, medium-coarse, pebbly, orange-brown (core)	3	24
Sand, coarse-granular, orange-brown	3	27
Missing	3	30
Sand, coarse-granular, pebbly, orange-brown (core)	3	33
Sand, coarse-granular, pebbly, orange-brown	3	36
Sand, medium-granular, silty, orange-brown (core)	3	39
Sand, medium-granular, silty, orange-brown	3	42
Sand, medium-coarse, pebbly, silty, orange-brown (core)	3	45
Sand, medium-very coarse, orange-brown	3	48
Sand, medium, orange-brown (core)	3	51
Sand, medium-granular, orange-brown	3	54
Sand, very coarse-pebbly, silty, orange-brown (core)	3	57
Sand, very coarse-pebbly, silty, orange-brown	3	60
Sand, very fine, silty, orange-brown (core)	2.5	62.5
Miocene series:		
Yorktown-Cohansey Formation:		
Sand, very fine, silty, dark gray (core)	.5	63
Clay, gritty, dark gray	3	66
Wi-Ce 160 (Altitude: 6.8 ft.) Cooperative Program (C&R)		
Fill	2	2
Holocene series:		
Lignitic material	1	3
Pleistocene series:		
Salisbury Formation:		
Beaverdam facies:		
Sand, medium, white (core)	3	6
Sand, medium-coarse, white	3	9
"Red Gravelly" facies:		
Sand, medium-coarse, orange-brown (core)	3	12
Sand, medium-coarse, orange-brown	3	15
Sand, medium-coarse, orange-brown (core)	1.5	16.5
Sand, gravel and silty, orange-brown, poorly-sorted (core)	1.5	18
Sand, medium-coarse, orange-brown	3	21
Sand, coarse, silty, pebbly, orange-brown (core)	3	24
Sand, medium-coarse, orange-brown	3	27
Sand, fine-medium, silty, orange-brown (core)	1	28
Sand, coarse-granular, pebbly, orange-brown (core)	2	30
Sand, medium-coarse, orange-brown	3	33
Sand, coarse-very coarse, pebbly, silty, orange-brown (core)	3	36
Sand, coarse-very coarse, pebbly, orange-brown	3	39
Sand, coarse-very coarse, pebbly, silty orange-brown(core)	3	42

Table 6. Logs of wells, Salisbury Area, Maryland--Continued

Well	Thickness (feet)	Depth to base (feet)
Sand, coarse-very coarse, orange-brown	3	45
Sand, very fine-fine, orange-brown (core)	.5	45.5
Clay, mottled, orange-brown and gray (core)	.5	46
Miocene series:		
Yorktown-Cohansey Formation:		
Clay, gritty, dark gray (core)	2	48
Clay, gritty, dark gray	3	51
Wi-Ce 165 (Altitude: 18 ft.) P. W. Hubbert (J)		
Holocene series:		
Top soil	1	1
Sand	5	6
Pleistocene series:		
Walston Formation:		
Clay	10	16
Salisbury Formation:		
Beaverdam facies (?):		
Sand and clay, white	26	42
"Red Gravelly" facies (?):		
Sand, fine-coarse, yellow	11	53
Wi-Ce 166 (Altitude: 38 ft.) W. K. Wood (R)		
Pleistocene series:		
Walston Formation:		
Clay, tan	5	5
Salisbury Formation (undifferentiated):		
Sand, very coarse-coarse and gravel, tan	5	10
Sand, very coarse, and gravel, tan	5	15
Sand, coarse, medium, whitish-tan	5	20
Clay, tan	5	25
Sand, very coarse-coarse and gravel, tan	10	35
Sand, very coarse, and gravel, orange-brown	5	40
Sand, very coarse-coarse, and gravel orange-brown	15	55
Sand, coarse-medium, orange-brown	5	60
Sand, coarse, orange-brown	5	65
Sand, very coarse-coarse and gravel, orange-brown	10	75
Sand, medium-coarse, orange-brown	5	80
Sand, fine-medium, orange-brown	5	85
Sand, coarse-very coarse, orange-brown	8	93
Miocene series:		
Yorktown-Cohansey Formation :		
Clay, sandy, dark gray	5	98
Sand, fine, gray	5	103
Clay, dark gray	2	105
Sand, fine, gray	13	118
Wi-Ce 171 (Altitude: 38 ft.) Cooperative Program (R)		
Holocene series:		
Sand, well sorted, fine, tan silty	9	9
Pleistocene series:		
Walston Formation		
Clay, gritty, tan	2	11
Salisbury Formation		
Beaverdam facies (?)		
Sand, pebbly, coarse, gray-white	4	15
Sand, medium, gray	5	20
Sand, pebbly, coarse to very coarse, tan	4	24
Sand, medium coarse, tan	6	30
"Red Gravelly" facies:		
Sand, fine, orange-brown	5	35
Sand, gravelly, coarse-very coarse, orange-brown	4	39
Clay, tan	3	42
Clay, dark gray	12	54
Sand, very fine-fine, tan	6	60
Sand, fine-medium, granular, tan	5	65
Sand, pebbly, coarse-very coarse, tan	5	70
Sand, coarse, granular to pebbly, orange-brown	5	75
Sand, coarse, orange-brown	5	80
Sand, medium, orange-brown	10	90
Sand, medium-coarse, tan	4	94
Miocene series:		
Yorktown-Cohansey Formation		
Clay, dark gray	4	98
Sand, clayey, fine, dark gray	12	110
Clay, gray, and tan	5	115
Wi-Ce 172 (Altitude: 38 ft.) Cooperative Program		
Holocene series:		
Sand, fine, tan	3	3
Pleistocene series:		
Walston Formation		
Sand, very clayey, tan	4	7
Clay, tan-gray	5	12
Salisbury Formation		
Beaverdam facies		
Sand, medium-coarse, gray-white	8	20
Sand, medium, gray-white, few pebbles	5	25
"Red Gravelly" facies		
Sand, coarse-very coarse, tan	10	35
Sand, fine-medium, tan, some pebbles	5	40
Sand, fine-medium, tan	5	45
Sand, coarse, tan, pebbles	5	50
Sand, coarse-very coarse, tan	10	60
Sand, coarse-medium, tan	5	65
Sand, granular to pebbly, tan	5	70
Sand, fine-medium, tan	5	75
Sand, coarse-very coarse, orange-brown	5	80
Sand, very coarse-granular, orange-brown	5	85
Sand, coarse-very coarse, orange-brown	5	90
Sand, coarse-very coarse and gravel, orange-brown, iron concretions	5	95
Sand, very coarse, orange-brown, pebbles	5	100
Sand, very coarse, tan-brown, pebbles, few gray clay balls	5	105
Miocene series:		
Yorktown-Cohansey Formation:		
Clay, blue-gray	5	110
Clay, gray-tan	5	115
Missing, but probably grading to very fine gray sand	7	122

