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PHYSICAL PROPERTIES OF NON-MARINE CRETACEOUS CLAYS IN THE MARYLAND COASTAL PLAIN

BY

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INTRODUCTION

Argillaceous materials in nonmarine sedimentary strata of Cretaceous age in the Maryland Coastal Plain have been investigated in pursuance of cooperative agreements between the Maryland Department of Geology, Mines and Water Resources and two agencies of the United States Department of the Interior: the Geological Survey and the Bureau of Mines. Listed in tables 1 to 5 are data relating to the geology, mineralogy, chemistry, and potential uses of sampled clay-bearing materials typical of the nonmarine strata, as well as a few materials associated with underlying pre-Cretaceous crystalline rocks and superjacent marine Cretaceous strata. The localities listed in the tables are marked on Plates 1 to 5, which also show areas wherein the crystalline rocks, nonmarine strata and marine strata are exposed; profiles on each of these plates give a general impression of the geologic structure, stratigraphic relations, and overall thickness of the nonmarine strata.

The areas shown lie partly on the Atlantic Coastal Plain and partly within the Piedmont physiographic province (fig. 1). The two provinces are separated by a somewhat vaguely defined transitional belt averaging about 5 miles in width, known as the "Fall Zone" or "Fall Line", which extends in a northeasterly direction across the State. The bedrock deposits are extensively concealed by soil and alluvium. They have been logged in many water wells but are readily visible at the surface only in small exposures along streams and in excavations such as road cuts, gravel and clay pits and abandoned iron ore workings.

Virtually all the types of material exposed or logged are believed to be represented among the samples collected for study. Those from a few of the localities listed in column 1 in Tables 1 to 5, came from surface exposures; all the rest were taken from exploratory holes, most of which were about 100 feet deep. The holes were bored with a truck-mounted 5-inch auger. Most of the holes

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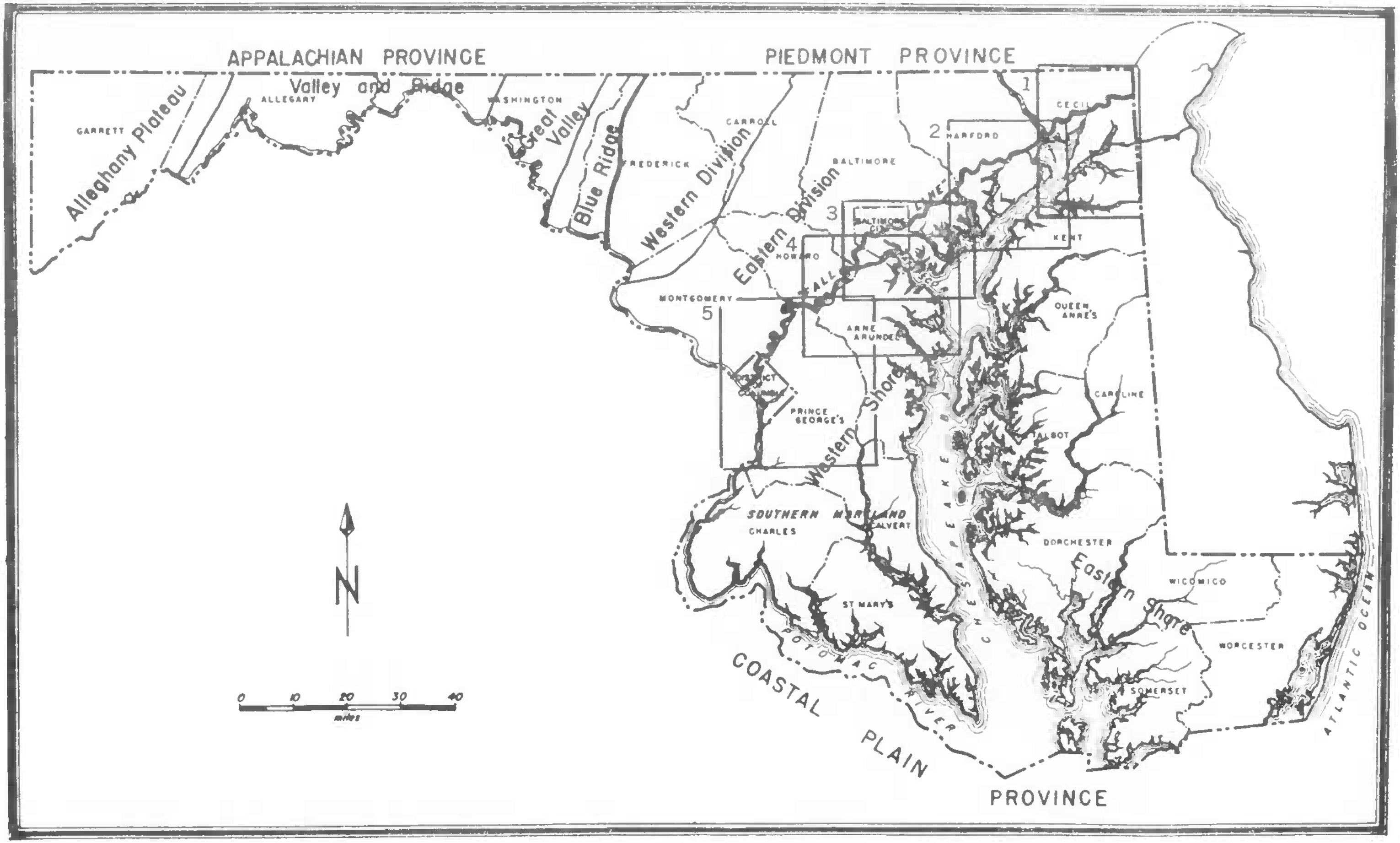

FIGURE 1. Map of Maryland showing physiographic provinces and areas on plates 1 to 5

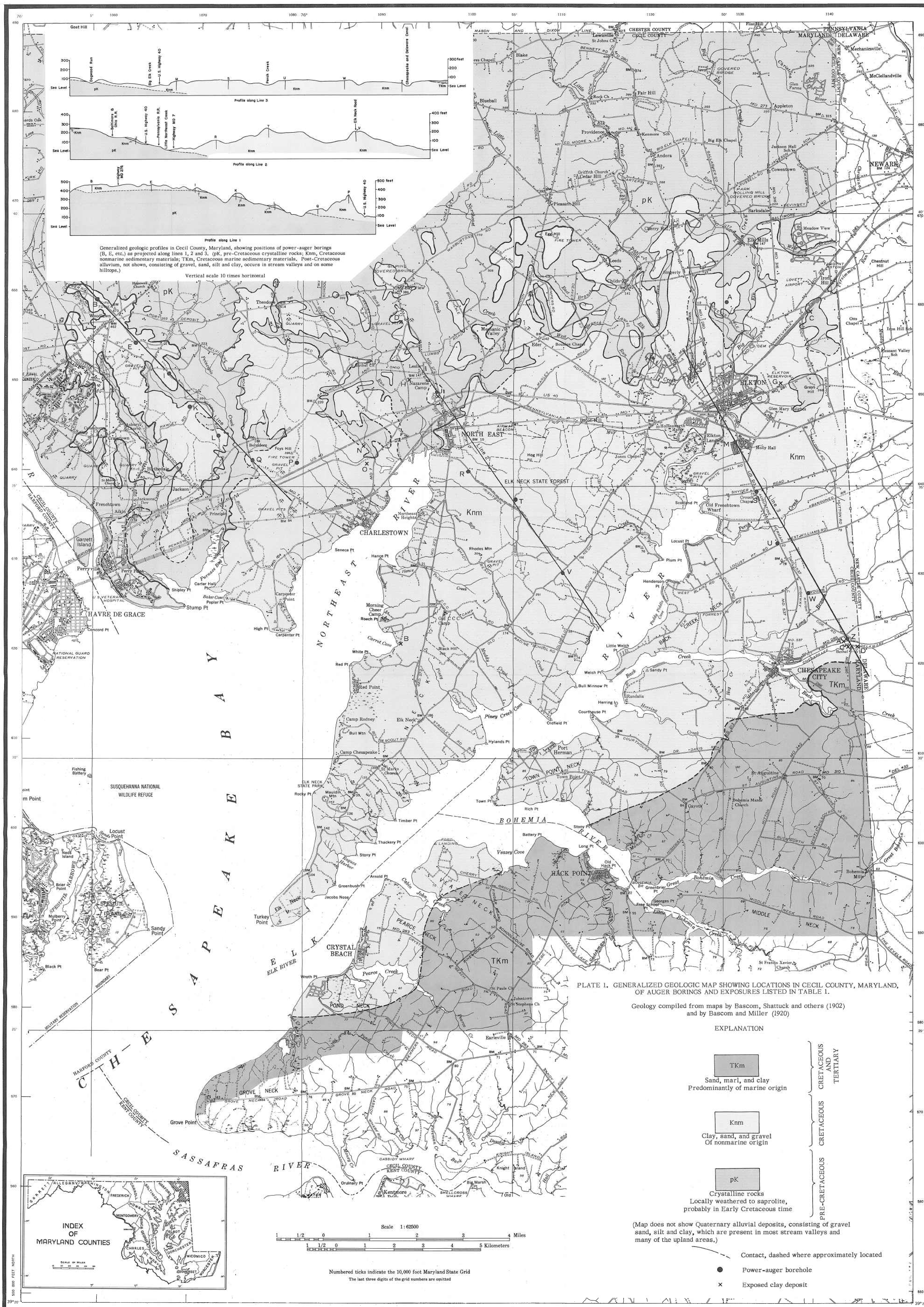

Plate 1. Map showing outcrop area of nonmarine Cretaceous strata in Cecil County and locations of auger borings and exposures listed in Table 1

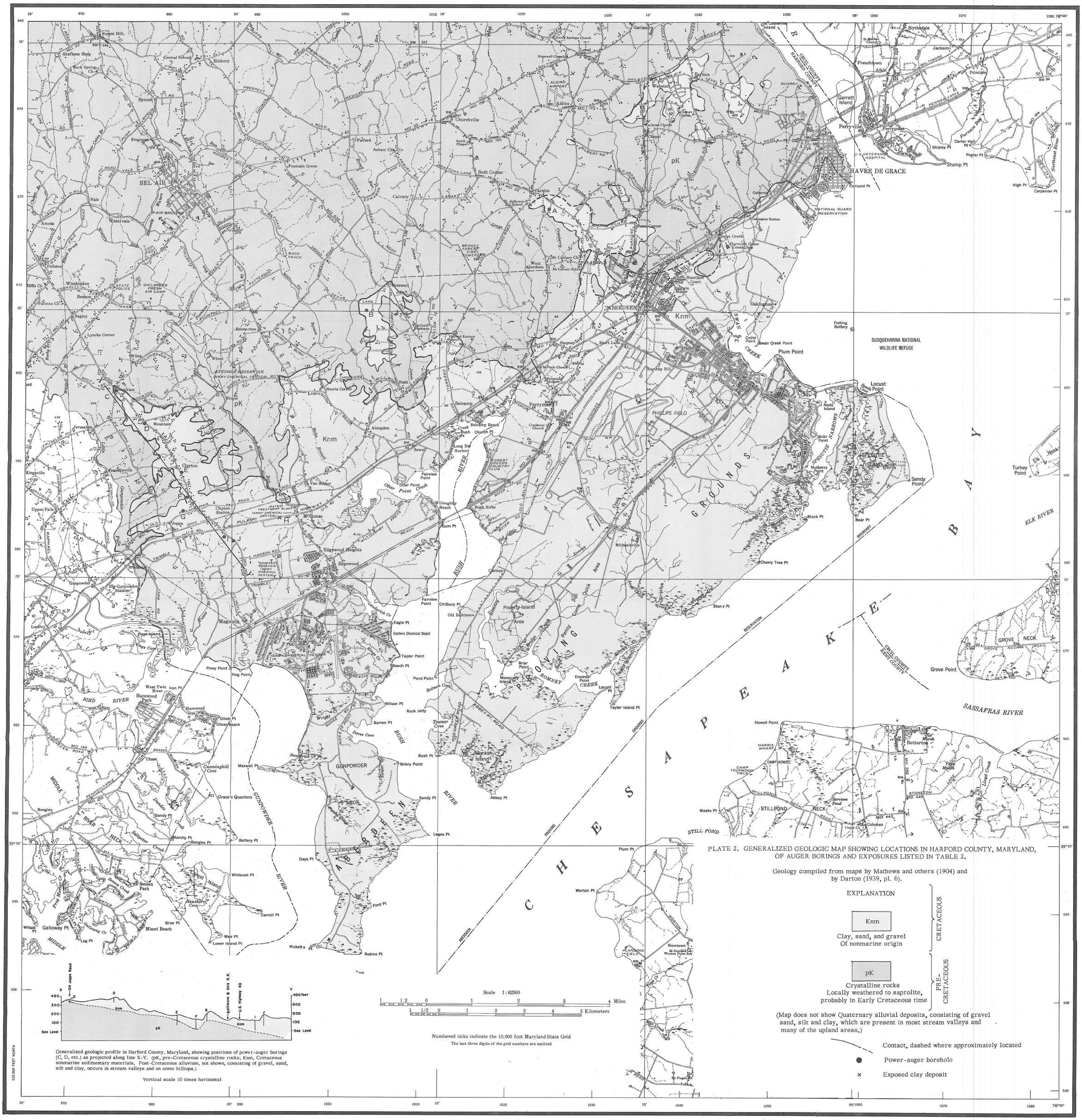

Plate 2. Map showing outcrop area of nonmarine Cretaceous strata in Harford County and locations of auger borings and exposures listed in Table 2

PLATE 3. Map showing outcrop area of nonmarine Cretaceous strata in Baltimore County and locations of auger borings and exposures listed in Table 3

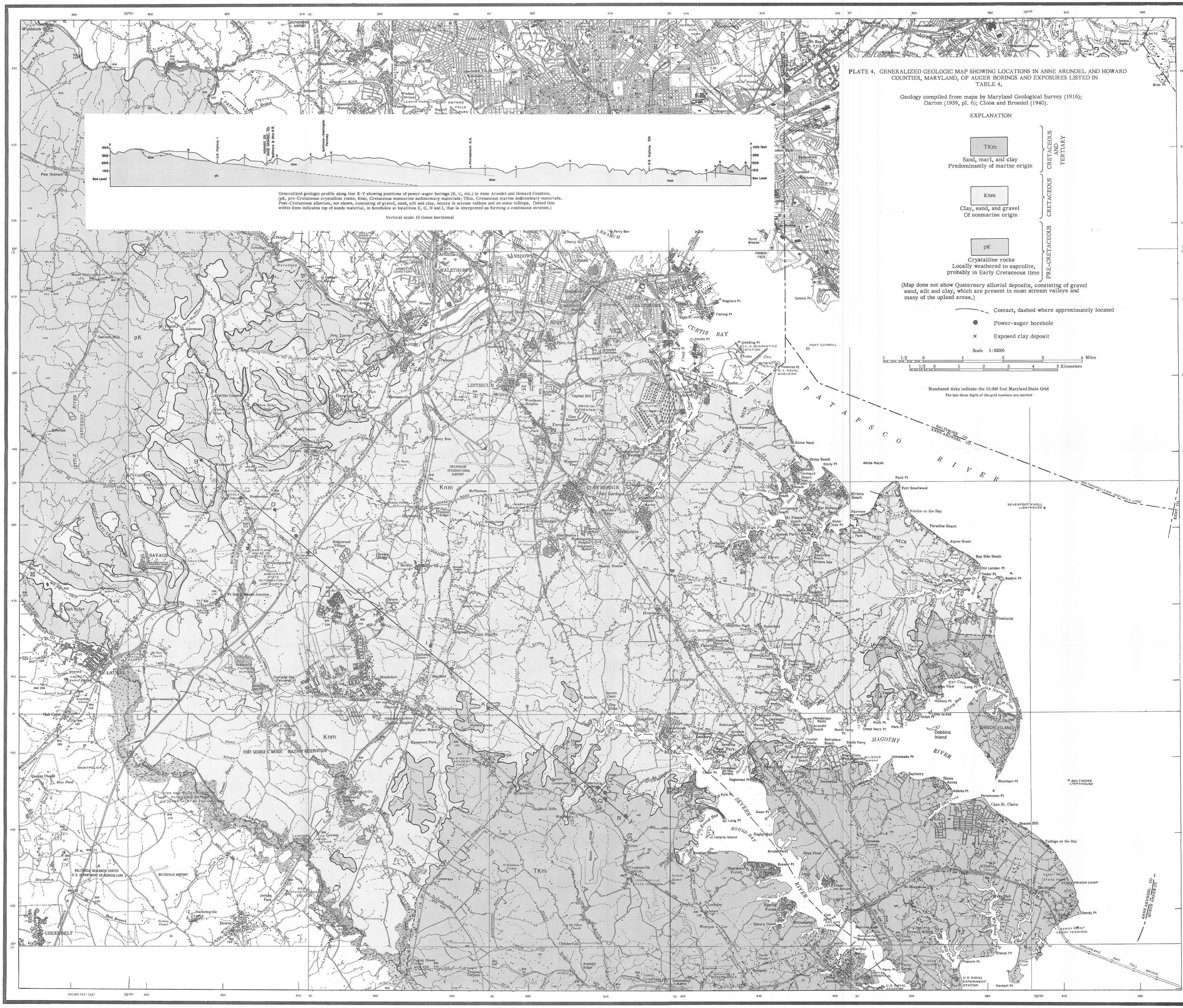

Plate 4. Map showing outcrop area of nonmarine Cretaceous strata in Anne Arundel and Howard Counties and locations of auger borings and exposures listed in Table 4

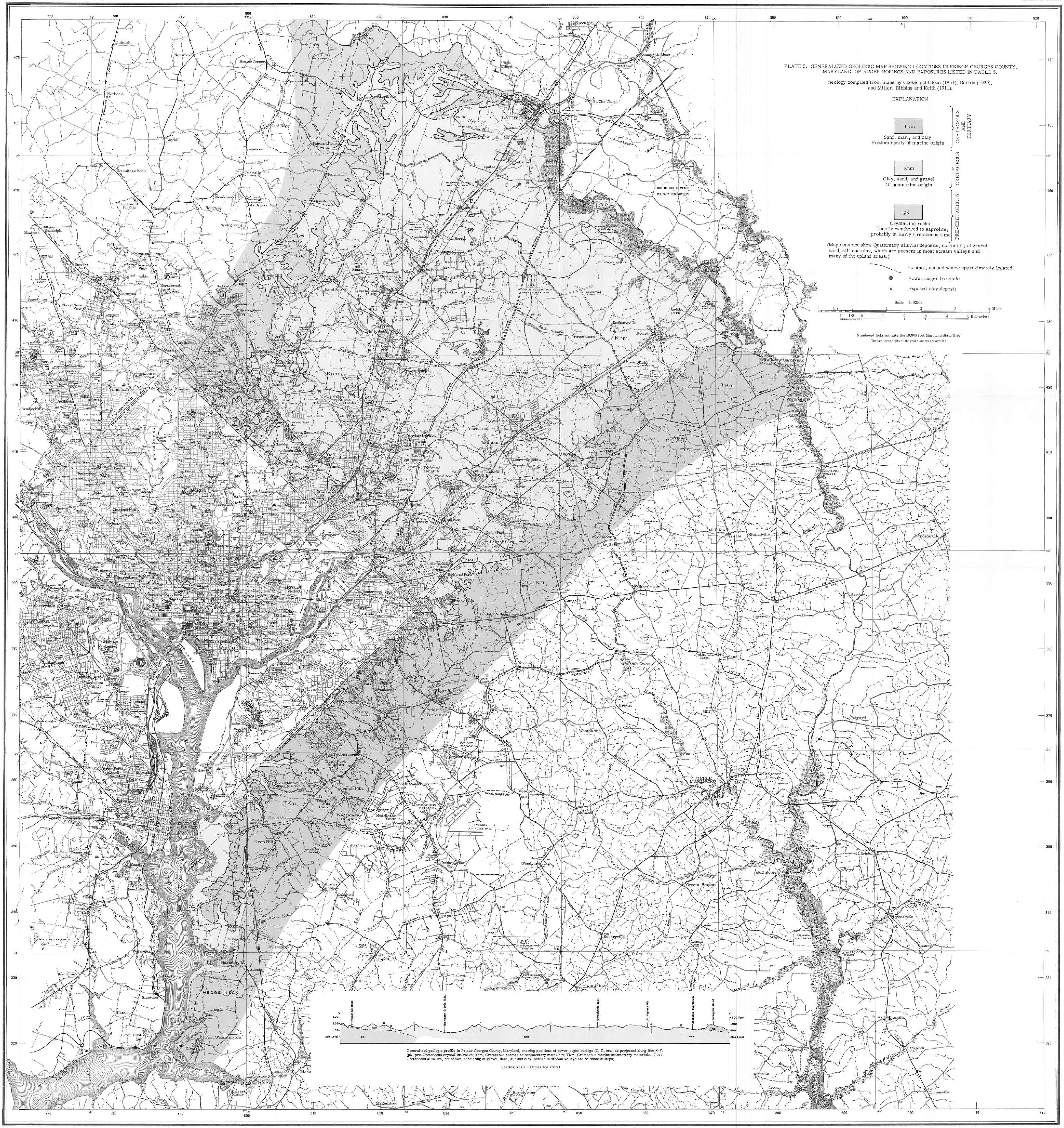

PLATE 5. Map showing outcrop area of nonmarine Cretaceous strata in Prince Georges County and locations of auger borings and exposures listed in Table 5

were bored close to lines laid out nearly normal to the strike of the Cretaceous rocks (for example, Pl. 1, lines 1, 2, and 3). The holes were spaced with a view to exploring stratigraphic intervals encompassing the entire thickness of the nonmarine Cretaceous sequence. The positions of the holes, as projected along the lines, are indicated in the geologic profiles on Plates 1 to 5; the materials brought to the surface by the auger or measured in surface exposures are logged under heading 2 of Tables 1 to 5.

PRE-CRETACEOUS SYSTEMS

The sedimentary deposits of Cretaceous age rest unconformably on older crystalline rocks of the Piedmont province. Within the Fall Zone the lowermost sedimentary strata crop out in contact with the crystalline rocks. The contact was reached in a number of the boreholes. The lowermost materials recorded in most such borings, and in a few of the outcrops from which samples were taken, are saprolites associated with the great unconformity. The finely divided ($<2\mu$) fractions of these argillaceous materials, which are products of the decomposition of the crystalline rocks, ordinarily give X-ray diffraction patterns characteristic of mixtures that contain much kaolinite and a little illite (finely divided dioctahedral mica). Most of the samples show considerable montmorillonite by X-ray, and a few show a little chlorite. The crystalline rocks that were altered to form the saprolites, probably as a result of weathering in Early Cretaceous time, are believed to include gabbros, granites, gneisses, and other metamorphic rocks. This interpretation is supported by evidence based on the heavy-mineral suites (Tables 1 to 5, heading 3) and on details of geologic mapping in the vicinity of each borehole and outcrop. (See geologic maps listed in the Bibliography.)

CRETACEOUS SYSTEM

Sedimentary strata of Cretaceous age, comprising deposits of gravel, sand, silt and clay, crop out over large parts of the Coastal Plain bordering Chesapeake Bay; they are present also within the Fall Zone in upland areas that are separated from each other by valleys cut into crystalline rocks of pre-Cretaceous age. The geologic structure of the Cretaceous strata is essentially homoclinal, with prevailing northeasterly strike and gentle southeasterly dip. The overall thickness of the strata increases gradually in the direction of the dip. The Cretaceous rocks rest unconformably on the crystalline rocks and are overlain by sedimentary deposits of Tertiary and Quaternary ages, which consist of gravel, sand, silt and clay. These overlying deposits, though not differentiated in Plates 1 to 5, are present in most stream valleys and on many upland areas.

The sequence of Cretaceous strata is readily separable into two parts: the upper part, comprising the Matawan and Monmouth formations, is made up

TA

Abbreviations and symbols appearin

1. (Localities, etc.)

Power-auger station

* Notation employed refers to published 7½ minute topographic quadrangle sheets bearing the following names:

I-21 Washington East
I-22 Lanham
J-21 Beltsville
J-22 Laurel
J-23 Odenton
J-24 Round Bay
K-22 Savage
K-23 Relay
K-24 Curtis Bay
L-23 Baltimore West
L-24 Baltimore East
L-25 Middle River
M-24 Towson
M-25 White Marsh
M-26 Edgewood
N-26 Bel Air
N-27 Aberdeen
N-28 Havre de Grace
N-29 North East
N-30 Elkton
O-28 Rising Sun
O-29 Bay View
O-30 Newark West

* Notation employed refers to nine 2½ minute subquadrangles within each 7½ minute topographic quadrangle, as shown in diagram below:

NW	N	NE
W	C	E
SW	S	SE

2. (Geologic section)

QT Alluvial deposits of Quaternary and late Tertiary (?) age (not shown on Plates 1–5)
Knm Nonmarine sedimentary materials of Cretaceous age
pK Rocks of pre-Cretaceous age

3. (Mineralogy)

\+ 1 or 2 grains only
++ Less than 1 per cent
[2] And other oxides
[3] Nearly all is blue-green variety; pyroxene is included
[4] Epidote generally dominant; zoisite also commonly present
[5] Present in light, rather than heavy, mineral fraction
[6] Both authigenic and detrital

4. X-ray emission analysis, etc.

None

5. pH

None

6. (Grain-size distribution)

< Less than
> More than
tr Trace

der headings 1, 2, etc. of tables 1–5

7. (Properties, etc.)

Strength:

SS	Very strong
S	Strong
M+	Above average
M	Moderate
L	Low
LL	Very low

Texture and workability:

PL	Very plastic
Pl	Plastic
pl	Slightly plastic
My	Mealy
SM	Very smooth
Sm	Smooth
sm	Fairly smooth
ST	Very sticky
St	Sticky
st	Slightly sticky
Lg	Long-working
lg	Fairly long-working
Sh	Very short-working
sh	Short-working
FY	Fatty
ft	Slightly fatty
Sy	Very sandy
Sy	Sandy
sy	Slightly sandy
Gy	Gritty
gy	Slightly gritty

Hardness:

h	Fairly hard
H	Hard
H	Very hard
HH	Steel hard
Hc	Hard, crumbly
Sc	Soft, crumbly
V	Vitreous
GV	Glazed, vitreous

Munsell color notation:

Hue (e.g., 7.5YR) followed by value/chroma (e.g., 5/6).

Exception: notation for neutral hue is N followed by value (e.g., N4). For color names corresponding to notations, see Fig. 2.

Other:

Ex Expansion

8. (Suggested products)

LWAs	Aggregate, lightweight, sintered
A	Artware
LGA	Artware, low-grade
CB	Brick, common
BB	Brick, buff
LBB	Brick, light buff
FBc	Brick, face, cream or buff
DB	Brick, decorative
CW	Ceramic ware
PF	Filler, for paper
PtF	Filler, mineral, low-grade
O	Ocher
OD	Oil decolorizer
Pr	Pigment (red)
P	Pottery
LGP	Pottery, low-grade
SHDR	Refractory, super heat-duty
HHDR	Refractory, high heat-duty
IHDR	Refractory, intermediate heat-duty
LHDR	Refractory, low heat-duty
SR	Refractory, silica
CSW	Stoneware, chemical
LGCS	Stoneware, chemical, low-grade
T	Tile
DT	Tile, drain
CFT	Tile, chimney-flue
QT	Tile, quarry
ST	Tile, structural
WW	Whiteware

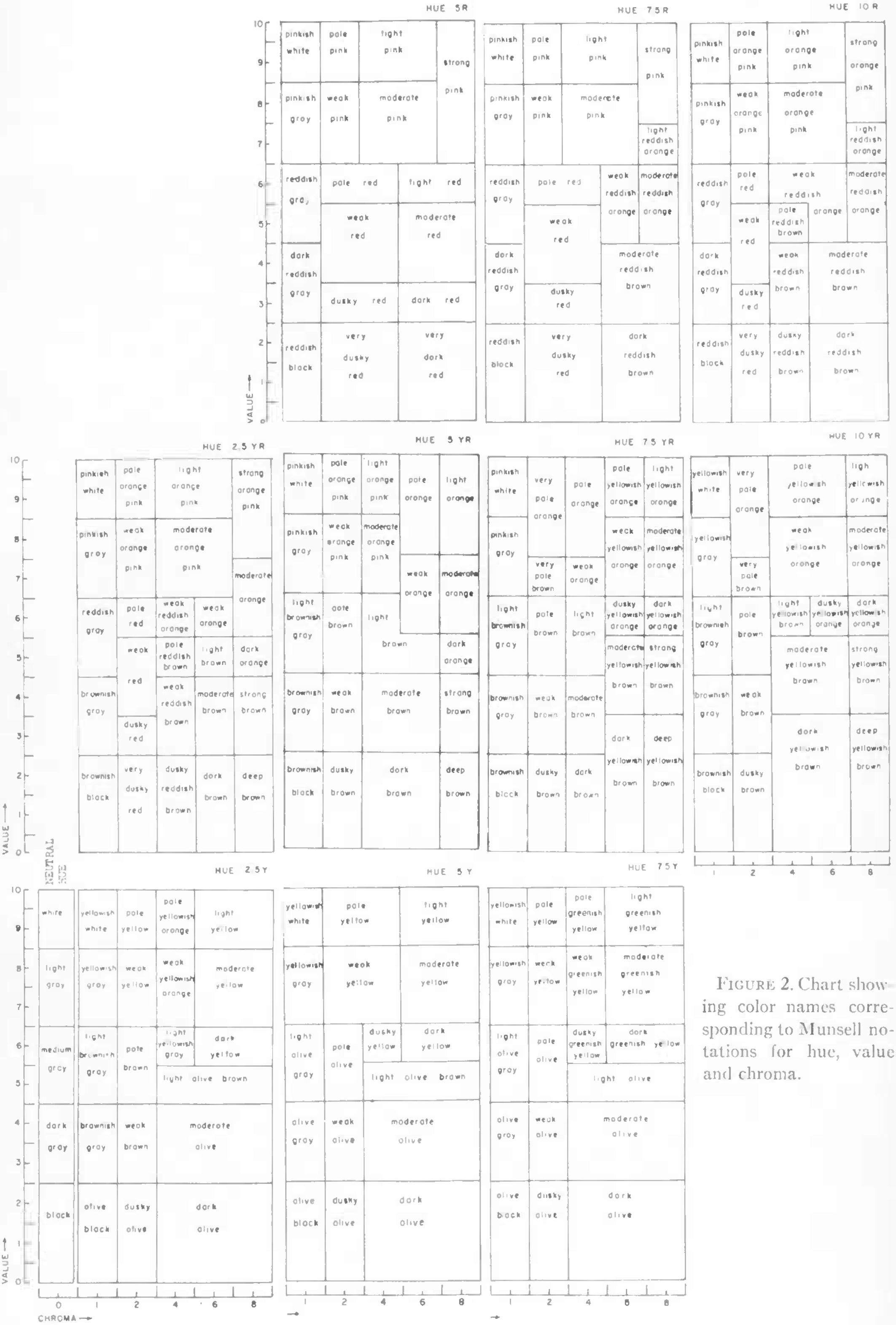

FIGURE 2. Chart showing color names corresponding to Munsell notations for hue, value and chroma.

of materials that accumulated in a marine environment; the lower part, which contains the clays with which this report is concerned, accumulated under terrestrial (that is, nonmarine) conditions. This lower part is customarily subdivided into five geologic formations which are known, in ascending order, as the Patuxent, Arundel and Patapsco (the Potomac group) and the Raritan and Magothy. In preparation of this report, however, it has been found expedient to treat the nonmarine sequence as a single unit and to refer to the upper and lower parts of the Cretaceous sequence as the *marine* and *nonmarine* divisions, respectively. The marine division contains abundant fossil remains of organisms that lived in salt water, whereas the underlying nonmarine strata include argillaceous deposits which carry lignitized wood fragments, plant spores and pollen. Bones and teeth of dinosaurs are also reported to have been found in this division decades ago during mining of iron ore from the Arundel clay. A further contrast between the marine and nonmarine parts of the Cretaceous sequence is found in the mineralogy of the fine-grained fractions of the contained argillaceous materials. Whereas many of the marine strata are composed of greensand that contains variable amounts of glauconite, this clay mineral is not known to occur in the underlying nonmarine deposits. In addition, the clay mineral montmorillonite occurs as an independent constituent of many of the marine materials but is found in the nonmarine sequence only intimately interlayered with the clay mineral illite.

