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HJ Carter
Virginia Institute of Marine Science

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APAGESOMA EDENTATUM, A NEW GENUS AND SPECIES OF OPHIDIID FISH FROM THE WESTERN NORTH ATLANTIC

H. Jacque Carter

ABSTRACT

A new genus and species of deep-sea fish, *Apagesoma edentatum*, (family Ophidiidae), is described from deep waters off the Bahamas. It can be distinguished from other ophidiid genera by the following characters: an enlarged and swollen anterior nostril; eyes placed anteriorly on the head; moderate-sized, unsculptured, hemispheric-shaped sagitta; absence of a basibranchial tooth patch; absence of an opercular spine; large sub-terminal mouth, with non-protrusible jaws. *Typhlonus delosommatus* Hureau et al., 1979 is placed in *Apagesoma* based on similarities in otoliths, non-protrusibility of jaws, swollen anterior nostrils and absence of a basibranchial tooth patch. *Typhlonus* contains only the type species, *T. nasus* Gunther, 1878, which differs from *Apagesoma* in possessing a much larger and highly sculptured otolith, highly protrusible jaws and presence of a basibranchial tooth patch.

A single specimen[1] of ophidiid fish captured from the western Atlantic off the Bahamas in 5,082-m depth proves to be a new genus and species which is here described as *Apagesoma edentatum*. A second species is referred to *Apagesoma* from *Typhlonus*. Seven specimens of *T. nasus*, all collected in the same region of the Indo-Pacific, provided the basis for a detailed study and redescription of the genus by Nielsen (1965). Two additional specimens of *T. nasus* were recently collected from the southern part of the Arabian basin and the southeastern Pacific Ocean at abyssal depths (Shcherbachev and Tsinovsky, 1980) and two specimens from the region between the equator and Hawaii in the Pacific Ocean (Cohen, pers. comm.). More than 100 years elapsed after the original generic description before a second species of the genus, *T. delosommatus*, was described from the western Atlantic (Hureau et al., 1979). The differences between *T. nasus* and *T. delosommatus* were so pronounced that the authors considered establishing a new genus for the latter.

METHODS AND TERMINOLOGY

Counts and measurements follow those of Hubbs and Lagler (1958) except that the upper jaw symphysis is used as the anteriormost point instead of the tip of the snout. Head length is measured to the posterior tip of the bony operculum. Measurements are presented as percent of standard length (SL). Vertebral and fin ray counts were determined from radiographs. Caudal fin rays are only those rays attached to the hypurals. Shape and size of the dentary, premaxillary, palatine and pharyngeal tooth patches were determined from clay impressions. Measurements were made with dial calipers to the nearest 0.1 mm; measurements less than 5.0 mm were made with the aid of an ocular micrometer. The sagitta was removed from the preserved holotype and described following the terminology of Frizzel and Dante (1965). All illustrations except Figure 1 were drawn with the aid of a camera lucida.

Apagesoma new genus

Type Species.—*Apagesoma edentatum.*

Diagnosis.—Neobythitine ophidiid fishes as defined by Cohen and Nielsen (1978) with enlarged swollen anterior nostrils; non-protrusible jaws; unarmed, posteriorly expanded preoperculum; absence of opercular spine; single ray in each pelvic fin;

[1] Two additional specimens of *Apagesoma edentatum* have been recently collected from the Venezuela basin in 5,000-m depth.

Table 1. Comparison between *Apagesoma* and other genera with sub-terminal mouths

	Apagesoma New Genus	*Typhlonus*† Gunther, 1878	*Abyssobrotula*† Nielsen, 1977	*Barathrites*† Zugmayer, 1911	*Barathrodemus*† Goode and Bean, 1883	Spectrunculus† Nielsen and Hureau, 1980
Mouth	inferior	inferior	inferior	inferior	inferior	inferior
Opercular spine	absent	weak	weak	strong	strong	strong
Pectoral fin	short	short	elongate	short	short	short
Pectoral fin-rays	25–28	24–28	10–11	22	20–25	21–27
Long gill rakers	10–12	10–13	8–11	5–7	12–15	7–8
Branchiostegal rays	7–8	7	7–8	7	8	8
Median basibranchial tooth patches	absent	1	2	1	2	2
Paired basibranchial tooth patches	absent	absent	1	absent	1	absent
Form of dentigerous vomer	absent*					

* Teeth on vomer present as small circular patch in *Typhlonus delosommatus* Hureau et al., 1979.
† Data from Nielsen, 1977.