Table 6. Logs of wells, Salisbury Area, Maryland--Continued

Well	Thickness (feet)	Depth to base (feet)
Wi-Ce 173 (Altitude: 35 ft.) Cooperative Program (R)		
Holocene series:		
Sand, fine, well sorted, tan silty	4	4
Pleistocene series:		
Walston Formation:		
Sand, medium, tan, very clayey	11	15
Salisbury Formation (undifferenated):		
Sand, fine-medium, tan, clayey	5	20
Sand, fine-medium, tan	5	25
Sand, coarse-very coarse, tan	7	32
Sand, very coarse, orange-brown, gravel to 1 inch	8	40
Sand, medium-coarse, orange-brown	5	45
Sand, fine-medium, orange-brown	5	50
Sand, fine, tan	5	55
Sand, medium, tan	5	60
Sand, medium-very coarse, orange-brown pebbles	5	65
Gravel (1-1 1/2 in.), orange-brown, very coarse granular matrix	10	75
Sand, very coarse, granular, orange-brown pebbles	5	80
Same	5	85
Pebbles (1 in.), orange-brown, coarse sandy matrix	5	90
Sand, fine-medium, orange-brown pebbles, intercalated gray clay	5	95
Sand, fine-very fine, tan	10	105
Sand, medium, tan, pebbles	5	110
Sand, very coarse, granular, tan pebbles, (1/4 - 1/2 in.)	5	115
Sand, coarse, granular, tan, pebbles (1/4 - 1/2 in.*	5	120
Sand, granular to fine, orange-brown, pebbles	5	125
Sand, granular to coarse, orange-brown pebbles (1 in.)	5	130
Sand, coarse-very coarse, orange-brown	5	135
Gravel (up to 1 1/2 in.), orange-brown	5	140
Sand, very coarse to granular, orange-brown pebbles (1 in.)	5	145
Sand, granular to pebbles (3/4 in.), orange-brown	5	150
Sand, medium-granular, tan	5	155
Sand, fine, tan	10	165
Sand, fine-medium, tan, some gravel	5	170
Sand, medium-coarse, tan, gravel	5	175
Sand, medium-fine, mixed iron-stained and gray grains	2	177
Miocene series:		
Yorktown-Cohansey Formation:		
Clay, gray, abundant woody fragments, interbedded fine gray sand	13	190
Sand, fine-medium, gray, intercalated clay	10	200
Wi-Ce 175 (Altitude: 34 ft.) Cooperative Program (R)		
Holocene series:		
Sand, fine-medium, gray-tan	5	5
Pleistocene series:		
Walston Formation:		
Clay, tan, sandy	5	10
Salisbury Formation:		
Beaverdam facies:		
Sand, very coarse-granular, tannish-white	5	15
"Red Gravelly" facies:		
Sand, very coarse-granular, orange-brown	5	20
Sand, medium-coarse, orange-brown	10	30
Sand, very fine-fine, orange-brown	5	35
Sand, fine to medium, orange-brown	5	40
Sand, coarse, orange-brown	10	50
Sand, very coarse-granular, orange-brown, pebbles	15	65
Sand, medium-very coarse, orange-brown	5	70
Sand, poorly sorted, orange-brown, and gravel	5	75
Gravel and sand, coarse, orange-brown	10	85
Gravel (up to 1/2 in.), orange-brown	5	90
Sand, medium pebbly, tan	5	95
Sand, medium-very coarse, orange-brown	10	105
Pebbles, gravel, and poorly sorted sand, orange-brown	10	115
Pebbles and gravel, orange-brown	10	125
Gravel (1/2 in.), orange-brown	10	135
Sand, granular, orange-brown, pebbles	5	140
Sand, coarse-very coarse, orange-brown	5	145
Sand, medium-coarse, orange-brown	20	165
Sand, fine-medium, orange-brown	10	175
Sand, medium-coarse, mixed iron-stained and gray grains	3	178
Miocene series:		
Yorktown-Cohansey Formation:		
Clay, gray, sandy	7	185
Sandy, coarse, gray	10	195
Sand, fine-medium, gray	10	205
Wi-Ce 176 (Altitude: 42 ft.) Cooperative Program (R)		
Holocene series:		
Sand, fine, light brown	3	3
Sand, fine, tan; silty	3	6
Pleistocene series:		
Walston Formation :		
Clay, very gritty, gray-tan (mottled)	6	12
Salsibury Formation:		
Beaverdam facies :		
Sand, medium-very coarse, light tan	6	18
Sand, fine-medium, white	7	25
Sand, fine-medium, white	10	35
Sand, medium-coarse, white	5	40
"Red Gravelly" facies:		
Sand, medium-coarse, tan	5	45
Sand, fine, orange-brown	5	50
Sand, fine-very fine, orange-brown	10	60
Sand, fine, orange-brown	5	65
Sand, coarse-granular, orange-brown, pebbles	5	70
Sand, very coarse, and gravel, orange-brown	10	80
Sand, medium-coarse, orange-brown	5	85
Sand, coarse-very coarse, orange-brown	5	90
Sand, very coarse-granular, orange-brown, pebbles	10	100
Sand, fine-medium, orange-brown	5	105

Table 6. Logs of wells, Salisbury Area, Maryland--Continued

Well	Thickness (feet)	Depth to base (feet)
Sand, medium, orange-brown, pebbles	5	110
Sand, medium, orange-brown; very well sorted	15	125
Sand, medium, orange-brown, well sorted	10	135
Sand, coarse-very coarse, mixture of iron-stained and gray grains; some lignite. Ferrunginous layer 137 to 137.5	4	139
Miocene series:		
Yorktown-Cohansey Formation:		
Clay, gritty, dark gray	21	160
Wi-Ce 177 (Altitude: 41 ft.) Cooperative Program (R)		
Sand, fine, grayish-tan	2	2
Pleistocene series:		
Walston Formation:		
Clay, very gritty, tan-gray (mottled)	12	14
Salisbury Formation:		
Beaverdam facies:		
Sand, medium-coarse, tan-gray	9	23
"Red Gravelly" facies:		
Sand, coarse, very coarse, orange-brown pebbles	2	25
Sand, medium, orange-brown	15	40
Sand, fine, orange-brown	5	45
Sand, very fine-fine, orange-brown	11	56
Sand, medium-coarse, orange-brown	4	60
Sand, medium, orange-brown	5	65
Sand, coarse-very coarse, orange-brown	11	76
Sand, very fine-fine, tan	6	82
Sand, medium, tan	8	90
Sand, medium-coarse, orange-brown	5	95
Sand, coarse-very coarse, orange-brown, pebbles	5	100
Sand, very coarse-granular, tan, pebbles	3	103
Sand, medium-fine, tan	7	110
Sand, coarse-very coarse, tan	5	115
Sand, very coarse, granular-pebbly, tan	5	120
Gravel (1/4 in.) orange-brown, very coarse, sandy matrix	5	125
Gravel (3/4 in.) and sand, very coarse, orange-brown	5	130
Sand, coarse-very coarse, orange-brown	5	135
Sand, granular-pebbly (1/4 in.), orange-brown	5	140
Gravel (1/2 in.) grayish-tan	5	145
Sand, coarse-very coarse, grayish-tan, gravel	5	150
Sand, medium-coarse, grayish-tan	5	155
Sand, medium, tan	5	160
Sand, medium, tan, pebbles	5	165
Sand, fine, gray-tan	5	170
Sand, very fine, grayish-tan	15	185
Sand, fine, grayish-tan	5	190
Sand, medium, grayish-tan	3	193
Clay, gray	3	196
Sand, fine, grayish-tan	9	205
Miocene series:		
Yorktown-Cohansey Formation:		
Sand, very fine, gray (slightly-tannish)	5	210
Sand, very fine-fine, gray, woody fragments	5	215
Wi-Ce 178 (Altitude: 42 ft.) Cooperative Program (R)		
Soil, fine sand, clayey, black	1	1
Pleistocene series:		
Walston Formation:		
Sand, medium, very clayey, tan mottled-gray	7	8
Clay, gritty, tannish-gray (mottled)	4	12
Clay, sandy, fine, tan	2	14
Salisbury Formation:		
Beaverdam facies:		
Sand, fine-medium, tannish-gray	1	15
Sand, medium-coarse, tannish-gray	5	20
Sand, medium-coarse, gray	5	25
Sand, medium-granular, gray	8	33
"Red Gravelly" facies:		
Sand, medium-very coarse, tan; fine pebbles	2	35
Sand, medium-coarse, orange-brown	5	40
Sand, fine-medium, tan	5	45
Sand, fine-medium, tan	5	50
Sand, medium, tan	5	55
Sand, fine-medium, tan	5	60
Sand, medium, tan	10	70
Sand, medium-coarse, tan, pebbles	5	75
Sand, fine-medium, tan	10	85
Sand, medium-coarse, tan	5	90
Sand, very fine-fine, grayish-tan	10	100
Sand, coarse-fine, grayish-tan, pebbles (1/4 in.)	5	105
Sand, medium, grayish-tan, pebbles	5	110
Sand, very fine-fine, grayish-tan	5	115
Sand, fine-medium, tan	5	120
Sand, very coarse-gravelly (1/2 in.)	5	125
Gravel (up to 3/4 in.), orange-brown	10	135
Gravel (up to 3/4 in.), orange-brown, coarse sandy matrix	6	141
Miocene series:		
Yorktown-Cohansey Formation:		
Sand, medium, gray, lignitic material	4	145
Sand, medium, gray, and clay, gritty, gray; lignitic material	20	165
Wi-Ce 188 (Altitude: 40 ft.) Cooperative Program (R)		
Pleistocene series:		
Salisbury formation (undifferentiated):		
Sand, fine, tan	10	10
Sand, fine, tan-white	10	20
Sand, fine-medium, white	10	30
Sand, medium-coarse, tan	10	40
Sand, medium-coarse, tan	10	50
Sand, coarse, iron-stained (some gravel)	14	64
Sand, very coarse, rusty tan; gravel	11	75
Gravel, mostly white	5	80
Sand, coarse, tan; some gravel	12	92
Gravel, mostly white	8	100
Sand, coarse, tan; gravelly	7	107
Gravel and sand, very coarse, tan; few pebbles	13	120