Nonmarine Division

The pre-Cretaceous crystalline rocks of the Piedmont Province and the Appalachian Mountains were the principal sources of the nonmarine Cretaceous clastic materials, and these materials were transported by southeastward-flowing streams to the sites of deposition. The coarser clastic materials are made up of rounded to subangular fragments, chiefly of quartz. The finely divided ($<2\mu$) constituents give X-ray diffraction patterns characteristic of mixtures of kaolinite with illite and highly illitic mixed-layer clay. Most of the deposits that make up the nonmarine division belong to one or the other of two readily distinguishable facies that are described here as facies 1 and facies 2.

Facies 1

Deposits of facies 1, which make up by far the greater part of the nonmarine division, include little or no organic matter. Most of these deposits contain appreciable amounts of disseminated iron that is largely in the trivalent, or ferric, state and the prevailing coloration of these sediments is, accordingly, that of reddish to brownish ferric oxide. In the Munsell hue-value-chroma system of notation (fig. 2) the colors of facies 1 deposits are typically of yellow-red hue, with values higher than 3 and chroma higher than 2. (See Tables 1 to 5, heading 7, subheading "before firing"). Assuming that the iron was transported to sites of deposition as ferric oxide, in the manner described by Carroll (1958), the iron in the reddish to brownish argillaceous materials can have undergone little or no chemical alteration since deposition of the sediments.

Facies 2

The deposits of facies 2 occur in many localized bodies of secondary material, typically of a medium to dark grayish color of yellow-red hue, value less than 6 and chroma less than 3. These deposits began accumulating immediately after deposition of the transported materials.

In places where swampy conditions existed, reaction with abundant organic matter reduced the transported iron from the trivalent to the bivalent condition to form ferrous compounds. In this condition the iron was largely leached from the sedimentary material and locally became segregated therein to form swarms of ferruginous nodules. In many places these nodules were composed of iron carbonate (siderite) and in other places they were heavy lumps of iron sulfide (pyrite) that formed by replacement of vegetal debris. The sulfide nodules, many of which retain the shapes of twigs or other fragments of wood they replaced, are especially numerous in bodies of facies 2 material in the uppermost strata of the nonmarine sequence. Finely divided ($<2\mu$) fractions of facies 2 materials give X-ray diffraction patterns that indicate intimate mixtures of clay minerals that are closely comparable to the mixtures in the finely divided facies 1 materials, except for a tendency to be slightly higher in kaolinite.

Though the aggregate volume of the bodies of grayish lignitiferous material of facies 2 is small compared with the volume of the enclosing more highly colored non-lignitiferous materials that are characteristic of facies 1, such bodies occur at many horizons within the sequence of Cretaceous nonmarine sedimentary strata. These bodies range from small lenses occupying no more than a few dozen cubic yards to deposits many yards thick that underlie many acres. Such bodies are especially numerous, well developed and extensive in the stratigraphic zone, shown on most published maps as Arundel clay, that crops out at many places between Washington, D. C., and the Susquehanna River. In this zone ferruginous nodules are locally abundant and tend to be larger than the average for the Cretaceous sequence as a whole. They were once mined as iron ore (Singewald, 1911) from open pits, many of which are now filled with water.

Much of the iron that was reduced chemically and became segregated after the sediments of facies 2 came to rest in the Coastal Plain province has since become reconstituted as ferric oxide. This has happened to some of the disseminated residual iron in the argillaceous materials and to nearly all the iron in the carbonate nodules, a large proportion of which have been converted to lumps composed wholly of ferric oxide in the form of limonite. Many of these nodules, however, still have carbonate cores. Where ferric oxide has thus reformed, the brownish to reddish cast of the argillaceous materials observed in outcrops is, in some places, so intense as to render such material hard to distinguish from the highly colored materials of facies 1.

POTENTIAL USES

Firing and other tests, results of which are reported under headings 7 and 8 of Tables 1 to 5, were performed at the Electrotechnical Experiment Station, U. S. Bureau of Mines, Norris, Tennessee, in general accordance with the clay-testing procedures described by Klinefelter and Hamlin (1957). For many of the materials that were examined at the localities marked on Plates 1 to 5, however, data relating to the mineralogy, chemistry, and potential uses (tables 1 to 5, headings 3–8) are, for various reasons, either lacking or incomplete. For example, the boreholes at localities O, P, Q and R, Plate 4, are not listed in Table 4 because none of the samples taken from these holes were subjected to extensive testing. The uppermost strata of the nonmarine sequence, as found in the holes at localities O and P, are excessively sandy, and the marine strata that were penetrated in all four of these holes, consisted chiefly of greensand, which has little, if any, value as ceramic raw material. Some of the greensand may prove to be suitable for some important industrial uses (for example, as water softener, or as acid-activable oil-decolorizing agent) and for agricultural uses largely because of its content of potassium. It is probable, also, that additional testing of the saprolites associated with the unconformity at the base of the Cretaceous section would result in discovery of important potential uses other than those suggested in the tables.

The appreciable differences, in both carbon and iron content, between the grayish (facies 2) and the more highly colored (facies 1) argillaceous materials are responsible for significant differences in their behavior when fired at kiln temperatures within the range commonly used in manufacture of ceramic wares. The reddish to brownish raw materials typical of facies 1, because of the oxidizing influence of the kiln atmosphere that forms in the presence of their relatively high ferric iron content, tend to yield reddish to brownish fired products, whereas those yielded by the relatively iron-free lignite-bearing materials, which characterize facies 2, tend to become buff or whitish in the reducing kiln atmosphere that forms as the black organic matter burns out. As a consequence the respective materials are commonly spoken of as "red-burning" and "buff-burning". At a number of places in the Maryland Coastal Plain, reddish to brownish clay closely comparable to that of many of the "red-burning" materials listed in Tables 1 to 5 has been dug from open pits for manufacture of hard fired common and face brick, drain tile, floor tile, flower pots, and terra cotta. Large tonnages of material suitable for manufacture of such products are present in the areas shown in Plates 1 to 5 as underlain by sedimentary materials of nonmarine origin.

A separate suite of uses has grown up for the relatively small available quantities of "buff-burning" grayish, lignite-bearing argillaceous materials of facies 2, which are commonly described as "blue clay". Clay of this kind that is mined from the upper part of the section exposed in an open-pit working at Poplar, Baltimore County (Table 3, locality G, materials 1, 2 and 3) has been marketed as raw material for manufacture of artware and fire-clay sanitary ware, for preparation of low-duty refractory mortars and for bonding silicon carbide in the manufacture of abrasives and kiln furniture. Clay taken from lower levels in the pit (materials 4, 5, 6 and 7), most of which has a more fatty consistency, has been marketed for manufacture of texture tile, red tile (material 5), fire-clay sanitary ware and stoneware, and as filler for linoleum cement and accoustical tile cement. Comparable material has been shipped from another working, near Harundale, Anne Arundel County (Table 4, locality F, material 3), for sanitary ware manufacture and from one near Contee, Prince Georges County (Table 5, locality A, materials 1a, 1c and 1d), to be used in low-grade refractory mortars, grinding wheels, and therapeutic hoof packings for race horses. A small proportion of the nonmarine clay of Cretaceous age that is mined primarily for manufacture of common and face brick and tile at plants in the vicinity of Washington and Baltimore comes from pockets of "blue clay" that are uncovered from time to time (e.g., Table 5, locality B, material 1c) and is made into buff brick. A small amount of such clay, taken from a road cut near the town of North East, Cecil County (Table 1, locality J), has been used by a nearby plant for manufacture of fire brick and other low-grade refractory products.

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TABLE 1

Geologic sections of clay-bearing materials in auger borings and outcrops in Cecil County with data relating to their physical properties

(See pp. 4–5 for explanation of abbreviations and symbols)

1. Localities (Pl. 1) defined with reference to State Grid, topographic quadrangles, highways, and other landmarks. 2. Geologic section

Locality	State coordinates N	State coordinates E	Quadrangle*	Subdivision**	Supplementary data	Stratigraphic unit	Downward sequence	Description	Thickness in feet
A	660	1129	0–30	SW	1½ miles south-southwest of Elk Mills. Near fence on top of broad, rounded hill west of Elk Creek. Elevation about 170 feet. #		1	Soil	2
						Knm	2	Clay, sandy	2
						Knm	3	Sand-silt-clay	2
						Knm	4	Sand-silt-clay	4
								---------UNCONFORMITY---------	
						pK	5	Clay (saprolite)	5
						pK	6	Clay (saprolite)	7
B	659.5	1058.5	0–28	S	Northeast side of road, 0.55 mile northwest of Woodlawn. #		1	Soil	3
						QT	2	Sand and gravel, reddish brown	13
								---------UNCONFORMITY---------	
						Knm	3	Sand, argillaceous	11
						Knm	4	Sand, argillaceous	13
						Knm	5	Sand, argillaceous	16
						Knm	6	Sand, argillaceous	24
						Knm	7	Sand, argillaceous	5
						Knm	8	Sand-silt-clay	5
C	659	1138	0–30	S	Exposure along southeast side of Pennsylvania Railroad 0.7 mile southwest of Iron Hill road crossing. Elevation about 120 feet.	pK	1	Clay (saprolite)	
D	657	1093	0–29	SW	¾ mile south of Bay View; about 600 feet west of Highway MD-272 at clay and gravel pit owned by Fred S. Russell. Elevation about 320 feet. #	QT	1	Sand and gravel	6
								---------UNCONFORMITY---------	
						Knm	2	Sand-silt-clay	4
					(Test data for Material 2 pertain to sample taken from exposure in the pit, at about same level as Material 2)	Knm	3	Sand, argillaceous	30
						Knm	4	Sand-silt-clay	10
								---------UNCONFORMITY---------	
						pK	5	Clay (saprolite)	12
						pK	6	Clay (saprolite)	5
						pK	7	Clay (saprolite)	3
						pK	8	Clay (saprolite)	5
							9	Crystalline rock, weathered	2
E	654.5	1063	0–28	S	¾ mile southeast of Woodlawn; southwest side of road extending southeastward through wooded area; at eastward bend of road. #		1	Soil	3
						Knm	2	Sand-silt-clay	8
						Knm	3	Sand, silty, and gravel	9
						Knm	4	Sand, silty, and gravel	10
						Knm	5	Sand, argillaceous	31
								---------UNCONFORMITY---------	
						pK	6	Clay (saprolite)	9
						pK	7	Clay (saprolite) and angular quartz	7
F	651.5	1066.5	N–28	N	1½ miles northeast of Craigtown; on west side of road leading southward through wooded area, 500 feet south of its junction with road leading west to Principio Road and east to Belvidere Road. Elevation about 420 feet. #		1	Soil	3
						Knm	2	Sand-silt-clay and gravel	14
						Knm	3	Sand-silt-clay and gravel	4
						Knm	4	Sand and gravel	9
						Knm	5	Sand, silty	15
						Knm	6	Sand, silty	10
G	651	1135	N–30	N	East side of Elkton; bedrock exposure on north side Highway MD-281, 2000 feet northeast of Big Elk Creek bridge. Elevation about 80 feet.	Knm	1	Clay, silty	15
H	651	1093.5	N–29	NE	1¼ miles northwest of North East; 1000 feet west of Nazarene Camp. Open pit working of North East Firebrick Co. Elevation about 150 feet.	pK	1	Clay, silty, derived by alteration of Pre-Cambrian granodiorite	15
I	649.5	1096.5	N–29	N	Northeast; in field west of Highway MD-272, 0.3 mile north of its intersection with U.S. Highway 40. Elevation about 120 feet. #	QT	1	Sand, gravelly	3
								---------UNCONFORMITY---------	
						Knm	2	Clay, silty	4
						Knm	3	Clay, silty	1
						Knm	4	Sand-silt-clay	1
						Knm	5	Sand-silt-clay	1
						Knm	6	Sand-silt-clay	1
						Knm	7	Clay, silty	1
						Knm	8	Clay, silty	8
								---------UNCONFORMITY---------	
						pK	9	Sand-silt-clay (saprolite)	2
						pK	10	Sand-silt-clay (saprolite)	6
						pK	11	Clay (saprolite)	4
						pK	12	Clay (saprolite)	15
						pK	13	Clay (saprolite)	2
J	649	1097	N–29	NE	¼ mile north of North East, road cut extending along Highway MD-272, north of its intersection with U. S. Highway 40. Elevation about 80 feet.	Knm	1	Clay, dark gray, containing lignite fragments, spores, pollen and nodules of pyrite.	
K	647.5	1069	N–28	N	1½ miles northeast of Blythedale. Northwest side of road that branches northeastward from U. S. Highway 222 near that town. Elevation about 360 feet. #		1	Soil	1
						QT	2	Sand and gravel	2
								---------UNCONFORMITY---------	
						Knm	3	Sand-silt-clay	5
						Knm	4	Sand-silt-clay	6
						Knm	5	Sand and gravel	10
						Knm	6	Sand-silt-clay	3
						Knm	7	Sand, argillaceous, and gravel	14
								---------UNCONFORMITY---------	
						pK	8	Clay (saprolite)	12
						pK	9	Clay (saprolite)	12
						pK	10	Clay (saprolite)	5
						pK	11	Clay (saprolite)	4
L	644.5	1072.5	N–28	NE	East side of road west of and roughly parallel to Principio Creek; 1.3 miles north of intersection of this road with U. S. Highway 40. Elevation about 230 feet. #		1	Soil	3
						QT	2	Sand, argillaceous, and gravel	5
								---------UNCONFORMITY---------	
						Knm	3	Sand	18
								---------UNCONFORMITY---------	
						pK	4	Clay, (saprolite)	4
						pK	5	Clay, (saprolite)	15
						pK	6	Clay, (saprolite)	7
						pK	7	Clay, (saprolite)	2
M	644	1130	N–30	N	0.1 mile west of U. S. Highway 213, 1200 feet south of its intersection with U. S. Highway 40. Elevation about 60 feet. #		1	Soil	3
						QT	2	Sand-silt-clay and gravel	2
								---------UNCONFORMITY---------	
						Knm	3	Sand-silt-clay	2
						Knm	4	Sand-silt-clay	3
						Knm	5	Sand, argillaceous	5
						Knm	6	Clay, silty	30
						Knm	7	Sand-silt-clay	7
						Knm	8	Sand-silt-clay	13
						Knm	9	Sand-silt-clay	5
						Knm	10	Sand	28
N	643.5	1089	N–29	NW	2 miles north-northeast of Charlestown; exposure in Broad Creek about 900 feet SE of U. S. Highway 40. Elevation about 30 feet.	pK	1A	Clay, white and yellowish, derived from alteration of granodiorite gneiss.	4
						pK	1B	Same material after beneficiation	
O	642	1089.5	N–29	NW	1½ mile northeast of Charlestown, 500 feet west of Highway MD-7; old open pit (abandoned). Elevation about 40 feet.	Knm	1	Clay, silty	20
P	642	1081	N–28	NE	100 feet east of trail leading to Foys Hill Lookout Tower; 0.3 mile northeast of intersection of trail with U. S. Highway 40. Elevation about 330 feet. #	QT	1	Sand, silty and gravel	15
								---------UNCONFORMITY---------	
						Knm	2	Sand, argillaceous, brown	1
						Knm	3	Clay, silty	5
						Knm	4	Silt, argillaceous	3
						Knm	5	Clay, silty	21
						Knm	6	Sand-silt-clay	13
						Knm	7	Sand, argillaceous	2
						Knm	8	Sand-silt-clay	15
						Knm	9	Sand-silt-clay	15
						Knm	10	Sand-silt-clay	6
						Knm	11	Clay, silty	4
Q	641.5	1076.5	N–28	N	.4 mile south of Belvedere; on east side of road leading southward from there to U. S. Highway 40; 300 feet south of a telephone line. Elevation about 185 feet. #		1	Soil	2
						QT	2	Sand and gravel	29
						QT	3	Sand and gravel	14
								---------UNCONFORMITY---------	
						QT or Knm	4	Sand, argillaceous	9
						QT or Knm	5	Sand-silt-clay	5

3. Mineralogy — Approximate ratios of heavy minerals in fine sands (grain size ⅛ mm to ¼ mm). Dorothy Carroll, analyst (Bromoform separations by Gillison W. Chloe); Approximate ratios of clay minerals in less-than-two-micron fractions, as estimated from X-ray (goniometer) diffraction patterns. John W. Hosterman, analyst. **4.** X-ray (goniometer) emission analysis (approximate percentage by weight). John W. Hosterman, analyst. **5.** pH. **6.** Grain-size distribution Weight ratios)

Locality	Downward sequence	Percentage of sand fraction (See column 6)	Pyrite	Limonite	Ilmenite	Siderite	Staurolite	Kyanite	Tourmaline	Garnet	Epidote	Amphibole	Chloritoid and glaucophane	Zircon	Sillimanite	Andalusite	Chlorite	Mica	Rutile	Anatase	Glaucophane	Corundum	Brookite	Sphene	Kaolinite	Illite	Mixed layer	Montmorillonite	Chlorite	Fe_2O_3	MnO_2	TiO_2	CaO	K_2O	5. pH	Clay (<1/256 mm)	Silt (1/256 mm–1/16 mm)	Sand (1/16 mm–2 mm)
A	5																								1.6			8.4		16.7	0.04	0.33	0.1	0.7		6.4	2.5	1.1
A	6																								1.7			8.3		15.5	0.05	0.18	0.1	0.5		6.2	2.5	1.3
B	2	15.8	+	0.5	7.0		0.1		0.3		1.0	0.1		0.5				+	+						3.5	2	4.5								5.9	2.4	2.5	5.1
B	3	17.2		1.0	8.0				+		0.2			0.5				+						+	8.5	1	0.5			2.9	0.01	0.32	0.1	1.2	6.5	4.2	1.3	4.5
B	4	18.2		1.5	8.0						0.2							+							9	1				4.0	0.06	0.30	0.1	1.7	5.8	3.9	1.8	4.3
B	5	15.6		0.5							9.5							+							7.5	2.5				3.4	0.07	0.26	0.1	1.5	6.5	3.7	1.7	4.6
B	6	14.4		2.0	1.0						7.0							+							7	3				3.2	0.05	0.24	0.3	1.9	7.1	2.9	1.8	5.3
B	7	17.0		2.0	1.0				+		7.0			+				+							7.5	2.5									6.9	2.9	1.6	5.5
B	8	17.9		1.5	8.0						+			+				+							2.5	7.5									8.0	2.1	3.1	4.8
C	1																											10.0		9.0	0.18	0.10	0.9	0.3	5.6	6.6	2.5	0.9
D	1	12.0		5.0	1.0		2.0	0.1	0.8					1.0				+							7.5	1	1.5									1.2	0.7	8.1
D	2	28.8		1.5	1.5		3.0		3.0					+				++							8.5	1	0.5			1.6	0.0	1.4	0.1	2.2	5.4	3.4	3.1	3.5
D	3	14.2		4.0	1.0		2.0		2.5					+				++	+						8.5	1	0.5									1.5	1.6	7.1
D	4	12.2		2.0	2.0		3.0	+	2.5			+		+				++							8.5	0.5	1									2.0	1.6	6.4
D	5	29.8		5.0	1.0		2.0	+	1.5			+						++							4			6		10.5	0.03	0.65	0.4	0.2		4.0	3.1	2.9
D	6	24.3		2.0		1.0	0.1		0.1		1.0	5.0		+				++						+	3.5			5.5	1	11.7	0.13	0.57	2.1	0.5		2.6	5.0	2.4
D	7	17.3									1.5	8.5						++										5.5	4.5	11.9	0.16	0.57	3.7	0.5		1.6	5.8	2.6
E	2	13.6		2.0	6.5			0.4	0.4					0.4				+	+						8.5	0.5	1								5.9	2.3	2.0	5.7
E	3	11.8		5.0	3.0		0.4	0.3	0.5					0.3				+	+						8.5	0.5	1								6.5	1.4	1.5	7.1
E	4	11.8		2.0	6.5	+	0.2		0.2	0.2	0.2			0.2				+							7	2	1								6.5	1.8	2.0	6.2
E	5	13.9		4.5	4.5						0.8			0.2				+							5.5	4	0.5								6.5	3.1	1.8	5.1
E	6	21.3		3.5	2.5						3.0	0.5						+	+						2.5	5		2.5							7.1	3.5	3.0	3.5
E	7	17.2		7.0							2.0	0.5		0.5				+							2	5		3							7.1	3.3	2.4	4.3
F	2	16.0		4.0	4.0		+		1.0		0.5	0.1		0.1				+	+						7.5	2	0.5								6.1	2.2	2.6	5.2
F	3	13.4		3.0	5.0			+	0.5		0.5	+		0.5		+		+							7	3	1								6.6	2.1	2.1	5.8
F	4	13.0		1.0	5.0			+	0.5		0.5			0.5				+	2.0						7	2.5	0.5								6.9	0.9	1.4	7.7
F	5	10.6		2.0	3.0		+		0.5		4.0			0.5	+			+							6.5	3	0.5								6.0	1.3	2.0	6.7
F	6	12.0		1.0	6.0		+		0.2					0.5	+			+	+			+			7.5	1.5	1								6.4	1.0	2.0	7.0
G	1																								6.0	2.5	1.5			7.1	0.01	1.2	0.1	2.0	4.0	6.6	3.1	0.3
H	1																								8.8	1.2				1.7	0.00	0.46	0.1	0.9	3.5	4.4	4.2	1.4
I	2																								9.1	0.9				7.2	0.01	1.1	0.1	2.1		6.4	2.9	0.7
I	8																								10.1					2.0	0.02	0.76	0.1	0.2		5.1	3.1	1.8
I	10																								2.5			7.5		11.0	0.03	0.46	0.8	0.7		4.0	3.7	2.3
I	12																								0.7			9.3		4.3	0.02	0.33	1.1	0.5		2.8	4.5	2.7
J	1																								9.9	0.1				2.5	0.02	0.87	0.1	0.9	3.5	9.0	0.2	0.8
K	3	29.7		1.0	4.0		2.5		2.5					+				+							9	0.5	0.5			2.0	0.02	1.3	0.1	1.9	4.2	4.9	2.7	2.4
K	4	25.3		1.0	5.0		1.0	+	1.5					+				++							8.5	1	0.5			1.9	0.02	1.5	0.1	2.4	5.1	2.6	2.5	4.9
K	5	15.6		5.0	1.0		2.0		1.5									++	+						9	0.5	0.5								5.2	0.8	1.5	7.7
K	6	21.0		4.0	2.0		2.0		1.5					+				++						+	9	0.5	0.5								4.9	2.8	2.0	5.2
K	7	16.9	+	3.0	2.0									+				+						+	9	0.5	0.5			1.7	0.02	1.1	0.1	1.5	5.3	2.0	1.7	6.3
K	8	27.6	1.0	6.0			1.0		1.0					+				+							5.5			4.5		11.1	0.10	1.7	0.1	1.2	5.8	5.3	1.6	3.1
K	9	24.8	5.0	4.0			+		+						+			+							4.5			5.5		10.6	0.10	1.9	0.5	0.8	7.0	6.2	1.5	2.3
K	10	16.6	1.0	2.5		3.0			+			3.0						+							4.5			4.5	1	14.3	0.22	1.7	2.6	0.7	7.6	3.4	4.9	1.7
K	11	14.4	0.5	2.5	3.0	3.0						0.5		+				+							4		1		5						7.2	2.8	3.5	3.7
L	2	13.7		1.5	4.0		2.0	+	2.5									+	+						8	2									5.6	2.7	1.2	6.1
L	3	11.9		1.5	5.0		2.5		0.5					+				+							5.5	3.5	1								5.3	1.1	1.1	7.8
L	4	26.1		9.5														+							6.5			3.5		11.9	0.00	1.2	0.3	0.6	6.0	6.1	2.8	1.1
L	5	20.0			1.0						9.0							+							4			6		12.0	0.08	0.82	4.0	0.4	6.3	4.6	4.0	1.4
L	6	28.3			1.5		0.3				8.0			0.2				+							4.5			5.5		9.1	0.10	1.0	3.1	1.0	6.6	3.9	7.7	3.8
L	7	18.2			0.5						9.5							+							1.5			8.5							6.8	3.8	5.9	2.1
M	2																																		5.9			
M	4																								4.9	3.9	1.2			2.8	0.03	0.63	0.1	1.4	6.0	3.3	2.6	4.1
M	5																																		5.5			
M	6																								4.2	3.2	2.6			2.9	0.02	1.1	0.1	1.8	5.0	5.0	4.5	0.5
M	7																								4.9	4.0	1.1			4.7	0.03	0.92	0.1	2.0	5.1	3.1	3.3	3.6
M	8																								5.5	2.7	1.8			2.4	0.04	0.78	0.1	1.2	5.0	5.7	2.2	2.1
M	9																																		4.0			
M	10																																		8.0			
N	1A																								8.3	0.6		1.1		2.2	0.02	1.3	0.1	1.8	4.4	7.6	1.4	1.0
O	1																								4.3	0.2		0.5		3.9	0.03	1.2	0.1	1.8	4.4	6.3	3.2	0.5
P	1	13.7		5.0	2.0		0.5		1.5					0.5				+	+						6.5	1.5	2								6.8	1.3	1.6	7.1
P	2	33.9		7.0	2.0				0.5					0.5				+	+						6.5	2.5	1									5.0	3.2	1.8
P	3	16.3		7.0	2.0		0.5		0.5									+						+	6	3	1			1.5	0.00	1.0	0.1	1.9	6.2	3.9	4.2	1.9
P	4	28.4		6.5	2.5		0.2		0.3		0.5							+	+					+	6	3	1			1.2	0.00	1.0	0.1	2.2	6.0	4.3	3.9	1.8
P	5	20.0		3.0	3.5				2.5		0.5							+	+				+		6.5	3.5									5.8	3.0	2.4	4.6
P	6	13.9		3.5	3.5				2.0		0.8	+		0.2				+	+						6.5	2.5	1								6.6	1.9	1.7	6.4
P	7	15.6		3.5	3.5		0.5	0.3	1.5					0.5				+	+	+					7	2.5	0.5								6.9	2.4	2.2	5.4
P	8	15.2		3.5	3.5		0.5	0.3	1.5					0.5				+	+	+					7	2.5	0.5								6.5	2.8	2.1	5.1
P	9	25.8		4.0	3.0		0.5	0.3	1.5			+		0.5				+	+	+					6	3	1								6.4	3.6	2.9	3.5
P	10	28.6		4.0	3.0		0.5		1.5									+	+				+	+	6	3.5	0.5								6.0	3.6	3.4	3.0
P	11	49.0		7.0			0.5	0.5	1.5									+						+	5.5	3.5	1								6.0	4.7	4.0	1.3
Q	2	11.4		1.0	3.0		3.0		2.0				0.2	0.5				+							7	1.5	1.5								5.8	0.3	1.1	8.6
Q	3	11.4		2.0	2.0		2.5	0.5	2.5									+						+	8.5	1.5									6.6	0.9	1.3	7.8
Q	4	13.4		1.0	2.0		2.5	0.5	3.0									+	+						9	1									5.9	1.4	1.3	7.3
Q	5	18.8		9.0			1.0											+							10										5.6	3.5	3.8	2.7

7. Properties relating to use possibilities of sampled material — Before firing; After firing at indicated temperatures (Degrees Fahrenheit). **8. Suggested products. 9. Comments**