8 caudal fin rays; absence of median basibranchial tooth patch, 10–12 developed rakers on anterior arch, 13 pre-caudal vertebrae and 7–8 branchiostegal rays; moderate-sized, unsculptured, hemispheric in shape sagitta otoliths, flaccid musculature, fluid content of tissue high.

Etymology.—From the Greek $\alpha\pi\alpha\gamma\eta$ (flaccid) and $\sigma o\mu\alpha$ (body). A flabby-bodied deep-sea ophidiid. Gender neuter.

Relationships.—A detailed discussion of the affinities of *Apagesoma* must await a thorough systematic study of the order Ophidiiformes; however, based on the swollen head, cephalic lateralis canals, small anteriorly placed eyes and soft body, the closest relative of *Apagesoma* appears to be *Typhlonus* (Gunther, 1878; Nielsen, 1965). *Apagesoma* can be readily distinguished from *Typhlonus* and other ophidiid genera with sub-terminal mouths and swollen snouts by the characters presented in Table 1.

Apagesoma edentatum new species
Figures 1–7

Holotype.—USNM 227090, R/V COLUMBUS ISELIN; Cruise 1980-07, Station C014, Lat. 23°43.5'N, Long. 73°40.0'W; 5,082 m, 2.3°C; 14 September 1980, bottom trawl.

Diagnosis.—A species of *Apagesoma* without vomerine and basibranchial tooth patches; dorsal fin rays 116, anal fin rays 111; caudal vertebrae 50; distance from pelvic fin base to anal fin base 27.0% SL.

Etymology.—From the Latin "edentatus" (without teeth). The name refers to the absence of vomerine and basibranchial tooth patches. A neuter noun in apposition.

Description.—Head and body pale chocolate brown in fresh specimen, fins slightly darker. Posterior ventral surface of operculum bluish to dark brown as is branchial cavity lining. Oral cavity lining white. Dorsal and anal fins confluent with caudal fin. Pectoral fins short and fan-like. Head swollen; mouth sub-terminal. Body completely covered with scales except for fin membranes. Scales elongate, subrectangular, cycloid and thin (Fig. 2). Eyes small (8.2 mm), placed anteriorly on the head. Lateral line barely visible on body, extending from head to caudal peduncle. Enclosed cephalic lateralis system could not be completely traced in this specimen.

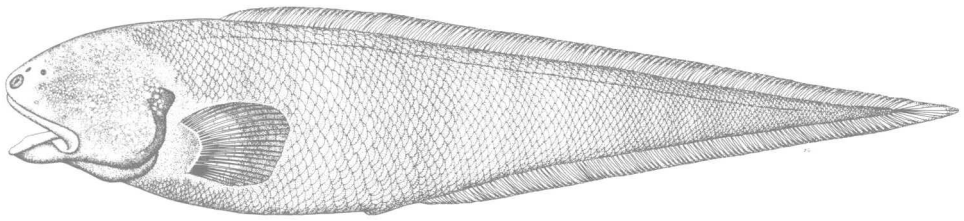

Figure 1. Lateral view of the holotype of *Apagesoma edentatum*, 752 mm SL. USNM 227090.

DENTITION. Pattern of dentigerous plates on upper and lower jaws and pharyngeal bones is depicted in Figure 3. Teeth minute, numerous and conical on all tooth plates. Palatine tooth patch of moderate width and lozenge shaped. Vomerine tooth patch absent. Dentigerous parts of premaxillaries and dentaries rather broad relative to palatines. Dentigerous parts of the dentaries and premaxillaries meet at lower and upper jaw symphyses respectively. Basibranchial tooth patch absent. Five upper pharyngeal tooth plates opposing oval shaped lower pharyngeal plates.

