# Fossils from bore holes on the Eastern Shore Peninsula, Virginia[1/]

By Ruth Todd, Julia A. Gardner, and I. C. Sohn

## Introduction

This report lists Foraminifera, Mollusca, and Ostracoda in five bore holes that penetrated a maximum of 445 feet of section in sediments of Pleistocene and Miocene age, and discusses the paleoecologic and stratigraphic significance of the fossils. It includes the contents of references 6, 16, and 18 of Virginia Division of Geology Mineral Resources Circular No. 2, dealing with the geology and groundwater resources of the Eastern Shore peninsula.

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1/ This report and accompanying illustrations have not been edited or reviewed for conformity with Geological Survey standards and nomenclature.

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## Foraminifera

(By Ruth Todd)

A report on 137 slides containing floated concentrates from rotary drill cuttings obtained from 4 shallow wells on the eastern shore of Virginia as follows:

Well #1 (Capeville Elementary School) 39 samples between 65 and 470 feet;

Well #2 (Machipongo High School) 11 samples between 5 and 100 feet;

Well #3 (Central High School) 44 samples between 5 and 450 feet;

Well #4 (Atlantic High School) 43 samples between 20 and 452 feet.

These concentrates were briefly examined and specimens from 25 of the more critical ones picked and mounted for closer examination.

As shown by the cuttings, the wells appear to penetrate the Miocene at the following depths:

Well #1: 65-70' (the top sample);
Well #2: 90-95';
Well #3: 125-130';
Well #4: 115-120'.

Above these depths in Wells 2 and 4, the cuttings are barren. In Well 3 a Pleistocene fauna consisting of abundant Elphidium incertum (Williamson) var. clavatum Cushman and rare Rotalia beccarii (Linné) is found at 45-50 ft. and continues down to the 105-110 ft. sample.

Within the Miocene parts of the section penetrated by the wells it is not possible to distinguish the formations on the basis of the Foraminifera. There are changes in relative abundance of species and in overall composition of the fauna from upper to lower parts in the wells, as crudely illustrated by the accompanying graphs, but these changes do not seem to be consistent from well to well. Hence any attempt to correlate precisely from one well to another on the basis of the Foraminifera would be merely guessing. For example, no specimens of Nonion pizarrense and Bulimina elongata occur in Well 4 above 280 feet while they are commonly or abundantly found in the upper parts of the other three wells. The top occurrences of Nonionella auris, Nonion medio-costatum, and Bolivina sp. may prove to be of significance, but whatever formational or zone boundaries they mark are not determined.

The changes present in the wells may be a result of slight facies differences along a fluctuating strand line.

No Foraminifera indicating a pre-Miocene age were found in any of the wells. Following are listed systematically the major constituents of the composite Miocene fauna from the four wells with brief notes on their expected occurrences as given by Dorsey (1948):

| | |
|---|---|
| Textularia mayori Cushman | Not below Choptank |
| Quinqueloculina seminulum (Linné) | ? |
| Massilina mansfieldi Cushman and Cahill | Top St. Marys |
| Nonion pizarrense W. Berry | Throughout Miocene section |
| N. medio-costatum (Cushman) | Top St. Marys into top Calvert |
| Nonionella auris (d'Orbigny) | Throughout but abundant only in lower Calvert |
| Elphidium poeyanum (d'Orbigny) | Middle St. Marys |
| Buliminella elegantissima (d'Orbigny) | Throughout |
| Bulimina elongata (d'Orbigny) | Throughout but more abundant in Calvert |
| Bolivina sp. | ? |
| Discorbis candeiana (d'Orbigny) | Low St. Marys and high Choptank |
| Buccella frigida (Cushman) | ? |
| B. mansfieldi (Cushman) | St. Marys and Choptank |
| Cassidulina laevigata (d'Orbigny) var. | Top St. Marys |
| Globigerina sp. | ? |
| Cibicides concentricus (Cushman) | Throughout but more abundant in Calvert |

## Paleoecological interpretation

The presence of Foraminifera indicates marine deposition, or possibly brackish in the case of the Pleistocene strata at the top of Well 3.