Locality	Downward sequence	Munsell color notation (moist sample)	Strength	% water required for plasticity	Texture and workability	% shrinkage	Defects	1800° Munsell color notation	1800° Hardness	1800° % linear shrinkage	1800° % water absorption	1800° Specific gravity (approximate)	2000° Munsell color notation	2000° Hardness	2000° % linear shrinkage	2000° % water absorption	2000° Specific gravity (approximate)	2100° Munsell color notation	2100° Hardness	2100° % linear shrinkage	2100° % water absorption	2100° Specific gravity (approximate)	2200° Munsell color notation	2200° Hardness	2200° % linear shrinkage	2200° % water absorption	2200° Specific gravity (approximate)	2300° Munsell color notation	2300° Hardness	2300° % linear shrinkage	2300° % water absorption	2300° Specific gravity (approximate)	2400° Munsell color notation	2400° Hardness	2400° % linear shrinkage	2400° % water absorption	2400° Specific gravity (approximate)	Pyrometric cone equivalent	8. Suggested products	9. Comments
A	2	7.5YR5/6																																						
A	3	7.5YR5/6																																						
A	4	7.5YR5/6																																						
A	5	7.5YR5/6	S	55	ST sh Pl	14.5		2.5YR4/5	h	17.0	16.8	2.90	2.5YR5/4	H	21.0	9.7	2.79	2.5YR4/4	H	23.0	5.8	2.76	2.5YR4/3	H	24.5	4.9	2.73	10R3/2	HH	24.5	3.9	2.70	10R3/1	HH	24.5	4.0	2.71		OD	Bloating test negative
A	6	5YR4/8	S	49	ST sh Pl	14.5		2.5YR5/5	h	14.5	20.1	2.94	2.5YR5/5	H	17.5	15.0	2.89	2.5YR5/5	H	21.5	9.4	2.86	2.5YR4/3	H	21.5	8.7	2.82	5YR4/2	HH	21.5	7.1	2.77	5YR3/1	HH	21.5	7.7	2.83		OD	Bloating test negative
B	2	7.5YR4/4																																						
B	3	10YR5/8	L	31	Sy Sh	5	0	5YR7/6	Hc	5.0	21.8	2.50	5YR8/4	Hc	5.5	21.3	2.53	5YR8/4	Hc	6.0	19.7	2.51	5YR6/4	Hc	7.0	18.1	2.50	2.5Y7/2	Hc	9.5	15.6	2.45	5Y6/2	Hc	9.5	14.7	2.43	27–28	IHDR	
B	4	2.5YR5/4	L	27	Sm Lg	5	0	5YR6/4	Hc	3.5	25.6	2.72	5YR7/4	Hc	3.5	25.3	2.73	5YR7/4	Hc	3.5	22.9	2.74	5YR6/4	Hc	3.5	22.8	2.78	5YR6/3	Hc	6.0	21.6	2.73	5YR6/3	Hc	6.0	21.9	2.74	27–28		
B	5	5YR5/4	L	30	Gy Sh	4.5	0	5YR6/4	Hc	3.5	27.1	2.73	5YR7/3	Hc	3.5	25.9	2.72	5YR7/4	Hc	5.0	23.6	2.73	5YR6/3	Hc	5.0	23.1	2.73	5YR6/2	Hc	5.0	21.3	2.72	5YR6/2	Hc	7.0	21.8	2.72			
B	6	10YR5/5		30	Sy Sh	6	0	5YR8/4	Hc	3.0	30.0	2.70	5YR6/4	Hc	3.0	29.6	2.71	5YR6/4	Hc	3.0	27.2	2.70	5YR7/3	Hc	3.5	26.1	2.75	5YR7/1	Hc	3.5	24.2	2.70	5YR7/1	Hc	3.5	24.5	2.72			
B	7	7.5YR5/6																																						
B	8	5Y4/3																																						
C	1	10YR6/6	SS	77	My Sh	22.5		2.5YR5/8	H	25.0	6.6	2.31	2.5YR5/8	H	30.0	1.9	2.38	2.5YR3/3	H	31.0	1.8	2.52	5YR4/1	H	35.0	1.8	2.50	5Y3/1	HH	Ex	2.9	2.40	N4	HH		3.8	2.28		OD? FSP	Slow drying necessary owing to warping and cracking tendencies
D	1	7.5YR5/6																																						
D	2	5Y8/1	L	44	Sm PL	5	0	N9	Sc	5.0	31.9	2.52	N9	Sc	6.5	30.7	2.56	N9	Sc	10.0	24.4	2.56	5Y9/1	h	10.5	19.4	2.55	5Y9/2	H	16.0	21.8	2.50	5Y9/2	H	16.0	7.5	2.49	30–31	IHDR, WW, PF, PtF	Has been marketed for use in whiteware and refractory products.
D	3	2.5YR8/4																																						
D	4	10YR6/8																																						
D	5	10YR6/8		23	Sy Sh	3	0	5YR7/5	Sc	4.0	16.3	2.40	5YR6/4	Sc	4.0	15.1	2.40	2.5YR6/5	Sc	4.0	14.3	2.38	2.5YR5/4	Sc	5.0	13.8	2.32	10R4/2	Sc	6.0	12.1	2.30	2.5Y5/2	Sc	6.0	11.7	2.28			See screen analysis
D	6	5Y5/4	L	30	Sy pl sh	6	0	2.5YR5/4	Sc	6.0	17.7	2.53	2.5YR5/4	Sc	7.0	15.6	2.50	2.5YR4/4	Sc	7.5	13.3	2.46	2.5YR5/2	h	7.5	12.9	2.43	10R3/1	h	7.5	9.7	2.37	10R2/1	h	9.0	7.2	2.29			
D	7	?	LL	32	Sy pl	2.5	0	5YR6/5	Sc	5.0	22.2	2.66	5YR5/5	Sc	7.5	18.8	2.63	5YR5/2	h	7.5	11.5	2.45	10YR3/1		Ex	13.4	1.30											5±		Expanded at 2200°; melted at 2300°; bloating test negative.
E	2	10YR5/4																																						
E	3	10YR4/2																																						
E	4	2.5YR4/4																																						
E	5	2.5YR4/4																																						
E	6	2.5YR4/4																																						
F	2	10YR5/4																																						
F	3	10YR4/4																																						
F	4	10YR4/3																																						
F	5	7.5YR5/6																																						
F	6	7.5YR5/8																																						
G	1	5YR7/4	M	27	Sm PL	5	0	5YR7/4	Sc	5.0	19.9	2.62	5YR7/4	h	5.0	15.9	2.65	2.5YR5/4	H	10.0	10.2	2.62	2.5YR4/2	H	12.5	5.0	2.55	10R4/1	H	12.5	0.8	2.41	10R4/1	HH	12.5	0.4	2.37		CB, T, QT	
H	1	5Y9/2		48	Sm pl fy	3	0	10YR9/2	Sc	5.0	43.0	2.43	10YR9/2	Sc	5.0	42.5	2.38	N9	Sc	6.0	39.9	2.46	N9	Sc	9.5	38.4	2.46	N9	Sc	10.0	35.7	2.48	N9	Sc	10.0	34.5	2.51	30–31	IHDR, CW	Test was performed after beneficiation. Has been used locally in manufacture of fire brick and other refractory wares
I	1	10YR5/6																																						
I	2	5YR6/8	M	41	Sm pl fy	5	0	5YR7/6	Sc	6.0	29.1	2.62	5YR7/5	Sc	11.0	21.3	2.62	5YR5/4	h	11.0	16.4	2.66	2.5YR5/3	H	12.0	12.2	2.61	10R4/1	H	16.0	8.4	2.56	2.5Y4/1	HH	16.0	3.7	2.47			Bloating test negative
I	3	7.5YR7/6																																						
I	4	7.5YR6/2																																						
I	5	10YR6/4																																						
I	6	10YR7/2																																						
I	7	10YR6/3																																						
I	8	5YR4/1	M	22	Sm PL	5.5	0	7.5YR7/4	Sc	5.0	16.0	2.69	7.5YR8/4	h	6.5	15.2	2.68	7.5YR7/4	h	8.0	13.4	2.65	7.5YR8/3	h	8.5	12.7	2.65	2.5Y8/2	h	7.5	12.7	2.64	2.5Y8/3	h	7.5	13.5	2.68	26–27	LHDR, CFT	Excellent working properties
I	9	10YR6/2																																						
I	10	10YR5/4	M	39	Sm pl	8	0	5YR6/4	Sc	8.5	18.8	2.61	5YR5/5	Sc	11.0	17.3	2.66	2.5YR5/4	Sc	11.0	16.6	2.67	2.5YR4/4	h	8.5	17.7	2.68	10R4/2	h	11.0	16.8	2.68	10R4/1	h	11.0	16.1	2.67		SB	Bloating test negative; extrusion characteristics excellent. Modulus of rupture for round bars (½″ dia) = 920 psi.
I	11	2.5Y4/4																																						
I	12	7.5Y3/2	S	50	Sm pl st	10.5	0	7.5YR6/4	Sc	13.0	19.9	2.64	5YR4/3	h	15.5	16.2	2.75	5YR4/3	h	15.5	16.5	2.74	5YR4/3	h	15.5	16.1	2.75	10R4/1	h	15.5	15.7	2.75	2.5YR3/1		16.5	6.9	2.59		DB	Bloating test negative.
J	1	10YR6/1	M	27	Sm Pl	5.5	0	10YR9/2	Sc	5.5	17.9	2.60	10YR8/2	Sc	5.5	17.4	2.58	10YR8/2	Sc	5.5	17.1	2.59	5Y9/2	h	9.5	14.5	2.58	5Y9/2	h	10.0	12.1	2.57	5Y9/2	h	10.0	10.8	2.55	29	IHDR	Sample from one of several small piles of material taken from road cut and dumped in field on west side of MD-272. Small amount has been used locally in manufacture of fire brick and other refractory wares.
K	3	7.5YR6/2	M	32	Sm Pl Lg	5	0	5YR8/2	Hc	4.5	25.3	2.58	5YR9/2	Hc	4.5	25.1	2.62	5YR9/1	Hc	4.5	22.1	2.62	2.5Y9/2	Hc	7.0	17.6	2.60	5Y9/2	h	10.0	12.4	2.54	5Y8/1	h	10.0	9.5	2.49	31–32	IHDR	
K	4	7.5YR7/2	L	26	sm sy	5	0	5YR8/2	Hc	2.5	20.6	2.37	5YR9/1	Hc	3.0	20.1	2.38	10YR9/1	Hc	3.5	18.6	2.35	2.5Y8/2	Hc	5.0	15.9	2.32	5Y9/2	Hc	6.0	14.2	2.29	5Y8/2	Hc	6.0	9.7	2.26	28	IHDR	
K	5	10YR6/4																																						
K	6	2.5YR7/2																																						
K	7	10YR6/3	LL	20	Sy Sh	5	0	5YR8/3	Hc	1.5	14.2	2.47	5YR9/2	Hc	1.5	14.8	2.46	7.5YR8/2	Hc	1.5	14.8	2.43	7.5YR7/2	Hc	1.5	13.9	2.44	10YR8/2	Hc	1.5	13.4	2.41	5Y7/2	Hc	2.0	11.6	2.35			
K	8	10YR5/6	LL	26	Gy Sh	5	0	2.5YR5/4	Hc	4.5	16.1	2.75	2.5YR5/4	Hc	7.0	15.9	2.77	2.5YR5/4	h	7.0	14.5	2.75	2.5YR4/4		7.0	12.9	2.72	10R3/2	H	7.5	11.8	2.68	10R3/1	H	8.5	10.9	2.64		CB	Sticky as raw material
K	9	10YR5/6	LL	27	Sy Sh	5	0	5YR6/6	Hc	5.5	24.0	2.70	5YR6/6	Hc	6.5	21.8	2.64	2.5YR5/6	Hc	7.5	19.6	2.69	2.5YR4/4	Hc	7.5	2.3	2.66	10R3/1	h	10.0	15.1	2.63	N4	h	11.5	11.9	2.58			Sticky as raw material
K	10	2.5Y4/4	L	27	Sh	5	0	5YR5/6	Hc	5.0	21.2	2.77	2.5YR4/6	Hc	6.5	19.3	2.76	2.5YR4/2	h	10.0	9.0	2.64																1–5		
K	11	10YR3/2																																						
L	2	5YR4/8																																						
L	3	7.5YR5/6																																						
L	4	10YR5/3	M	37	Gy Sm PL	6	0	5YR7/3	h	10.0	17.3	2.7	5YR6/4	H	10.5	12.4	2.70	2.5YR5/4	H	15.0	7.5	2.63	2.5YR5/2	HH	15.0	6.6	2.60	10R5/1	HH	15.0	4.3	2.51	5Y4/2	HH	15.0	2.9	2.49			Bloating test negative; fired samples show scumming.
L	5	10YR5/8	S	27	Sm Lg PL	5	0	2.5YR6/6	h	10.0	17.4	2.69	2.5YR6/6	h	11.0	13.6	2.64	2.5YR5/4	H	12.5	10.0	2.58	2.5YR4/4	H	14.0	8.6	2.57	10R4/1	H	15.0	5.7	2.51	N4	H	18.5	2.6	2.46		SB	
L	6	10YR5/8	L	27	St Gy Sh	5	0	2.5YR6/6	Hc	5.5	15.7	2.69	2.5YR6/6	Hc	9.0	13.9	2.63	2.5YR4/4	h	9.0	13.2	2.62	10R4/1	H	15.0	7.1	2.44													
L	7	10YR4/4																																				5–8		
M	2	10YR4/4																																						
M	3	10YR4/3																																						
M	4	10YR5/6	L	21	Sy Sh	5	0	5YR7/6	Sc	3.5	16.8	2.67	5YR6/6	Sc	6.0	14.7	2.66	2.5YR5/4	h	7.0	11.8	2.62	2.5YR4/3	h	8.0	10.0	2.59	10R4/1	H	9.5	7.0	2.55	5Y5/1	H	9.5	5.9	2.50			Bloating test negative
M	5	10YR5/8																																						
M	6	10YR3/1	M	25	Sm fy PL	4	0	7.5YR7/4	Sc	4.5	16.0	2.57	7.5YR7/4	h	7.5	11.3	2.54	5YR6/4	H	8.0	7.6	2.48	7.5YR5/2	HH	12.0	2.6	2.39	2.5Y5/2	HH	12.0	0.1	2.29	2.5Y6/2		Ex	9.4	2.20		LGP, A	Expanded at 2400° but bloating test was negative.
M	7	10YR4/1	L	19	Sy Sh	4	0	7.5YR7/4	Sc	2.0	15.7	2.66	7.5YR6/4	Sc	3.5	14.3	2.64	5YR6/3	h	5.5	12.3	2.62	10YR6/2	H	6.5	9.9	2.58	10YR5/1	H	7.5	6.9	2.52								Bloating test negative.
M	8	2.5YR4/4	S	23	Gy Sm pl	4.5	0	2.5YR7/6	Sc	5.0	15.8	2.66	2.5YR6/6	h	6.5	12.4	2.65	2.5YR5/4	H	7.5	9.9	2.60	2.5YR4/2	H	9.5	6.8	2.52	10R4/1	H	11.0	4.0	2.49	2.5Y4/2		9.0	7.0	2.34		CB, T	Bloating test negative.
M	9	5YR5/2																																						
M	10	10YR6/3																																						
N	1A	10YR8/2	L	29	Sy Sh	5		7.5YR8/5	Sc	5.5	23.0	2.62	10YR9/2	Sc	5.5	23.9	2.65	10YR9/2	Sc	5.5	22.2	2.62	10YR8/2	Sc	6.0	18.1	2.60	2.5YR8/2	h	6.0	16.2	2.58	2.5YR6/2	h	9.0	12.5	2.47	26–27		
N	1B	10YR8/2		34	Sm Pl Fy	5	0	5YR9/2	Sc	5.0	27.0	2.42	5YR9/1	Sc	5.0	24.7	2.43	2.5YR9/4	H	10.0	12.2	2.34	2.5Y9/4	HH	10.0	11.2	2.35	2.5YR7/2	HH	10.0	7.7	2.40	5Y7/1	HH	11.0	6.0	2.35	28–29	LHDR, IHDR	Pyrometric properties are improved by beneficiation.
O	1	10YR8/4	L	36	Sy Fy	5	0	2.5YR8/4	Sc	5.5	26.4	2.59	2.5YR8/4	Sc	7.5	25.4	2.6	7.5YR7/4	Sc	7.5	24.4	2.61	7.5YR7/4	h	10.0	17.2	2.61	10YR6/3	H	10.5	13.1	2.56	5Y6/3	H	11.0	9.1	2.45	27–28	LHDR, CFT	Has been used for manufacture of brick and tile.
P	1	5YR5/6																																						
P	2	2.5YR4/8																																						
P	3	2.5YR6/6	L	25	Sy Sh	3.5	0	5YR7/5	Sc	4.0	19.2	2.67	5YR7/6	Sc	4.5	17.1	2.67	5YR7/5	Sc	6.0	14.3	2.65	5YR6/3	h	6.5	11.2	2.61	2.5Y5/2	H	9.0	7.1	2.56	5Y6/1	H	9.5	6.7	2.52	<20		
P	4	7.5YR6/4	M	24	Sm PL	3.5	0	5YR8/2	Sc	3.0	17.3	2.65	5YR9/2	h	4.5	15.5	2.64	10YR9/2	H	6.0	12.0	2.59	2.5Y8/2	H	8.0	8.8	2.55	2.5Y7/2	HH	10.5	4.7	2.47	5Y6/1	HH	11.5	2.0	2.47	<20	DB, T, P, A	
P	6	7.5YR5/4																																						
P	7	10YR5/4																																						
P	8	5YR5/8																																						
P	9	2.5YR5/8																																						
P	10	5YR5/6																																						
P	11	2.5YR5/6																																						
Q	2	7.5YR6/6																																						
Q	3	10YR6/4																																						
Q	4	10YR6/6																																						
Q	5	7.5YR5/8																																						

						pK	8	Clay (saprolite)	12
							9	Clay (saprolite)	12
							10	Clay (saprolite)	5
							11	Clay (saprolite)	4
L	644.5	1072.5	N–28	NE	East side of road west of and roughly parallel to Principio Creek; 1.3 miles north of intersection of this road with U. S. Highway 40. Elevation about 230 feet. #		1	Soil	3
						QT	2	Sand, argillaceous, and gravel	5
								UNCONFORMITY	
						Knm	3	Sand	18
								UNCONFORMITY	
							4	Clay (saprolite)	4
						pK	5	Clay (saprolite)	15
							6	Clay, (saprolite)	7
							7	Clay (saprolite)	2
M	644	1130	N–30	N	0.1 mile west of U. S. Highway 213, 1200 feet south of its intersection with U. S. Highway 40. Elevation about 60 feet. #		1	Soil	1
						QT	2	Sand-silt-clay and gravel	2
								UNCONFORMITY	
							3	Sand-silt-clay	2
							4	Sand-silt-clay	3
							5	Sand, argillaceous	3
						Knm	6	Clay, silty	30
							7	Sand-silt-clay	7
							8	Sand-silt-clay	13
							9	Sand-silt-clay	5
							10	Sand	28
N	643.5	1089	N–29	NW	2 miles north-northeast of Charlestown; exposure in Broad Creek about 900 feet SE of U. S. Highway 40. Elevation about 30 feet.	pK	1A	Clay, white and yellowish, derived from alteration of granodiorite gneiss.	4
							1B	Same material after beneficiation	
O	642	1089.5	N–29	NW	1½ mile northeast of Charlestown, 500 feet west of Highway MD-7; old open pit (abandoned). Elevation about 40 feet.	Knm	1	Clay, silty	20
P	642	1081	N–28	NE	100 feet east of trail leading to Foys Hill Lookout Tower; 0.3 mile northeast of intersection of trail with U. S. Highway 40. Elevation about 330 feet. #	QT	1	Sand, silty and gravel	15
								UNCONFORMITY	
							2	Sand, argillaceous, brown	2
							3	Clay, silty	5
							4	Silt, argillaceous	3
							5	Clay, silty	21
						Knm	6	Sand-silt-clay	13
							7	Sand, argillaceous	2
							8	Sand-silt-clay	15
							9	Sand-silt-clay	15
							10	Sand-silt-clay	6
							11	Clay, silty	4
Q	641.5	1076.5	N–28	N	.4 mile south of Belvedere; on east side of road leading southward from there to U. S. Highway 40; 300 feet south of a telephone line. Elevation about 185 feet. #		1	Soil	2
						QT	2	Sand and gravel	29
							3	Sand and gravel	14
								UNCONFORMITY	
						QT or Knm	4	Sand, argillaceous	9
							5	Sand-silt-clay	5
R	641	1100	N–29	N	Southwest side of road branching southeastward from Highway MD-272 at southern edge of North East; half a mile from junction of the two roads. Elevation about 110 feet. #	QT	1	Sand, argillaceous	3
								UNCONFORMITY	
							2	Clay, silty	2
							3	Sand-silt-clay	8
							4	Sand	17
							5	Sand	5
							6	Clay, silty	12
							7	Sand-silt-clay	1
							8	Sand-silt-clay	5
						Knm	9	Sand-silt-clay	2
							10	Sand-silt-clay	25
							11	Silt, argillaceous	10
							12	Sand-silt-clay	10
S	639	1132.5	N–30	C	2 miles south-southeast of Elkton; 700 feet north of Crouch Chapel; east side U. S. Highway 213 about 60 feet south of its intersection with Old Frenchtown Wharf road. Elevation about 70 feet. #		1	Fill, artificial	2
							2	Sand-silt-clay	4
							3	Silt, argillaceous	3
						Knm	4	Sand and gravel	7
							5	Sand-silt-clay	11
							6	Sand, silty	9
							7	Sand-silt-clay	16
							8	Sand-silt-clay	8
							9	Sand and gravel	8
							10	Sand-silt-clay	10
							11	Sand-silt-clay	14
							12	Sand	5
							13	Sand and gravel	3
T	637.5	1105.5	N–29	E	1½ miles southeast of town of North East; 1½ miles south of Highway MD-7 on east side of road branching southward. Near Airway beacon. Elevation about 240 feet. #		1	Soil	2
						QT	2	Sand, silty, and fine gravel	3
								UNCONFORMITY	
							3	Sand, argillaceous	3
							4	Clay-silt-sand	9
							5	Sand, argillaceous	14
							6	Sand-silt-clay	10
						Knm	7	Sand-silt-clay	9
							8	Sand-silt-clay	13
							9	Sand-silt-clay	22
							10	Sand-silt-clay	5
							11	Sand-silt-clay	10
U	633	1135	N–30	C	3 miles south-southeast of Elkton; 2000 feet south of Perch Creek; west side of U. S. Highway 213, northwest of its intersection with Henderson Point road. Elevation 65 feet. #		1	Soil	2
							2	Sand, silty	2
							3	Sand	16
							4	Clay, silty	10
							5	Sand-silt-clay	7
							6	Silt, argillaceous	5
						Knm	7	Clay, silty	1
							8	Sand	9
							9	Sand-silt-clay	28
							10	Sand and gravel	6
							11	Clay, silty	14
V	629.5	1111	N–29	E	Southeast side of Elkton-Elk Neck road, 0.4 mile southwest of Wesley Church cemetery. Elevation 205 feet. #		1	Sand, brown, and some gravel	3
						QT	2	Sand-silt-clay	6
								UNCONFORMITY	
							3	Clay, silty	1
							4	Clay, silty	2
							5	Sand-silt-clay	3
							6	Sand-silt-clay	4
							7	Sand-silt-clay	3
							8	Sand-silt-clay	8
							9	Sand, argillaceous	15
							10	Sand-silt-clay	16
						Knm	11	Sand-silt-clay	9
							12	Sand-silt-clay	15
							13	Sand-silt-clay	10
							14	Sand	15
W	627.5	1138.5	N–30	C	1½ miles north-northeast of Chesapeake City; ⅓ mile northwest of Long Branch on north side of east-west road, 300 feet east of its junction with road extending southeastward from U. S. Highway 213 to Chesapeake and Delaware Canal. Elevation about 65 feet. #		1	Soil	3
							2	Sand, silty	27
							3	Sand, silty	6
						Knm	4	Sand-silt-clay	6
							5	Sand	27
							6	Sand-silt-clay	27
							7	Sand	6
							8	Silt, argillaceous	2
Z	623	1043	N–30	SE	240 feet north of north bank of Chesapeake and Delaware Canal; opposite Bethel. Elevation about 25 feet. #		1	Soil	3
						QT	2	Sand	23
								UNCONFORMITY	
							3	Sand-silt-clay	34
						Knm	4	Sand-silt-clay	15
							5	Sand-silt-clay	13
							6	Sand	12
A_1	622.5	1142.5	N–30	SE	North bank of Chesapeake and Delaware Canal, opposite Bethel; exposure 300 feet west of Light No. 40. Near sea level.	Knm		Clay	
B_1	622	1093	N–29	SW	4½ miles south of North East; 800 feet east of Carrot Cove. Small pit on property of Nelson Cameron. Elevation about 20 feet.	Knm		Clay, mottled	10±
C_1	622	1042.5	N–30	SE	South bank Chesapeake and Delaware Canal at Bethel; 600 feet west of light. Elevation about 15 feet.		1	Soil	3
						Knm	2	Sand, coarse	10
							3	Clay, silty	3
D_1	621.5	1144	N–30	SE	South bank of Chesapeake and Delaware Canal; exposure 600 feet east of Bethel, about 60 feet west of Delaware State boundary. Near sea level.		1	Clay, black, containing lignite fragments	
						Knm	2	Clay, silty	6
								Beach level	

	8	27.6	1.0	6.0			1.0		1.0					+				+							5.5			4.5	
	9	24.8	5.0	4.0			+		+						+			+							4.5			5.5	
	10	16.6	1.0	2.5		3.0			+			3.0						+							4.5			4.5	1
	11	14.4	0.5	2.5	3.0	3.0					0.5			+				+							4		1		5
L	2	13.7		1.5	4.0		2.0	+	2.5									+							8	2			
L	3	11.9		1.5	5.0		2.5		0.5					+				+							5.5	3.5	1		
L	4	26.1		9.5														+							6.5			3.5	
L	5	20.0			1.0						9.0							+							4			6	
L	6	28.3			1.5		0.3				8.0			0.2				+							4.5			5.5	
L	7	18.2			0.5						9.5							+							1.5			8.5	
M	4																								4.9	3.9	1.2		
M	6																								4.2	3.2	2.6		
M	7																								4.9	4.0	1.8		
M	8																								5.5	2.7	1.8		
N	1A																								8.3	0.6		1.1	
O	1																								4.3	0.2		0.5	
P	1	13.7		5.0	2.0		0.5		1.5					0.5				+	+						6.5	1.5	2		
P	2	33.9		7.0	2.0				0.5					0.5				+	+						6.5	2.5	1		
P	3	16.3		7.0	2.0		0.5		0.5									+	+				+		7	3	1		
P	4	28.4		6.5	2.5		0.2		0.3		0.5							+	+				+		6	3	1		
P	5	20.0		3.0	3.5				2.5		0.5							+	+			+			6.5	3.5			
P	6	13.9		3.5	3.5				2.0		0.8	+		0.2				+	+						6.5	2.5	1		
P	7	15.6		3.5	3.5		0.5	0.3	1.5					0.5				+	+	+					7	2.5	0.5		
P	8	15.2		3.5	3.5		0.5	0.3	1.5					0.5				+	+	+					6.5	2.5	0.5		
P	9	25.8		4.0	3.0		0.5	0.3	1.5			+		0.5				+	+	+					6	3	1		
P	10	28.6		4.0	3.0		0.5		1.5									+	+				+	+	6	3.5	0.5		
P	11	49.0		7.0			0.5	0.5	1.5									+						+	5.5	3.5	1		
Q	2	11.4		1.0	3.0		3.0		2.0				0.2	0.5				+							7	1.5	1.5		
Q	3	11.4		2.0	2.0		2.5	0.5	2.5									+						+	8.5	1.5			
Q	4	13.4		1.0	2.0		2.5	0.5	3.0									+	+						9	1			
Q	5	18.8		9.0			1.0											+							10				
R	3																								7.5	1.6	0.9		
R	6																								6.4	3.0	0.6		
R	7																								6.4	2.3	1.0		
R	8																								6.0	3.1	0.9		
S	2	21.2		0.5	5.0		1.5		+	+	+	1.5		+	1.5	+		+							7	2	1		
S	3																								6.5	2.5	1		
S	4	14.5			6.0				+		+	1.5		+	1.5			++							7.5	2.5			
S	5	19.0		6.0	1.0						+	+		+	2.5			++	+						8	1	1		
S	6	13.1		6.5	1.0	+		+	+			+						++							7.5	1.5	1		
S	7	24.8	+	4.0	1.0	3.0						+		+	+			++							7	1.5	1.5		
S	8	24.3		7.0	1.0	2.0												++							7.5	1.5	1		
S	10	26.1		0.5	+	8.0	+		+					+				++							7	2	1		
S	11	28.1	+	7.0	+	2.0						+		+	+			++							7.5	2	0.5		
T	2	20.5		3.5	3.5		1.5	0.5	1.0					+				+							5	3	2		
T	3	16.3		4.0	4.0		0.5		1.0					+				+		+			+		6.5	2	1.5		
T	4	18.4		4.0	4.0		0.5		1.0					+				+							7.5	2	0.5		
T	5	17.3		6.0	2.0				1.0					+				+	+	+					7.5	2	0.5		
T	6	18.6		6.5	2.5			+	0.5					+				+		+			+		7.5	2	0.5		
T	7	21.4		8.5	+		+		0.5					+				+	+	+					7	2	1		
T	8	17.8		8.5	+		+		0.8			+		+				+							7	2	1		
T	9	22.4		8.5	+		0.5		0.5					+				+	+	+					6	3	1		
T	10	34.4	+	8.5	+				1.0					+				+	+	+			+		5.5	3.5	1		
T	11	16.2	+	7.0	1.0		+		1.5					+				+	+	+					6.5	2	1.5		
U	2	15.5	+	1.0	6.0		+		+		3.0	+		+	+			+	+					+	5	3.5	1.5		
U	3	48.3		+	6.0		1.5	+	+		+	1.0		+	1.5			+					+		6	2	2		
U	4																								8	1	1		
U	5	32.7	1.5	4.5			+		2.5		+	+		+				+							9	0.5	0.5		
U	6	20.8	0.5	8.5	6.5		+		+									+							8.5	1	0.5		
U	7																								8	1	1		
U	9	20.0	+	0.5		9.0	+		+									+							6.5	2.5	1		
U	11	37.3		6.0		3.5			+									+							6.5	2	1.5		
V	2	16.1		7.0	0.5	0.5	0.5		0.5			0.5						+	+						6	2	2		
V	3	6.6		7.0	1.0		+	+	+							+		+							8	1	1		
V	4	4.6		8.0	1.0		+		+									+							6.5	2	1.5		
V	5	27.4		6.5	1.0		1.0	+	1.0			+						+		+					7	2	1		
V	6	31.4		4.5	1.5		2.0		2.0			+		+				+		+					7.5	1.5	1		
V	7	26.1		4.0	1.0		2.5	+	2.5							+		+		+					7	1.5	1.5		
V	8	17.0	+	6.0	1.0		1.5	5	1.0									+							6.5	2.5	1		
V	9	16.0		5.5	1.0		1.0		2.0					+				+	+	+					7	2.5	0.5		
V	10	19.3		4.0	2.0		1.5	+						1.5				+	0.5	+					7.5	2	0.5		
V	12	17.9		5.5	2.0		1.5		1.0					+				+					+		7.5	2	0.5		
V	13	17.6		3.5	3.5		0.5		1.0					1.5				+	0.5						7	2.5	0.5		
V	14	19.3		3.0	3.5		1.0		1.0					1.0				+	+	+			+		7.5	2.5			
W	2	15.1		1.0	5.0		1.5	1.0	0.5		0.5	+		0.5	+			+	+						5.5	1	3.5		
W	3	15.7			1.5		5.5	0.5	1.5				+	1.0				+							7.5	2.5			
W	4	19.2			1.5		5.5	0.5	1.5					1.0	+			+						+	6	3	1		
W	5	10.8			4.0		3.5	0.5	0.5					0.5				+	+						6	3	1		
W	6	13.4	5.0	1.0	1.0	1.0		0.5	0.5					0.5				+						+	6	3	1		
W	7																								5	3	2		
Z	2	8.6		2.5	2.5		2.5		0.5			0.5		0.5				+							5.5	2.5	2		
Z	3	18.4	1.0	1.0	1.0	6.0	0.4		0.4									+		+	0.2				5.5	3	1.5		
Z	4	25.4	3.0	1.0		4.0	0.5		1.0					0.5			+	+							5	3.5	1.5		
Z	5	20.0	1.0	4.0		3.0	0.5		1.0				+	0.5				+							5	3.5	1.5		
A_1																									7.0	1.6	1.4		
B_1																									7.4	1.4	1.2		
C_1	3																								6.0		4.0		
D_1	2																								9.5		0.5		