OTOLITH. Left sagitta, moderate-sized, hemispheric in shape, 8 mm in diameter, and 6 mm maximum depth (Fig. 4). Medial face with poorly defined sulcus acousticus and excisura ostia. Prominent smooth dome present on lateral face. Compared with most other ophidiid genera sagitta of *Apagesoma* small but of typical shape. Pattern very unlike large, laterally compressed and highly sculptured sagitta of *Typhlonus nasus* (Nielsen, 1965, pl. XIII, fig. 1a, 1b, not 2a, 2b).

AXIAL SKELETON. Moderately ossified skeleton with hourglass shaped vertebral centra. First neural spine half the length of the second; anterior neural spines pointed and decreasing in length from 3–8, subsequent spines longer. Parapophy-

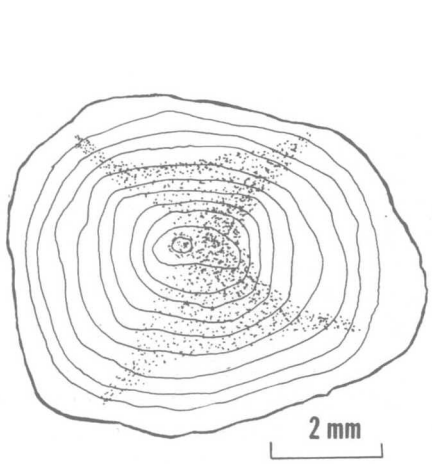

Figure 2. (Left) Scale from left flank of holotype of *A. edentatum*.

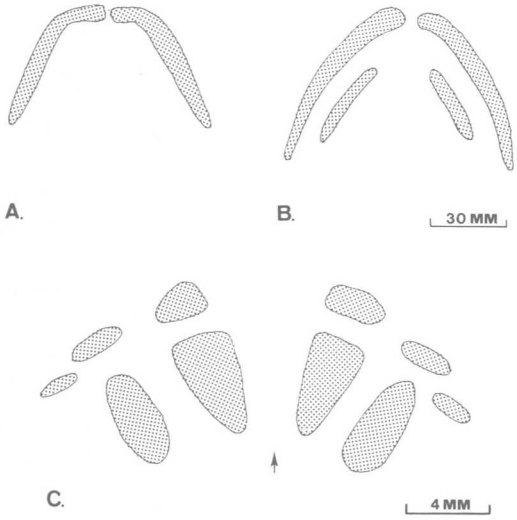

Figure 3. (Right) Arrangement of dentigerous plates in oralbranchial cavity of holotype of *A. edentatum*; A, dentary; B, premaxillary and palatine; C, upper pharyngeal patches.