Table 6. Logs of wells, Salisbury Area, Maryland--Continued

Well	Thickness (feet)	Depth to base (feet)
Sand, medium-coarse, tan; gravelly	10	130
Sand, very coarse, tan; gravelly	10	140
Sand, very coarse, tan; some gravel	20	160
Gravel and sand, very coarse; iron stained	10	170
Sand, fine-medium, tan	10	180
Sand, medium-coarse, rust-tan	10	190
Sand, coarse, rusty red;gravelly	10	200
Sand, coarse, tan and gravel	10	210
Sand, very coarse, tan; gravelly	10	220
Sand, medium-coarse, gray-tan	14	234
Miocene series:		
Yorktown-Cohansey Formation:		
Sand, fine, gray; lignite	6	240
Sand, fine-medium, dark gray; some gray clay	10	250
Wi-Cf 42 (Rasmussen and Slaughter, 1955, p. 410)		
Wi-Cf 44 (Rasmussen and Slaughter, 1955, p. 410)		
Wi-Cf 45 (Rasmussen and Slaughter, 1955, p. 410-411)		
Wi-Cf 49 (Rasmussen and Slaughter, 1955, p. 411)		
Wi-Cf 55 (Rasmussen and Slaughter, 1955, p. 412)		
Wi-Cf 61 (Rasmussen and Slaughter, 1955, p. 413)		
Wi-Cf 62 (Rasmussen and Slaughter, 1955, p. 414-415)		
Wi-Cf 63 (Rasmussen and Slaughter, 1955, p. 416-417)		
Wi-Cf 70 (Rasmussen and Slaughter, 1955, p. 418)		
Wi-Cf 74 (Altitude: 26.99 ft.) Cooperative Program (R)		
Holocene series (?):		
Sand and gravel, yellow	8	8
Pleistocene series:		
Walston Formation:		
Clay, yellow to gray and sand	7	15
Salisbury Formation:		
Beaverdam facies:		
Gravel, coarse, and sand whitish gray	5	20
Sand and gravel (up to 3/4 in.), grayish-white	10	30
Sand, coarse, grayish-yellow and gravel	5	35
"Red Gravelly" facies:		
Sand, very coarse and gravel, orange-brown	10	45
Sand, very coarse and gravel, orange-brown	44.5	89.5
Miocene series:		
Yorktown-Cohansey Formation:		
Clay, silty, bluish-gray and sand, fine bluish-gray	1.5	91
Wi-Cf 81 (Altitude: 40 ft.) N. Shannahan (R)		
Pleistocene series:		
Walston Formation:		
Clay, sandy	4	4
Salisbury Formation (undifferentiated):		
Sand, white and gray	16	20
Sand, white and gray	42	62
Sand, brown and white	36	98
Miocene series:		
Yorktown-Cohansey Formation:		
Clay	20	118
Wi-Cf 87 (Altitude: 38 ft.) E. R. Kauffman (R)		
Top soil	1	1
Pleistocene series:		
Walston Formation:		
Sand and clay	2	3
Salisbury Formation (undifferentiated):		
Sand, white	19	22
Sand, tan	68	90
Wi-Cf 90 (Altitude: 40 ft.) E. R. Kauffman (R)		
Top soil	.5	.5
Pleistocene series:		
Walston Formation:		
Clay, sandy	7.5	8
Salisbury Formation (undifferentiated):		
Sand and clay layers	20	28
Sand, white	19	47
Sand, brown	33	80
Wi-Cf 98 (Altitude: 35 ft.) Roger B. White (J)		
Pleistocene series:		
Walston Formation:		
Clay, red	12	12
Salisbury Formation (undifferentiated):		
Sand and clay, red	18	30
Sand, white	10	40
Sand and clay, red	10	50
Gravel and clay, red	5	55
Sand, orange	15	70
Wi-Cf 101 (Altitude: 34 ft.) E. P. Schultz (J)		
Holocene series: (?)		
Top soil	1	1
Sand	2	3
Pleistocene series:		
Walston Formation:		
Clay	2	5
Salisbury Formation (undifferentiated):		
Sand, fine	20	25
Sand and clay streaks	15	40
Sand, fine	25	65
Sand and coarse gravel	17	82
Wi-Cf 108 (Altitude: 42 ft.) E. P. Schultz (J)		
Top soil and fill	4	4

Table 6. Logs of wells, Salisbury Area, Maryland--Continued

Well	Thickness (feet)	Depth to base (feet)
Pleistocene series:		
Walston Formation:		
Clay	8	12
Salisbury Formation (undifferentiated):		
Sand	6	18
Clay, sandy	9	27
Sand and gravel	12	39
Clay, sandy	40	79
Sand and gravel	14	93
Wi-Cf 114 (Altitude: 38 ft.) E. R. Kauffman (R)		
Pleistocene series: (undifferentiated):		
Top soil	1	1
Sand and clay	17	18
Sand and gravel	65	83
Clay and sand	10	93
Miocene series:		
Yorktown-Cohansey Formation:		
Clay, blue and sand streaks	12	105
Clay, blue	3	108
Wi-Cf 125 (Altitude: 38 ft.) Cooperative Program (C&A)		
Soil, fine-medium sandy, clayey, tannish-gray (core)	1	1
Pleistocene series:		
Walston Formation:		
Clay, fine sandy, tannish-brown (core)	1.5	2.5
Sand, fine-medium, clayey, tannish-brown (core)	3.5	6
Salisbury Formation:		
Beaverdam facies:		
Sand, fine-medium, tannish-brown (core)	4	10
Missing	2	12
Sand, fine-medium, clayey, grayish-brown (core)	.5	12.5
Sand, medium, fine pebbles, tan (core)	1.5	14
Missing	1	15
Sand, medium, silty, fine pebbles, orange-brown (core)	3	18
Missing	2	20
Sand, fine-medium, silty, white	2	22
Missing	3	25
Sand, fine white (core)	3	28
Missing	7	35
Sand, very coarse-granular, silty, white (core)	3	38
Missing	8	46
Sand, coarse-very coarse, silty, white (core)	4	50
Missing	2	52
Sand, fine, silty, white (core)	4	56
Sand, fine-medium, white	2	58
"Red Gravelly" facies :		
Sand, coarse-pebbly, orange-brown	19	77
Miocene series:		
Yorktown-Cohansey Formation:		
Clay, gritty, dark gray; shell fragments	18	95
Sand, medium, dark gray; intercalated clay, dark gray, gritty	7	102
Wi-Cf 126 (Altitude: 45 ft.) Cooperative Program (C&A)		
Soil, sandy, brown (core)	1	1
Pleistocene series:		
Walston Formation:		
Sand, fine-medium, clayey, brown (core)	1.5	2.5
Clay, gritty, brown (core)	1	3.5
Sand, fine, very clayey, tannish-brown (core)	3.5	7
Salisbury Formation:		
Beaverdam facies:		
Sand, fine-medium, silty, grayish-tan (core)	2	9
Missing	3	12
Sand, medium, very silty, tan (core)	2	14
Missing	3	17
Sand, coarse-pebbly (1/4 in.), silty, white (core)	1	18
Sand, medium, silty, white (core)	2	20
Missing	3	23
Sand, very fine-fine, silty, white (core)	3	26
Missing	3	29
Sand, fine-medium, silty, tannish-white (core)	3	32
Missing	5	37
"Red Gravelly" facies:		
Sand, very coarse-pebbly (1/2 in.), "clean", orange-brown (core)	2	39
Missing	13	52
Sand, very coarse-granular, "clean", rusty-brown (core)	1	53
Sand, coarse-pebbly, rusty-brown	7	60
Same, fine-coarse, orange-brown	40	100
Miocene series:		
Yorktown-Cohansey Formation:		
Clay, gritty, bluish gray	2	102
Wi-Cf 127 (Altitude: 28 ft.) Cooperative Program (C&A)		
Pleistocene series:		
Salisbury Formation:		
Beaverdam facies:		
Soil, sandy, dark gray (core)	1	1
Sandy, fine-medium, grayish-brown (core)	2	3
Sand, medium-granular, tan (core)	3	6
Sand, medium-coarse, silty, tan (core)	3	9
Sand, medium-coarse, silty, orange-brown (core)	2	11
Sand, very fine-fine, silty, white (core)	1	12
Sand, fine-medium, silty, white (core)	3	15
Sand, medium, silty, tannish-white (core)	3	18
"Red Gravelly" facies :		
Sand, fine-medium, orange-brown (core)	3	21
Missing	2	23
Sand, very fine-fine silty, tan (core)	3	26
Sand, fine, silty, tan (core)	3	29
Missing	3	32
Sand, medium-coarse, "clean", orange-brown (core)	3	35
Sand, medium, "clean", orange-brown (core)	3	38
Sand, very fine-fine, silty, tan (core)	3	41
Sand, medium-granular, pebbly, orange-brown	24	65