	8	11.1	0.10	1.7	0.1	1.2	5.8	5.3	1.6	3.1	10YR5/6	LL	26	Gy Sh	5	0
	9	10.6	0.10	1.9	0.5	0.8	7.0	6.2	1.5	2.3	10YR5/6	LL	27	Sy Sh	5	0
	10	14.3	0.22	1.7	2.6	0.7	7.6	3.4	4.9	1.7	2.5Y4/4	L	27	Sh	5	0
	11						7.2	2.8	3.5	3.7	10YR3/2					
L	2						5.6	2.7	1.2	6.1	5YR4/8					
L	3						5.3	1.1	1.1	7.8	7.5YR5/6					
L	4	11.9	0.00	1.2	0.3	0.6	6.0	6.1	2.8	1.1	10YR5/3	M	37	Gy Sm PL	6	0°
L	5	12.0	0.08	0.82	4.0	0.4	6.3	4.6	4.0	1.4	10YR5/8	S	27	Sm Lg PL	5	0
L	6	9.1	0.10	1.0	3.1	1.0	6.6	3.9	7.7	3.8	10YR5/8	S	27	St Gy Sh	5	0
L	7						6.8	3.8	5.9	2.1	10YR4/4					
M	2						5.9				10YR4/4					
M	3										10YR4/3					
M	4	2.8	0.03	0.63	0.1	1.4	6.0	3.3	2.6	4.1	10YR5/6	L	21	Sy Sh	5	0
M	5						5.5				10YR5/8					
M	6	2.9	0.02	1.1	0.1	1.8	5.0	5.0	4.5	0.5	10YR3/1	M	25	Sm fy PL	4	0
M	7	4.7	0.03	0.92	0.1	2.0	5.1	3.1	3.3	3.6	10YR4/1	L	19	Sy Sh	4	0
M	8	2.4	0.04	0.78	0.1	1.2	5.0	5.7	2.2	2.1	2.5YR4/4	S	23	Gy Sm pl	4.5	0
M	9						4.0				5YR5/2					
M	10						8.0				10YR6/3					
N	1A	2.2	0.02	1.3	0.1	1.8	4.4	7.6	1.4	1.0	10YR8/2	L	29	Sy Sh	5	0
N	1B										10YR8/2	L	34	Sm Pl Fy	5	0
O	1	3.9	0.03	1.2	0.1	1.8	4.4	6.3	3.2	0.5	10YR8/4	L	36	Sy Fy	5	0
P	1						6.8	1.3	1.6	7.1	5YR5/6					
P	2							5.0	3.2	1.8	2.5YR4/8					
P	3	1.5	0.00	1.0	0.1	1.9	6.2	3.9	4.2	1.9	2.5YR6/6	L	25	Sy Sh	3.5	0
P	4	1.2	0.00	1.0	0.1	2.2	6.0	4.3	3.9	1.5	7.5YR6/4	M	24	Sm PL	3.5	0
P	5						5.8	3.0	2.4	4.6						
P	6						6.6	1.9	1.7	6.4	7.5YR5/4					
P	7						6.9	2.4	2.2	5.4	10YR5/4					
P	8						6.5	2.8	2.1	5.1	5YR5/8					
P	9						6.4	3.6	2.9	3.5	5YR5/8					
P	10						6.0	3.6	3.4	3.0	5YR5/6					
P	11						6.0	4.7	4.0	1.3	2.5YR5/6					
Q	2						5.8	0.3	1.1	8.6	7.5YR6/6					
Q	3						6.6	0.9	1.3	7.8	10YR6/4					
Q	4						5.9	1.4	1.3	7.3	10YR6/6					
Q	5						5.6	3.5	3.8	2.7	7.5YR5/8					
R	1						5.3				7.5YR5/8					
R	2						5.3				2.5YR6/2					
R	3	2.8	0.03	0.63	0.1	1.4	6.0	3.0	3.3	3.7	10YR8/3	L	31	Gy Sh	3	0
R	4						5.6				10YR6/3					
R	5						5.8				10YR7/4					
R	6	5.4	0.01	1.0	0.1	1.7	5.8	4.6	3.5	1.9	5YR5/6	H	31	Sm Sh	5.5	0
R	7	4.4	0.01	0.93	0.1	1.9	5.7				2.5YR4/6					
R	8	1.7	0.00	0.77	0.1	1.5	5.9	3.3	3.2	3.5	5YR4/8	M	27	Gy sh pl	4	0
R	9						5.6				5YR5/6					
R	10						6.7	3.3	2.2	4.5	10YR3/3	L	24	Gy Sh	4	0
R	11						5.5				10YR5/4					
R	12						5.9				5YR5/3					
S	2						4.8	2.6	3.9	3.5	5Y6/4					
S	3						4.7	3.9	5.4	0.7	2.5Y5/4					
S	4						6.5	1.1	1.2	7.7	10Y5/8					
S	5						5.2	3.5	3.2	3.3	2.5YR5/6					
S	6	0.5	0.02	0.82	0.2	1.2	5.0	1.5	2.5	6.0	10YR6/2	L	19	Sy Sh	2	0
S	7	3.2	0.02	0.93	0.1	1.8	5.0	3.0	2.6	4.4	2.5YR4/6	L	21	Sy pl sm	4	0
S	8	5.1	0.02	1.1	0.1	1.2	5.1	3.7	3.0	3.3	10R4/6	L	22	Gy pl sm	2	0
S	10	5.1	0.01	1.0	0.1	1.4	4.8	4.2	2.6	3.2	10R4/6	L	26	gy pl Sm Lg	3.5	0
S	11	4.8	0.02	1.0	0.1	1.2	4.9	2.9	3.9	3.2	2.5YR4/6	L	22	Gy pl {fy lg Sm	5	0
T	2						6.8	1.8	2.5	5.7	7.5YR5/6					
T	3						6.5	2.1	1.9	6.0	7.5YR5/6					
T	4						6.4	2.3	2.6	5.1	10YR7/3					
T	5						6.0	2.0	1.9	6.1	10YR6/4					
T	6	2.1	0.00	0.77	0.1	1.6	5.8	2.4	2.3	5.3	2.5YR5/8	L	20	Gy Sh ST	5	0
T	7	1.7	0.00	0.90	0.1	1.7	5.8	2.9	2.8	4.3	2.5YR4/6	L	22	Sy Sh.	5	0
T	8	1.4	0.00	0.60	0.1	1.8	5.9	2.6	3.1	4.3	5YR5/6	LL	21	Sy Sh	5	0
T	9						5.4	3.4	3.2	3.4	7.5YR4/2					
T	10						5.2	3.8	3.9	2.7	10YR4/1					
T	11						5.2	2.8	2.3	4.9	10YR5/2					
U	2						5.8	1.7	3.7	4.6	10YR4/4					
U	3						6.2	7.0	1.1	1.9	7.5YR5/8					
U	4	4.5	0.00	1.5	0.2	1.2	4.8	5.6	4.0	0.4	2.5YR4/6	M	30	Sm pl	4	0
U	5	1.1	0.00	1.2	0.1	0.0	5.1	2.8	6.5	3.7	10YR3/1	L	22	Sy Sh	2.5	0
U	6	2.6	0.00	1.5	0.1	0.9	4.6	4.4	4.6	1.0	2.5YR4/4	M	30	Sm pl	5	0
U	7						5.0	6.4	3.2	0.4	10YR4/8					
U	9	6.6	0.02	1.0	0.1	1.7	5.5	4.3	3.1	2.6	10R4/6	M	28	Sy Sm Pl	6	0
U	11	3.6	0.01	1.2	0.1	1.7	4.8	4.9	3.5	1.6	2.5YR4/4	M	28	Sm Lg Pl	6	0
V	2						6.0	3.4	3.8	2.8	10YR5/6					
V	3						5.9	6.0	2.7	1.3	10YR7/6					
V	4						6.4	4.9	3.8	1.3	7.5YR7/4					
V	5	2.4	0.00	1.0	0.1	2.2	6.4	3.0	2.4	4.6	10YR6/4	M	25	gy sm pl	3.5	0
V	6	1.9	0.00	1.2	0.1	2.2	6.4	3.5	3.5	3.0	2.5YR7/6	M	29	gy Sm pl	5.5	0
V	7	1.9	0.01	1.0	0.1	2.2	6.5	3.0	3.0	4.0	7.5YR6/4	M	23	gy sm pl	5.0	0
V	8						7.3	2.5	2.1	5.4	5YR5/6					
V	9						6.9	2.0	1.8	6.2	5YR5/4					
V	10						6.7	2.1	2.1	5.8	7.5YR5/4					
V	11						6.7									
V	12						7.3	3.1	2.8	4.1	10YR5/3					
V	13						6.9	2.9	2.9	4.2	10YR6/3					
V	14							3.0	2.9	4.1	7.5YR6/4					
W	2						7.0	1.4	3.4	5.2	10YR4/4					
W	3						8.0	1.1	1.8	7.1	10YR5/6					
W	4						7.6	2.1	2.3	5.6	2.5Y4/4					
W	5						7.1	1.0	1.2	7.8	10YR5/8					
W	6						5.5	3.4	4.0	2.6	2.5YR3/2					
W	8						5.1	4.1	5.5	0.4	10YR4/1					
Z	2						7.2	0.8	1.4	7.8	7.5YR5/8					
Z	3						5.7	2.4	3.2	4.2	2.5YR5/2					
Z	4						5.5	4.2	3.1	2.7	10YR5/1					
Z	5						5.5	2.8	3.7	3.5	5Y4/1					
A_1		1.8	0.05	1.3	0.1	0.6	3.2	9.2	0.6	0.2	10YR7/1	M	22	Sm Pl	4.8	0
B_1		6.6	0.00	1.0	0.1	1.5	4.3	8.4	0.9	0.7	2.5YR6/4	L	25	Sm pl	5	0
C_1	3	1.9	0.02	2.0	0.1	0.5	3.0	6.1	2.0	1.9	N5/5	LL	29	Sy Sh	0.4	0
D_1	2	15.1	0.07	1.6	0.1	0.0	5.3	4.8	3.3	1.9	5YR6/6	LL	29	Sy Sh	4	0

	8	2.5YR5/4	Hc	4.5	16.1	2.75	2.5YR5/4	Hc	7.0	15.9	2.77	2.5YR5/4	h	7.0	14.5	2.75	2.5YR4/4		7.0	12.9	2.72	10R3/2	H	7.5	11.8	2.68	10R3/1	H	8.5	10.9	2.64		CB	Sticky as raw material
	9	5YR6/6	Hc	5.5	24.0	2.70	5YR6/6	Hc	6.5	21.8	2.64	2.5YR5/6	Hc	7.5	19.6	2.69	2.5YR4/4	Hc	7.5	2.3	2.66	10R3/1	h	10.0	15.1	2.63	N4	h	11.5	11.9	2.58			Sticky as raw material
	10	5YR5/6	Hc	5.0	21.2	2.77	2.5YR4/6	Hc	6.5	19.3	2.76	2.5YR4/2	h	10.0	9.0	2.64																1–5		
L	4	5YR7/3	h	10.0	17.3	2.7	2.5YR6/4	H	10.5	12.4	2.70	2.5YR5/4	H	15.0	7.5	2.63	2.5YR5/2	HH	13.0	6.6	2.60	10R5/1	HH	15.0	4.3	2.51	5Y4/2	HH	15.0	2.9	2.49			Bloating test negative; fired samples show scumming.
L	5	2.5YR6/6	h	10.0	17.4	2.69	2.5YR6/6	h	11.0	13.6	2.64	2.5YR5/4	H	12.5	10.0	2.58	2.5YR4/4	H	14.0	8.6	2.57	10R4/1	H	15.0	5.7	2.51	N4	H	18.5	2.6	2.46		SB	
L	6	2.5YR6/6	Hc	5.5	15.7	2.69	2.5YR6/6	Hc	9.0	13.9	2.63	2.5YR4/4	h	9.0	13.2	2.62	10R4/1	H	15.0	7.1	2.44											5–8		
M	4	5YR7/6	Sc	3.5	16.8	2.67	5YR6/6	Sc	6.0	14.7	2.66	2.5YR5/4	h	7.0	11.8	2.62	2.5YR4/3	h	8.0	10.0	2.59	10R4/1	H	9.5	7.0	2.55	5Y5/1	H	9.5	5.9	2.50			Bloating test negative
M	6	7.5YR7/4	Sc	4.5	16.0	2.57	7.5YR7/4	h	7.5	11.3	2.54	5Y6/4	H	8.0	7.6	2.48	7.5YR5/2	HH	12.0	2.6	2.39	2.5Y5/2	HH	12.0	0.1	2.29	2.5Y6/2		Ex	9.4	2.20		LGP, A	Expanded at 2400° but bloating test was negative.
M	7	7.5YR7/4	Sc	2.0	15.7	2.66	7.5YR7/4	Sc	3.5	14.3	2.64	5YR6/3	H	5.5	12.3	2.62	10YR6/2	H	6.5	9.9	2.58	10YR5/1	H	7.5	6.9	2.52								Bloating test negative.
M	8	2.5YR7/6	Sc	5.0	15.8	2.66	2.5YR6/6	h	6.5	12.4	2.65	2.5YR5/4	H	7.5	9.9	2.60	2.5YR4/2	H	9.5	6.8	2.52	2.5Y4/2	H	11.0	4.0	2.49	2.5Y4/2		9.0	7.0	2.34		CB, T	Bloating test negative.
N	1A	7.5YR8/5	Sc	5.5	23.0	2.62	10YR9/2	Sc	5.5	23.9	2.65	10YR9/2	Sc	5.5	22.2	2.62	10YR8/2	Sc	6.0	18.1	2.60	2.5Y8/2	h	6.0	16.2	2.58	2.5Y6/2	h	9.0	12.5	2.47	26–27		
N	1B	5YR9/2	Sc	5.0	27.0	2.42	5YR9/1	Sc	5.0	24.7	2.43	2.5Y9/4	H	10.0	12.2	2.34	2.5Y9/4	HH	10.0	11.2	2.35	2.5Y7/2	H	10.0	7.7	2.40	5Y7/1	HH	11.0	6.0	2.35	28–29	LHDR, IHDR	Pyrometric properties are improved by beneficiation.
O	1	2.5YR8/4	Sc	5.5	26.4	2.59	2.5YR8/4	Sc	7.5	25.4	2.6	7.5YR7/4	Sc	7.5	24.4	2.61	7.5YR7/4	h	10.0	17.2	2.61	10YR6/3	H	10.5	13.1	2.56	5Y6/3	H	11.0	9.1	2.45	27–28	LHDR, CFT	Has been used for manufacture of brick and tile.
P	3	5YR7/5	Sc	4.0	19.2	2.67	5YR7/6	Sc	4.5	17.1	2.67	5YR7/5	Sc	6.0	14.3	2.65	5YR6/3	h	6.5	11.2	2.61	2.5Y5/2	HH	9.0	7.1	2.56	5Y6/1	H	9.5	6.7	2.52	<20		
P	4	5YR8/2	Sc	3.0	17.3	2.65	5YR9/2	h	4.5	15.5	2.64	10YR9/2	Sc	6.0	12.0	2.59	2.5Y8/2	H	8.0	8.8	2.55	2.5Y7/2	HH	10.5	4.7	2.47	5Y6/1	H	11.5	2.0	2.47	<20	DB, T, P, A	
R	3	5YR9/2	Sc	2.5	17.9	2.59	7.5YR8/2	Sc	2.5	17.8	2.61	10YR9/2	Sc	2.5	17.0	2.61	2.5Y9/2	Sc	4.5	15.3	2.62	2.5Y8/2	Sc	4.5	14.0	2.58	5Y8/2	Sc	4.5	12.3	2.58			Bloating test negative.
R	6	5YR7/6	Sc	6.0	21.6	2.63	5YR6/6	Sc	9.5	15.6	2.64	2.5YR5/4	h	11.0	12.4	2.62	2.5YR4/2	H	12.5	9.3	2.57	10R4/1	HH	14.5	4.1	2.47	10R3/1	HH	14.5	2.0	2.41		CB, T	Bloating test negative. Shrinkage rather high.
R	8	5YR7/6	Sc	3.5	21.3	2.68	5YR6/6	Sc	6.5	18.2	2.70	5YR5/4	Sc	7.5	16.7	2.68	2.5YR4/3	h	9.0	14.5	2.64	10R4/2	h	9.0	11.8	2.61	10R4/1	H	9.0	9.7	2.56		CB, T	Bloating test negative.
R	10	7.5YR8/5	Sc	4.0	19.5	2.63	7.5YR7/5	Sc	4.0	18.8	2.65	5YR7/5	Sc	6.0	17.2	2.62	5YR6/4	Sc	6.0	15.3	2.60	10YR6/3	h	7.5	13.2	2.57	2.5Y6/2	h	9.0	12.0	2.55	<23		Bloating test negative.
S	6	7.5YR7/4	Sc	2.0	20.1	2.61	7.5YR8/4	Sc	2.0	20.4	2.63	7.5YR8/4	Sc	2.0	20.1	2.61	10YR8/2	Sc	2.0	19.6	2.61	10YR8/1	Sc	2.0	18.8	2.60	2.5Y7/2	Sc	2.0	17.8	2.58			Bloating test negative.
S	7	2.5YR6/5	Sc	4.5	17.3	2.66	2.5YR6/5	Sc	6.0	16.0	2.67	2.5YR6/4	h	6.0	14.9	2.66	5YR6/3	h	6.0	13.5	2.64	2.5Y6/2	H	7.5	11.4	2.58	5Y6/2	H	7.5	10.3	2.55			
S	8	2.5YR6/5	Sc	2.5	16.3	2.68	2.5YR6/4	Sc	4.0	14.3	2.66	2.5YR5/4	h	6.5	12.0	2.62	2.5YR5/2	H	6.5	9.8	2.57	2.5Y5/2	H	7.5	7.5	2.53	5Y5/2	H	5.5	7.5	2.55			Bloating test negative.
S	10	5YR7/6	Sc	3.5	17.9	2.66	5YR6/6	Sc	5.0	14.5	2.63	5YR5/4	h	5.5	12.4	2.63	5YR5/2	H	9.5	10.2	2.57	2.5Y5/2	H	11.0	7.6	2.51	5Y6/1	H	13.0	6.5	2.49			Bloating test negative.
S	11	2.5YR6/4	Sc	5.0	16.3	2.66	2.5YR6/4	Sc	6.0	13.7	2.65	2.5YR5/4	h	7.5	11.6	2.61	2.5YR5/2	H	8.0	9.6	2.58	10YR5/1	H	10.5	6.6	2.51	5Y5/2	H	10.5	5.5	2.48			Bloating test negative.
T	6	2.5YR7/5	Hc	3.0	17.4	2.65	5YR7/4	Hc	3.0	17.4	2.67	2.5YR6/5	Hc	3.0	16.7	2.66	5YR6/3	Hc	3.0	15.6	2.65	2.5YR5/2	h	5.0	15.3	2.62	5Y6/2	h	5.0	13.7	2.60			Bloating test negative.
T	7	2.5YR7/5	Hc	4.0	18.1	2.65	2.5YR8/5	Hc	5.0	17.8	2.65	5YR7/4	Hc	5.5	17.0	2.66	7.5YR7/3	Hc	5.5	15.1	2.63	2.5Y6/2	h	5.5	12.9	2.61	5Y6/2	h	6.5	13.5	2.57			Bloating test negative.
T	8	2.5YR8/4	Hc	7.0	18.0	2.64	7.5YR8/4	Hc	7.0	17.3	2.67	7.5YR8/4	Hc	7.0	16.2	2.65	10YR7/3	Hc	7.0	15.1	2.63	2.5Y7/2	h	7.0	13.3	2.61	2.5Y7/2	h	7.0	12.2	2.59			Bloating test negative.
U	4	2.5YR7/6	Hc	5.0	19.4	2.63	2.5YR7/5	H	8.5	13.6	2.59	2.5YR5/5	H	9.5	10.3	2.55	2.5YR5/3	H	9.5	8.3	2.52	10YR5/1	HH	12.0	3.9	2.40	5Y5/2	HH	13.5	2.1	2.38		CB, T	Bloating test negative. Melting temperature rather high.
U	5	5YR8/4	Sc	3.5	18.8	2.64	7.5YR8/4	Sc	3.5	17.7	2.62	7.5YR8/4	Sc	3.5	17.5	2.64	10YR8/3	Sc	3.5	15.4	2.65	2.5Y8/2	Sc	3.5	15.8	2.60	2.5Y7/2	Sc	3.5	15.5	2.56			Bloating test negative.
U	6	2.5YR7/4	Sc	5.0	18.9	2.60	2.5YR6/4	h	7.0	14.2	2.56	2.5YR5/4	H	9.5	11.4	2.50	7.5YR6/2	H	10.5	8.3	2.44	2.5Y6/2	H	10.5	7.1	2.46	5Y6/2	HH	10.5	4.3	2.35			Bloating test negative.
U	9	2.5YR7/5	Sc	4.5	18.2	2.64	5YR6/6	h	9.0	12.7	2.60	2.5YR5/4	H	9.0	11.4	2.60	2.5YR5/2	H	10.5	7.5	2.50	10R4/1	HH	11.5	4.9	2.46	5Y5/1	HH	14.0	8.6	2.36		CB, T	
U	11	2.5YR7/4	Sc	7.0	17.0	2.59	2.5YR6/4	h	10.0	10.2	2.53	2.5YR5/4	H	11.0	8.0	2.48	2.5YR4/2	H	12.5	4.8	2.42	5YR5/1	HH	13.5	2.9	2.38	5Y5/2	HH	11.5	6.9	2.31			Bloating test negative.
V	5	5YR7/4	Sc	4.0	18.9	2.62	5YR7/5	Sc	5.0	17.3	2.63	5YR5/4	Sc	6.5	15.7	2.62	5YR6/3	Sc	7.5	14.0	2.61	2.5Y6/2	h	8.5	11.9	2.59	5Y6/1	H	8.0	8.6	2.56	<23		Bloating test negative.
V	6	5YR8/4	Sc	5.0	19.3	2.51	7.5YR8/4	Sc	7.5	16.4	2.52	7.5YR7/3	h	7.5	13.9	2.54	10YR7/2	H	10.0	11.5	2.48	2.5Y7/2	H	10.0	9.4	2.46	5Y6/1	H	11.0	4.5	2.33	<23		Bloating test negative.
V	7	5YR8/3	Hc	2.0	17.9	2.57	7.5YR8/4	Hc	3.0	16.9	2.60	7.5YR7/3	Hc	4.0	15.5	2.60	10YR7/2	h	5.5	13.8	2.58	2.5Y7/2	h	5.5	11.3	2.55	5Y6/1	H	5.5	8.4	2.52			Bloating test negative.
A_1		10YR9/2	Sc	4.0	15.7	2.60	10YR9/2	h	5.0	13.8	2.60	10YR9/2	H	5.0	11.8	2.60	2.5Y8/3	HH	6.0	9.7	2.54	2.5Y8/3	HH	9.5	6.7	2.50	2.5Y8/3	HH	9.5	4.8	2.09		P, A, DB (2200° F), CFT	
B_1		2.5YR6/4	Sc	5.0	17.5	2.63	2.5YR7/4	Sc	5.0	16.6	2.65	5YR6/6	h	7.5	12.5	2.60	5YR5/3	H	10.0	8.7	2.58	5YR5/1	H	11.0	5.0	2.49	10YR5/1	HH	12.0	3.0	2.44			
C_1	3	2.5YR8/2	Sc	4.5	26.1	2.47	2.5YR8/2	Sc	4.5	25.8	2.46	2.5YR8/2	Sc	5.0	23.8	2.49	10YR8/3	Sc	5.0	23.0	2.48	2.5YR8/2	Sc	8.0	21.4	2.45	2.5Y7/2	Sc	8.0	19.0	2.47			
D_1	2	2.5YR6/6	Sc	5.0	25.3	—	2.5YR6/6	Sc	8.5	20.3	—	2.5YR5/6	h	9.5	17.4		2.5YR5/4	h	12.5	15.9		2.5YR4/4	h	12.5	14.4		2.5YR4/4	h	14.0	12.0				

TABLE 2

Geologic sections of clay-bearing materials in auger borings and outcrops in Harford County with data relating to their physical properties
(See pp. 4–5 for explanation of abbreviations and symbols.)

1. Localities (Pl. 1) defined with reference to State Grid, topographic quadrangles, highways, and other landmarks. — 2. Geologic section

Locality	State coordinates N	State coordinates E	Quadrangle*	Subdivision**	Supplementary data	Stratigraphic unit	Downward sequence	Description	Thickness in feet
A	619	1024	N-27	S	0.5 miles southeast of Carsins; west side of road, 500 feet south of its intersection with highway MD 22. Elevation about 295 feet. #		1	Soil	2
							2	Sand, argillaceous	7
						Knm	3	Sand-silt-clay	9
							4	Sand-silt-clay	16
							—	---------UNCONFORMITY---------	
							5	Clay (saprolite)	16
						pK	6	Clay (saprolite)	8
B	608	1003	N-26	SE	0.7 mile southwest of Creswell; 2500 feet west of Highway MD 136; 850 feet south of Cedar Lane. Elevation about 210 feet. #		1	Soil	2
							2	Sand-silt-clay	6
						Knm	3	Sand-silt-clay	11
							4	Sand-silt-clay	6
C	598.5	975	M-25	NE	Stockton; northeast side of Highway MD 152, about 50 feet southeast of Old Joppa Road intersection. Elevation about 360 feet. #		1	Soil	4
							2	Sand-silt-clay	2
						Knm	3	Sand-silt-clay	10
							4	Sand-silt-clay	10
							--	---------UNCONFORMITY---------	
						pK	5	Clay (saprolite)	13
D	594.5	978	M-26	NW	Mountain, southwest side of Highway MD 152; 500 feet southeast of Singer Road junction. Upper 30 feet of the "sand and gravel" (Material 1) exposed in open-pit; basal 5 feet, and underlying 15 feet of Cretaceous material, were explored by boring in pit bottom. Elevation, top of Material 1, about 395 feet.	QT	1	Sand and gravel	35
							--	---------UNCONFORMITY---------	
							2	Clay, silty	4
							3	Sand-silt-clay	5
						Knm	4	Sand, light brown	1
							5	Sand-silt-clay	3
							6	Sand	2
E	589	982.5	M-26	W	East side of Highway MD 152; 850 feet southeast of Clayton road junction. Elevation about 180 feet. #	QT	1	Sand and gravel	9
							--	---------UNCONFORMITY---------	
							2	Sand-silt-clay	8
							3	Sand	2
						Knm	4	Clay, sandy	25
							5	Sand	8
							6	Sand-silt-clay	15
							--	---------UNCONFORMITY---------	
							7	Clay (saprolite)	9
						pK	8	Clay (saprolite)	13
							9	Clay (saprolite)	28
F	586	983	M-26	W	West side Highway MD 152; 2,000 feet north of Old Philadelphia Road. Elevation about 130 feet. #		1	Fill, artificial	10
							2	Sand	4
							3	Sand, silty	16
							4	Sand-silt-clay	12
						Knm	5	Sand-silt-clay	9
							6	Sand-silt-clay	19
							7	Sand-silt-clay	36
							--	---------UNCONFORMITY?---------	
						pK ?	8	Sand, micaceous, gray (saprolite ?)	2
G	584.5	982.5	M-26	W	North side of Old Philadelphia Road, 1500 feet west of its intersection with Highway MD 152. Elevation about 200 feet. #		1	Soil	1
						QT	2	Sand and gravel	14
							--	---------UNCONFORMITY---------	
							3	Sand-silt-clay	9
							4	Silt, clayey	24
							5	Clay, silty	17
						Knm	6	Sand and gravel	15
							7	Clay, silty	4
							--	---------UNCONFORMITY?---------	
						pK ?	8	Rock, hard (crystalline?)	
H	584	993.5	M-26	C	South side of US Highway 40; 0.5 mile west of Highway MD 408 intersection at McComas; east end of old open pit. Elevation about 90 feet.	Knm	1	Clay containing numerous lignite fragments.	8
					West end of same pit.	Knm	2	Clay, silty	3
I	581.5	988.5	M-26	W	1300 feet south of US Highway 40; 300 feet southwest of Highway MD 152; on hillside facing southwest. Elevation about 120 feet. #		1	Soil	3
						QT	2	Sand-silt-clay and gravel	24
							--	---------UNCONFORMITY---------	
							3	Sand, silty	4
							4	Sand	4
							5	Sand	13
						Knm	6	Sand-silt-clay	15
							7	Sand-silt-clay	19
							8	Clay, sandy	9
							9	Sand, clayey	5
							10	Sand, clayey	17
J	581	988.5	M-26	C	Southwest side of Highway MD 152; 0.45 mile southeast of intersection with US Highway 40. Elevation about 180 feet. #	QT	1	Sand and gravel	15
							--	---------UNCONFORMITY---------	
							2	Sand-silt-clay	2
							3	Sand	27
						Knm	4	Sand-silt-clay	18
							5	Sand-silt-clay	8
							6	Sand, silty	53
							7	Sand, silty, and streak of clay	17
							8	Sand-silt-clay	?

3. Mineralogy — Approximate ratios of heavy minerals in fine sands (grain size ⅛ mm to ¼ mm). Dorothy Carroll, analyst (Bromoform separations by Gillison W. Chloe). Approximate ratios of clay minerals in less-than-two-micron fractions, as estimated from X-ray (goniometer) diffraction patterns. John W. Hosterman, analyst.