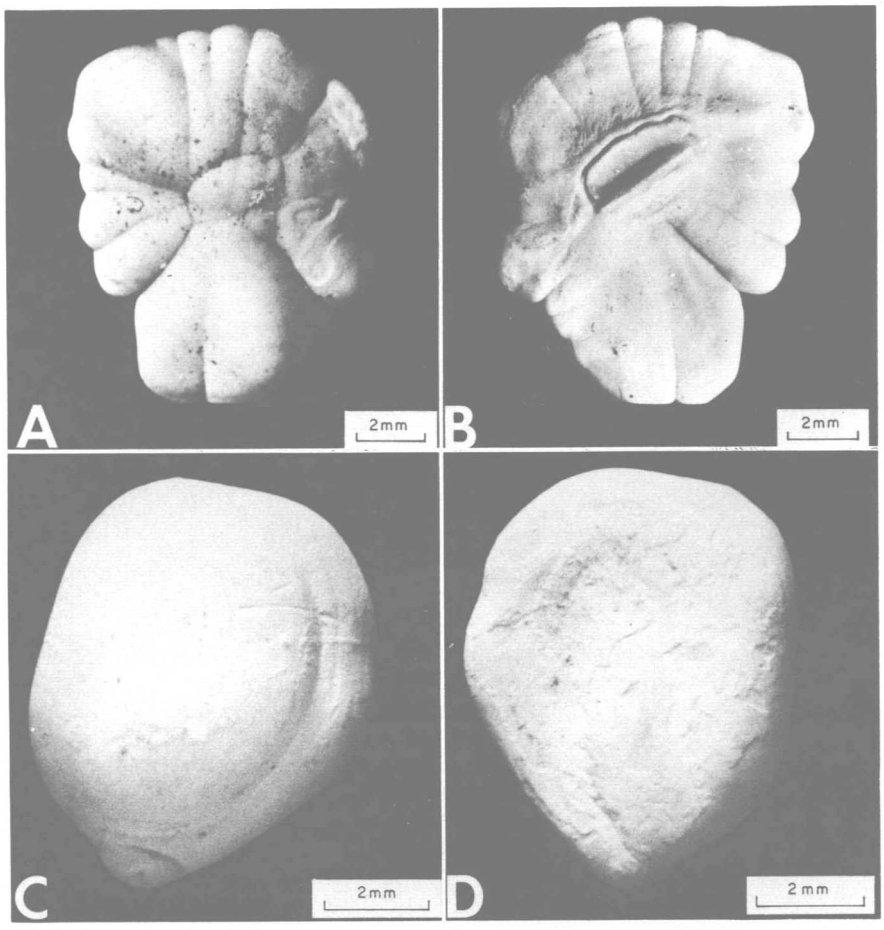

Figure 4. *Typhlonus nasus*, "Galathea" ST. 450, right sagitta: A, medial view; B, lateral view. *Apagesoma edentatum*, USNM 227090, right sagitta: C, medial view; D, lateral view. Photograph of *T. nasus* otolith from Nielsen (1965).

ses poorly developed or absent on centra 1–4, while remainder of the pre-caudal vertebrae with increasingly well developed parapophyses and transverse processes. First vertebrae without ribs. Vertebrae 2–4 with pleural ribs directly attached to centra. Vertebrae 5–11 with pleural ribs connected to parapophyses. No ribs present on vertebrae 12–13. The caudal skeleton has two apparently separate hypural plates, each supporting 4 caudal fin rays.

SWIM BLADDER. Swim bladder thin walled, small, elongate sac-like structure overlying foremost part of stomach (Fig. 5). Outer edges of ventral and dorsal walls appear tightly bound together by tough connective tissue restricting expansion of chamber. At posterior end of sac, artery and vein run forward to supply single unipolar rete mirabilia 6 mm in length. Rete runs forward but bends sharply to run along right hand side of gas-gland. Rete loops backwards to enter gland just ahead of the forward edge of the gas gland. Gas gland and resorbent capillary network appear as two glandular lobes investing floor and lateral walls of sac. In

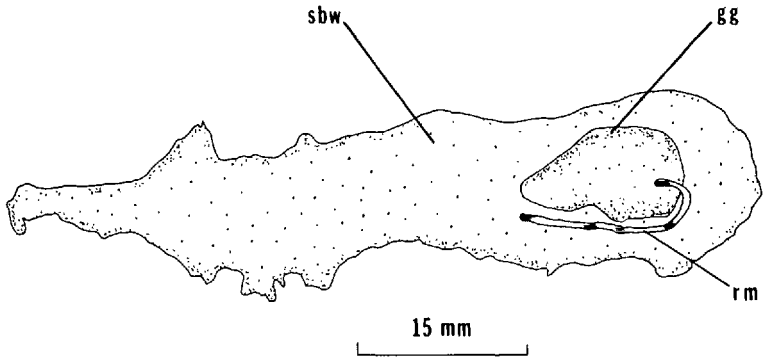

Figure 5. Dorsal view of swimbladder of *A. edentatum*. gg, gas-gland and associated resorbent capillary network; rm, rete mirabile; sbw, swimbladder wall.

addition, swim bladder lacks any trace of intrinsically or extrinsically developed drumming muscles.