The Miocene assemblage is a shallow-water one, from the beach out to probably not more than 50 fathoms or so, probably toward the shallower end of this range. The presence but not abundance of planktonic specimens (Globigerina sp.) indicates that the area of deposition was open to the ocean and probably fairly close to the circulation of oceanic currents.

The Pleistocene fauna is a cold-water one, typical of areas north of Virginia (from the south coast of New England into the Arctic).

## References

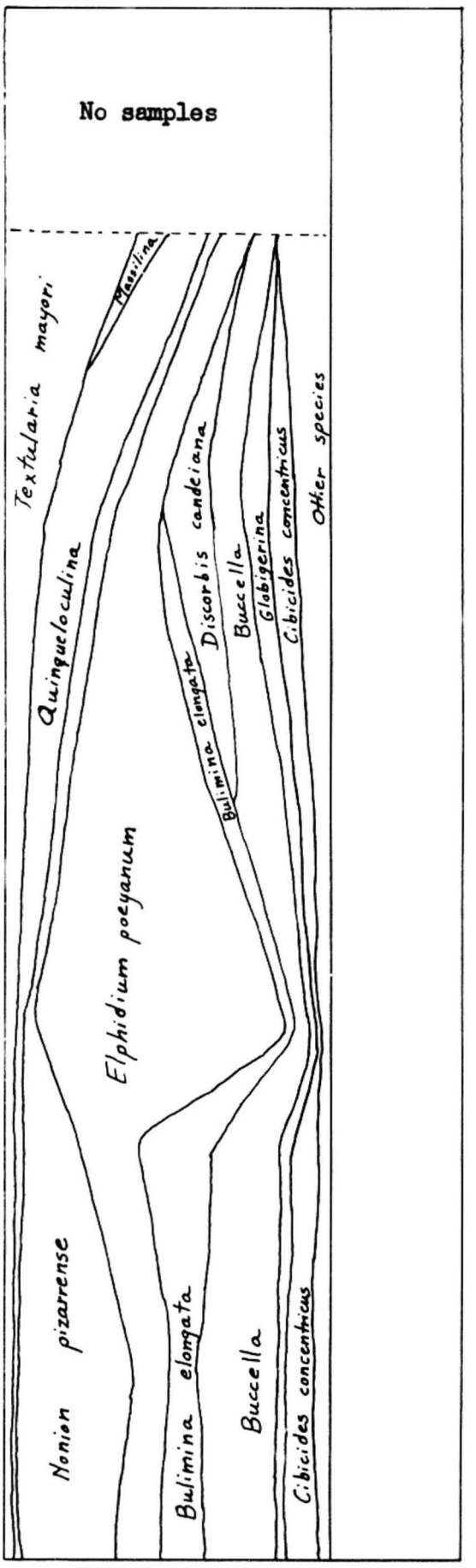
Cushman and Cole, 1930, Pleistocene Foraminifera from Maryland: Contr. Cushman Lab. Foram. Research, v. 6, pt. 4, p. 94-100, pl. 13.

Dorsey, 1948, Miocene Foraminifera, Chesapeake group: Maryland Dept. Geol. Mines, and Water Res. Bull. 2, p. 268-321, pls. 27-39.

Well 1

Vertical scale:

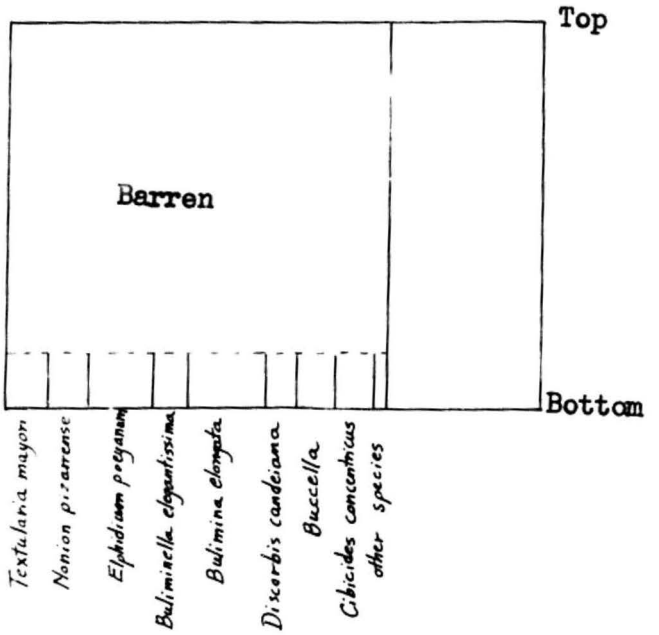
1 inch = 50 feet



Well 2

Vertical scale:

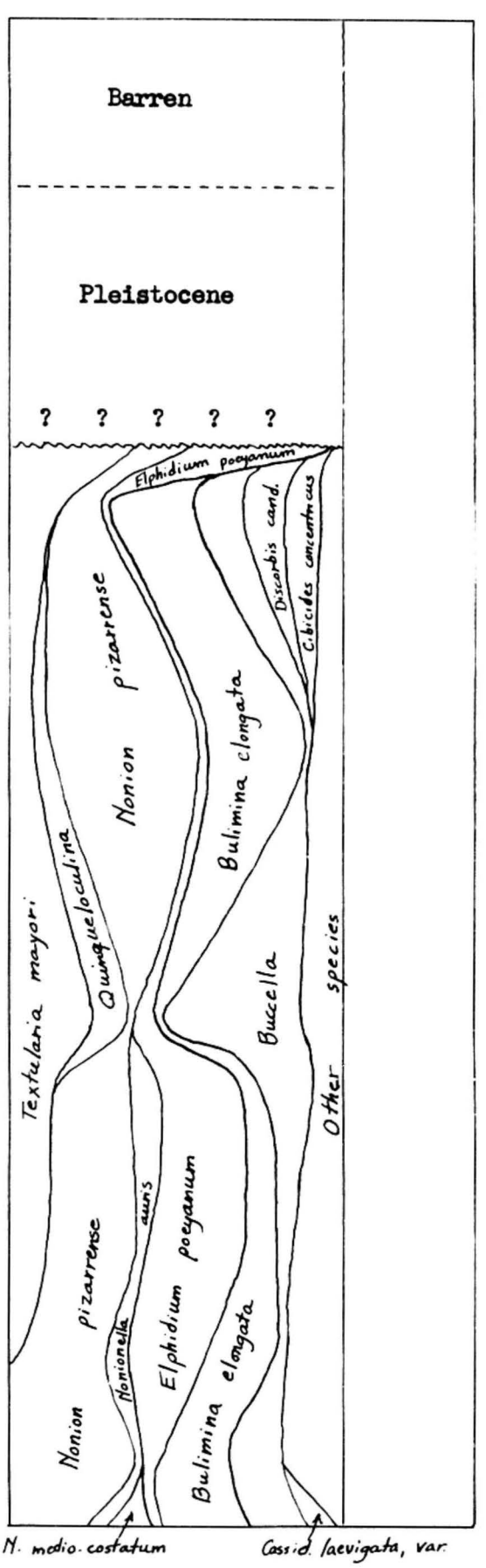
1 inch = 50 feet



Well 3

Vertical scale:

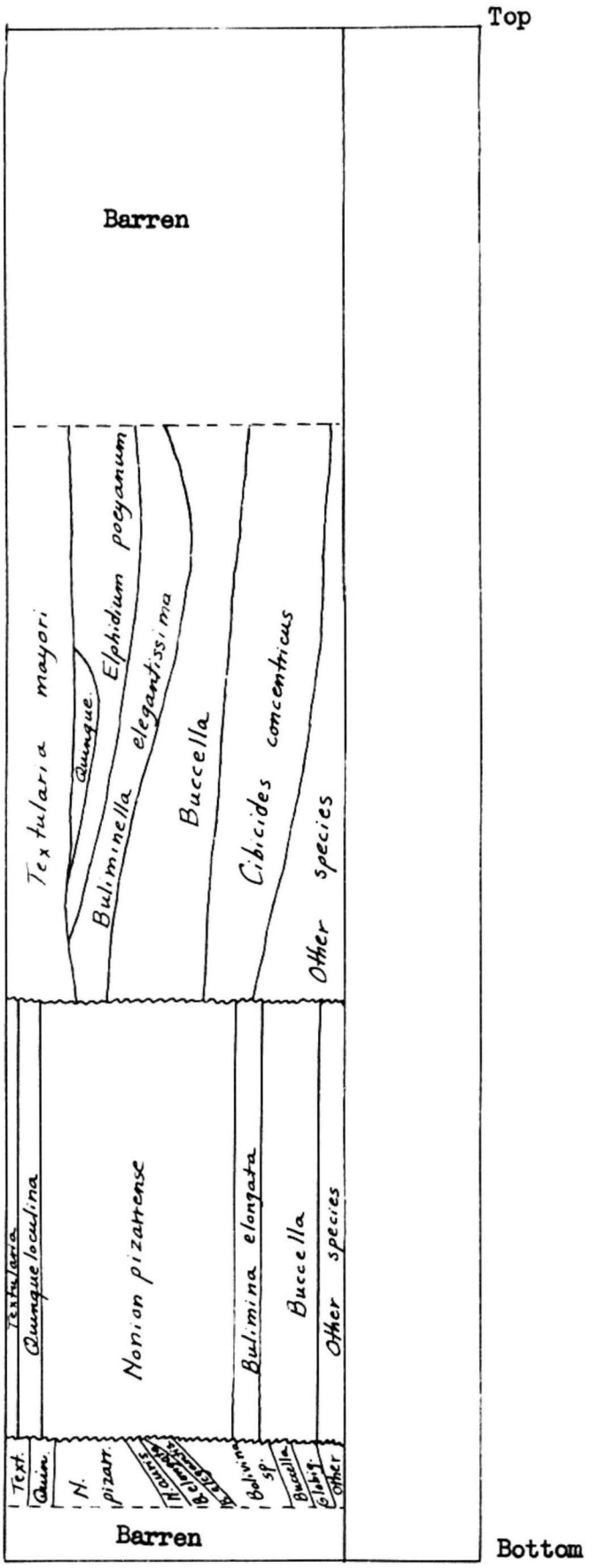
1 inch = 50 feet



Well 4

Vertical scale:

1 inch = 50 feet



## Mollusca from a well at Cheriton,

## Northampton County, Virginia

(By Julia A. Gardner)

The sample from 106 ft. to 110 ft. includes Nucula proxima Say, common from the Miocene to the Recent; Parvilucina crenulata (Conrad), not reported above the Miocene; and Mulinia sp. and Marginella sp. The age is probably Miocene, but there is no evidence for any one zone within the Miocene.

In the sample from 122 ft. to 125 ft. two species, Crassinella sp. cf. C. duplinensis Dall and Parvilucina multilineata (Tuomey and Holmes), indicate a Yorktown age. Venericardia cf. V. granulata Say is most commonly associated with the Miocene, though it survives into the Waccamaw, and Corbula (Caryocorbula) sp., though restricted to the Miocene, is present both in the Yorktown and in the St. Marys. Chione sp. and Mulinia sp. are Miocene or later.

The small fauna from 175 ft. to 190 ft., Venericardia granulata Say, Parvilucina crenulata (Conrad), and Corbula sp., is restricted to the Miocene by P. crenulata.

The fauna recovered from 158 ft. to 164 ft. contains a zone marker, Astarte (Ashtarotha) undulata deltoidea Gardner, which characterizes zone 1 of the Yorktown formation. The attendant species, Astarte sp., Venericardia granulata Say, Phacoides (Pseudomiltha) anodonta Say, Phacoides (Lucinoma) contracta (Say), Mulinia sp., and Turritella cf. T. variabilis Conrad, are also recorded from the Yorktown although they are not restricted to it.

The lowest sample, depth 220 ft., includes an indeterminate Ostrea, Venericardia granulata Say (the St. Marys species), Cerastoderma cf. C. laqueata (Conrad), and the longer-ranging (Miocene and Pliocene) Dentalium cf. D. attenuatum Conrad. The Cerastoderma is not certainly determined, but the probable age is the St. Marys.

## Ostracoda

(By I. G. Sohn)

A report on 40 slides containing ostracodes, that were segregated from 137 slides containing floated concentrates from rotary drill cuttings obtained from 4 shallow wells on the eastern shore of Virginia, is as follows:

Well 1 (Capeville Elementary School) 21 slides 85 to 470 ft. Miocene

Well 2 (Machipongo High School) 2 slides 90 to 100 ft. Miocene

Well 3 (Central High School) 8 slides 210 to 435 ft. Miocene

Well 4 (Atlantic High School) 9 slides 245 to 435 ft. Miocene

Wells 1 and 2 contain similar elements that differ from Wells 3 and 4 which also contain similar elements. However, complete faunules are not represented in any of the samples because of the method used in obtaining the faunules.