Locality	Seq.	Percentage of sand fraction (See column 6)	Pyrite	Limonite[2]	Ilmenite	Siderite	Staurolite	Kyanite	Tourmaline	Garnet	Epidote[4]	Amphibole[4]	Chloritoid and glaucophane	Zircon	Sillimanite	Andalusite	Chlorite	Mica[5]	Rutile[6]	Anatase	Glaucophane	Corundum	Brookite	Sphene	Kaolinite	Illite	Mixed layer	Montmorillonite	Chlorite
A	2	10.9		3.0	+[7]		2.0	0.5	0.5		0.5	3.0		+				+	+		+				4	3.5	2.5		
A	3	15.8		8.5	1.0		+											++	+						3.5	3.5	3		
A	4	20.8		8.5	1.0			+				+						++							2.5	5	2.5		
A	5	13.0		0.5	+	5.0	+	+		1.5		+						++							1.5	1.5		7	
B	2	19.3		0.5	2.0						7.0	0.5						+							6	3.5	.5		
B	3	18.1			1.0						8.5	0.5						+							7.5	1.5	1		
B	4	16.8		+							0.5	9.5						+						+	7	1.5	1.5		
C	2	17.1		4.0	6.0													++							9	1			
C	3	17.9	1.0	7.0	2.0													++							9	1			
C	4	12.6		4.0	6.0													++							7.5	2.5			
C	5	19.6		1.0	7.0					2.0								++							5	1		4	
D	2	23.0																							8.5	1	.5		
D	3	31.2																							8.5	1	.5		
D	5	27.8																							8	1.5	.5		
E	2	16.2		1.0	2.0		2.5	0.5	2.5					0.5	+			+	+			+			7	2	1		
E	4	33.9		8.0			1.0	0.5	0.5																8	.5	1.5		
E	6	24.7		1.0	2.0	0.5	2.5	1.0	2.5					0.5				+							8.5	.5	1		
E	7	20.0		1.0	3.0	1.5	2.5	1.0	2.0	0.5								+							5.5	.5		4	
E	9	6.9		7.0		1.0		0.5		0.5	0.5							+							3			7	
F	3	11.3		2.0	1.0		2.2	1.8	2.0					0.8	+			+							7	2.5	.5		
F	4	40.2		2.0	1.0		2.0	1.5	2.5					0.5				+							9	.5	.5		
F	5	26.6	0.5	2.0	1.0		2.0	2.0	1.5									+							9.5	.5			
F	6	23.7	0.5	2.0	1.0		2.0		1.5	1.0				1.0				++	+						9	.5	.5		
F	7	20.4	0.2	1.5	3.5		1.0	1.0	1.5	1.0					+			++							8.5	1	.5		
G	2	14.8		3.0	2.0		3.0	2.0	+									+							6.5	1.5	2		
G	3																								6.5	3	.5		
G	4	4.9		5.0	2.0		1.5	0.2	1.0					0.3				+							6.5	3.5			
G	5	2.4	0.5	5.0		2.0	2.0	+	0.5					+				+	+						6	3.5	.5		
H	1																								4.4	4.2	1.4		
H	2																								5.9	2.3	1.8		
I	2	19.4		4.0	2.0		1.5	0.5	2.0					+				+							9	.5	.5		
I	3	11.9		4.0	2.0		1.5	0.5	1.5					0.5				+							7.5	2	.5		
I	4	13.0		4.0	1.0		2.0	1.5	0.5					+				+	+						8.5	1	.5		
I	5	17.6		4.0	1.0		1.0	0.5	1.0					+	+			+							8.5	1	.5		
I	6	31.6		7.5	1.0		0.3	0.2	1.0					+				+							9	.5	.5		
I	7	27.7		+		9.0	0.4		0.4								+	++							9	.5	.5		
I	8	20.6		2.5	1.0	5.0	0.5	0.4	0.5		0.1							++							9	.5	.5		
I	9	17.3			1.0	9.0					+			+				++							9	1			
I	10	17.3		1.0	8.4		+		0.4					0.2				++							9	1			
J	2	8.2																++							7	2	1		
J	4	15.5		3.0			3.5	2.0	0.5					0.5				+	+						7.5	1.5	1		
J	5	19.6		5.5			2.5	1.0	0.5				+	0.5				+	+					+	7.5	1.5	1		
J	6	10.7		2.0	4.0		3.0	0.5	0.5				+	0.5	+			+	+						7	2	1		
J	7	14.8		1.5	1.5		3.0	1.0	3.0									+		+					9	.5	.5		
J	8	24.6		1.5	1.5		3.5	0.5	3.0									+		+				+	7	2	1		

4. X-ray (goniometer) emission analysis (approximate percentage by weight). John W. Hosterman, analyst — 5. pH — 6. Grain-size distribution (Weight ratios) — 7. Properties relating to use possibilities of sampled material: Before firing

Locality	Seq.	Fe_2O_3	MnO_2	TiO_2	CaO	K_2O	5. pH	Clay (<1/256 mm)	Silt (1/256 mm–1/16 mm)	Sand (1/16 mm–2 mm)	Munsell color notation (moist sample)	Strength	% water required for plasticity	Texture and workability	% shrinkage	Defects
A	2						5.6	2.6	1.1	6.3	10YR4/4					
A	3	15.5	0.62	0.27	0.1	3.4	5.6	2.0	2.6	5.4	7.5YR4/4		25	Sy Sh	5	0
A	4	12.4	0.17	0.23	0.1	4.4	6.4	2.4	2.7	4.9	5YR4/8	L	23	Gy Sh	5	0
A	5	4.4	0.07	0.25	0.6	3.9	8.1	3.2	2.8	4.1	2.5YR4/4	L	25	Gy Sh	5	0
B	2	3.6	0.05	0.37	0.8	0.8	5.4	3.0	2.5	4.5	10YR5/4	L	27	Sy Sh	5	0
B	3	3.0	0.07	0.32	1.3	1.1	6.0	2.5	2.1	5.4	10YR5/4	L	20	Sy Sh	5	0
B	4						6.9	2.0	3.5	4.5	2.5YR4/4					
C	2						5.2	3.6	2.4	4.0	2.5YR6/6					
C	3	5.1	0.02	0.40	0.1	0.95	5.9	3.4	2.7	4.4	10YR6/6	L	33	Gy Sh	4.5	0
C	4	5.7	0.03	0.47	0.1	0.95	5.9	4.9	2.3	2.8	10YR6/4	L	36	Gy Sh	4.5	0
C	5	5.7	0.04	0.38	0.1	1.1	6.4	5.3	0.9	3.8	10YR6/4	L	30	pl sh	1	0
D	2	1.5	0.00	1.1	0.1	2.5	6.0	5.9	3.6	0.6	10YR8/2	L	29	gy pl sm	4.5	0
D	3	1.4	0.01	1.4	0.1	2.6	6.1	3.7	3.3	3.0	7.5YR7/2	M	25	pl sm	4.5	0
D	5	1.3	0.01	0.87	0.1	2.1	6.2	3.0	2.7	4.3	10YR7/3	L	20	Gy Sh	4.5	0
E	2						5.7	2.3	2.2	5.5	10YR6/3					
E	4	5.6	0.02	1.3	0.1	1.7	5.2	5.4	1.9	2.7	2.5YR4/8	M	29	Sm Pl Lg	5	0
E	6	4.8	0.02	1.1	0.1	1.7	5.4	3.8	2.3	3.9	10R4/6	M	23	Gy pl Sm	5	0
E	7						6.4	4.3	3.5	3.2	2.5R3/4					
E	9						7.3	3.7	3.6	2.7	7.5YR4/4					
F	3						5.8	1.1	1.7	7.2	10YR6/4					
F	4	1.3	0.02	1.9	0.1	0.7	5.5	4.6	2.3	3.1	10R3/6	M	22	Gy Sh		0
F	5	2.7	0.02	1.4	0.1	1.3	5.4	4.0	2.6	3.4	2.5YR5/4	M	27	Sm Pl Lg		0
F	6	4.0	0.06	1.4	0.1	1.5	5.8	3.5	2.4	4.1	5YR4/2	L	27	Gy pl Sh	5	0
F	7	5.7	0.05	1.3	0.1	2.0	5.6	3.5	2.3	4.2	7.5YR5/4	L	27	Gy Sh	5	0
G	2						6.2	0.5	1.6	7.9	5YR4/4					
G	3						7.2	2.0	2.5	5.5	10YR3/3					
G	4	1.8	0.00	0.83	0.1	1.6	5.3	4.3	4.6	1.1	10YR6/4	S	24	Pl Sm Lg	5	0
G	5	3.9	0.07	1.0	0.2	2.4	5.4	5.6	3.7	0.7	2.5Y3/2	S	30	Pl Sm Lg	5	0
H	1	1.9	0.01	1.1	1.0	3.5	3.3	7.7	2.2	0.1	10YR4/1	S	32	PL Sm	6	0
H	2	1.4	0.00	1.2	1.0	2.4	6.2	4.2	4.1	1.7	10YR6/3	L	21	sy pl sm	3	0
I	2						6.2	2.8	2.7	4.5	2.5YR4/6					
I	3						6.1	1.1	1.5	7.4	10YR7/3					
I	4						6.0	1.3	1.2	7.5	2.5YR5/6					
I	5						5.5	0.9	1.5	7.9	7.5YR7/4					
I	6	5.5	0.01	1.3	1.0	2.2	5.3	4.2	3.0	2.8	2.5YR4/6	M	26	sm Pl lg	5	0
I	7	4.5	0.03	1.3	1.0	1.6	5.3	4.8	2.1	3.1	5YR5/2	M	25	sy sm sh	5	0
I	8						5.4	4.2	1.6	4.2	10YR5/1					
I	9						6.1	3.3	1.3	5.4	2.5YR5/2					
I	10						6.0	2.8	1.7	5.5	10YR6/3					
J	2	0.6	0.00	0.95	0.1	1.1	5.9	4.0	3.9	2.1	2.5Y8/2	M	26	Sm Pl Lg	5	0
J	4						5.9	2.2	2.3	5.5	5YR6/6					
J	5						6.4	2.7	2.2	4.1	2.5YR7/2					
J	6						6.8	1.1	2.2	6.7	2.5YR5/2					
J	7	3.4	0.02	1.3	0.1	1.2	6.8	4.4	2.5	3.1	10YR7/3	M	27	Sm Pl Lg	5	0
J	8							1.9	2.2	5.9						

7. Properties relating to use possibilities of sampled material: After firing at indicated temperatures (Degrees Fahrenheit) — 8. Suggested products — 9. Comments

Locality	Seq.	1800° Munsell color notation	1800° Hardness	1800° % linear shrinkage	1800° % water absorption	1800° Specific gravity (approximate)	2000° Munsell color notation	2000° Hardness	2000° % linear shrinkage	2000° % water absorption	2000° Specific gravity (approximate)	2100° Munsell color notation	2100° Hardness	2100° % linear shrinkage	2100° % water absorption	2100° Specific gravity (approximate)	2200° Munsell color notation	2200° Hardness	2200° % linear shrinkage	2200° % water absorption	2200° Specific gravity (approximate)	2300° Munsell color notation	2300° Hardness	2300° % linear shrinkage	2300° % water absorption	2300° Specific gravity (approximate)	2400° Munsell color notation	2400° Hardness	2400° % linear shrinkage	2400° % water absorption	2400° Specific gravity (approximate)	Pyrometric cone equivalent	8. Suggested products	9. Comments
A	3	2.5YR4/5	Hc	5.0	22.8	2.64	2.5YR4/2	Hc	5.0	18.7	2.60	10R4/2	Hc	7.5	13.5	2.55	7.5R3/2	h	10.0	9.5	2.56	5R3/1	H	13.5	2.3	2.49	N2	H	8.5	2.5	2.26			
A	4	2.5YR5/6	Hc	2.5	21.7	2.79	2.5YR5/5	Hc	2.5	19.1	2.79	2.5YR4/2	Hc	7.0	13.4	2.79	10R4/2	h	10.5	7.7	2.75	10R4/1	H	10.5	2.6	2.27	10R2/1	H	5.5	12.5	2.24			
A	5	5YR6/6	Hc	2.5	24.7	2.63	2.5YR5/6	Hc	5.0	22.4	2.66	2.5YR4/2	h	9.0	11.0	2.61	10R4/2	H	12.0	4.0	2.33													
B	2	5YR6/6	Hc	5.5	17.8	2.48	5YR6/6	Hc	5.5	26.6	2.46	2.5YR5/4	Hc	5.5	15.1	2.43	10R5/2	Hc	7.0	12.2	2.39	N5	h	9.5	7.5	2.34	N5	h	11.0	2.1	2.28			
B	3	5YR6/5	Hc	1.0	16.5	2.32	5YR6/5	Hc	1.0	18.1	2.35	5YR5/3	Hc	5.0	16.0	2.34	10R4/1	Hc	5.0	11.6	2.31											5-8		
C	3	2.5YR7/8	Hc	4.5	29.0	2.66	5YR6/6	Hc	4.5	29.4	2.76	5YR7/7	Hc	4.5	29.6	2.75	5YR8/4	Hc	4.5	28.3	2.76	5YR6/4	Hc	5.0	25.6	2.75	5YR6/3	Hc	6.0	24.5	2.76			Bloating test negative
C	4	2.5YR7/5	Hc	5.0	33.7	2.65	5YR7/4	Hc	5.0	33.7	2.73	5YR8/4	Hc	5.0	33.9	2.76	5YR7/3	Hc	5.0	32.3	2.77	5YR7/3	Hc	5.5	27.7	2.76	5YR6/3	Hc	6.0	26.0	2.76			
C	5	5YR7/6	Hc	4.0	23.0	2.65	5YR7/5	Hc	4.0	21.3	2.64	5YR5/5	Hc	5.5	19.5	2.66	2.5YR5/4	h	6.0	18.3	2.66	10R5/1	H	7.0	15.5	2.62	N4	H	5.0	11.3	2.63			Bloating test negative
D	2	5YR9/2	Hc	4.5	21.8	2.43	5YR9/1	Hc	5.0	21.8	2.48	5YR9/1	Hc	5.0	21.3	2.49	10YR9/1	h	6.5	16.7	2.49	10YR9/1	H	9.0	12.7	2.46	10YR9/1	H	10.0	9.1	2.42		IHDR, WW	
D	3	5YR9/2	Hc	3.5	21.0	2.53	5YR9/1	Hc	4.5	19.9	2.53	N9	Hc	7.5	16.7	2.54	2.5Y9/2	Hc	8.0	14.1	2.54	5Y9/2	h	8.0	11.9	2.53	5Y8/1	H	8.5	8.4	2.48		IHDR, CSW, P	
D	5	5YR8/3	Hc	3.5	16.8	2.62	5YR9/2	Hc	3.5	16.8	2.63	5YR9/1	Hc	3.5	15.9	2.64	10YR8/1	Hc	4.0	14.1	2.63	5Y6/1	h	5.5	12.8	2.62	5Y6/1	h	5.5	10.8	2.60	28	IHDR	
E	4	2.5YR5/4	Hc	5.0	19.4	2.57	2.5YR6/4	Hc	6.0	19.9	2.66	2.5YR7/4	Hc	6.0	18.5	2.66	5YR6/4	h	10.0	12.5	2.62	5YR6/3	H	10.5	9.7	2.58	5YR5/2	H	10.5	8.2	2.5	23-26	LHDR	
E	6	2.5YR5/4	Hc	6.0	20.5	2.63	2.5YR6/4	Hc	7.5	18.9	2.65	2.5YR6/4	Hc	3.5	16.2	2.64	2.5YR5/2	h	10.0	14.3	2.63	10R4/1	h	10.0	11.5	2.60	10R5/1	H	11.0	8.7	2.54	<23		
F	4	2.5YR6/4	Hc	4.0	18.3	2.60	2.5YR7/4	Hc	4.0	18.4	2.61	2.5YR7/4	Hc		16.8	2.64	2.5YR6/2	h		14.6	2.64	5YR7/1	h		13.0	2.63	5Y6/2	H		10.2	2.60			
F	5	2.5YR6/4	Hc		20.2	2.59	2.5YR7/2	Hc		20.4	2.64	2.5YR7/2	Hc		18.0	2.64	5YR6/2	Hc		15.2	2.65	2.5Y7/2	h		12.8	2.63	5Y6/2	H		10.3	2.62		IHDR	
F	6	5YR7/4	Hc	4.0	20.5	2.66	5YR7/3	Hc	4.0	20.8	2.68	5YR7/3	Hc	6.0	18.3	2.65	10YR7/2	Hc	7.0	16.2	2.65	2.5Y7/2	h	8.0	14.7	2.64	5Y6/2	h	8.0	11.2	2.62	<23		
F	7	5YR7/6	Hc	4.5	25.0	2.71	5YR7/4	Hc	5.0	24.0	2.71	5YR6/4	Hc	5.0	21.4	2.72	5YR5/2	h	8.5	19.5	2.70	5Y6/1	h	10.0	15.8	2.67	5Y5/1	H	11.0	12.1	2.64			
G	4	5YR7/3	Hc	3.0	17.5	2.64	5YR8/3	Hc	4.5	16.0	2.63	7.5YR8/4	h	6.5	12.6	2.59	10YR7/3	H	7.5	8.3	2.54	2.5Y7/2	*H*	7.5	4.3	2.46	5Y6/1	HH	11.0	1.5	2.35		P, DB, DT, CFT CB, T	
G	5	5YR8/3	Hc	5.0	19.6	2.61	7.5YR7/4	Hc	5.5	16.0	2.61	5YR7/4	h	9.0	9.0	2.51	5YR5/3	H	11.0	3.5	2.38	10YR5/1		10.5	2.4	2.00	5Y6/1		9.0	2.5	1.76			
H	1	7.5YR8/2	Sc	9.0	23.3	2.54	7.5YR8/2	h	9.5	18.6	2.59	10YR7/3	H	13.5	12.1	2.56	5Y7/3	*H*	14.5	5.3	2.47	5Y6/3	HH	16.0	0.6	2.44	5Y6/3	HH	16.0	0.4	2.44		LGA, LGP	Could be mixed with other clay to improve working properties and green strength
H	2	7.5YR8/4	Sc	4.0	13.4	2.55	7.5YR8/2	Sc	4.0	14.0	2.55	10YR9/2	h	6.0	10.3	2.55	2.5Y9/4	H	6.0	9.2	2.49	5Y7/2	*H*	7.5	5.3	2.45	5Y7/1	*H*	9.0	3.22	2.37	<23	LHDR, P, A, CFT	
I	6	2.5YR6/4	Hc	3.5	19.5	2.59	5YR7/4	Hc	4.5	19.4	2.63	2.5YR5/4	Hc	6.5	15.9	2.67	2.5YR5/2	h	8.5	14.2	2.67	10YR5/1	H	9.5	11.7	2.64	5Y5/1	H	9.5	10.0	2.61	23–36	LHDR, CFT	
I	7	5YR7/4	Hc	4.5	18.5	2.50	5YR7/3	Hc	6.0	18.3	2.55	5YR6/2	Hc	8.0	13.8	2.55	10YR6/2	h	8.0	12.3	2.53	5Y6/2	H	9.5	9.2	2.47	5Y6/2	H	9.5	8.9	2.49			
J	2	5YR9/2	Hc	3.0	20.5	2.56	5YR9/1	Hc	3.5	20.7	2.58	5YR9/1	Hc	6.0	19.1	2.57	10YR9/1	h	6.5	15.4	2.55	2.5Y9/2	H	8.5	12.1	2.53	2.5Y9/2	H	9.5	8.4	2.48	27–28	IHDR	
J	7	5YR8/2	Hc	5.0	18.2	2.55	5YR9/2	Hc	5.0	18.5	2.59	5YR9/1	Hc	5.5	16.4	2.59	2.5Y9/2	h	9.0	11.9	2.56	5Y9/2	h	9.5	10.6	2.55	5Y8/2	h	9.0	9.1	2.54		HHDR	

TABLE 3

Geologic sections of clay-bearing materials in auger borings and outcrops in Baltimore County with data relating to their physical properties
(See pp. 4–5 for explanation of abbreviations and symbols)

1. Localities (Pl. 1) defined with reference to State Grid, topographic quadrangles, highways, and other landmarks. — 2. Geologic section (Materials)

Locality	State coordinates N	State coordinates E	Quadrangle*	Subdivision**	Supplementary data	Stratigraphic unit	Downward sequence	Description	Thickness in feet
A	571.5	926	M-24	S	Southeast of Oakleigh; on property of St. Margaret's Episcopal Church, 1819 Cromwood Road. Elevation about 500 feet. #		1	Soil	3
						QT?	2	Sand, silty and gravel	2
							3	Sand, argillaceous, and gravel	4
								-------- UNCONFORMITY? --------	
							4	Sand	8
							5	Sand-silt-clay	13
							6	Sand, silty	10
							7	Sand-silt-clay	6
						Knm	8	Sand, silty	22
							9	Sand, silty	18
							10	Sand, silty	7
								-------- UNCONFORMITY? --------	
						pK	11	Sand (saprolite)	7
							12	Sand (saprolite)	6
B	566	930	M-24	SE	100 feet northeast of Putty Hill Road about halfway between Harford Road and Old Harford Road. Southeast side of Parkerville Senior High School grounds. Elevation about 410 feet. #		1	Fill, artificial	3
							2	Sand, silty	1
							3	Sand, silty	13
						Knm	4	Sand, and gravel	21
							5	Sand, silty	12
							6	Sand	15
								-------- UNCONFORMITY --------	
							7	Clay (saprolite)	17
						pK	8	Clay (saprolite)	9
							9	Clay (saprolite)	5
C	563	935.5	M-24	SE	100 feet south of Putty Hill Road on west side of private lane about halfway between Harford Road and U. S. Highway 1. Elevation about 295 feet. #		1	Soil	3
							2	Sand, argillaceous	2
							3	Sand, silty	4
							4	Sand, silty	3
							5	Sand	3
							6	Sand, argillaceous	1
							7	Clay, sandy	3
							8	Sand-silt-clay	4
						Knm	9	Sand-silt-clay	3
							10	Sand-silt-clay	4
							11	Sand-silt-clay	5
							12	Sand-silt-clay	15
								-------- UNCONFORMITY --------	
							13	Clay (saprolite)	6
							14	Clay (saprolite)	9
						pK	15	Clay (saprolite)	14
D	559	941	L-25	NW	¾ mile southeast of Fullerton. North side of Fitch Avenue, about 100 feet west of Ridge Road. Elevation about 250 feet. #		1	Soil	3
							2	Sand, silty, and gravel	4
							3	Sand, silty, and gravel	2
							4	Sand, silty, and gravel	7
							5	Sand, silty, and gravel	2
							6	Sand-silt-clay	6
							7	Sand, argillaceous	2
						Knm	8	Sand and gravel	20
							9	Sand-silt-clay	3
							10	Sand and gravel	20
E	556	948	L-25	NW	1.2 miles northwest of Poplar; south side of King Avenue; 3,000 feet northwest of Old Philadelphia Road. Elevation about 140 feet. #		1	Soil	2
							2	Sand, silty	3
							3	Sand, silty	2
							4	Sand	3
							5	Ironstone	1
							6	Sand	8
							7	Sand-silt-clay	5
						Knm	8	Sand-silt-clay	2
							9	Sand-silt-clay	6
							10	Sand-silt-clay	5
							11	Sand-silt-clay	13
							12	Sand-silt-clay	15
							13	Sand-silt-clay	10
							14	Sand-silt-clay	9
							15	Sand-silt-clay	13
							16	Sand, silty	3
F	553	955.5	L-25	N	Northwest side of Bird River Road, at bend in road 1300 feet northeast of junction with Middle River Road. Elevation about 150 feet. #		1	Soil	3
							2	Sand-silt-clay	5
							3	Sand, silty	3
							4	Sand	5
							5	Sand, silty	4
						Knm	6	Clay, silty	39
							7	Sand-silt-clay	9
							8	Sand-silt-clay	6
							9	Clay, silty	15
							10	Sand and gravel	11
G	553	953.5	L-25	N	Poplar; southeast side of U. S. Highway 40; 0.15 mile southwest of Middle River Road intersection; United Clay Mines Corporation's clay pit (Company's processing plant is on opposite side of highway). Elevation upper part of excavation is about 80 feet.		1	Clay, silty, with lignite fragments	<10
							2	Silt, argillaceous, with lignite fragments	2
						Knm	3	Silt, argillaceous, with lignite fragments	2
							4	Clay	10
							5	Clay	10
							6	Clay	5
							7	Clay	5
							8	Clay, gray, sandy, in pit bottom	
H	552.5	951.5	L-25	NW	Half way between Rossville and Poplar; 300 feet west of B & O Railroad; 1,000 feet northeast of Baltimore Brick Company's plant. Small open pit on Company property.	Knm	1	Clay, silty	10
I	552.5	951.5	L-25	NW	½ mile northeast of Rossville; 500 feet northwest of B & O Railroad; 500 feet west of Baltimore Brick Company's plant. In Company's large open pit at elevation about 80 feet.	Knm	1	Clay	20
J	550.5	941.5	L-24	NE	East side of Shady Spring Ave. between Kenwood Road and Rump Mill Road, City of Baltimore. Open pit of Champion Brick Company, with bottom at elevation about 70 feet.	Knm		Clay	15
K	549.5	959.5	L-25	N	½ mile northeast of Middle River School; 100 feet southeast of sharp bend in Wampler Road at junction with road leading east-northeastward. Elevation about 50 feet. #		1	Soil	3
							2	Sand, silty	5
							3	Sand	10
							4	Sand, argillaceous	12
							5	Sand	10
						Knm	6	Sand-silt-clay	7
							7	Sand-silt-clay	3
							8	Sand	10
							9	Sand-silt-clay	5
							10	Sand, silty	3
							11	Sand-silt-clay	24
							12	Sand and gravel	8
L	519.5	892	L-23	S	1,300 feet due south of Excelsior Brick Company plant; small excavation in wooded area owned by the Company. Elevation about 190 feet.	Knm		Silt, argillaceous	6
M	508	885.5	K-23	N	In Relay, 800 feet north of Calvert Distillery; 200 feet northwest of B & O Railroad; small excavation on hillside, behind stone house. Elevation about 120 feet.	Knm		Clay, silty	2
N	507.5	885.5	K-23	N	In Relay, 500 feet northwest of Calvert Distillery; cut on northwest side of B & O railroad tracks; 300 feet southwest of U. S. Highway 1. Elevation about 100 feet.	Knm		Silt, argillaceous	3

3. Mineralogy — Approximate ratios of heavy minerals in fine sands (grain size ⅛ mm to ¼ mm). Dorothy Carroll, analyst (Bromoform separations by Gillison W. Chloe)

Locality	Downward sequence	Percentage of sand fraction (See column 6)	Pyrite	Limonite[2]	Ilmenite	Siderite	Staurolite	Kyanite	Tourmaline	Garnet	Epidote[4]	Amphibole[3]	Chloritoid and glaucophane	Zircon	Sillimanite	Andalusite	Chlorite	Mica[5]	Rutile[6]	Anatase	Glaucophane	Corundum	Brookite	Sphene
A	2	12.1			1.0		5.0	2.0	+[7]									+	+					
A	3	16.6			1.5		5.0	2.0	+					+	+			+	+					
A	4	14.1		1.5	1.5		3.0	1.5	1.5					+	+			+	+					
A	5	24.9		2.5	2.5		1.5	0.5	1.0					+	1.0			+	+					
A	6	14.2		2.5	2.5		2.0	1.0	0.5									+	+	+				
A	7	31.1		2.0	2.0		3.0	1.5	1.0					+	+			+	+					
A	8	19.4		3.5	0.5		3.0	0.5	1.5									+				+		
A	9	12.6		4.0	1.0		2.0	1.0	1.5					+	+			++	+					
A	10	14.8		3.5	0.5		2.0	1.0	2.0					+	+			++	+					
A	11	14.4	+	1.0	0.5		0.5	+										7.0						
A	12	14.6	+	2.5	0.5		1.5	1.0	1.5					+				3.0						
B	2	18.7		3.0	1.0		2.0	2.0	2.0						+			+	+					
B	3	14.2		2.0	1.0		2.0	1.5	2.5					0.5				+	+	+				
B	4	11.8		3.0	1.0		1.5	1.5	2.0					0.5				+		+				
B	5	11.7		3.0	1.0		2.0	1.5	2.0					0.5				++	+	+				
B	6	11.2		3.0	1.0		2.5	2.0	1.5									++	+	+				
B	7	24.4		3.0		2.0	0.5	0.5	0.5		1.5	1.5		0.5				++					+	
B	8	11.3		3.0			2.5	1.0	2.0		0.5	0.5		0.5	+			++		+				
B	9	21.3		3.0			3.0	2.0	1.5		+	0.5		0.5				++		+				+
C	2	13.5		3.0	1.0		2.0	2.0	2.0						+			+						
C	3	12.4		3.0	1.0		2.0	1.5	2.0					0.5				+	+	+			+	+
C	4	14.6		3.0	1.0		2.0	1.5	2.0					0.5				+	+					
C	5	10.9		4.0	1.5		2.5	0.5	0.5					0.5				+		+				
C	6	16.1		2.0	1.0		2.0	1.5	2.0		0.5			0.5	+			++	+	+				
C	7	17.2		2.0	1.0	2.0	2.5	1.0	0.5		0.5			0.5				++						+
C	8	31.0			9.0	+	0.2	0.4										++	+					
C	9	27.6		1.5	3.5	2.0	0.5	1.0	0.5		0.3	0.2						++	+					
C	10	33.1		3.0	1.5		1.5	0.5	1.5			1.5		0.5				++						
C	11	27.8		1.0	4.5		2.0	1.5	0.5		0.5	0.5						++		+				
C	12	27.7		7.0	2.0	0.5			+									++					+	
C	13	33.2			0.5	5.5					2.0	2.0						++						
C	14	31.0			0.5	5.5					0.5	3.0						+						
C	15	27.8			+	1.0					4.0	5.0						+						
D	2	16.3		0.5	3.0		3.5	1.5	0.5			+		0.5	+			+					+	
D	3	15.0		0.5	3.0		4.0	1.8	0.2						+			+						
D	4	15.2		2.0	1.0		3.5	2.0	0.5					0.5				+	+					
D	5	12.7		2.0	1.0		3.0	1.5	0.2			2.0		0.5				+						
D	6	16.5		3.5	0.5		3.5	1.5	0.5			0.5						+						
D	7	20.6		4.0			3.0	1.5	0.5			0.5		0.5	+			+	+					
D	8	6.8		4.5			3.0	1.5	0.5			0.3		0.2				+						
D	9	24.1		4.0	1.0		2.0	0.5	2.0						+			+						
D	10	11.5		3.0	1.0		2.5	1.5	0.5			0.5		0.5	+			+	+					
E	2	40.0			4.0		1.5	2.0	2.0					0.5				++						+
E	3	10.4			4.5		2.5	1.5	1.5			+						++		+				
E	4	10.6		2.0	3.0		2.5	0.5	2.0			+						++	+					
E	6	11.4		3.0	0.8		3.5	2.0	0.2					0.5			+	+						
E	7	15.2		2.0	0.5		4.0	2.0	1.5									+	+					+
E	8	9.7		0.2	1.8		3.5	2.0	2.0					0.2	+			+	+					
E	9	10.6		1.5	0.5		3.5	2.0	2.0					0.5	+			+						
E	10	16.3		0.5	1.5		4.0	2.0	2.0									+						
E	11	27.6		0.5	1.5		3.5	2.0	2.0					0.5				+	+	+				
E	12	22.9		4.0	1.0		2.0	0.5	1.0					0.5	+			+		+				
E	13	21.1	0.5	3.5	1.0		2.5	0.5	0.5					0.5	+			+	+					
E	14	15.2		3.5	1.0		3.0	2.0	0.5						+			+	+					
E	15	24.5		2.5	1.5		3.0	1.5	0.5					+	+			+		+				
E	16	19.3			4.0		3.0	0.5	2.0		0.5							++		+				
F	2	13.4		1.5	3.5		2.0	2.0	0.2			0.2		0.2				+						
F	3	10.8		0.5	4.5		2.0	2.0	0.5					0.2				+						
F	4	4.6		4.0			2.5	2.5	0.5					0.5				+	+					
F	5	11.8		4.0			2.5	+	2.5			+		0.5				+						
F	7	18.3		2.0	3.5		2.0	2.0	0.5									++						
F	8	21.2		3.0			2.0	2.0	2.5									++	+	+				
F	9	24.5	5	8.0			0.5	0.5	0.5					0.5				++		+				
F	10	20.3		4.0	1.0		2.5	2.0	0.5			+		+						+				
K	2	14.6		5.0	1.0		2.0	0.5	0.5					0.5				+					+	+
K	3	11.4		4.0	2.0		2.0	0.5	0.5					0.5	+			+						
K	4	10.0		7.0	2.0				0.5					0.5				+						
K	6	14.3	+	5.0	2.0		1.5		1.5									+	+	+				
K	7	26.5		4.0	1.0		2.5	2.0	0.3					0.2	+			+						
K	9	36.5		1.0	3.0		3.0	2.0	0.5						+			+						
K	10	14.3		2.0	3.0		3.0	0.5	0.5					0.5	+			+						
K	11	23.3		4.0	1.0		3.0	0.5	0.5					0.5				+	+	+				