GILL CAVITY. First gill arch on right side with 4 rudimentary rakers on epibranchial, 2 fused developed rakers on epibranchial-ceratobranchial-hypobranchial portion (Fig. 6). Second through fifth branchial arches bear only rudimentary rakers. Gill filaments small not much longer than the width of the arches. First gill arch on the left side of holotype lacks gill filaments and developed rakers and is considered anomalous. Pseudobranch with 2 small filaments. Externally developed thymus absent.

VISCERA. Esophagus short with thick muscular walls. Inside of voluminous stomach provided with numerous microvilli projections. Stomach wall very thick and muscular. No pyloric caeca. Intestine 36 mm in length with a compact S

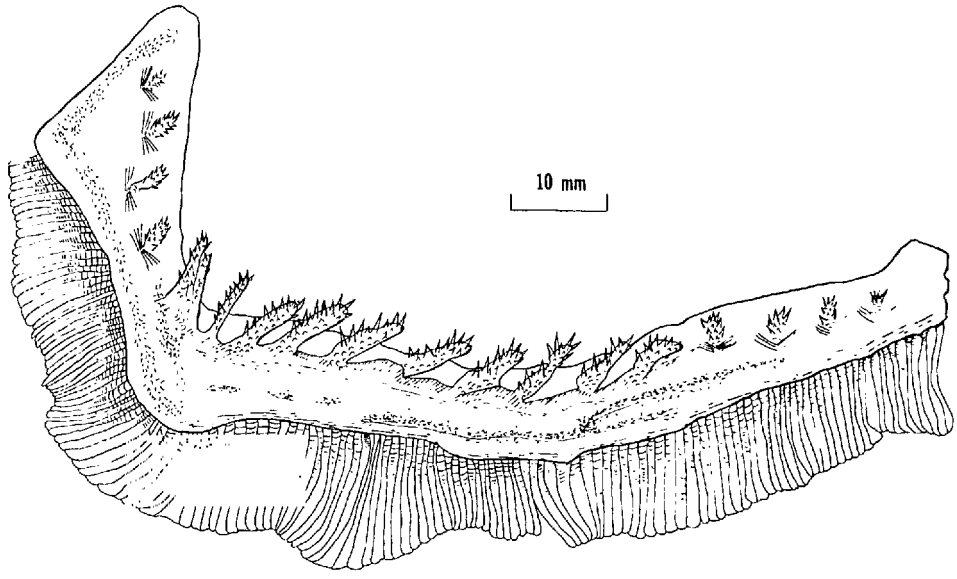

Figure 6. First branchial arch from right side of holotype of *A. edentatum*.

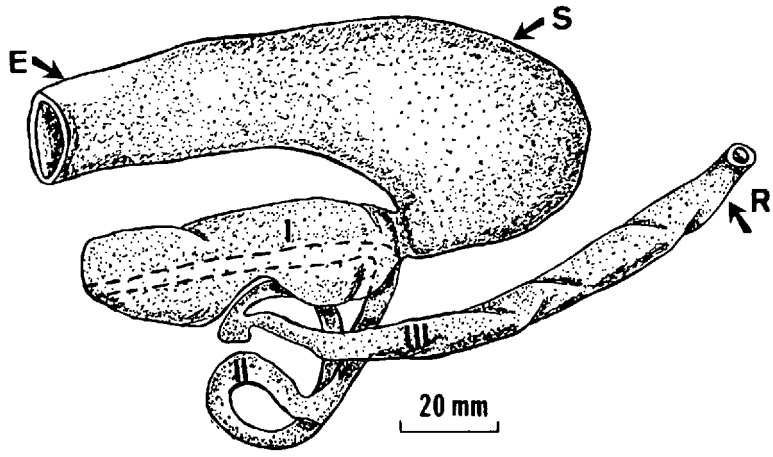

Figure7. Lateral view of the alimentary tract of holotype *A. edentatum*. E, esophagus; S, stomach; I, II, III, sections of intestine; R, rectum.

shaped coil occurring in mid-portion (Fig. 7); intestine expanded in pyloric region and decreasing in diameter posteriorly until just anterior to rectum where it is slightly expanded. Lumen white and provided with small numerous villi in its entire length. Liver yellowish, with three lobes. Large central lobe, triangular in shape; two smaller lobes extending dorsolaterally to cover parts of anterior alimentary tract. Pancreas diffuse, occurring as nodules scattered throughout mesentery. Gall bladder moderately large, partially surrounded by liver, opening anteriorly into intestine via bile duct. Moderately large ovaries completely coalesced along medium line and closely attached to abdominal wall at the vent. Ovaries with small developing ova about 0.5–1.0 mm in diameter.