Table 6. Logs of wells, Salisbury Area, Maryland--Continued

Well	Thickness (feet)	Depth to base (feet)
Sand, fine, very clayey, occasional pebbles, grayish-brown; poorly sorted	5	70
Miocene series:		
Yorktown-Cohansey Formation:		
Clay, gritty, dark gray	20	90
Sand, fine, silty, dark gray	7	97
Wi-Cf 128 (Altitude: 42 ft.) N. Shannahan (R)		
Pleistocene series:		
Walston Formation:		
Clay and sand	10	10
Salisbury Formation (undifferentiated):		
Sand, coarse white and brown	42	52
Rock (ferruginous layer)	1	53
Clay, gray	13	66
Clay, light brown	1	67
Sand, coarse, white	39	106
Sand, coarse, brown and white	20	126
Sand, fine, brown and white	12	138
Sand, coarse, white and brown	29	167
Sand, medium brown and white	11	178
Wi-Cf 131 (Altitude: 44 ft.) N. Shannahan (R)		
Sand	2	2
Pleistocene series:		
Walston Formation:		
Clay	10	12
Salisbury Formation (undifferentiated):		
Sand and gravel	38	50
Clay	19	69
Sand, coarse	35	104
Sand	39	143
Miocene series:		
Yorktown-Cohansey Formation:		
Clay	32	175
Wi-Cf 132 (Altitude: 42 ft.) Cooperative Program (R)		
Sand, very fine to fine, tan	2	2
Pleistocene series:		
Walston Formation:		
Clay, fine to medium sandy, brown	3	5
Clay, fine sandy, tan	10	15
Salisbury Formation:		
Beaverdam facies:		
Sand, fine-granular, pebbly, white	35	50
"Red Gravelly" facies:		
Clay, fine-medium sandy, tannish-brown	15	65
Sand, medium-granular, clayey, brown	5	70
Sand, medium-pebbly, orange-brown	20	90
Sand, medium-coarse, orange-brown	10	100
Sand, medium-coarse, granular, orange-brown	10	110
Sand, fine-medium, occasionally coarse, orange-brown	20	130
Sand, coarse-very coarse, orange-brown	5	135
Sand, medium-coarse, tan	5	140
Sand, coarse-very coarse, orange-brown	15	155
Sand, medium, rusty-brown	5	160
Sand, coarse-very coarse, rusty brown	2	162
Miocene series:		
Yorktown-Cohansey Formation:		
Sand, medium, gray	13	175
Sand, medium-coarse, gray, lignitic fragments	15	190
Sand, medium-coarse, gray, rare lignitic fragments	10	200
Sand, fine-coarse, gray, rare lignitic fragments	15	215
Sand, fine-medium, gray, rare lignitic fragments	5	220
Sand, medium-coarse, gray, rare lignitic fragments	5	225
Wi-Cf 134 (Altitude: 27 ft.) Cooperative Program (C&A)		
Pleistocene series:		
Salisbury Formation:		
Beaverdam facies:		
Sand, medium-coarse, silty, tannish-brown	4	4
Sand, fine-medium, silty, tannish-brown	4	8
Sand, fine-medium, silty, whitish-tan (core)	2	10
Missing	4	14
Sand, medium-coarse, silty, whitish-tan (core)	2	16
Missing	4	20
Sand, fine-medium, silty, some granules, whitish-tan (core)	2	22
Missing	4	26
Sand, medium-coarse, silty, some pebbles, tan (core)	2	28
Missing	4	32
Sand, medium-coarse, silty, some pebbles, whitish-tan (core)	2	34
Missing	4	38
Sand, fine-medium, very silty, some granules, whitish-tan (core)	2	40
Missing	4	44
Sand, fine-medium, very silty, whitish-tan (core)	2	46
Missing	4	50
Sand, fine, very silty, whitish-tan (core)	2	52
Missing	6	58
Sand, medium, tan (core)	2	60
Sand, coarse-granular, orange-brown (core)	1	61
"Red Gravelly" facies :		
Missing	3	64
Sand, granular, rusty-brown	2	66
Missing	12	78
Sand, very coarse-granular, pebbly (1/2 in.), rusty-brown (core)	2	80
Missing	4	84
Sand, fine-medium, silty, rusty-brown (core)	.5	84.5
Sand, granular, silty, rusty-brown (core)	1	85.5
Miocene series:		
Yorktown-Cohansey Formation :		
Clay, fine sandy, dark gray (core)	.5	86
Missing	2	88
Sand, fine to medium, dark gray	2	90
Wi-Cf 135 (Altitude: 25 ft.) Cooperative Program (C&A)		
Holocene series:		

Table 6. Logs of wells, Salisbury Area, Maryland--Continued

Well	Thickness (feet)	Depth to base (feet)
Clay, highly organic, dark gray and sand, fine-medium, clayey, dark gray	7	7
Missing	1	8
Pleistocene series:		
Salisbury Formation:		
Beaverdam facies:		
Sand, medium-coarse, silty, white (core)	2	10
Missing	4	14
Sand, fine-medium, silty, white (core)	2	16
Missing	4	20
Sand, very fine-fine, silty, white (core)	2	22
Missing	4	26
"Red Gravelly" facies:		
Sand, coarse-very coarse, silty, tan (core)	2	28
Missing	4	32
Sand, granular, very silty, orange-brown (core)	2	34
Missing	4	38
Sand, granular, very silty, orange-brown (core)	2	40
Missing	4	44
Sand, very fine-fine, silty, tan (core)	2	46
Missing	4	50
Sand, medium-coarse, very silty, tan (core)	2	52
Missing	4	56
Sand, very coarse-granular, silty, tan (core)	2	58
Missing	4	62
Sand, coarse-granular, very silty, orange-brown (core)	2	64
Missing	4	68
Sand, coarse-granular, very silty, orange-brown (core)	2	70
Missing	4	74
Sand, medium, tan	2	76
Sand, medium-coarse, tan	2	78
Sand, very coarse-granular, silty, orange-brown	2	80
Missing	3	83
Sand, medium, silty, orange-brown (core)	2	85
Missing	5	90
Sand, fine, tannish-gray	2	92
Missing	2	94
Miocene series:		
Yorktown-Cohansey Formation:		
Sand, fine-medium, gray	1	95
Clay, fine-sandy, gray	2	97
Wi-Cf 136 (Altitude: 47 ft.) Cooperative Program (C&A)		
Pleistocene series:		
Walston Formation :		
Clay, fine sandy, tan-gray (mottled)	5	5
Sand, fine, very clayey, tan-gray (mottled)	3	8
Salisbury Formation:		
Beaverdam facies:		
Sand, coarse-very coarse, very silty, white (core)	2	10
Missing	6	16
Sand, fine, very silty, white (core)	2	18
Missing	6	24
Sand, fine-medium, silty, white (core)	2	26
Missing	6	32
Sand, fine-medium, silty, white (core)	2	34
Missing	6	40
Sand, fine-medium, very silty, some granules, white (core)	2	42
Missing	6	48
Sand, coarse-granular, pebbly 3/4 in.), white (core)	2	50
Missing	6	56
Sand, very coarse-fine pebbly, white (core)	2	58
Missing	10	68
Sand, medium-coarse, very silty, white (core)	2	70
Missing	4	74
Sand, fine-medium, "clean", white (core)	2	76
Missing	9	85
"Red Gravelly" facies:		
Sand, medium, ornage-brown	4	89
Missing	1	90
Sand, fine to coarse and gravel (1 in.), orange-brown (core)	2	92
Missing	8	100
Sand, medium to coarse, some granules, very silty, tan (core)	2	102
Missing	15	117
Miocene series:		
Yorktown-Cohansey Formation:		
Sand, medium gray (core)	5	122
Clay, gritty, dark gray (core)	4	126
Wi-Cf 138 (Altitude: 7.3 ft.) Cooperative Program (C&R)		
Fill	2	2
Holocene series:		
Orgnaic material, clayey, dark gray	2	4
Pleistocene series:		
Salisbury Formation:		
Beaverdam facies		
Sand, fine-medium, "clean", white (core)	2	6
Sand, coarse-very coarse, white	1	7
"Red Gravelly" facies:		
Gravel and sand, medium, redish black; mottled tan-gray matrix	1	8
Sand, coarse, orange-brown	1	9
Sand, coarse-very coarse, tan (core)	3	12
Sand, coarse-very coarse, tan	3	15
Sand, medium-coarse, silty, tan (core)	2	17
Sand, fine, very silty, tan (core)	1	18
Sand, fine-medium, orange-brown	3	21
Sand, fine very silty, orange-brown (core)	1	22
Sand, medium-coarse, some granules, orange-brown (core)	2	24
Clay, tan	1	25
Sand, fine, orange-brown	2	27
Sand, fine-medium, silty, orange-brown (core)	3	30
Sand, fine-medium, orange-brown	3	33
Sand, medium, granular, orange-brown (core)	1	34
Sand, fine, silty, orange-brown (core)	2	36
Sand, medium-coarse, orange-brown	3	39
Sand, coarse-fine gravelly, orange-brown (core)	3	42