Approximate ratios of clay minerals in less-than-two-micron fractions, as estimated from X-ray (goniometer) diffraction patterns. John W. Hosterman, analyst — 4. X-ray (goniometer) emission analysis (approximate percentage by weight). John W. Hosterman, analyst — 5. pH — 6. Grain-size distribution (Weight ratios) — 7. Properties relating to use possibilities of sampled material: Before firing

Locality	Downward sequence	Kaolinite	Illite	Mixed layer	Montmorillonite	Chlorite	Fe_2O_3	MnO_2	TiO_2	CaO	K_2O	5. pH	Clay (<1/256 mm)	Silt (1/256 mm–1/16 mm)	Sand (1/16 mm–2 mm)	Munsell color notation (moist sample)	Strength	% water required for plasticity	Texture and workability	% shrinkage	Defects
A	2	5	2.5	2.5								7.0	0.3	2.8	6.9	10YR5/6					
A	3	8	0.5	1.5								6.2	3.4	1.6	5.0	7.5YR5/6					
A	4	7.5	1.5	1								6.8	1.3	1.0	7:7	7.5YR5/6					
A	5	7	1.5	1.5								6.3	2.4	3.3	4.3	10YR6/8					
A	6	6.5	2.5	1								7.8	1.9	2.3	5.8	2.5YR6/4					
A	7	8	1.5	0.5			1.7	0.01	0.95	0.1	2.0	7.7	2.9	2.8	4.3	5YR7/3	L	25	Gy Sh	5	0
A	8	6.5	2.5	1			1.3	0.01	1.10	0.1	1.9	7.4	1.2	2.3	6.5	2.5Y8/4	L	22	Gy Sh	2.5	0
A	9	7	2	1								7.1	0.9	1.9	7.2	2.5YR8/4					
A	10	6	2.5	1.5								7.1	1.3	2.0	6.7	5Y7/4					
A	11	3.5	2.5		4							7.9	1.6	2.6	5.8	5Y7/3					
A	12	5.5	2.5		2							7.6	1.4	2.0	6.6	5Y7/3					
B	2	6.5	2	1.5								6.5	1.6	1.7	6.7	5YR6/8					
B	3	7.5	2	0.5								7.1	1.2	1.5	7.3	7.5YR6/4					
B	4	6.5	2.5	1								8.0	0.6	1.3	8.1	10YR6/2					
B	5	6.5	3	0.5								8.1	1.0	1.7	7.3	10YR6/4					
B	6	7	2.5	0.5								7.2	0.7	1.4	7.9	10YR6/4					
B	7	3	0.5		6.5							8.2	2.3	2.7	4.0	5Y5/4					
B	8	5	1.5		3.5							8.0	1.3	2.3	6.4	2.5Y5/4					
B	9	9.5	0.5									7.2	3.1	1.7	5.2	10YR7/4					
C	2	6	1.5	2.5								5.5	1.6	1.5	6.9	2.5YR6/4					
C	3	7	2.5	0.5								5.9	1.0	1.8	7.2	10YR6/3					
C	4	7	2	1								6.1	1.1	1.9	7.0	10YR6/3					
C	5	7	2	1								6.2	0.7	1.2	8.1	10YR6/4					
C	6	9	0.5	0.5								5.8	2.8	1.8	5.4	10YR5/6					
C	7	9	0.5	0.5			1.1	0.00	0.15	0.1	1.1	5:8	5.1	0.6	4.3	5YR8/3	L	28	Gy lg	5	0
C	8	9.5	0.5				2.1	0.00	0.55	0.1	1.1	5.7	3.9	2.7	3.4	10YR6/4	L	32	gy lg	5	0
C	9	8.5	1.5				1.7	0.00	0.30	0.1	1.4	5.9	2.6	3.2	4.2	2.5YR7/4	L	34	Gy lg	0	0
C	10	9.5	0.5				6.4	0.01	0.73	0.1	0.5	5.9	3.4	3.5	3.1	5YR5/8	L	38	gy Lg	5	0
C	11	9.5	0.5				7.7	0.02	1.3	0.1	0.5	5.9	4.0	3.2	2.8	5YR5/8	L	38	Gy Lg	5	0
C	12	9	0.5	0.5			11.6	0.04	1.9	0.1	0.5	5.9	4.7	3.4	1.9	7.5YR5/6	L	40	gy Lg	5	0
C	13	4	0.5		5.5		11.5	0.23	1.3	1.2	0.8	7.6	5.5	2.4	2.1	10YR4/4	L	40	Gy Lg	5.5	0
C	14	3			7		15.9	0.45	1.3	2.4	0.7	8.2	2.7	4.0	3.3	5Y4/3	L	30	Gy Sh	5.5	0
C	15	3	1		6		14.0	0.31	0.9	4.2	2.9	8.0	1.8	4.4	3.8	5GY4/2	L	24	Gy Sh	5.0	0
D	2	7	2.5	0.5								7.0	1.2	2.3	6.5	2.5YR3/6					
D	3	6	2.5	1.5								7.7	0.7	1.9	7.4	5YR4/8					
D	4	7.5	1.5	1								7.2	1.3	1.9	6.8	5YR4/4					
D	5	7.5	2	0.5								7.5	1.0	1.7	7.3	5YR4/4					
D	6	7.5	2	0.5								6.5	2.1	2.2	5.7	7.5YR6/4					
D	7	7.5	2	0.5								6.5	2.0	1.9	6.1	7.5YR5/4					
D	8	8	1.5	0.5								6.7	0.5	0.9	8.6	7.5YR5/4					
D	9	8	1.5	0.5								6.4	2.9	3.0	4.1	10YR7/2					
D	10	8	1.5	0.5								6.9	0.4	0.8	8.8	5YR5/6					
E	2	5	3.5	1.5								5.8	4.1	2.9	3.0	10YR5/6					
E	3	8	1	1								6.3	3.5	5.3	1.2	10YR7/2					
E	4	7.5	1.5	1								6.5	2.7	5.4	1.9	10YR7/4					
E	6	7.5	2	0.5								6.1	0.8	2.5	6.7	5YR6/4					
E	7	7	2.5	0.5								6.4	1.1	1.2	7.1	7.5YR6/4					
E	8	7.5	2.5									6.1	0.3	1.4	8.3	10YR5/3					
E	9	7	3									6.9	0.8	0.8	8.4	5YR4/4					
E	10	7	2.5	0.5								6.4	2.7	3.1	4.2	7.5YR6/4					
E	11	7	2.5	0.5								6.1	3.1	3.6	3.3	2.5YR5/8					
E	12	7	2.5	0.5								6.4	2.7	3.0	4.3	5YR5/8					
E	13	7	3									7.3	2.1	2.6	5.3	5YR4/8					
E	14	8.5	1	0.5								6.1	2.6	2.4	5.1	10R4/6					
E	15	7.5	2	0.5			2.8	0.01	1.1	0.1	1.7	6.2	2.6	2.6	4.8	2.5YR5/6	L	26	sy sm sh	5	0
E	16	8.5	1	0.5								6.4	1.6	1.7	6.7	5YR7/2					
F	2	3	3	4								7.4	2.1	2.1	5.8	10YR5/6					
F	3	4	2	4								7.0	1.8	2.0	6.2	10YR5/6					
F	4	5.5	2	2.5								7.1	1.0	0.7	8.3	10YR5/6					
F	5	8	1.5	0.5								6.6	1.1	1.6	7.3	5YR5/4					
F	6	6.5	2	1.5								5.4	6.4	3.2	0.4	2.5YR4/8					
F	7	6.5	2.5	1			3.9	0.02	0.9	0.1	1.4	5.8	3.5	2.3	4.2	2.5YR4/6	M	25	Sm pl Lg	5.5	0
F	8	6	2.5	1.5			6.4	0.06	1.0	0.1	1.5	5.7	3.9	3.0	3.1	2.5YR3/6	M	26	Sm pl Sh	5	0
F	9	5.5	3.5	1			11.1	0.24	0.9	0.1	2.7	5.6	5.3	3.7	1.0	5YR3/4	M	26	Sm Pl Lg	5	0
F	10	6	1	3									2.8	4.0	3.2						
G	1	5.5	2.6	1.9			1.3	0.00	1.0	0.1	2.4	4.1	5.8	3.8	4.0	10YR5/1	L	25	sm Pl sh	.5	0
G	2	5.2	2.9	1.9			1.2	0.00	1.1	0.1	2.4	4.3	4.7	4.8	5.0	10YR5/1	L	25	sm Pl	5	0
G	3	5.9	2.9	1.2			1.3	0.00	1.1	0.1	2.4	4.4	4.4	5.3	3.0	10YR5/1	M	29	Sy pl st	5	0
G	4	5.8	2.1	2.1			2.2	0.01	1.0	0.1	2.7	4.1	8.6	<1.4	>0	10YR5/1	S	38	fy Pl Sm	7.5	Yes
G	5	6.1	1.6	2.3			2.2	0.01	1.0	0.1	2.7	4.1	8.3	<1.7	>0	10YR5/2	M	40	fy pl Sm	6.5	Yes
G	6	7.6	1.0	1.4			2.2	0.01	1.4	0.1	1.7	3.6	9.7	<3.0	>0	10YR4/1	S	40	Fy Pl Sm	8.0	
G	7	5.5	3.1	1.4			1.5	0.00	1.1	0.1	2.2	4.2	<7.9	2.1	>0	10YR5/1	S	35	ST PL Sm	7	Yes
H	1	6.1	2.3	1.6			2.4	0.01	1.1	0.1	1.9	4.2	7.0	2.6	0.4	10YR5/3	L	30	*Sy* Sh	4	0
I	1	4.1	4.8	1.1			8.9	0.05	0.95	0.1	2.9	6.6	<7.8	2.2	>0	7.5YR5/4	S	28	Sm Pl	6.5	0
J		6.0	2.4	1.6			9.1	0.0	1.0	0.1	2.2	4.7	7.6	2.3	1	7.5YR5/4	M	34	ST PL Sm	5	0
K	2	6	3.5	0.5								5.9	1.2	1.6	7.2	10YR7/4					
K	3	7	1.5	1.5								6.2	1.1	1.2	7.7	10YR6/3					
K	4	7.5	2	0.5								6.9	1.5	1.5	7.0	5YR6/3					
K	6	8	1.5	0.5								5.9	2.7	2.7	4.6	2.5YR4/8					
K	7	8	1.5	0.5			4.9	0.0	1.0	0.1	1.5	5.9	4.6	2.8	2.6	2.5YR4/8	M	28	st pl lg	5	0
K	9	8	1.5	0.5			3.7	0.0	1.1	0.1	1.2	5.9	4.6	2.7	2.7	2.5YR5/8	L	23	gy pl Lg	5	0
K	10	7.5	2	0.5								7.1	1.7	2.2	6.1	2.5YR6/6					
K	11	7.5	1.5	1								6.2	3.1	2.8	4.1	2.5YR6/6					
L		4.1	3.7	2.2			4.2	0.08	1.0	0.3	2.5	6.3	4.1	5.4	0.5	10YR5/2	M	26	PL Sm	4.5	0
M		5.0	2.6	2.4			2.0	0.02	0.95	0.2	3.2	4.3	4.7	4.0	1.3	10YR5/2	L	26	sy Sm pl	5.5	0
N		6.6	2.6	0.8			1.4	0.00	0.00	0.1	2.9	4.3	4.7	4.5	0.8	10YR6/1	L	23	Sm PL	5	0

7. Properties relating to use possibilities of sampled material: After firing at indicated temperatures (Degrees Fahrenheit) — 8. Suggested products — 9. Comments

Locality	Downward sequence	1800° Munsell color notation	1800° Hardness	1800° % linear shrinkage	1800° % water absorption	1800° Specific gravity (approximate)	2000° Munsell color notation	2000° Hardness	2000° % linear shrinkage	2000° % water absorption	2000° Specific gravity (approximate)	2100° Munsell color notation	2100° Hardness	2100° % linear shrinkage	2100° % water absorption	2100° Specific gravity (approximate)	2200° Munsell color notation	2200° Hardness	2200° % linear shrinkage	2200° % water absorption	2200° Specific gravity (approximate)	2300° Munsell color notation	2300° Hardness	2300° % linear shrinkage	2300° % water absorption	2300° Specific gravity (approximate)	2400° Munsell color notation	2400° Hardness	2400° % linear shrinkage	2400° % water absorption	2400° Specific gravity (approximate)	Pyrometric cone equivalent	8. Suggested products	9. Comments
A	7	7.5YR8/4	Hc	3.0	20.0	2.62	7.5YR8/4	Hc	4.0	18.7	2.65	7.5YR8/2	Hc	5.0	17.1	2.68	10YR7/2	Hc	6.0	15.6	2.68	2.5Y7/2	Hc	7.5	13.2	2.65	2.5Y6/2	Hc	8.5	10.8	2.62			
A	8	7.5YR8/4	Hc	1.0	20.5	2.63	7.5YR7/2	Hc	1.0	19.7	2.66	10YR7/3	Hc	3.0	18.4	2.67	10YR8/2	Hc	4.5	17.2	2.68	2.5Y7/2	Hc	6.0	15.5		5Y7/1	Hc	6.0	13.1	2.65	26	LHDR	
C	7	10R8/2	Hc	5.0	25.8	2.61	N9	Hc	5.0	24.7	2.63	N9	Hc	5.5	24.1	2.64	N9	Hc	5.5	22.2	2.65	N9	Hc	5.5	21.0	2.65	N9	Hc	5.5	20.6	2.66	32–33	HHDR	
C	8	5YR7/4	Hc	5.0	27.3	2.59	5YR8/2	Hc	5.0	27.4	2.66	5YR9/1	Hc	5.0	26.4	2.66	10YR9/2	Hc	7.0	23.4	2.66	5Y9/2	Hc	7.5	21.9	2.67	5Y8/2	Hc	7.5	20.8	2.65	32–33	HHDR	
C	9	5YR8/3	Hc	3.0	30.7	2.58	5YR9/2	Hc	3.0	31.3	2.67	5YR9/1	Hc	3.5	30.2	2.65	10YR9/1	Hc	5.5	27.9	2.66	N9	Hc	5.5	25.8	2.67	7.5Y9/2	Hc	6.0	23.3	2.67	32	HHDR, WW	
C	10	5YR6/6	Hc	5.5	30.7	2.67	5YR8/4	Hc	5.5	28.7	2.67	5YR6/4	Hc	7.5	24.6	2.68	5YR6/4	Hc	7.5	24.1	2.67	2.5YR6/4	Hc	9.5	22.2	2.65	2.5YR6/2	Hc	9.5	20.3	2.66			
C	11	5YR6/6	Hc	5.5	31.0	2.68	5YR8/6	Hc	5.5	30.1	2.67	5YR7/6	Hc	7.0	25.6	2.70	5YR7/6	Hc	7.0	25.4	2.70	2.5YR6/4	Hc	7.5	24.3	2.69	10R6/4		8.5	22.0	2.69			
C	12	2.5YR6/6	Hc	6.5	29.6	2.77	2.5YR7/6	Hc	6.5	20.1	2.78	2.5YR7/6	Hc	10.5	18.8	2.78	2.5YR6/5	Hc	10.5	17.8	2.85	2.5YR5/4	Hc	11.5	19.6	2.81	10R4/3	Hc	11.5	20.7	2.79	23		
C	13	5YR6/6	Hc	8.5	30.4	2.71	5YR6/6	Hc	8.5	23.9	2.72	2.5YR5/4	Hc	9.5	25.8	2.74	2.5YR5/4	Hc	9.5	24.2	2.77	10R4/2	Hc	11.5	21.1	2.69	5YR4/1	Hc	11.5	26.6	2.68			
C	14	7.5YR5/4	Hc	5.5	27.0	2.93	5YR5/4	Hc	6.5	23.6	2.96	2.5YR5/4	Hc	7.0	24.0	3.00	10R3/2	h	7.0	17.4	2.96											5±		Melted at 2300°
C	15	7.5YR6/4	Hc	5.0	22.2	2.67	5YR6/3	Hc	5.0	24.9	2.87	5YR4/2	Hc	5.0	20.7	2.87																1±		Melted at 2200°
E	15	5YR7/6	Hc	5.5	20.1	2.51	5YR7/6	Hc	5.5	17.5	2.51	5YR7/6	Hc	5.5	17.9	2.58	2.5YR5/4	Hc	7.0	14.1	2.46	2.5YR5/2	Hc	9.5	11.6	2.43	5Y6/2	h	10.5	9.2	2.41	23		
F	7	5YR7/6	Hc	5.5	16.1	2.59	5YR6/6	Hc	5.5	14.4	2.54	5YR5/6	Hc	5.5	13.4	2.57	2.5YR4/2	h	7.0	8.0	2.43	2.5YR3/2	H	9.0	7.7	2.40	10YR4/1	*H*	10.0	4.5	2.33		CB	
F	8	5YR7/6	Hc	7.5	17.7	2.60	5YR6/6	Hc	9.0	14.3	2.56	2.5YR5/6	Hc	9.0	13.4	2.60	2.5YR4/2	H	11.0	7.4	2.42	2.5YR3/2	*H*	11.0	5.2	2.39	10YR3/1	*H*	14.0	2.9	2.28		CB	
F	9	5YR7/6	h	5.5	17.9	2.72	5YR6/4	H	7.5	11.8	2.66	5YR5/4	H	7.5	10.9	2.69	2.5YR3/2	HH	13.5	2.4	2.48	10R4/1	HH	13.5	2.1	2.45	10YR3/1		10.0	4.1	1.89			
G	1	5YR9/2	Sc	5.0	17.6	2.57	5YR9/2	Sc	7.5	16.4	2.54	10YR9/2	h	7.5	12.2	2.57	2.5Y9/4	H	10.0	8.5	2.46	5Y7/2	HH	11.5	4.4	2.41		HH	11.5	2.1	2.38	19–20	LHDR, CFT	
G	2	10YR7/1	Sc	6.0	17.5	2.54	5YR9/2	Sc	6.0	17.0	2.55	10YR9/2	h	8.5	14.3	2.53	2.5Y9/2	H	9.0	11.4	2.50	2.5Y8/3	H	10.0	7.2	2.41	2.5Y8/3	H	11.0	5.1	2.37	23	LHDR, CFT	Raw material marketed as bond for silicon carbide abrasives and kiln furniture, for manufacture of artware and fireclay sanitary ware and for preparation of low-duty refractory mortars
G	3	10YR9/1	Sc	5.5	18.8	2.56	10YR9/1	Sc	8.5	16.2	2.54	10YR9/1	h	8.5	12.9	2.55	2.5Y9/2	H	11.0	10.6	2.51	5Y9/2	H	11.0	5.5	2.46	N7	HH	11.0	2.3	2.39	20–23	CSW, CFT, LHDR	
G	4	5YR9/2	Sc	9.0	22.0	2.58	10YR9/2	h	13.5	15.5	2.60	2.5YR8/4	H	13.5	10.6	2.50	2.5Y7/4	*H*	15.5	3.4	2.43	5Y7/3	HH	16.0	0.4	2.42	5Y7/2	HH	16.0	0.6	2.41		Same as Sample A	Some tendency to warp in drying. Thermal shock resistance poor. 2100–2300°F specimens cracked when removed from kiln. Marketed for manufacture of texture tile, fireclay sanitary ware and stoneware, and a filler for linoleum cement and acoustical tile cement
G	5	5YR7/6	h	8.5	21.0	2.63	5YR8/4	H	8.5	14.6	2.61	7.5YR7/4	*H*	15.0	9.1	2.67	7.5YR6/4	*H*	19.0	3.2	2.47	7.5YR5/4	HH	19.0	0.3	2.38	7.5YR5/4	HH	19.0	0.3	2.42			Some tendency to warp in drying. If mixed with other clays, might improve their workability and green strength. Marketed for manufacture of red tile
G	6	10YR9/2	Sc	9.5	23.6	2.59	10YR9/2	H	14.5	17.2	2.58	10YR9/2	*H*	14.5	14.9	2.54	2.5Y9/4	*H*	15.0	8.0	2.49	5Y7/3	HH	15.5	1.0	2.34	10YR6/1	HH	16.0	0.9	2.35		Same as Sample A	Raw material is marketed for same uses as material 4
G	7	10YR9/1	Sc	8.5	21.5	2.56	10YR9/1	h	8.5	15.2	2.59	5Y9/2	H	9.5	14.3	2.58	5Y8/3	*H*	14.0	5.9	2.50	5Y7/2	HH	16.0	0.1	2.34	2.5Y7/2	HH	16.0	0.4	2.41		P, A	Raw material tends to warp and crack if dried too fast; if mixed with other clays, might improve their workability and green strength. Raw material is marketed for same uses as material 4
H	1	7.5YR8/4	Sc	4.5	18.2	2.59	7.5YR8/4	Sc	5.0	18.2	2.62	7.5YR7/4	h	9.0	13.3	2.57	10YR6/3	HH	10.0	9.5	2.30	5Y6/1	*H*	10.0	6.5	2.44	5Y6/1	HH	14.0	1.7	2.38		CB, LGMF	Raw material is used for brick and tile manufacture
I	1	2.5YR6/8	h	10.0	15.0	2.64	2.5YR5/6	H	14.0	8.4	2.59	2.5YR4/4	*H*	16.0	3.5	2.50	2.5YR4/4	HH	16.0	0.4	2.48	2.5YR2/2	V	Ex				V	Ex				CB, T	Bloating test negative. Raw material is used for brick and tile manufacture
J		5YR6/6	h	8.5	19.8	2.63	5YR6/6	H	11.0	14.4	2.61	2.5YR4/4	HH	16.0	4.9	2.55	2.5YR3/2	HH	17.5	0.3	2.45	10R3/1	GV	Ex		2.38	10R2/1	GV	Ex		2.31		CB, ST	Firing shrinkage rather high; color range good. Raw material is used for brick and tile manufacture
K	7	2.5YR7/6	Hc	4.5	21.0	2.75	5YR8/4	Hc	5.0	19.0	2.73	5YR7/6	h	7.5	15.7	2.73	5YR5/4	*H*	8.0	14.1	2.73	2.5YR4/2	*H*	10.0	10.9	2.68	2.5YR5/2	*H*	10.0	11.4	2.68			
K	9	5YR7/6	Hc	5.5	17.2	2.62	5YR8/4	Hc	5.5	16.1	2.60	5YR7/6	Hc	5.5	14.6	2.61	5YR5/3	h	9.5	10.6	2.49	5YR5/2	H	10.0	9.3	2.45	2.5Y5/2	H	11.0	7.4	2.40			
L		5YR7/6	Sc	5.0	15.7	2.54	5YR7/6	H	5.0	14.2	2.58	2.5YR5/4	HH	14.0	6.3	2.44	5YR4/2	HH	14.0	2.9	2.39	2.5Y4/2	HH	14.0	0.8	2.27	2.5Y4/2		Ex				CB, ST	Color range fair. Raw material has been used for brick and tile manufacture
M		10YR8/4	Sc	6.0	19.5	2.60	7.5YR8/4	h	7.5	16.6	2.59	10YR8/4	h	9.0	12.5	2.54	2.5Y7/2	HH	10.5	10.7	2.60	2.5Y7/2	HH	11.0	7.2	2.54	2.5Y7/2	HH	Ex	6.5	2.49	<23	FBcb; CFT; P; A	
N		7.5YR8/2	Sc	5.0	18.0	2.65	10YR9/2	h	6.0	16.3	2.64	2.5Y9/4	H	7.5	12.6	2.58	5Y8/3	*H*	8.0	11.0	2.59	2.5Y7/2	HH	10.0	6.9	2.59	2.5Y7/2	HH	11.0	7.1	2.60	23	LHDR, FBcb; CFT; P; A	

TABLE 4

Geologic sections of clay-bearing materials in auger borings and outcrops in Anne Arundel and Howard Counties with data relating to their physical properties

(See pp. 4-5 for explanation of abbreviations and symbols)

1. Localities (Pl. 1) defined with reference to State Grid, topographic quadrangles, highways, and other landmarks.

Locality	State coordinates N	State coordinates E	Quadrangle*	Subdivision**	Supplementary data
A	501	884.5	K-23	N	0.25 mile southeast of Elkridge, 300 feet south of Deep Run bridge. Large open pit of Maryland Roads Commission.
B	488.5	857	K-22	C	0.8 mile west-northwest of Waterloo (intersection of U.S. Highway 1 and Highway MD-175); in field 1100 feet northeast of Pallottine Mission House. Elevation about 345 feet. #
C	484	862	K-22	SE	Near water tower on west side of Highway MD-175; 0.7 mile south of its intersection with U.S. Highway 1. Elevation about 265 feet. #
D	482	867	K-22	SE	0.75 mile northeast of Jessup; 1500 feet southeast of Baltimore and Ohio Railroad, in C. A. Shipley's barnyard. Elevation about 265 feet. #
E	479	869.5	K-22	SE	2 miles northeast of Jessup school; ½ mile north-northeast of St. Lawrence church; northwest side of road parallel to and northwest of Baltimore Washington Parkway. Elevation about 275 feet. #
F	478	913.5	K-24	SW	Open pit working of Severn Clay Co. Midway between Harundale and Marley, in wooded area 500 feet northwest of Marley Station Rd. Elevation about 40 feet.
G	476.5	871	K-22	SE	2200 feet east of St. Lawrence Church; 700 feet southeast of Washington Baltimore Expressway; 1500 feet northeast of Highway MD-175; close to Motel. Elevation about 300 feet. #
H	468	881	J-23	NW	East of Fort Meade military establishment southeast side of Reece Road (Highway MD-554), 3500 feet northeast of its intersection with Highway MD-175. Elevation about 165. #
I	464.5	887	J-23	N	West side of Highway MD-170; 1.5 miles north of its intersection with Highway MD-175. Elevation about 125 feet. #
J	461.5	890	J-23	N	East side of Burns Crossing road on north side of its junction with road branching eastward; 1000 feet south of south branch of Severn Run. Elevation about 120 feet. #
K	456	895	J-23	N	North side of road between Benfield and Sappington school, about 0.6 mile northeast of its intersection with Burns Crossing road. Elevation about 190 feet. #
L	455.5	906.5	J-23	NE	Benfield, 200 feet west of old U.S. Highway 301 about .15 mile southwest of its intersection with Highway MD 386. Excavation on west side of divided highway under construction. Elevation about 130 feet.
M	451.1	919.5	J-24	C	Carrollton Manor real estate subdivision 400 feet west of mouth of Forked Creek, on small peninsula projecting southward into Severn River. Old glass sand mine workings. Near sea level.
N	451	919.5	J-24	C	Same mine workings; about 500 feet farther South. Steep slope facing northward. Near sea level.