It is not possible to differentiate between the various members of the Miocene as outlined by Malkin in the Journal of Paleontology, vol.27, no. 6, Nov. 1953, pp. 763-771. This may be due to contamination in drilling.

Preliminary faunal lists follow:

| Well No. 1 (feet) | |
|---|---|
| 85-90 | Hemicythere conradi Howe and McGuirt, 1935 |
| 95-100 | H. conradi Howe and McGuirt, 1935 |
| 105-110 | H. conradi Howe and McGuirt, 1935<br>Cytherideis ashermani Ulrich and Bassler, 1904 |
| 115-120 | Gen. indet. young individual |
| 125-130 | Hemicythere conradi Howe and McGuirt, 1935<br>Loxoconcha sp.<br>Trachyleberis exanthemata (Ulrich and Bassler), 1904<br>T. martini (Ulrich and Bassler), 1904<br>Cytherideis sp.<br>Cytherura? sp. |
| 135-140 | Same as above, except T. exanthemata<br>Cytheridea sp. |
| 145-150 | Same as above, including T. exanthemata |
| 155-160 | Same as above |

| | |
|---|---|
| 165-170 | Same as above |
| 175-180 | Hemicythere conradi Howe and McGuirt, 1935 |
| | Loxoconcha sp. |
| 185-190 | Hemicythere conradi Howe and McGuirt, 1935 |
| | Cytherideis sp. |
| | Cytherura? sp. |
| 195-200 | Hemicythere conradi Howe and McGuirt, 1935 |
| | Loxoconcha sp. |
| | Cytheropteron? sp. |
| | Gen. indet. |
| 215-220 | Hemicythere conradi Howe and McGuirt, 1935 |
| | Loxoconcha sp. |
| | Cytherideis sp. |
| 225-230 | Hemicythere conradi Howe and McGuirt, 1935 |
| 235-240 | H. conradi Howe and McGuirt, 1935 |
| 285-290 | Cytheridea? sp. |
| | Loxoconcha? sp. |
| 390-395 | Trachyleberis sp. |
| 435-440 | Ostracode indet. valve lost |
| 445-450 | Hemicythere conradi Howe and McGuirt, 1935 |
| 460-465 | Cytherideis sp. |
| 465-470 | Hemicythere conradi Howe and McGuirt, 1935 |

| Well No. 2 (feet) | |
|---|---|
| 90-100 | Hemicythere conradi Howe and McGuirt, 1935 |
| | Trachyleberis exanthemata (Ulrich and Bassler), 1904 |
| | T. martini (Ulrich and Bassler), 1904 |
| | Cytherura sp. |
| | Loxoconcha sp. |
| | Cytherideis ashermani Ulrich and Bassler, 1904 |
| | Cytherideis sp. |

| Well No. 3 (feet) | |
|---|---|
| 210-215 | Cytheretta sp. |
| 270-275 | Cytheretta porcella (Ulrich and Bassler), 1904 |
| 280-285 | Cytherideis? sp. |
| 290-295 | Cytheretta sp. |
| 300-305 | C. sp. |
| | Trachyleberis sp. |
| | Cytherideis spp. |
| | Cytheridea? sp. |
| 380-385 | Cytheretta sp. |
| 390-395 | C. sp. |
| 430-435 | Trachyleberis sp. |

| Well No. 4 (feet) | |
|---|---|
| 245–250 | Cytherideis sp. |
| 290–295 | C. ashermani Ulrich and Bassler, 1904 ? |
| | Trachyleberis? sp. |
| 300–305 | T.? sp. 2 |
| 310–315 | Cytheretta sp. |
| 320–325 | C. sp. |
| 340–345 | Loxoconcha sp. |
| 360–365 | Cytherideis ashermani Ulrich and Bassler, 1904 |
| 410–415 | Loxoconcha sp. 2 |
| 430–435 | Trachyleberis? sp. |