Table 6. Logs of wells, Salisbury Area, Maryland--Continued

Well	Thickness (feet)	Depth to base (feet)
Sand, medium-coarse, orange-brown	3	45
Sand, very coarse-gravelly, silty, orange-brown (core)	3	48
Sand, medium-coarse, orange-brown	3	51
Clay, gritty, mottled gray and rusty (core)	1	52
Sand, medium-coarse, orange-brown (core)	1	53
Clay, gritty, mottled gray and rusty (core)	1	54
Sand, medium-coarse, orange-brown	3	57
Sand, medium, "clean", orange-brown (core)	2	59
Miocene series:		
Yorktown-Cohansey Formation:		
Sand, fine, dark gray (core)	1	60
Clay, gritty, dark gray; lignitic fragments	3	63
Wi-Cf 139 (Altitude: 19.5 ft.) Cooperative Program (C&R)		
Fill	3	3
Pleistocene series:		
Salisbury Formation:		
Beaverdam facies:		
Sand, fine-medium, silty, white (core)	2	5
Clay, pebbly, tannish-white (core)	1	6
Sand, coarse-gravelly, white	3	9
Sand, medium, very silty, some pebbles (1/2 inch), white (core)	3	12
Sand, medium-pebbly, white	3	15
Sand, very coarse-granular, "clean", white (core)	1	16
Sand, very coarse-pebbly (3/8 in.), silty, orange-brown (core)	2	18
Sand, very coarse-granular, tan	3	21
Sand, medium, whitish-tan (core)	3	24
Sand, medium-coarse, some pebbles, whitish-tan	3	27
Sand, gravelly (1 inch), whitish-tan (core)	1	28
Sand, medium, "clean", whitish-tan (core)	2	30
Sand, medium-pebbly, whitish-tan	3	33
Sand, coarse, pebbly (1 in.), tannish-white (core)	1	34
Sand, fine-medium, silty, tannish-white (core)	2	36
Sand, medium-coarse, tannish-white	3	39
Sand, medium-coarse, some pebbles (1/4 in.), tannish-white	3	42
Sand, medium-coarse, tannish-white	3	45
Sand, fine-medium, tannish-white (core)	3	48
Sand, medium-coarse, tannish-white	3	51
"Red Gravelly" facies:		
Sand, very fine-fine, silty, orange-brown (core)	3	54
Sand, medium-coarse, orange-brown	3	57
Sand, coarse-very coarse, granular, orange-brown (core)	3	60
Sand, coarse-very coarse, orange-brown	3	63
Sand, coarse-very coarse, fine pebbly, orange-brown (core)	3	66
Sand, coarse-very coarse, fine pebbly, orange-brown	3	69
Sand, coarse-very coarse, fine pebbly, orange-brown (core)	3	72
Sand, very coarse-granular, orange-brown	3	75
Sand, coarse-granular, pebbles (1/4 in.) orange-brown (core)	3	78
Sand, coarse-granular, pebbles, orange-brown	3	81
Sand, very coarse-granular, fine pebbles, orange-brown (core)	3	84
Sand, coarse-very coarse, orange-brown	3	87
Sand, very coarse-granular, fine pebbles, orange-brown (core)	3	90
Sand, coarse-very coarse, orange-brown	3	93
Sand, coarse-very coarse, rusty-brown (core)	.5	93.5
Miocene series:		
Yorktown-Cohansey Formation:		
Clay, gritty, dark gray (core)	2.5	96
Clay, gritty, dark gray	3	99
Wi-Cf 144 (Altitude: 35 ft.) W. K. Wood (R)		
Pleistocene series:		
Walston Formation:		
Clay, gritty, grayish tan	5	5
Salisbury Formation (undifferentiated):		
Sand, fine, clayey, tan	5	10
Sand, coarse granular, tan	5	15
Sand, coarse, pebbles (1/2 in.), orange-brown	5	20
Sand, coarse-granular, orange-brown	5	25
Sand, medium, orange-brown	10	35
Sand, very coarse-fine gravelly, orange-brown	5	40
Sand, medium-coarse, orange-brown	5	45
Sand, coarse-fine gravelly, orange-brown	10	55
Sand, granular, pebbles (3/4 in.) orange-brown	5	60
Sand, medium-coarse, orange-brown	5	65
Sand, coarse, pebbles (1/4 in.) orange-brown	15	80
Miocene series:		
Yorktown-Cohansey Formation:		
Clay, fine sandy, dark gray	10	90
Clay, gritty, dark gray and sand, fine, dark gray	10	100
Clay, fine sandy, dark gray	15	115
Wi-Cf 147 (Altitude: 41 ft.) Cooperative Program (R)		
Holocene series:		
Top soil	1	1
Sand, fine-medium, tan	4	5
Pleistocene series:		
Walston Formation:		
Clay, tan, sandy	5	10
Salisbury Formation:		
Beaverdam facies:		
Sand, medium-coarse, tan, silty	5	15
Sand, medium-coarse, white, pebbles; clayey matrix	5	20
Sand, very fine-fine, white, silty	5	25
Sand, medium-coarse, white, silty	10	35
Sand, medium-coarse, pebbly, tannish-gray	5	40
Sand, medium-coarse, tannish-gray	8	48
"Red Gravelly" facies:		
Sand, coarse-very coarse, orange-brown and gravel	6	54
Clay, gritty, rusty brown	4	58
Clay, gray	7	65
Sand, coarse-fine pebbly, orange-brown	10	75
Sand, very coarse-granular, orange-brown	15	90
Sand, medium-coarse, tan	5	95
Sand, fine-medium, tan	10	105

Table 6. Logs of wells, Salisbury Area, Maryland--Continued

Well	Thickness (feet)	Depth to base (feet)
Sand, medium, some granules, tan	10	115
Sand, very coarse-fine pebbly, tan	15	130
Gravel, very coarse, sandy-granular, tan	9	138
Sand, medium-coarse, pebbly, tan	7	145
Sand, coarse-granular, tan	8	153
Gravel, fine, orange-brown	7	160
Gravel, fine-medium, orange-brown	5	165
Sand, medium-coarse, some pebbles, tan	5	170
Sand, fine-medium, grayish tan	20	190
Sand, medium-coarse, grayish tan	10	200
Sand, coarse-granular, grayish orange	7	207
Miocene series:		
Yorktown-Cohansey Formation:		
Sand, fine-medium, gray	3	210
Sand, medium-coarse, gray	10	220
Sand, very fine, gray	10	230
Sand, very fine, gray, lignitic fragments	20	250
Sand, very fine, gray, abundant lignitic fragments	5	255
Sand, very fine, gray	3	258
St. Marys Formation:		
Clay, fine sandy, dark gray, shell fragments (e.g. Turritella, Uzita, Terebra)	12	270
Clay, fine, sandy, dark gray, abundant shell fragments	15	285
Wi-Cf 148 (Altitude: 39 ft.) Cooperative Program (R)		
Holocene series:		
Sand, very fine-fine, well sorted, tannish-brown	5	5
Pleistocene series:		
Walston Formation:		
Sand, fine-medium, clayey, grayish-tan	5	10
Salisbury Formation:		
Beaverdam facies:		
Sand, medium-coarse, finely granular, tannish-white	5	15
Sand, medium-coarse, tannish-white, few pebbles	10	25
"Red Gravelly" facies:		
Sand, coarse-fine, orange-brown	5	30
Sand, medium-coarse, pebbly, orange-brown	5	35
Sand, coarse-granular, tan	5	40
Sand, fine-medium, some granules, tan	5	45
Sand, medium-coarse, fine pebbles, orange-brown	5	50
Gravel, very coarse-granular, orange-brown	4	54
Clay, gritty, mottled tan and gray	4	58
Sand, fine silty, tan	7	65
Sand, medium-very coarse, tan	5	70
Sand, fine, tan	5	75
Sand, very fine-fine, grayish-tan	7	82
Sand, medium-very coarse, tan and gravel	3	85
Sand, fine-medium, grayish tan	5	90
Miocene series:		
Yorktown-Cohansey Formation:		
Clay, gritty, dark gray; intercalated sand, very fine, dark gray	10	100
Sand, very fine, clayey, dark gray; lignitic fragments	5	105
Wi-Cf 149 (Altitude: 40 ft.) Cooperative Program (R)		
Holocene series:		
Sand, very fine-fine, tan	5	5
Pleistocene series:		
Walston Formation:		
Clay, very gritty, mottled tan and gray	8	13
Salisbury Formation (undifferentiated):		
Sand, fine-medium, grayish-white, few pebbles	2	15
Sand, fine-medium, orange-brown	5	20
Sand, fine-medium, grayish-tan	5	25
Sand, medium, orange-brown	5	30
Sand, medium-coarse, tan	5	35
Sand, fine-medium, gray, abundant black lignitic material	7	42
Sand, coarse-granular orange-brown, abundant pebbles (1/2 in.)	3	45
Sand, fine-medium, tan	8	53
Sand, coarse, orange-brown, pebbles (1 in.)	2	55
Sand, fine-medium, tan few pebbles (1 in.)	5	60
Sand, medium, tan to orange-brown	5	65
Sand, very fine-fine, tan	5	70
Sand, coarse-granular, orange-brown	10	80
Sand, coarse-fine pebbly, tan	15	95
Sand, very coarse-granular, orange-brown and gravel (1/4 in.)	5	100
Miocene series:		
Yorktown-Cohansey Formation:		
Clay, gritty, gray, woody fragments	6	106
Sand, very fine-fine, gray, woody fragments	14	120
Wi-Cf 150 (Altitude: 34 ft.) Cooperative Program (R)		
Holocene series:		
Sand, medium, slightly clayey, tan	5	5
Pleistocene series:		
Walston Formation:		
Clay, gritty, grayish	5	10
Salisbury Formation:		
Beaverdam facies:		
Sand, fine-medium, grayish tan, some fine pebbles	5	15
Sand, fine-medium, grayish white	5	20
Sand, very coarse-coarse, grayish white, some fine pebbles	5	25
Sand, medium-coarse, grayish-white	5	30
Sand, medium-coarse, tannish-gray	5	35
"Red Gravelly" facies:		
Sand, coarse-granular, tan; lignitic fragments	6	41
Gravel, fine-medium, tan, in matrix of rusty brown clay	2	43
Clay, gritty, tan	3	46
Clay, gritty, gray	15	61
Sand, coarse-granular, orange-brown	4	65
Sand, coarse-very coarse, granular, tan	5	70
Sand, very coarse, grayish tan; and fine gravel	5	75
Sand, coarse-very coarse, granular, tannish-gray	20	95
Sand, medium, grayish-tan	5	100
Sand, very coarse-fine pebbly, grayish-tan	5	110
Sand, very coarse, granular, tan	5	115
Sand, coarse-very coarse, tan	5	120