2. Geologic section; 3. Mineralogy (Approximate ratios of heavy minerals in fine sands (grain size ⅛ mm to ¼ mm). Dorothy Carroll, analyst (Bromoform separations by Gillison W. Chloe); Approximate ratios of clay minerals in less-than-two-micron fractions, as estimated from X-ray (goniometer) diffraction patterns. John W. Hosterman, analyst); 4. X-ray (goniometer) emission analysis (approximate percentage by weight). John W. Hosterman, analyst; 5. pH; 6. Grain-size distribution (Weight ratios); 7. Before firing: Munsell color notation (moist sample)

Loc.	Strat. unit	No.	Description	Thickness in feet	Percentage of sand fraction (See col. 6)	Pyrite	Limonite	Ilmenite	Siderite	Staurolite	Kyanite	Tourmaline	Garnet	Epidote	Amphibole	Chloritoid and glauconite	Zircon	Sillimanite	Andalusite	Chlorite	Mica	Rutile	Anatase	Glaucophane	Corundum	Brookite	Sphene	Kaolinite	Illite	Mixed layer	Montmorillonite	Chlorite	Fe_2O_3	MnO_2	TiO_2	CaO	K_2O	pH	Clay (<1/256 mm)	Silt (1/256 mm-1/16 mm)	Sand (1/16 mm-2 mm)	Munsell color notation (moist sample)
A	QT	1	Gravel	25																																						
A			---UNCONFORMITY---																																							
A		2	Silt containing large ferruginous concretions	60																																						
A	Knm	3	Clay	8																								4.7	4.2	1.1			4.9	0.05	1.1	0.2	3.9	5.3	9.4	0.5	0.1	2.5YR4/6
A		4	Clay, containing lignite fragments	17																								2.9	3.7	3.4			2.9	0.09	1.0	0.4	4.6	5.4	9.9	0.0	0.1	N/1
B		1	Soil	3																																						
B	QT	2	Sand and gravel	11																																						
B			---UNCONFORMITY---																																							
B		3	Sand, argillaceous	15	15.8		3.5	1.0		0.5	1.5	1.0			0.5		1.0	0.5				0.5						7	2	1								7.1	2.4	1.9	5.7	2.5Y4/6
B		4	Sand, argillaceous	16	12.9		3.5	1.0		1.5	+?	2.0					1.5				+	0.5	+					8	1	1								6.2	1.9	1.7	6.4	10YR5/8
B	Knm	5	Sand-silt-clay	49	24.6	4.5	4.0			0.5		0.5	0.5								++							8.5	1	0.5			5.3	0.05	1.0	0.3	0.9	5.5	4.1	2.9	3.0	5YR4/6
B		6	Sand-silt-clay (saprolite)	7	13.9							0.5		0.5	8.5					0.5							+	1.5			8.5							8.2	2.5	4.0	3.5	10YR4/2
B	pK	7	Crystalline rock																																							
C		1	Fill, artificial	2																																						
C		2	Sand-silt-clay	1.5			7.5	0.5				0.5					1.5											5.5	2	2.5								8.0	2.0	2.7	5.3	7.5YR5/6
C		3	Sand, argillaceous	1.5	15.8	0.5	5.0					0.5					0.5					2.5						7.5	1	1.5								6.9	2.4	1.3	6.3	7.5YR5/6
C	Knm	4	Sand	10	14.7		6.0			0.5	0.5	1.5					1.0					0.5						8	1.5	0.5								6.3	0.6	1.4	8.2	10YR5/4
C		5	Sand, argillaceous	21	13.1		6.0	1.0		1.0	1.0	1.0																8	2									6.5	2.7	0.3	7.0	10YR6/4
C		6	Sand	12	11.7		5.0	1.0		0.4	0.2	1.5		0.4			1.5											8.5	1.5									6.3	1.2	1.1	7.7	10YR5/4
C		7	Sand, argillaceous	2	13.6		3.5	1.0																				9	1									6.4	1.6	1.5	6.9	10YR6/4
C		8	Sand-silt-clay	43	24.2		3.5	1.0		1.5	0.5	1.5					1.5					0.5						7	2	1			2.9	0.04	0.62	0.1	0.9	7.0	2.6	2.6	4.8	10YR5/4
C		9	Sand, argillaceous	8	12.9		3.5	1.0		2.0	1.5	0.5					0.5					0.5						8	2									6.9	1.4	1.3	7.3	10YR7/6
C		10	Sand-silt-clay	4	12.8																							8	2									6.0	2.6	2.5	4.9	2.5YR4/8
D		1	Soil	4																																						
D		2	Sand-silt-clay	2	100.0		4.0	2.0				1.5				1.5	1.0				+							5.5	3	1.5			2.7	0.03	0.87	0.1	2.5	5.3	3.5	4.1	2.4	5YR5/8
D		3	Sand-silt-clay	2.5	12.5		4.0	2.0		1.0	1.0	0.5		1.0			0.5				+	+						5.5	4.5				3.9	0.04	1.0	0.1	1.7	6.5	2.6	2.5	4.9	10YR4/4
D		4	Sand-silt-clay	2.5	31.8		4.0	2.0				1.0				1.5	1.0			+	+							5.5	4.5				3.1	0.05	0.83	0.1	2.7	6.2	4.2	3.4	2.4	10YR4/3
D		5	Clay, silty	9	100.0		4.0	2.0				1.0		0.5		1.5	1.0				+						+	5	4	1			7.7	0.04	0.85	0.1	2.5	6.3	5.2	3.2	1.6	10YR4/8
D	Knm	6	Sand-silt-clay	12	100.0		3.0	3.0		0.5		1.0				1.0	1.0					+						5	5				7.7	0.05	0.58	0.1	2.0	8.0	3.4	4.2	2.4	10YR4/4
D		7	Sand-silt-clay	3	100.0		3.0	3.0				1.0		1.0			1.0					+					+	4	4	2			8.2	0.10	0.55	0.1	1.9	8.1	3.5	4.5	2.0	2.5YR4/4
D		8	Sand-silt-clay	23																								3.5	3.5	3			8.1	0.10	0.65	0.1	0.8	7.6	3.4	4.4	2.2	2.5YR4/4
D		9	Sand-silt-clay	9																																						
D		10	Sand-silt-clay	14	100.0		3.0	3.0			0.5	1.0				1.0	1.0					+						8	2				1.5	0.00	0.73	0.1	1.2	6.5	3.2	4.6	4.4	7.5YR4/4
E		1	Soil	3.5																																						
E		2	Clay	6.5																								4.5	2.5	3			12.4	0.02	0.9	0.1	3.2	4.9	7.5	2.2	0.3	10YR5/8
E		3	Clay, silty	6																								4.5	3.5	2			6.8	0.12	1.1	0.2	3.7	5.3	6.7	3.2	0.1	7.5YR5/6
E		4	Clay, silty	3.5																								5.5	3.5	1			7.7	0.22	1.0	0.2	3.2	5.9	7.0	2.9	0.1	10YR4/4
E	Knm	5	Clay, silty	5.5																								5	3.5	1.5			3.5	0.06	1.0	0.2	3.2	5.5	6.6	3.2	0.2	10YR4/2
E		6	Clay, silty	3																								5	3.5	1.5			4.0	0.07	1.0	0.2	3.2	5.4	6.6	3.0	0.4	10YR4/3
E		7	Sand-silt-clay	18	100.0		6.0	2.0		0.5	+	0.5	0.5			+	+				+							5.5	3	1.5			3.2	0.05	0.8	0.1	2.4	5.9	4.1	2.3	3.6	10YR5/4
E		8	Clay, silty	35.5	17.9		6.5	1.5			+	0.5				+	+				+							5.5	3.5	1			2.7	0.05	1.0	0.1	2.7	5.6	4.6	4.0	1.4	10YR4/4
F	Knm	1	Clay, silty	11																								4.2	2.9	2.9			6.5	0.0	1.1	0.2	3.6	3.6	5.8	4.2	tr	5YR4/6
F		2	Clay, silty	9																								4.2	3.2	2.6			6.5	0.05	1.1	0.2	3.9	4.8	5.6	4.3	0.1	7.5YR5/4
F		3	Clay, silty, containing lignite fragments	8																								4.0	3.6	2.4			1.4	0.0	1.1	0.1	4.0	4.0	5.2	4.4	0.4	10YR4/1
G	QT	1	Sand and gravel	5																																						
G			---UNCONFORMITY---																																							
G	Knm	2	Clay, silty	16																								5.5	4	0.5			7.9	0.06	1.0	0.1	2.1	5.4	5.7	4.1	0.2	5YR4/6
G		3	Clay, silty	14																								5	3.5	1.5			9.4	0.12	1.1	0.1	2.8	5.7	7.0	2.9	0.1	2.5YR3/6
G		4	Clay, silty	9																								6.5	3	0.5			10.1	0.13	1.1	0.1	2.5	5.8	7.0	2.8	0.2	2.5YR3/6
G		5	Clay, silty	29	20.2	2.0	7.0					0.5									+						+	5.5	3	1.5			9.4	0.16	1.0	0.2	2.2	5.5	6.5	3.0	0.5	5YR4/4
G		6	Sand-silt-clay	12	100.0	3.0	3.0		3.0			0.2				0.5	0.3			+	+	+						6	3.5	0.5			3.1	0.07	0.82	0.2	1.4	5.7	3.9	2.1	4.0	7.5YR4/4
G		7	Clay, silty	15	100.0		9.0		1.0											+								6.	3.5	0.5			7.4	0.22	0.92	0.4	1.7	5.6	6.4	1.8	1.8	10YR3/2
H		1	Soil	4																																						
H		2	Clay, silty	19																								5.5	3	1.5			4.9	0.03	1.0	0.1	3.2	5.0	6.4	3.5	0.1	10YR4/4
H		3	Clay, silty	11	11.8	5.0	1.0	1.0		0.5		1.0			0.5		0.5				+							5.5	3	1.5			2.2	0.0	0.95	0.1	2.5	4.3	4.9	4.5	0.6	7.5YR4/2
H	Knm	4	Clay, silty	16	20.1	6.0	2.0			1.0		1.0									+							6	2.5	1.5			3.0	0.0	0.92	0.1	2.6	4.7	5.0	3.9	1.1	7.5YR4/2
H		5	Sand, argillaceous	35			5.0	3.0		0.5		0.5					1.0				+							7	2.5	0.5								4.4	2.2	1.9	5.9	10YR4/3
H		6	Sand-silt-clay	10	16.8	2.0	4.0	3.0				0.5					0.5				+							6.5	2.5	1			0.7	0.0	0.84	0.1	2.2	5.7	4.1	3.5	2.4	2.5YR8/4
H		7	Sand, coarse, yellow	5																																						
I		1	Soil	3																																						
I		2	Clay, silty	25	16.6		8.0	1.0		0.5											+							8.5	1	0.5			6.5	0.0	1.1	0.1	2.6	4.8	6.4	3.1	0.5	2.5YR5/6
I		3	Clay, silty	2	19.3		10.0														+							7.5	2	0.5			5.5	0.03	1.0	0.2	2.7	5.4	5.8	3.5	0.7	7.5YR6/6
I	Knm	4	Clay, silty	25	20.1		10.0									+					+							7	2	1			7.7	0.03	1.0	0.1	2.4	5.3	6.6	3.0	0.4	2.5YR4/8
I		5	Clay, silty	30	24.1		9.0	1.0													+							7	2.5	0.5			6.5	0.0	1.0	0.1	2.5	5.4	6.0	3.3	0.7	2.5YR3/6
I		6	Sand-silt-clay	15	100.0	3.0	4.0			0.5		1.0					1.0				+	0.5						7	3				3.2	0.0	0.70	0.1	1.9	4.9	3.9	2.8	3.3	5YR4/8
J		1	Soil	3																																						
J	QT	2	Sand and gravel	7																																						
J			---UNCONFORMITY---																																							
J		3	Sand, silty	25	9.4	2.0	4.0	2.0				0.5		0.5			1.0											8	1.5	0.5								5.6	1.1	1.7	7.2	10YR6/4
J	Knm	4	Clay silty	10	100.0		6.0	2.0				0.5		0.5			0.5				+	0.5						7.5	2.5				1.8	0.0	0.95	0.1	1.9	4.9	4.4	3.8	1.8	10YR5/4
K		1	Soil	3																																						
K		2	Sand	7	15.6		2.0			4.0	2.0	1.0					1.0	+	+									5	1	4								5.6	0.7	1.3	8.0	5YR5/6
K	QT	3	Sand and gravel	3	8.9		2.0			4.0	2.0	0.5					1.0											6.5	1	2.5								5.5	0.8	1.7	7.5	7.5YR5/6
K			---UNCONFORMITY---																																							
K		4	Sand, silty	15	14.0		2.0			4.0	2.0	0.5					1.0										+	8	1.5	0.5								5.4	1.8	2.3	5.9	7.5YR5/4
K		5	Sand, silty	16	12.4		7.0					2.0	0.5															8.5	1	0.5								5.7	1.1	1.9	7.0	7.5YR6/6
K		6	Sand-silt-clay	11	24.5		7.0	1.5		0.5	0.5	0.5					+											8	2				2.8	0.0	0.73	0.1	1.9	6.0	3.4	3.2	3.4	2.5YR5/8
K	Knm	7	Sand-silt-clay	19	17.2		7.0					2.0					1.0				+							7.5	2.5				1.7	0.0	0.60	0.2	1.4	6.5	2.4	2.5	5.1	2.5YR4/6
K		8	Sand-silt-clay	14	17.4		7.0			1.0	0.5	1.0					0.5	+			+							8	2				1.2	0.0	0.57	0.1	1.2	6.3	2.1	2.3	5.6	5YR4/6
K		9	Sand-silt-clay	10	100.0		6.0					1.5					1.5				+	+	+					8	2				0.4	0.0	0.73	0.1	1.2	6.0	2.3	2.9	4.8	7.5YR8/4
K		10	Sand	2																																						
L		1	Sand, fine, iron stained	4+																																						
L	Knm	2	Silt, argillaceous	1																								6.3	2.7	1.0			1.0	0.0	1.1	0.4	1.2	4.4	4.1	4.4	1.5	2.5Y8/2
L		3	Sand, fine, white; some iron stain	25+																																						
M		1	Soil	3																																						
M		2	Clay, mottled, red and gray	9																								5.4	3.2	1.4			1.0	0.0	1.0	0.1	2.7	3.7	9.4	>0.5	<0.1	7.5YR7/4
M	Knm	3	Clay	2																								5.4	3.0	1.6			0.8	0.0	1.1	0.1	2.9	3.3	<9.6	0.4	tr	10YR6/1
M		4	Clay, silty	8																								4.7	3.4	1.9			0.2	0.3	1.0	0.1	2.5	3.5	5.0	4.9	0.1	10YR7/1
N		1	Sand, fine-grained, white	6																																						
N	Knm	2	Clay, silty	1																								7.9	2.0	0.1			1.0	0.0	2.5	0.1	2.5	3.9	7.5	2.5	tr	5Y9/1
N		3	Sand, fine-grained, white	20																																						

7. Properties relating to use possibilities of sampled material — Before firing; After firing at indicated temperatures (Degrees Fahrenheit): 1800°, 2000°, 2100°

Loc.	No.	Strength	% water required for plasticity	Texture and workability	% shrinkage	Defects	1800° Munsell color notation	Hardness	% linear shrinkage	% water absorption	Specific gravity (apparent)	2000° Munsell color notation	Hardness	% linear shrinkage	% water absorption	Specific gravity (apparent)	2100° Munsell color notation	Hardness	% linear shrinkage	% water absorption	Specific gravity (apparent)
A	3	S	31	Sm Pl / sy Lg	5	No	2.5YR6/6	Sc	5.0	21.7	2.80	2.5YR5/6	H	8.0	15.0	2.79	2.5YR4/4	HH	13.0	6.0	2.73
A	4	M	25	Sm Pl	5	No	10YR7/1	Sc	6.0	17.8	2.50	7.5YR6/1	H	7.5	11.4	2.49	10YR5/2	HH	10.0	3.4	2.36
B	5	L	29	Sm Pl		No	2.5YR7/6	Sc	6.5	30.0	2.69	5YR7/4	Sc	7.5	18.8	2.70	2.5YR6/3	h	8.5	16.4	2.70
C	8	LL	22	Sy SH	1	No	5YR8/4	Sc	1.5	17.4	2.68	5YR8/3	Sc	1.5	17.3	2.70	7.5YR8/4	Sc	2.0	16.6	2.69
D	2	L	25	Gy Sh pl	25?	No	5YR7/6	Sc	2.5	18.7	2.66	5YR7/6	Sc	5.5	16.1	2.66	5YR5/4	h	5.5	14.7	2.63
D	3	LL	21	Sy Sh	1		5YR6/6	Sc	2.5	17.7	2.74	5YR7/6	Sc	2.5	17.9	2.74	5YR5/4	Sc	5.0	16.4	2.70
D	4	L	25	Gy pl Sh			5YR8/4	Sc	5.0	17.4	2.71	5YR8/4	h	5.5	14.8	2.65	5YR5/3	H	7.5	10.4	2.60
D	5	M	30	Sm gy pl	5.5	No	5YR7/6	Sc	5.5	18.5	2.69	5YR5/6	H	11.5	10.1	2.63	5YR4/3	HH	12.5	5.8	2.53
D	6	L	25	sy sm pl	4	No	5YR6/8	Sc	4.5	9.8	2.75	5YR5/8	Sc	4.5	13.5	2.74	2.5YR4/4	h	6.5	10.7	2.69
D	7	LL	22	Sy SH S	2	No	5YR7/6	Sc	3.5	18.7	2.70	5YR6/6	Sc	3.5	16.7	2.71	4YR4/6	Sc	3.5	14.9	2.66
D	10	LL	24	Sy SH	3	No	5YR7/6	Sc	3.0	18.4	2.72	5YR7/6	Sc	3.0	18.2	2.72	2.5YR5/6	Sc	3.0	16.2	2.70
E	2	S	31	Sm PL	5	No	5YR6/6	h	6.0	17.2	2.65	5YR7/6	HH	12.5	5.0	2.49	5YR5/4	HH	14.0	0.0	2.34
E	3	S	35	st Sm PL	5	No	5YR6/6	H	9.0	20.2	2.68	5YR4/4	H	14.5	9.1	2.59	5YR4/3	HH	14.5	0.2	2.27
E	4	M	35	st Sm Pl	7.5	Yes	2.5YR6/4	H	9.5	17.7	2.60	2.5YR5/4	H	12.5	6.6	2.52	2.5YR4/2	HH	14.5	1.1	2.35
E	5	S	35	St Sm Pl	7.5	Yes	5YR8/4	H	9.0	17.0	2.52	7.5YR7/4	H	14.5	8.0	2.42	7.5YR5/4	HH	16.0	1.3	2.27
E	6	S	35	Sm Sy PL	7	Yes	5YR7/6	h	7.5	16.3	2.57	5YR6/6	H	13.0	7.9	2.48	5YR5/3	HH	15.0	1.2	2.31
E	7	L	25	sm sy pl	5	No	5YR7/6	Sc	5.5	18.3	2.68	5YR6/6	H	7.5	15.7	2.68	5YR5/4	H	8.5	13.7	2.64
E	8	S	26	Sm gy Pl	4	No	5YR8/4	Sc	4.0	18.4	2.68	5YR8/4	h	4.5	15.4	2.64	5YR6/5	H	7.5	11.3	2.58
F	1	LL	28	Sm PL			5YR6/6	Sc	5.0	21.2	2.67	5YR7/8	h	5.0	18.0	2.69	5YR7/8	H	8.5	13.7	2.68
F	2	L	28	Sm Pl	3	No	5YR7/6	Sc	4.0	20.6	2.57	5YR7/6	h	5.0	18.6	2.60	5YR6/6	H	9.0	12.5	2.63
F	3	M	31	Sm PL	3	No	7.5YR8/2	Sc	5.0	21.0	2.48	10YR8/2	Sc	6.5	18.9	2.49	10YR8/2	H	11.0	11.5	2.45
G	2	S	35	Sm PL	5	1	5YR7/6	h	5.5	20.1	2.62	5YR5/6	H	14.0	8.8	2.57	5YR4/4	HH	15.0	4.6	2.50
G	3	S	33	Sm PL	4.5	0	2.5YR6/6	H	5.0	19.4	2.68	2.5YR5/6	H	12.5	8.0	2.63	2.5YR4/4	HH	16.5	1.3	2.47
G	4	S	35	Sm PL	5	0	2.5YR7/8	H	5.0	19.1	2.69	2.5YR5/6	H	14.5	6.5	2.61	2.5YR4/4	HH	17.5	1.2	2.48
G	5	S	32	Sm lg Pl	2.5	0	2.5YR7/8	H	6.5	13.0	2.70	2.5YR4/4	H	13.0	1.2	2.44	2.5YR4/2	H	13.0	0.4	2.38
G	6	L	21	Sy Sh pl	4.5	0	5YR7/6	Sc	5.0	17.2	2.68	5YR6/6	Sc	5.0	16.1	2.67	5YR5/4	h	7.5	14.8	2.65
G	7	L	30	sm pl	5	0	7.5YR7/4	Sc	5.5	17.6	2.56	7.5YR6/4	h	11.0	12.9	2.52	5YR6/3	H	12.5	9.0	2.43
H	2	S	35	Sm Pl Lg	4	0	5YR7/6	h	7.5	18.3	2.66	5YR5/4	H	14.0	5.1	2.50	2.5YR4/2	HH	14.0	1.3	2.40
H	3	M	31	Sm Pl Lg	4	0	7.5YR8/4	h	7.0	14.8	2.56	7.5YR7/4	H	9.5	6.3	2.44	10YR6/2	HH	13.5	2.5	2.37
H	4	M	25	Sm pl Sh	2	0	5YR7/6	Hc	2.5	10.4	2.57	5YR8/4	h	6.0	10.3	2.52	5YR5/3	H	7.0	6.6	2.45
H	6	L	33	Sm Pl lg	5	0	5YR9/1	Hc	5.0	20.0	2.60	2.5Y9/2	Hc	7.5	17.3	2.61	2.5Y9/2	H	11.0	8.9	2.54
I	2	M	29	Sm Pl	5	0	2.5YR7/6	Sc	5.5	20.3	2.70	5YR7/4	h	7.0	18.3	2.70	5YR6/4	H	9.0	12.2	2.65
I	3	S	29	Sm PL	5	0	2.5YR6/6	Sc	5.5	17.7	2.66	2.5YR7/6	h	5.5	15.7	2.67	2.5YR6/6	H	9.5	9.7	2.61
I	4	S	32	Sm PL	5.5	0	2.5YR6/6	h	6.0	18.0	2.63	5YR6/6	H	9.5	12.0	2.61	5YR5/4	HH	13.0	6.3	2.55
I	5	S	36	Sm PL st	6	Yes	2.5YR6/6	h	6.5	20.6	2.64	2.5YR7/6	H	8.5	15.8	2.66	2.5YR5/6	HH	14.5	8.3	2.57
I	6	L	26	st sy pl	5	0	2.5YR6/6	Sc	3.5	18.3	2.68	5YR6/6	Sc	4.5	17.0	2.69	2.5YR6/6	Sc	7.5	14.5	2.67
J	4	L	27	sm sy pl	3	0	2.5YR7/4	Sc	3.5	19.3	2.60	5YR8/3	Sc	6.5	18.5	2.6	5YR8/4	Sc	6.5	16.3	2.58
K	6	L	26	Sy Sh	3	0	5YR7/6	Sc	5.0	19.4	2.68	7.5YR7/4	Sc	5.0	19.3	2.70	5YR7/6	Sc	7.0	17.4	2.70
K	7	L	20	Sy Sh	2	0	5YR7/6	Sc	2.0	19.5	2.65	5YR8/4	Sc	2.0	17.2	2.69	5YR7/6	Sc	2.0	16.1	2.69
K	9	LL	19	Sy Sh NP	1	0	5YR8/2	Sc	1.0	15.0	2.62	5YR9/1	Sc	2.5	15.3	2.62	5YR9/1	Sc	2.5	14.7	2.62
L	2	M	28	Sm pl	2.5	0	10R8/3	Sc	2.5	20.2	2.62	10R9/2	Sc	2.5	20.7	2.61	10R9/1	Sc	2.5	18.8.	2.62
M	2	M	30	sy Sm PL	4	0	5YR6/6	Sc	5.0	21.6	2.58	5YR7/6	Sc	5.0	16.7	2.54	2.5YR5/4	H	10.0	7.2	2.49
M	3	M	30	Sm PL	4.5	0	10YR9/1	Sc	5.0	23.7	2.50	10YR9/1	h	6.0	19.6	2.48	5Y9/1	HH	10.5	8.5	2.46
M	4	M	27	Sm PL	5	0	5YR9/2	Sc	4.0	21.6	2.65	5YR9/2	h	5.0	18.5	2.63	5YR9/1	H	7.5	13.6	2.58
N	2	M	45	sm St Pl	6.5	Yes	5YR9/1	Sc	7.0	32.6	2.59	5YR9/1	Sc	7.5	31.4	2.56	N9	h	11.0	21.1	2.59

After firing at indicated temperatures (Degrees Fahrenheit): 2200°, 2300°, 2400°; Pyrometric cone equivalent; 8. Suggested products; 9. Comments

Loc.	No.	2200° Munsell color notation	Hardness	% linear shrinkage	% water absorption	Specific gravity (apparent)	2300° Munsell color notation	Hardness	% linear shrinkage	% water absorption	Specific gravity (apparent)	2400° Munsell color notation	Hardness	% linear shrinkage	% water absorption	Specific gravity (apparent)	Pyrometric cone equivalent	8. Suggested products	9. Comments
A	3	2.5YR4/2	HH	15.0	2.0	2.63	10R3/2	HH	15.0	0.9	2.48	10R2/1	V	Ex	0.9	2.36		CB, T, QT, Pr	Color range very good. High specific gravity of fired products is due to high iron content.
A	4	2.5Y4/4	HH	12.5	0.3	2.26	5Y5/3	V	Ex	1.0	2.19	5Y5/2	V	Ex	12.7	2.07		CB, T, QT (2200°)	Matures for brick between 2000 and 2100°F; slight scumming at 2000°F; glazed and nonporous at 2200°F; effects of high soluble salt content can be neutralized by barium carbonate.
B	5	2.5YR5/2	h	9.0	14.9	2.67	5YR5/2	H	9.0	13.3	2.62	5Y5/2	H	9.0	10.8	2.60	<23		Bloating test negative. Sand content high. Clay does not vitrify in 1800°-2400° range.
C	8	10YR8/4	Sc	3.5	13.8	2.64	10YR7/3	Sc	3.5	14.5	2.65	2.5Y7/2	Sc	4.0	13.2	2.62	<23		
D	2	5YR4/3	H	9.0	10.3	2.58	2.5Y5/2	H	Ex	9.5	2.53	2.5Y6/2	H	Ex	10.0	2.51			Bloating test negative.
D	3	5YR4/3	h	5.0	15.2	2.70	2.5YR3/2	h	5.0	14.2	2.63	10YR4/1	h	Ex	14.0	2.61			Bloating test negative. Similar to Material 2, Locality E, but sandier. Mixture of the two is suggested.
D	4	5YR5/2	H	10.0	7.1	2.54	5Y5/1	H	Ex	5.0	2.45	5Y5/1	H	Ex	9.6	2.24			Bloating test negative. Similar to Material 2, Locality E, but sandier. Mixture of the two is suggested.
D	5	2.5YR3/2	HH	14.5	3.4	2.48	5YR3/1	HH	Ex	5.2	2.33	N3		Ex	15.4	2.28		CB, QT (Dark)	Bloating test negative. Addition of fine sand would probably improve drying and firing characteristics.
D	6	2.5YR4/2	H	8.5	8.2	2.63	2.5YR3/2	H	8.5	7.6	2.56	5YR3/1	H	8.5	7.7	2.53		CB, T	Bloating test negative. Mixture with another clay (e.g. Material 2, Locality E) suggested for improved working and firing characteristics.
D	7	2.5YR4/4	h	3.5	13.3	2.63	2.5YR4/2	h	3.5	12.8	2.56	2.5YR3/2	H	3.5	12.8	2.51	<23	Ocher? O(?)	Bloating test negative.
D	10	2.5YR4/4	Sc	4.5	14.4	2.66	2.5YR4/2	Sc	4.5	14.4	2.63	2.5YR3/2	Sc	4.5	14.0	2.61			
E	2	5YR5/2	HH	15.0	2.4	2.16	2.5Y5/2		10.0?	10.2	2.15	2.5Y5/2		9.0?	8.0	2.15		DB, QT	Bloating test negative. Tends to warp when fired. Acceptability of fired colors questionable.
E	3	5YR3/2	HH	Ex	9.1	2.19	2.5Y5/2	HH	Ex	11.1	2.10	2.5Y4/2		Ex	17.8	2.10		CB, QT	Bloating test negative. Addition of another clay or fine sand would probably be beneficial.
E	4	2.5YR3/2	HH	Ex	3.8	2.17	2.5Y3/2	HH	Ex	2.7	2.14	2.5Y2/2		Ex	16.5	2.07		CB, QT (Dark)	Bloating test negative. Addition of another clay or fine sand would probably be beneficial. Tends to warp in drying. Fe content higher than Material 3.
E	5	10YR6/2	HH	16.0	0.9	2.22	2.5Y6/2	H	12.5	8.6	2.12	5Y6/1		12.5?	14.2	2.08		LGP, CB, T	Bloating test negative. Addition of another clay or fine sand would probably be beneficial. Colors unattractive. Shrinkage high. Tends to warp in drying.
E	6	10YR5/2	HH	15.0	1.3	2.15	2.5Y6/2	HH		9.9?	2.15	5Y5/2		Ex	15.9	2.07		LGP, CB, T	Bloating test negative. Addition of another clay or fine sand would probably be beneficial. Similar to Material 5.
E	7	2.5YR4/2	HH	10.5	10.1	2.57	10YR4/1	HH	11.0	8.5	2.52	2.5Y4/2	HH	Ex	8.4	2.43		LGP, DB, T	Bloating test negative.
E	8	7.5YR5/4	H	8.5	7.8	2.47	10YR5/2	HH	10.5	4.7	2.42	5Y5/2	HH	11.5	2.9	2.36			Bloating test negative.
F	1	2.5YR4/6	HH	10.0	9.5	2.65	2.5YR4/4	HH	14.0	5.2	2.53	10YR3/1	V	7.4		2.32		ST, QT, CB	Bloating test negative.
F	2	2.5YR4/4	HH	14.5	5.4	2.51	2.5YR3/2	HH	14.5	1.6	2.40	10YR4/1	V	Ex	1.0	2.22		ST, QT, CB	Drying characteristics good. Bloating test negative. Color range good.
F	3	2.5Y8/2	HH	14.5	5.6	2.42	2.5Y7/2	HH	15.0	0.0	2.32	2.5YR6/2	V	0.3	2.29	2.29		DB, T, LGA	Drying characteristics good. Bloating test negative. Color range good. (2400° specimen cracked when removed from kiln, indicating low thermal shock resistance.)
G	2	5YR3/2	HH	17.0	0.2	2.40	5YR2/2	HH	Ex	8.4	2.30	10YR3/1		Ex	15.7	2.24		CB, T, QT	Bloating test negative. Shrinkage high. 10% to 20% addition of sand would probably improve drying and firing characteristics.
G	3	2.5YR4/2	HH	16.5	0.6	2.38	2.5YR3/2	HH	Ex	9.5	2.23	5YR3/1		Ex	14.1	2.14		CB, T	Bloating test negative. Shrinkage high. 10% to 20% addition of sand would probably improve drying and firing characteristics.
G	4	2.5YR4/2	HH	Ex	0.9	2.40	2.5YR3/2	HH	Ex	10.2	2.37	5YR3/1		Ex	12.6	2.21		CB, T	Bloating test negative. Shrinkage high. 10% to 20% addition of sand would probably improve drying and firing characteristics.
G	5	2.5YR3/2	H	11.5	3.4	2.21	5Y2/1		Ex	13.8	1.96							CB, LWAs	Melts at 2400°.
G	6	5YR5/2	H	9.5	12.3	2.62	2.5Y5/2	H	9.5	10.1	2.55	5Y5/2	H	9.5	10.5	0.53			Bloating test negative.
G	7	10YR6/1	H	15.0	3.9	2.34	2.5Y6/2	HH	Ex	7.7	2.26	5Y5/2		Ex	13.1	2.17			Bloating test negative.
H	2	5YR5/1		11.0	7.7	2.19	2.5Y4/2		Ex	12.2		2.5Y3/2		Ex	16.4			CB, LWAs	
H	3	2.5Y6/2	HH	14.0	2.2	2.21	5Y6/1		9.0?	7.3	1.83	5Y5/1		9.0?	17.6	1.67		LWAs	
H	4	10YR5/2	HH	9.5	2.2	2.37	2.5Y5/2	HH	9.5	1.6	2.34	5Y5/2		6.5?	3.4	2.29		P, A	
H	6	2.5Y8/2	HH	13.5	3.9	2.44	10YR8/1	HH	13.0	1.2	2.37	N8		9.0?	12.4	2.24		CB?	
I	2	2.5YR6/4	H	11.5	8.6	2.60	2.5YR5/2	HH	11.5	5.4	2.53	10YR5/1	HH	11.5	3.1	2.47		CFT (if color not objectionable)	Bloating test negative. Workability could be improved by admixture of another clay.
I	3	5YR5/3	HH	10.0	5.4	2.52	2.5YR4/2	HH	14.0	2.2	2.45	10YR4/1	HH	Ex	1.3	2.40		CB, T, DB	Bloating test negative. Fired colors unusual. Blend of Materials 2 and 3 would probably be satisfactory raw material for brick and tile.
I	4	2.5YR4/2	HH	13.0	2.6	2.45	2.5YR3/2	HH	14.5	0.4	2.40	10R3/1	HH	Ex		2.30		CB, T	Bloating test negative. Firing shrinkage rather high; color range good.
I	5	10R4/3	HH	15.5	4.2	2.47	10R4/2	HH	15.5	1.0	2.44	10R4/1	HH	15.5	1.9	2.34		CB, T	Bloating test negative. Firing shrinkage rather high. Slow drying required to prevent warping.
I	6	2.5YR5/4	h	7.5	12.6	2.64	10YR4/1	H	8.5	9.8	2.60	5YR4/1	H	10.5	9.4	2.56		CB, T	Bloating test negative. Blending with Materials 4 or 5 would reduce their shrinkage.
J	4	5YR7/3	h	9.0	12.3	2.55	10YR7/2	h	10.5	8.0	2.5	10YR6/2	H	11.5	6.0	2.45		LHDR, CFT	Bloating test negative.
K	6	2.5YR5/4	h	7.5	15.3	2.68	2.5YR5/2	H	7.5	12.9	2.65	7.5YR5/2	H	7.5	12.4	2.64	<23	CB, T	Bloating test negative. Resembles Material 6, Locality I.
K	7	5YR5/4	Sc	4.0	15.2	2.67	5YR5/2	Sc	4.0	13.9	2.64	10YR6/2	h	4.0	13.5	2.64			Bloating test negative. Resembles Material 6, Locality I.
K	9	10YR9/2	Sc	2.5	13.4	2.60	10YR8/2	h	2.5	12.5	2.59						27-28	SR, RFS	
L	2	10YR9/2	h	5.0	15.3	2.57	10YR9/2	H	7.5	10.8	2.54	10YR9/2	H	7.5	7.7	2.49	26	LHDR, CFT, P, A	Possibility that stratum may thicken laterally might be worth investigating.
M	2	2.5YR4/2	HH	11.5	4.6	2.47	2.5YR3/2	HH	14.0	0.1	2.41	5YR4/1	HH	14.0	2.3	2.23		CB, QT	Good color range.
M	3	2.5Y9/2	HH	12.5	5.6	2.36	2.5Y8/2	HH	15.0	0.8	2.30	2.5Y7/2	HH	15.0	0.9	2.28		A, P, LBB	
M	4	10YR8/2	H	11.0	8.6	2.55	10YR8/2	HH	13.5	2.4	2.48	2.5Y8/2	HH	Ex	3.6	2.50	<23		
N	2	N9	H	12.5	13.3	2.61	N9	H	17.5	9.3	2.56	2.5Y9/2	HH	18.5	6.6	2.54	34	SHDR, CW, PF	Warps slightly in drying. Very fine-grained. Would be classified as good ball clay if green strength were higher.

TABLE 5

Geologic sections of clay-bearing materials in auger borings and outcrops in Prince Georges County with data relating to their physical properties

(See pp. 4–5 for explanation of abbreviations and symbols)

1. Localities (Pl. 1) defined with reference to State Grid, topographic quadrangles, highways, and other landmarks. — 2. Geologic section

Locality	State coordinates N	State coordinates E	Quadrangle*	Subdivision**	Supplementary data	Stratigraphic unit	Downward sequence	Materials: Description	Thickness in feet
A	451	841.5	J-22	W	¾ mile southeast of Contee. Open pit in wooded area on property of Wm. Allen, 2000 feet southwest of his house, which stands on west side of Highway MD 197. (The four samples listed are from four different points in the pit.) Elevation of pit bottom is about 160 feet.	Knm	1a	Clay, silty, containing lignite fragments	<10
						Knm	1b	Clay, silty	<10
						Knm	1c	Clay containing lignite fragments	<10
						Knm	1d	Clay containing lignite fragments	<15
B	448	834	J-21	E	Muirkirk, 0.3 mile northeast of B & O railroad crossing; 300 feet southeast of tracks. Open pit of Washington Brick Company. (The four samples listed are from four different points in the pit.) Elevation of lowest part of pit is about 170 feet.	Knm	1a	Clay, "chocolate", "fat"	<20
						Knm	1b	Clay, silty, mottled "maroon"	<15
						Knm	1c	Clay, silty, "plastic gray", containing lignite	<5
						Knm	1d	Clay, "pink-burning"	<10
C	433.5	817	J-21	S	1 mile northwest of College Park, west side of Cherry Hill Road, 1 mile northwest of its junction with Buck Lodge Road; 2000 feet south of Water Tower. Elevation about 175 feet. #		1	Soil	2
						QT?	2	Sand and gravel	21
								UNCONFORMITY?	
						Knm	3	Sand, silty	10
D	431.5	817.5	J-21	S	¾ mile northwest of College Park, west side of Cherry Hill Road, just north of its junction with Buck Lodge Road. Elevation about 130 feet. #		1	Soil	2
						QT	2	Sand-silt-clay	10
						QT	3	Sand and gravel	21
								UNCONFORMITY	
						pK	4	Clay (saprolite)	10
						pK	5	Clay (saprolite)	39
E	430	820.5	J-21	S	College Park, west side of US Highway 1, north side of its junction with Cherry Hill Road. Elevation about 180 feet. #		1	Fill (artificial)	5
						QT	2	Sand and gravel	40
						QT	3	Sand	5
								UNCONFORMITY(?)	
						Knm	4	Sand-silt-clay	20
						Knm	5	Sand-silt-clay	25
						Knm	6	Sand-silt-clay	5
F	424	828	I-21	NE	Greenbelt. East side of Edmonston Road, 350 feet north of intersection with Glen Dale Road (Highway MD 430). Elevation about 180 feet. #		1	Soil	2
						QT	2	Gravel and sand	30
								UNCONFORMITY	
						Knm	3	Sand, argillaceous	20
						Knm	4	Sand-silt-clay	18
						Knm	5	Clay, silty	15
						Knm	6	Sand, argillaceous	15
G	421	858	I-22	N	East side of MD 197; 45 feet south of Springfield crossing of Pennsylvania Railroad. Small open pit of Bowie Operating Corporation. Elevation about 150 feet.	QT	1	Sand	5
								UNCONFORMITY	
						Knm	2	Clay, gray	2
						Knm	3	Clay, mottled	<10
H	418.5	837.5	I-22	NW	1½ miles north of Lanham, auger hole in abandoned sand pit on Tidler farm, 1500 feet north of Good Luck Road. Elevation about 180 feet. # (Material 1 is exposed 300 feet north of auger hole. Elevation about 200 feet.)	Knm	1	Sand-silt-clay	5
						Knm	2	Sand, argillaceous	18
						Knm	3	Sand, silty	5
						Knm	4	Sand, argillaceous	6
						Knm	5	Sand-silt-clay	10
						Knm	6	Sand	16
						Knm	7	Sand-silt-clay	40
I	415	842	I-22	NW	Lanham, Lot 3, Block 1. Elevation about 150 feet. #		1	Soil	3
						Knm	2	Clay, silty	5
						Knm	3	Clay, silty	4
						Knm	4	Clay, silty	13
						Knm	5	Sand-silt-clay	7
						Knm	6	Sand-silt-clay	8
						Knm	7	Silt, argillaceous	23
						Knm	8	Clay, silty	21
						Knm	9	Clay, silty	16
J	408	849	I-22	C	Buena Vista. West side of road leading south between Folly Branch and Bald Hill Branch; about 700 feet south of junction with Highway MD 704 (Defense Highway). Elevation about 160 feet. #		1	Soil	4
						Knm	2	Clay, silty	31
						Knm	3	Clay, silty	30
						Knm	4	Clay, silty	40
K	407	853.5	I-22	C	West side MD 199 at sharp bend in road ½ mile south of intersection with US Highway 50. Elevation about 150 feet. #		1	Soil	5
						QT	2	Gravel and sand, coarse	8
								UNCONFORMITY	
						Knm	3	Sand	13
						Knm	4	Sand	9
						Knm	5	Clay, silty	65
L	392	826	I-21	SE	West Brothers Brick Company's open pit 300 feet southwest of plant office at 6600 Sheriff Road, Fairmont Heights. Elevation about 55 feet.	Knm	1	Clay, silty, containing lignite fragments	<25
					Same pit, 1000 feet northwest of office. Elevation about 115 feet.	Knm	2	Clay	<10

3. Mineralogy — Approximate ratios of heavy minerals in fine sands (grain size ⅛ mm to ¼ mm). Dorothy Carroll, analyst (Bromoform separations by Gillison W. Chloe)

Locality	Downward sequence	Percentage of sand fraction (See column 6)	Pyrite	Limonite[2]	Ilmenite	Siderite	Staurolite	Kyanite	Tourmaline	Garnet	Epidote[4]	Amphibole[3]	Chloritoid and glaucophane	Zircon	Sillimanite	Andalusite	Chlorite	Mica[5]	Rutile[6]	Anatase	Glaucophane	Corundum	Brookite	Sphene
C	3	12.2																+[7]						
D	2	16.2		7.0	1.0				2.0									+						
D	3	12.5		6.0	1.0	+	1.0		0.8	3				0.3				+	+	+				
D	4	18.9			2.0					70							1.0	++						
D	5	15.2			2.0				0.3	22							+	5.0						
E	2	12.3		7.0	1.0	0.2	0.3		0.3	+	0.2	0.2		0.1				+	+	+				
E	4	13.5	7.0	1.0	0.5		0.5		0.5	+			+	0.3										
E	5	25.2	8.0	1.0			0.5		0.5	+				+				+						
E	6	20.8	1.0	7.0	1.0		0.2		0.3					+				+	+					
F	2	12.8		6.0	2.0		0.2		0.3					0.5	+			+	0.2					
F	3	14.8	1.0	2.0	5.0		0.7	0.5						0.3				+	+					
F	4	25.6	1.0	2.0	5.0		0.7	0.5						0.3	+			+	+					
F	5	16.6																+						
F	6	17.1	0.8	4.0	3.0			1.0	0.2					0.2				+						
H	1	48.7																						
H	2	19.8		6.0	2.0		0.5		1.0	+										+				
H	3	11.5		6.0	2.0				1.0					0.8						+				+
H	4	12.4		3.0	4.0		0.8		1.2					0.5					+	+				+
H	5	22.3		3.0	4.0			0.5	1.0		+			1.0				+	+					
H	7	23.7																+						
I	2	26.0		9.5					0.5															
I	3	18.0		10.0																				
I	4	19.0																						
I	5	15.7	5.0	2.0	2.0				0.5					0.5				+	+					
I	6	11.7	8.0	2.0														+	+					
I	7	11.7	1.0	8.5									0.5					+	+					
I	8	10.9	1.0	9.0														+	+					
I	9	18.8		10.0																				
J	2	11.6		9.5			0.5																	
J	3	22.9																						
J	4	19.6		9.5			0.2		0.3															+
K	2	13.8	0.5	1.0	4.5		2.0	0.5	0.5					0.8	+			+						
K	3	15.9	0.5	2.0	3.5		2.0		0.5				0.3	0.5	+				+		+			
K	4	11.7	0.5	2.0	3.4		2.0		0.5		0.5		0.4	0.5										
K	5	16.1		10.0														+						

3. Mineralogy (cont.) — Approximate ratios of clay minerals in less-than-two-micron fractions, as estimated from X-ray (goniometer) diffraction patterns. John W. Hosterman, analyst; 4. X-ray (goniometer) emission analysis (approximate percentage by weight). John W. Hosterman, analyst; 5. pH; 6. Grain-size distribution (Weight ratios); 7. Properties relating to use possibilities of sampled material — Before firing

Locality	Downward sequence	Kaolinite	Illite	Mixed layer	Montmorillonite	Chlorite	Fe_2O_3	MnO_2	TiO_2	CaO	K_2O	pH	Clay (<1/256 mm)	Silt (1/256 mm–1/16 mm)	Sand (1/16 mm–2 mm)	Munsell color notation (moist sample)	Strength	% water required for plasticity	Texture and workability	% shrinkage	Defects
A	1a	5.4	2.6	2.0			1.8	0.02	1.3	0.2	2.4	4.7	7.4	2.3	0.3	10YR5/1	S	36	Sm PL	6	
A	1b	6.4	2.5	1.1			6.9	0.00	1.1	0.2	2.0	4.4	6.1	3.2	0.7	10YR3/4	L	26	sy Pl Sm	4	
A	1c	5.0	3.2	1.8			1.9	0.03	1.3	0.2	3.0	4.7	8.1	1.8	0.1	10YR5/2	S	36	sy Pl Sm	8	
A	1d	4.0	3.3	2.7			3.6	0.05	1.0	0.3	1.7	4.0	8.8	1.1	0.1	10YR4/1	S	40	St Pl Sm	7	
B	1a	3.6	3.4	3.0			9.8	0.04	1.0	0.2	2.6	4.3	8.1	1.9	tr	5YR4/4	S	30	SM Pl	5	
B	1b	4.4	3.1	2.5			8.5	0.02	1.1	0.1	2.4	4.7	5.3	3.7	1.0	5YR4/6	M	25	sm sy PL	4	
B	1c	4.9	3.6	1.5			2.2	0.02	1.1	0.1	2.4	4.3	7.5	1.8	0.7	5YR4/2	M	25	Sm PL	4	
B	1d	4.7	2.8	2.5			3.8	0.06	1.1	0.4	2.9	5.6	8.2	1.4	0.4	7.5YR4/2	S	24	Sm pl	3.5	
C	3	7	3										1.2	1.7	7.1	2.5Y4/4					
D	2	3	1	6								5.3	2.2	2.3	5.5	7.5YR4/4					
D	3	5	1	4								5.7	1.3	1.2	7.5	10YR5/8					
D	4	2.5	2		5.5							8.5	2.4	2.7	4.9	5Y4/2					
D	5	4.5	1		4.5							8.4	2.5	2.0	5.5	5Y4/3					
E	2	6.5	3.5									7.0	0.1	2.2	7.7	10YR5/4					
E	4	8	1.5	0.5								5.9	2.2	2.3	5.5	10YR4/3					
E	5	6.5	2	1.5								3.6	3.5	3.2	3.4	10YR3/1					
E	6	7.5	2.5									5.8	2.1	2.8	5.1	10YR7/3					
F	2	6.5	2	1.5								6.0	0.9	0.8	8.3	7.5YR4/4					
F	3	6	3	1								5.5	4.7	0.9	4.4	5YR5/6					
F	4	6.5	2	1.5								5.5	3.1	2.2	4.7	5YR4/6					
F	5	4.5	3	2.5			0.7	0.03	[illegible]	0.4	3.4	5.1	[illegible]	2.7	0.5	[illegible]	M	[illegible]	Sm Pl Lg	5.5	0
F	6	5.5	3	1.5								5.5	2.2	1.8	6.0	7.5YR4/4					
G	3	5.4	1.7	2.9			2.3	0.02	1.2	0.4	1.9	4.5	7.9	2.0	0.1	2.5YR7/4	M	30	Sm Pl	6	0
H	1	5.9	2.8	1.3			0.6	0.00	0.87	0.1	2.0	4.3	4.5	3.4	2.1	10YR5/2	M	21	Sm lg Pl	4.5	0
H	2	8	1.5	0.5								5.7	2.4	1.9	5.7	10YR5/4					
H	3	7.5	1.5	1								6.2	1.8	1.9	6.3	2.5Y4/4					
H	4	7.5	2.5									6.1	1.6	1.5	6.9	10YR5/8					
H	5	9	1				4.4	0.00	1.0	0.2	0.0	5.8	4.0	2.5	3.5	2.5YR4/6	L	26	Gy sh pl	5	0
H	7	4.5	4	1.5			6.6	0.03	0.87	0.1	2.1	5.5	4.8	3.2	2.0	5YR4/6	M	28	sm gy Lg Pl	6	0
I	2	8.5	0.5	1			6.1	0.00	0.90	0.1	1.1	5.1	5.6	3.2	1.2	2.5YR4/6	M	28	Sm Lg Pl	5	0
I	3	8.5	1.5				5.5	0.00	0.98	0.1	1.2	5.3	5.4	3.6	1.0	2.5YR4/6	M	25	Sm Lg Pl	5	0
I	4	9	0.5	0.5			4.0	0.00	1.0	0.1	0.7	5.8	5.0	3.8	1.2	2.5YR4/6	M	24	Sm Lg Pl	5.5	0
I	5	7.5	2	0.5			4.4	0.01	0.90	0.2	1.3	5.8	4.4	3.1	2.5	2.5YR5/6	M	25	Sm Lg Pl	5	0
I	6	7.5	2	0.5			6.0	0.02	0.95	0.3	1.2	5.9	2.9	4.7	2.4	2.5YR5/6	M	23	Pl lg	6	0
I	7	7.5	1.5	1			7.5	0.01	0.98	0.2	1.4	5.9	4.1	4.4	1.5	2.5YR4/6	M	30	st Gy pl	4.5	0
I	8	8	1	1			4.1	0.01	1.1	0.1	1.5	6.1	4.8	4.2	1.0	2.5YR4/6	M	30	Sm lg pl	5	0
I	9	8	1.5	0.5			9.6	0.01	1.4	0.1	1.6	6.4	5.9	3.2	.9	2.5YR4/6	M	30	Sm lg Pl	5	0
J	2	6.5	2.5	1			6.0	0.00	1.1	0.2	1.2	6.4	5.1	3.8	1.1	2.5YR4/6	S	27	st Lg Sm Pl	5	0
J	3	7.5	1.5	1			8.3	0.02	1.0	0.3	1.2	6.5	5.3	3.2	1.6	2.5YR4/6	S	26	st Lg Sm Pl	5.5	0
J	4	7	2	1			7.7	0.00	1.0	0.3	1.5	6.6	5.7	3.3	1.0	2.5YR4/6		30	Sm Lg Pl	4.5	0
K	2	5.5	3	1.5								5.8	0.8	1.5	7.7	10YR4/4					
K	3	5.5	2.5	2								6.1	0.7	1.8	7.5	10YR4/4					
K	4	10										5.6	0.7	1.4	7.9	10YR5/8					
K	5	7.5	2	0.5			7.3	0.00	1.0	0.2	1.5	6.1	4.7	4.6	0.7	2.5YR4/6	M	27	Sm Lg Pl	4	0
L	1	9.5		0.5			4.3	0.03	1.0	0.2	1.7	6.8	8.0	1.7	0.3	7.5YR5/2	S	37	fy Sm Pl	7.5	0
L	2	6.7	1.8	1.5			7.2	0.02	1.4	0.4	0.2	5.3	6.7	2.4	0.9	7.5YR5/4	M	22	sy pl	4	0

7. Properties relating to use possibilities of sampled material (cont.) — After firing at indicated temperatures (Degrees Fahrenheit)

Locality	Downward sequence	1800° Munsell color notation	1800° Hardness	1800° % linear shrinkage	1800° % water absorption	1800° Specific gravity (approximate)	2000° Munsell color notation	2000° Hardness	2000° % linear shrinkage	2000° % water absorption	2000° Specific gravity (approximate)	2100° Munsell color notation	2100° Hardness	2100° % linear shrinkage	2100° % water absorption	2100° Specific gravity (approximate)	2200° Munsell color notation	2200° Hardness	2200° % linear shrinkage	2200° % water absorption	2200° Specific gravity (approximate)	2300° Munsell color notation	2300° Hardness	2300° % linear shrinkage	2300° % water absorption	2300° Specific gravity (approximate)	2400° Munsell color notation	2400° Hardness	2400° % linear shrinkage	2400° % water absorption	2400° Specific gravity (approximate)
A	1a	10YR9/2	Sc	6.5	18.4	2.57	10YR9/2	H	10.0	12.7	2.58	10YR9/2	HH	12.5	8.4	2.59	2.5YR8/4	HH	14.0	2.9	2.45	5Y7/3	HH	15.0	0.0	2.45	5Y6/3	HH	15.0	0.6	2.36
A	1b	2.5YR6/4	Sc	5.0	16.5	2.51	10YR6/4	H	5.0	21.3	2.54	2.5YR5/4	*H*	6.0	11.9	2.56	2.5YR5/4	HH	9.5	7.5	2.50	2.5YR4/2	HH	11.0	3.9	2.45	2.5YR3/2	HH	Ex	2.3	2.38
A	1c	10YR8/4	*H*	10.0	13.5	2.47	10YR8/4	HH	11.0	10.4	2.55	2.5YR7/4	HH	12.5	3.8	2.40	2.5Y6/4	HH	15.0	0.1	2.33	2.5Y6/4	HH	15.0	0.2	2.26	5Y7/2	HH	18.5	0.1	2.18
A	1d	10YR8/4	H	10.5	9.3	2.47	10YR7/6	*H*	17.5	6.7	2.48	10YR6/4	HH	20.0	0.5	2.30	10YR6/3	HH	21.5	0.5	2.34	2.5Y6/2	HH	Ex	2.5	2.18	5Y6/2	HH	Ex	4.9	2.10
B	1a	2.5YR7/8	Sc	5.0	19.9	2.69	2.5YR5/4	*H*	10.0	11.1	2.72	2.5YR4/4	HH	15.0	1.7	2.52	2.5YR3/2	HH	15.0	0.9	2.54	10R3/1	HH	Ex	0.8	2.38	10R2/1	V	Ex	10.0	2.13
B	1b	2.5YR6/6	Sc	5.0	17.2	2.62	2.5YR4/6	H	7.5	15.3	2.67	2.5YR4/4	*H*	10.0	11.4	2.64	10R3/2	HH	11.5	8.0	2.58	10R3/1	HH	12.5	5.1	2.51	N2	V	Ex	5.0	2.40
B	1c	7.5YR8/4	Sc	5.0	17.4	2.58	7.5YR8/4	h	6.5	12.5	2.58	10YR7/3	*H*	10.0	4.5	2.47	10YR6/4	HH	13.5	0.8	2.49	10YR6/2	HH	13.5	0.9	2.37	2.5Y6/2	HH	Ex	7.4	2.28
B	1d	5YR7/6	Sc	4.0	13.7	2.59	5YR6/3	H	3.0	7.8	2.52	5YR5/3	*H*	9.0	5.3	2.46	10YR5/3	HH	10.0	2.3	2.47	2.5YR5/2	HH	Ex	1.3	2.33	5Y5/2	HH	Ex	10.5	—
F	5	2.5YR5/5	h	8.0	13.6	2.79	2.5YR5/4	H	10.5	8.1	2.63	[illegible]	H	9.5	7.0	2.57	10R4/1	*H*	10.5	5.6	2.53	10R3/1	*H*	19.5	4.5	2.50	N3		12.0?	10.6	2.31
G	3	5YR7/4	h	7.0	16.6	2.59	5YR7/4	*H*	1.?	13.5	2.55	7.5YR7/4	HH	9.0	5.2	2.50	10YR6/4	HH	12.5	5.3	2.47	2.5Y5/2	HH	15.0	0.0	2.36	5Y6/1	HH	Ex	0.0?	2.35
H	1	10YR9/2	Hc	4.5	17.2	2.62	5Y9/2	h	7.5	9.8	2.53	5Y9/2	H	9.5	9.2	2.52	2.5Y8/2	*H*	11.5	5.0	2.44	2.5Y7/2	HH	11.5	2.8	2.39	10YR8/1	HH	11.5	1.8	2.31
H	5	2.5YR7/8	Hc	5.5	13.2	2.75	5YR6/6	Hc	5.5	11.9	2.76	5YR5/6	Hc	5.5	10.6	2.75	2.5YR5/4	Hc	7.5	10.6	2.78	10R4/2	h	6.0	10.2	2.72	7.5YR4/2	H	6.0	15.5	2.65
H	7	5YR6/6	Hc	6.0	1?.?	2.73	2.5YR5/5	h	9.5	13.0	2.71	2.5YR4/2	H	11.0	10.7	2.66	10R4/1	H	11.5	7.1	2.62	10R3/1	*H*	11.0	4.8	2.53	N2		12.0?	9.3	2.24
I	2	5YR6/6	Hc	5.5	20.9	2.74	5YR7/6	h	7.0	15.4	2.74	5YR5/4	h	9.5	13.2	2.69	5YR5/3	H	10.0	11.4	2.62	5YR5/1	*H*	10.0	9.8	2.61	N3		11.0	4.0	2.43
I	3	2.5YR7/8	Hc	5.0	18.3	2.73	5YR7/6	Hc	6.0	16.9	2.72	7.5YR5/4	h	10.0	12.3	2.68	5YR5/3	H	10.0	11.0	2.64	5YR5/1	*H*	10.0	8.7	2.61	2.5YR4/0	*H*	10.0	5.6	2.51
I	4	5YR6/6	Hc	5.0	17.2	2.70	5YR7/6	h	6.5	12.3	2.66	5YR5/4	H	9.5	10.8	2.61	2.5YR5/2	*H*	9.5	9.3	2.54	5YR5/2	*H*	10.5	7.8	2.51	10YR4/1	*H*	11.5	4.2	2.40
I	5	5YR7/6	Hc	5.5	17.5	2.63	5YR8/6	Hc	5.5	15.8	2.60	7.5YR5/4	h	8.5	11.1	2.55	7.5YR5/3	*H*	9.0	7.6	2.49	2.5Y6/2	*H*	10.5	5.6	2.43	5Y5/2	*H*	10.5	4.8	2.43
I	6	5YR7/6	Hc	5.0	17.9	2.70	5YR5/5	Hc	5.5	12.6	2.65	5YR5/4	h	8.5	11.0	2.66	2.5YR4/2	H	11.5	7.4	2.53	2.5Y5/1	H	10.5	7.9	2.55	5Y4/2	H	10.5	3.7	2.41
I	7	2.5YR6/8	Hc	5.0	19.4	2.70	2.5YR7/8	Hc	9.0	16.3	2.68	2.5YR5/6	h	9.5	13.2	2.67	2.5YR4/4	H	12.0	10.1	2.62	2.5YR3/2	*H*	14.0	9.5	2.62	2.5YR3/1	HH	14.5	4.1	2.47
I	8	2.5YR5/6	Hc	5.5	20.9	2.74	2.5YR6/6	h	9.0	15.8	2.74	2.5YR5/5	H	10.5	10.5	2.68	2.5YR4/2	*H*	14.5	7.4	2.62	2.5YR3/2	HH	14.5	3.7	2.52	10R3/1	HH	15.0	2.3	2.53
I	9	2.5YR5/6	Hc	5.0	17.7	2.70	2.5YR6/5	h	9.5	13.0	2.71	2.5YR5/5	H	6.0	7.1	2.63	2.5YR4/2	*H*	14.0	5.1	2.56	10R3/1	HH	14.5	2.5	2.51	N4	HH		1.0	2.48
J	2	5YR7/5	Hc	5.0	16.0	2.67	5YR7/6	h	5.0	14.3	2.66	5YR5/1	*H*	9.0	8.7	2.58	5YR5/2	*H*	9.0	6.3	2.47	2.5Y5/2	HH	9.5	4.0	2.42	2.5Y4/2		10.0	2.5	2.39
J	3	2.5YR6/5	Hc	6.0	17.1	2.68	2.5YR6/6	h	9.0	11.6	2.62	2.5YR5/4	*H*	9.5	9.1	2.59	10R4/2	*H*	10.5	4.4	2.42	5YR4/1	*H*	10.5	7.1	2.43	N4		12.5	2.1	2.33
J	4	2.5YR6/5	Hc	5.5	16.9	2.66	2.5YR6/6	h	9.0	11.1	2.61	2.5YR5/4	*H*	11.0	8.1	2.54	10R4/1	HH	13.5	0.7	2.31	N5	HH	14.0	2.4	2.44	N4		11.5	6.0	2.43
K	5	2.5YR6/6	Hc	4.5	18.0	2.70	2.5YR7/5	Hc	7.5	14.7	2.66	2.5YR6/5	h	10.0	10.1	2.60	2.5YR4/2	*H*	14.0	5.8	2.51	10R4/1	HH	14.5	3.2	2.49	10YR4/1	HH	14.5	3.7	2.20
L	1	5YR7/4	h	11.0	16.5	2.63	5YR7/4	H	11.0	15.6	2.64	5YR7/4	*H*	15.5	6.7	2.59	5YR6/3	HH	16.0	4.8	2.53	7.5YR6/4	HH	16.0	1.8	2.38	2.5YR6/2	HH	16.0	1.1	2.33
L	2	5YR7/6	Sc	5.0	15.8	2.66	5YR7/6	h	5.0	14.0	2.59	5YR6/6	H	9.0	9.7	2.52	5YR5/4	*H*	9.5	7.2	2.48	5YR5/2	HH	10.0	3.1	2.40	5YR5/2	HH	10.0	3.1	2.39

Pyrometric cone equivalent; 8. Suggested products; 9. Comments

Locality	Downward sequence	Pyrometric cone equivalent	8. Suggested products	9. Comments
A	1a		DB, T, A	Sampled raw material 1a has been used in refractory mortar, in grinding wheels, and as hoof packing at Laurel and other race tracks. (Materials 1c and 1d are also marketed for these uses.)
A	1b		CB, T	Color range very good.
A	1c		DB, T, P, A	Soluble salt content fairly high. Shrinkage rather high for brick. Color range good.
A	1d			Soluble salt content high and fired specimens showed scumming. Shrinkage too high for brick and tile. Admixture of other clays might improve plasticity and green strength. Salt would have to be neutralized.
B	1a		CB, T	2100°, 2200° and 2300° specimens cracked when removed from kiln, indicating poor thermal shock resistance. Color range good. Addition of 10% sand and mixing with less plastic clay are suggested.
B	1b		CB, T	Good color range. Bloating test negative.
B	1c		BB, T, P, LGCS	Has been used for manufacture of buff brick.
B	1d		CB, T	Soluble salt content, which is above average, causes scumming when material is fired. Similar to sample B, but contains more soluble salt and iron. Color rather unattractive.
F	5		CB	Bloating test negative.
G	3		CB, T, CFT, LGP	Fired colors are unusual. Raw material is used for manufacture of drain tile.
H	1		DB, DT, P, A	Bloating test negative.
H	5			Bloating test negative.
H	7		CB, T	Bloating test negative.
I	2			Bloating test negative.
I	3			Bloating test negative.
I	4			Bloating test negative.
I	5			Bloating test negative.
I	6			Bloating test negative.
I	7		CB	Bloating test negative; shrinkage slightly excessive.
I	8		CB	Bloating test negative; shrinkage slightly excessive.
I	9		CB	Bloating test negative; shrinkage slightly excessive.
J	2		DT	Fired colors may not be satisfactory for brick. Bloating test negative.
J	3		CB	Bloating test negative.
J	4		CB	Bloating test negative.
K	5		CB	Shrinkage slightly excessive. Bloating test negative.
L	1		BB; mixture with sandy clay (e.g., Sample B) to improve plasticity.	Material is similar to Sample B but contains less sand and less iron. Raw material has been used in manufacture of buff brick.
L	2		CB, ST	Fired colors not particularly attractive. Raw material is used for manufacture of hard-fired common and face brick.