Table 6. Logs of wells, Salisbury Area, Maryland--Continued

Well	Thickness (feet)	Depth to base (feet)
Gravel, fine-medium, orange-brown, very coarse sandy matrix	5	125
Gravel, fine-coarse, orange-brown in sandy matrix	10	135
Sand, coarse-very coarse, orange-brown and gravel	10	145
Sand, medium, orange-brown	5	150
Sand, fine-medium, grayish-tan	10	160
Sand, fine, grayish-tan	5	165
Sand, medium-coarse, tan and gravel, fine	10	175
Sand, coarse-very coarse, orange-brown	5	180
Sand, very coarse-fine pebbly, orange-brown	5	185
Gravel, fine, orange-brown	5	190
Sand, very coarse, orange-brown and gravel, fine; ferruginous laminae, rusty, brown	5	195
Concretion zone, fragmented ferruginous material, rusty brown	5	200
Sand, coarse, very coarse, rusty brown	5	205
Sand, fine, grayish-tan	5	210
Sand, medium, grayish-tan	5	215
Sand, fine, grayish-tan	5	220
Sand, medium, grayish-tan	5	225
Sand, fine, tannish-gray	5	230
Miocene series:		
Yorktown-Cohansey Formation:		
Sand, very fine-fine, dark gray	6	236
St. Marys Formation:		
Clay, gritty, dark gray	19	255
Clay, gritty, dark gray, shell fragments (Turritella, Terebra, pelecypod fragments)	10	265
Wi-Cf 151 (Altitude: 46 ft.) Cooperative Program (R)		
Note: Test hole drilled in borrow pit. Pit floor (well datum) is about 4 ft. below former land surface. Holocene material in wall of pit is tannish-gray, fine sand.		
Pleistocene series:		
Walston Formation:		
Sand, fine, clayey, tan	5	5
Sand, fine, very clayey, tan	3	8
Salisbury Formation (undifferentiated):		
Sand, medium-coarse, white	7	15
Sand, medium, some fine pebbles, tan	5	20
Sand, medium, tan	10	30
Sand, coarse-very coarse, pebbly, orange-brown	5	35
Sand, very coarse-granular, tan	9	44
Sand, medium-coarse, orange-brown	1	45
Gravel, medium-large, clay matrix	1	46
Clay, orange-brown	2	48
Clay, gritty, dark gray	12	60
Sand, fine-medium, rusty brown, ferruginous fragments (concretions)	5	65
Sand, coarse granular, tan	5	70
Gravel, medium-coarse, grayish-tan	5	75
Sand, medium-coarse, tan	10	85
Sand, coarse-fine pebbly, orange-brown	12	97
Miocene series:		
Yorktown-Cohansey Formation:		
Clay, gritty, dark gray	8	105
Sand, very fine-fine, dark gray, lignitic fragments	10	115
Wi-Cf 152 (Altitude: 42 ft.) Cooperative Program (R)		
Holocene series:		
Sand, fine, gray	1	1
Sand, fine-medium, tan	4	5
Pleistocene series:		
Walston Formation:		
Sand, medium, very clayey, tan	7	12
Salisbury Formation:		
Beaverdam facies:		
Sand, medium, white	3	15
Sand, fine, white	5	20
Sand, very coarse, white and gravel, medium	5	25
Sand, fine-very coarse, white and gravel, medium	5	30
Gravel, coarse (1 in.), white and sand, very coarse, white	5	35
Sand, granular, white; some fine pebbles	5	40
Sand, medium-coarse, tan; some fine pebbles	5	45
Sand, medium, tan and gravel	4	49
"Red Gravelly" facies:		
Ferruginous layer	1	50
Clay, gritty, grayish-tan	11	61
Sand, fine-medium, tan	4	65
Sand, medium-coarse, grayish-tan	5	70
Sand, fine-medium, grayish-tan	10	80
Sand, medium-coarse, tan	5	85
Sand, fine-medium, tan	13	98
Miocene series:		
Yorktown-Cohansey Formation:		
Clay, dark gray	7	105
Sand, very fine-fine, gray; intercalated dark gray clay	20	125
Wi-Cg 35 (Rasmussen and Slaughter, 1955, p. 421)		
Wi-Cg 37 (Anderson, 1948, fig. 10)		
Wi-Cg 40 (Rasmussen and Slaughter, 1955, p. 422)		
Wi-Cg 42 (Rasmussen and Slaughter, 1955, p. 423)		
Wi-Cg 44 (Rasmussen and Slaughter, 1955, p. 423)		
Wi-Cg 45 (Altitude: 69 ft.) L. E. Cowger (J)		
Pleistocene series:		
Parsonsburg Sand:		
Top soil	3	3
Sand, fine	17	20
Walston Formation:		
Clay, gray	14	34
Salisbury Formation:		
Beaverdam facies:		
Sand, fine and clay	40	74

Table 6. Logs of wells, Salisbury Area, Maryland--Continued

Well	Thickness (feet)	Depth to base (feet)
Sand, medium-coarse	8	82
Sand, and gravel	16	108
Wi-Cg 51 (Altitude: 80 ft.) K. Wood (R)		
Pleistocene series:		
Parsonsburg Sand:		
Top soil	1	1
Sand, fine, tan, well sorted	4	5
Sand, fine-medium, tannish-gray	5	10
Sand, fine-medium, grayish-tan	5	15
Sand, medium, light gray and clay, light gray	5	20
Walston Formation:		
Clay, fine sandy, gray	5	25
Clay, fine sandy, gray and sand, fine gray	10	35
Clay, fine sandy, greenish gray	7	42
Salisbury Formation:		
Beaverdam facies:		
Sand, medium-coarse, whitish-gray	48	90
Sand, coarse-granular, whitish-gray	10	100
Wi-De 13 (Rasmussen and Slaughter, 1955, p. 432)		
Wi-De 32 (Rasmussen and Slaughter, 1955, p. 433)		
Wi-De 50 (Altitude: 48 ft.) E. R. Kauffman (R)		
Top soil	1	1
Pleistocene series:		
Walston Formation:		
Clay, brown	7	8
Salisbury Formation (undifferentiated):		
Sand, brown and clay layers	37	45
Sand, brown	47	92
Ferruginous zone	5	97
Sand, brown	1	98
Miocene series:		
Yorktown-Cohansey Formation:		
Clay, blue and sand layers	17	115
Wi-De 51 (Altitude: 40 ft.) N. Shannahan (R)		
Pleistocene series:		
Walston Formation:		
Clay, sandy, white and gray	20	20
Salisbury Formation (undifferentiated):		
Sand, fine	10	30
Sand, medium	23	53
Sand, fine	4	57
Sand, medium	7	64
Miocene series:		
Yorktown-Cohansey Formation:		
Clay, gray	2	66
Wi-De 56 (Altitude: 20 ft.) E. P. Schultz (J)		
Pleistocene series:		
Salisbury Formation (undifferentiated):		
Top soil (sandy loam)	1	1
Sand, medium, buff	20	21
Sand, coarse, white	24	45
Sand, fine to medium, light orange	15	60
Sand, medium and gravel fine, orange	10	70
Sand, medium to coarse, orange	15	85
Miocene series:		
Yorktown-Cohansey Formation:		
Clay, dark	-	85
Wi-De 58 (Altitude: 28 ft.) E. P. Schultz (J)		
Holocene series:		
Top soil	1	1
Sand, fine	13	14
Pleistocene series:		
Walston Formation:		
Clay	8	22
Salisbury Formation (undifferentiated):		
Sand, clayey	20	42
Sand, gray	11	53
Clay, sandy	5	58
Sand, fine	5	63
Sand, red and clay streaks	10	73
Wi-De 59 (Altitude: 25 ft.) P. W. Hubbert (J)		
Holocene series:		
Soil and sand	5	5
Pleistocene series:		
Walston Formation:		
Clay	7	12
Salisbury Formation (?) (undifferentiated):		
Sand, fine and clay	10	32
Sand, fine	6	38
Clay, gray	15	53
Clay, blue	6	59
Clay	2	61
Gravel, coarse	6	67
Wi-De 61 (Altitude: 25 ft.) P. W. Hubbert (J)		
Holocene series:		
Top soil and sand	4	4
Pleistocene series:		
Walston Formation:		
Clay	12	16
Salisbury Formation (undifferentiated):		
Sand, white	4	20
Sand, yellow and gravel, coarse	10	30
Sand, fine, red	15	45
Sand, fine-coarse, red	13	58
Wi-De 63 (Altitude: 18 ft.) Cooperative Program (C&A)		
Pleistocene series:		
Salisbury Formation:		
Beaverdam facies:		

Table 6. Logs of wells, Salisbury Area, Maryland--Continued

Well	Thickness (feet)	Depth to base (feet)
Sand, fine-medium, gray	4	4
Missing	4	8
Sand, fine-medium, very silty, tan (core)	1	9
"Red Gravelly" facies:		
Sand, medium-granular, clayey, orange-brown (core)	1	10
Missing	4	14
Sand, medium-granular, silty, orange-brown (core)	2	16
Missing	4	20
Sand, medium-fine pebbly, silty, orange-brown (core)	2	22
Missing	4	26
Sand, coarse-pebbly, clayey matrix, grayish-tan (core)	2	28
Missing	4	32
Sand, very fine-fine, very silty, orange-brown (core)	2	34
Missing	4	38
Sand, medium-fine pebbly, silty, orange-brown (core)	2	40
Missing	4	44
Sand, fine-medium, very silty, orange-brown (core)	2	46
Missing	4	50
Sand, coarse-granular, very silty orange-brown (core)	2	52
Missing	4	56
Sand, very coarse-pebbly (1/2 in.) silty, rusty-brown (core)	2	58
Missing	4	62
Sand, very coarse-granular, silty, rusty-brown (core)	2	64
Missing	4	68
Sand, very-coarse, well sorted, orange-brown (core)	2	70
Missing	4	74
Sand, fine-medium, mottled gray and orange-brown (core)	1.5	75.5
Miocene series:		
Yorktown-Cohansey Formation:		
Sand, fine, clayey, dark gray (core)	.5	76
Missing	4	80
Sand, fine-medium, silty, dark gray (core)	2	82
Wi-De 64 (Altitude: 20 ft.) Cooperative Program (C&A)		
Fill	3	3
Pleistocene series:		
Salisbury Formation:		
Beaverdam facies:		
Sand, very fine-fine, gray	2	5
Sand, fine-medium, tannish-gray	3	8
Sand, fine, "clean", white (core)	1	9
"Red Gravelly" facies:		
Sand, medium-coarse, orange-brown (core)	1	10
Missing	4	14
Sand, medium, orange-brown (core)	2	16
Missing	4	20
Sand, medium-fine, pebbly, silty, orange-brown (core)	2	22
Missing	4	26
Sand, very coarse-fine pebbly, silty, orange-brown	2	28
Missing	4	32
Sand, medium-coarse, silty, orange-brown (core)	2	34
Missing	4	38
Sand, medium-very coarse, silty, orange-brown (core)	2	40
Missing	4	44
Sand, medium-coarse, silty, orange-brown and some gravel, fine (core)	2	46
Missing	4	50
Sand, medium-coarse, silty, some fine pebbles, orange-brown (core)	2	52
Missing	4	56
Sand, medium, very silty, orange-brown; several ferruginous nodules (1 in.) present (core)	2	58
Missing	4	62
Sand, medium-coarse, rusty-brown; fragmented ferruginous nodules present. Lower 3 inches consists of gravel in matrix of dark gray clay (core)	1	63
Miocene series:		
Yorktown-Cohansey Formation:		
Clay, sandy, dark gray (core)	1	64
Missing	4	68
Sand, fine-medium, very clayey, dark gray (core)	2	70
Wi-De 66 (Altitude: 38 ft.) E. P. Schultz (J)		
Fill	5	5
Holocene series:		
Sand, fine	5	10
Pleistocene series:		
Walston Formation:		
Sand, clayey	5	15
Clay, dark gray	5	20
Salisbury Formation (undifferentiated):		
Sand, fine	10	30
Sand, coarse and gravel, fine	10	40
Sand, fine, tan	10	50
Gravel, fine-medium	3	53
Gravel, medium-coarse	5	58
Sand, coarse, red	5	63
Miocene series:		
Yorktown-Cohansey Formation:		
Clay, dark		63
Wi-Df 19 (Rasmussen and Slaughter, 1955, p. 434)		
Wi-Df 20 (Rasmussen and Slaughter, 1955, p. 434)		
Wi-Df 29 (Rasmussen and Slaughter, 1955, p. 436)		
Wi-Df 44 (Rasmussen and Slaughter, 1955, p. 441)		
Wi-Df 52 (Altitude: 44 ft.) E. R. Kauffman (R)		
Holocene series:		
Sand, tan	4	4
Pleistocene series:		
Walston Formation:		
Sand, tan and clay	12	16
Clay, white	3	19
Salisbury Formation (undifferentiated):		
Sand, tan	64	83

Table 6. Logs of wells, Salisbury Area, Maryland--Continued

Well	Thickness (feet)	Depth to base (feet)
Sand, brown	7	90
Miocene series:		
Yorktown-Cohansey Formation:		
Clay, blue	10	100
Wi-Df 55 (Altitude: 43 ft.) Cooperative Program (C&A)		
Pleistocene series:		
Walston Formation:		
Clay, fine sandy, mottled tan and gray	8	8
Salisbury Formation:		
Beaverdam facies:		
Sand, fine, clayey, tan (core)	2	10
Missing	4	14
Clay, fine sandy, mottled tan and gray (core)	2	16
Missing	4	20
Sand, fine, very silty, tannish-white (core)	2	22
Missing	4	26
Sand, very fine-fine, very silty, white (core)	2	28
Missing	4	32
Sand, medium, some fine pebbles, silty, white (core)	2	34
Missing	4	38
Sand, fine-medium, some granules, silty, tannish-white (core)	1	39
Sand, very fine, silty, white (core)	1	40
Missing	4	44
Sand, medium-coarse, very silty, tannish-white (core)	1	45
Sand, very coarse-pebbly, tan (core)	1	46
Missing	4	50
Sand, fine-medium, very silty, tannish-white (core)	2	52
Missing	4	56
Sand, coarse-granular, very silty, tannish-white (core)	2	58
Missing	4	62
Sand, very coarse-granular, silty, tan (core)	2	64
Missing	4	68
Sand, very coarse-fine pebbly, tannish-white (core)	2	70
Missing	4	74
Sand, very coarse-fine pebbly, silty, white (core)	2	76
Missing	6	82
Sand, granular-fine pebbly, very silty, tannish-white (core	2	84
Missing	4	88
"Red Gravelly" facies:		
Sand, very coarse-fine pebbly, silty, orange-brown (core)	2	90
Missing	2	92
Sand, medium-coarse, silty and ferruginous nodules, pink-orange brown. Very hard drilling.	4	96
Missing	2	98
Miocene series:		
Yorktown-Cohansey Formation:		
Clay, fine sandy, dark gray	3	101
Wi-Df 56 (Altitude: 38 ft.) Cooperative Program (C&A)		
Missing	2	3
Pleistocene series:		
Walston Formation:		
Sand, fine-medium, silty, tan	2	5
Clay, fine, sandy, light gray	2	7
Salisbury Formation:		
Beaverdam facies:		
Missing	1	8
Sand, fine-medium, silty, white (core)	2	10
Missing	4	14
Sand, fine-medium, silty, white (core)	2	16
Missing	4	20
Sand, fine, clayey, tan (core)	2	22
Missing	4	26
Sand, medium, "clean", tan (core)	1	27
Sand, fine-medium, silty, white (core)	1	28
Missing	4	32
"Red Gravelly" facies:		
Sand, fine-medium, very silty, orange-brown (core)	2	34
Missing	4	38
Sand, medium, silty, orange-brown (core)	1	39
Sand, medium, few fine pebbles, orange-brown (core)	1	40
Missing	4	44
Sand, coarse, orange-brown	2	46
Missing	4	50
Sand, fine-medium, few fine pebbles, orange-brown (core)	2	52
Missing	4	56
Sand, medium-granular, silty orange-brown (core)	2	58
Missing	4	62
Sand, very coarse-granular, orange-brown	2	64
Missing	4	68
Sand, coarse-pebbly, silty, tan (core)	2	70
Missing	4	74
Sand, fine-medium, very silty, light tan (core)	2	76
Missing	4	80
Sand, fine-medium, very silty, orange-brown (core)	2	82
Missing	4	86
Sand, medium-coarse, silty, rusty-brown (core)	2	88
Missing	1	89
Gravel, gray clayey matrix	1	90
Miocene series:		
Yorktown-Cohansey Formation:		
Clay, fine sandy, dark gray	2	92

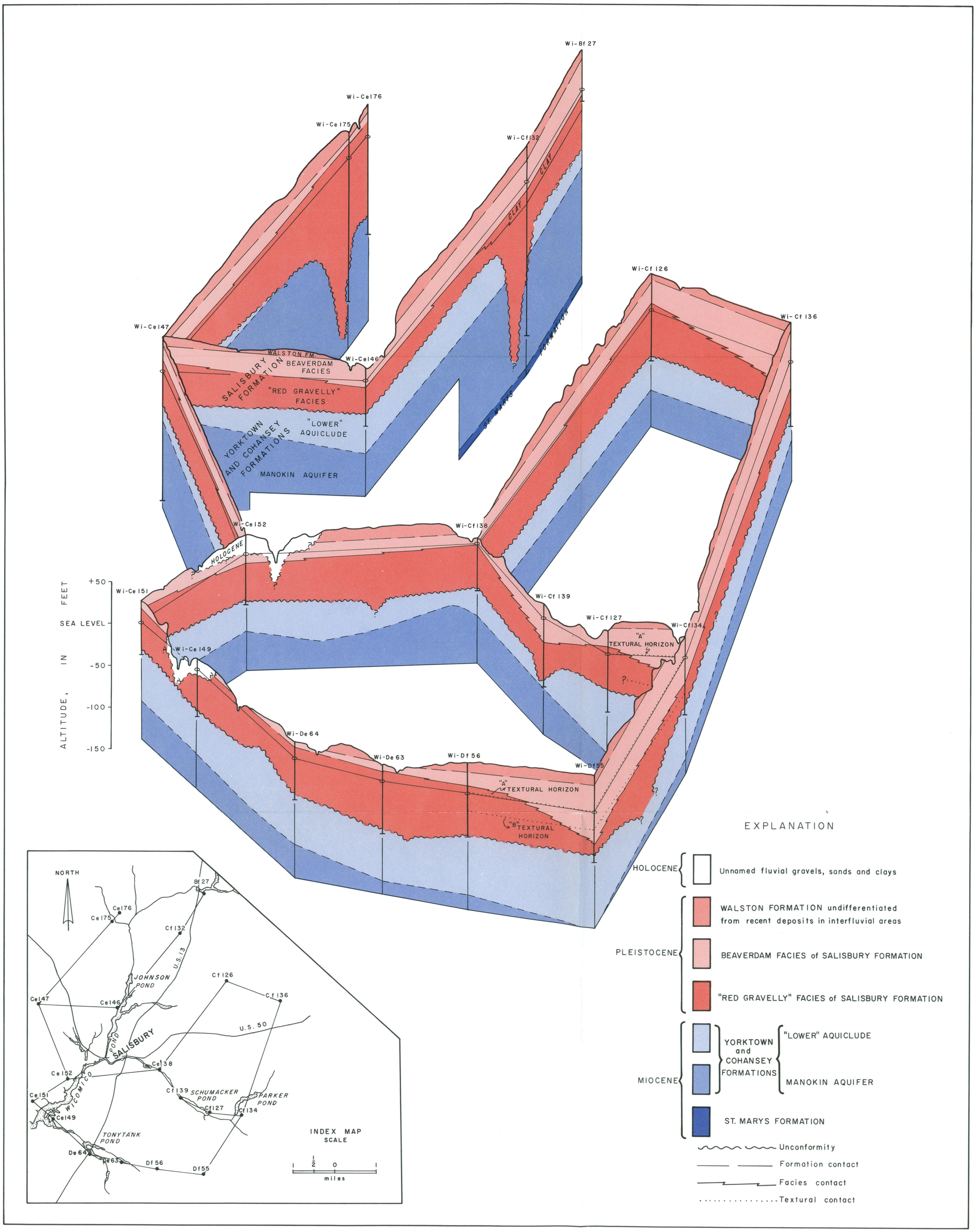

Figure 7.—Panel diagram showing Pleistocene stratigraphy of Salisbury area, Maryland.

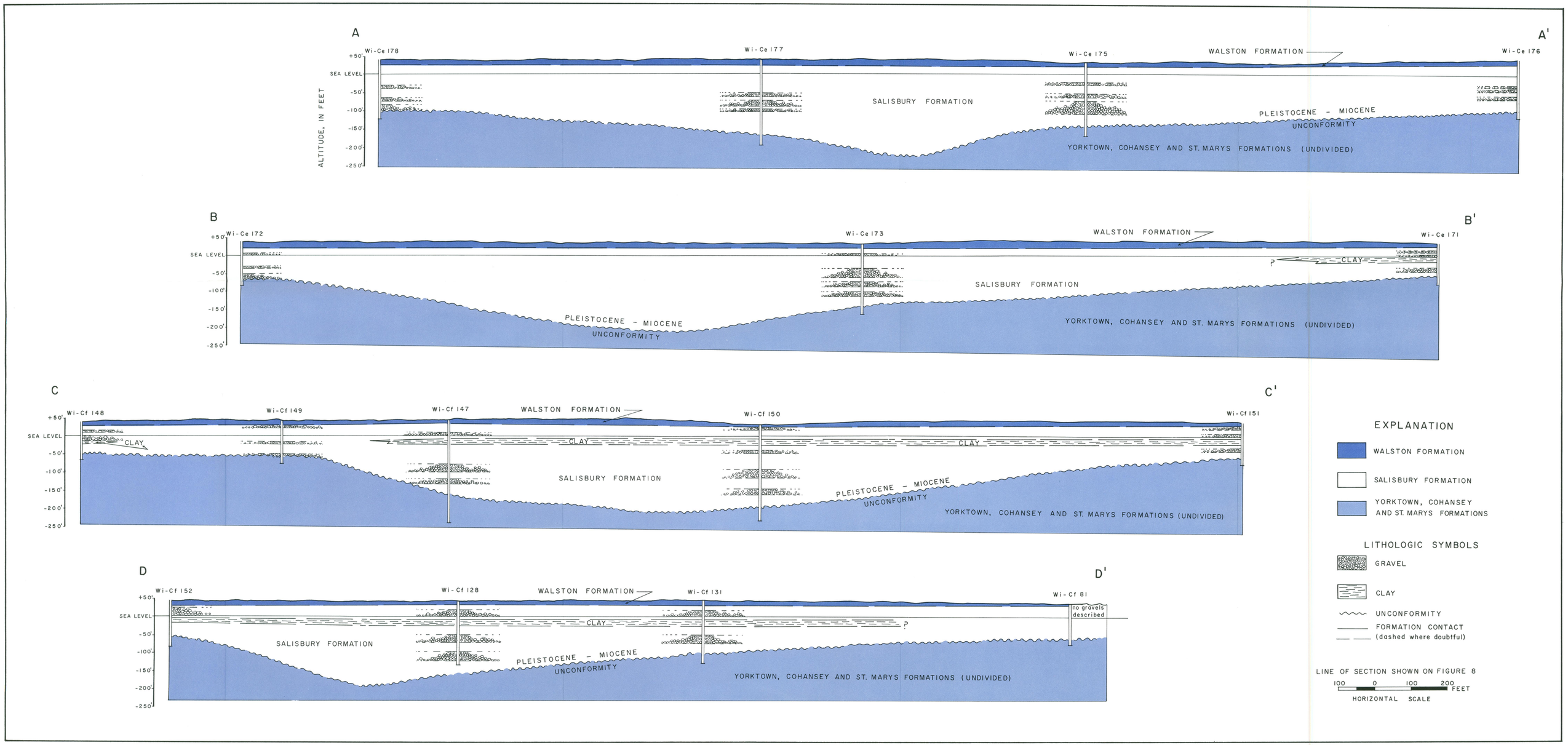

Figure 9.—Four geologic sections of the Naylor Mill paleochannel.