Biology.—Apagesoma edentatum may be a rare species; however, it should be commented that very few trawl samples have been obtained from depths as great as that of the type locality. The bottom sediment at depth of capture consisted of fine silty "red" clays and oozes.

Its poorly developed musculature suggests that *Apagesoma edentatum* is probably a slow swimmer. This species, lacking a large and well developed swim bladder, may approach neutral buoyancy by reducing the density of its tissues through increased water content. Several investigators consider heavy tissue reduction and high water content in deep sea fishes as an adaptation to conserve energy in a food-poor environment (Denton and Marshall, 1958; Blaxter et al., 1971; Horn et al., 1978). Its large mouth opening and oral cavity may enable it to utilize a great size range of prey items. The remains of squid beaks from the epipelagic family Ommastrephidae and fish bones in the intestine suggest this species may scavenge the bottom for food. Helminth parasites were not found in the intestinal tract. The enlarged and swollen anterior nostril may reflect increased reliance on olfaction in the recognition of conspecifics or of food sources for a fish with reduced eyes.

Apagesoma delosommatus (Hureau, Staiger and Nielsen, 1979)

Comparative Material.—Typhlonus delosommatus—Paratype: UMML 33179; R/V JOHN ELIOT PILLSBURY; Station P-1429, Lat. 21°19.2–21.9'N, Long. 73°45.5–44.2'W; 2,560–2,487 m; 21 July 1971.

Table 2. Comparison between meristic and morphometric characters of *Apagesoma edentatum*, *A. delosommatus* and *Typhlonus nasus*

	Apagesoma edentatum n. sp.		*A. delosommatus*		*Typhlonus nasus*
	Holotype		2 Specimens*		7 Specimens†
Total length mm	786		520–571		–
Standard length mm	752		486–563		70–265
Meristic Characters					
Dorsal fin rays	116		129–131		93–104
Anal fin rays	98		111		71–78
Caudal fin rays	8		8		8
Pectoral fin rays	25		25–28		24–28
Pelvic fin rays	1		1		1
Branchiostegal rays	8		7/7–8/8		7/7
Gill rakers on anterior arch (see text)	iv+10+iv		iv+11–12+iv		ii–iv+10–13+v–vi
Vertebrae (incl. ural centra)	13+50		13+59-60		13–14+42–45
	% SL	mm	% SL	mm	% SL
Morphometric Characters					
Head length	19.3	145	21.5–22.5	109–121	20.0–29.5
Depth at dorsal fin origin	18.5	139.1	20.1–22.0	107–113	17.0–26.0
Upper jaw length	11.0	82.5	11.0–11.5	56.0–61.9	7.0–8.7
Lower jaw length	10.4	78.3	9.8–10.5	51.2–54.9	7.7–9.4
Hor. diam. of pigmented eye	1.1	8.2	1.0–1.0	5.0–5.6	0.3–0.7
Snout to premaxillary symphysis	2.2	16.8	2.8–3.4	14.0–19.3	10.0–13.5
Premax. symphysis to anus	36.0	270.0	34.0–34.0	166–192	28.0–35.5
Preanal length	39.2	312.3	35.0–38.5	188–197	34.5–40.5
Predorsal length	21.9	164.3	26.4–26.5	129–148	24.5–30.0
Ventral fin base to anus	22.6	170.2	17.0–20.0	95.7–96.9	12.0–14.0‡
Ventral fin base to anal fin base	27.0	202.1	19.9–23.5	112–114	17.0–21.0
Ventral fin ray length	8.7	65.3	13.0–16.0	63.8–90.1	16.5–27.0
Bifurcate operculum spine	absent		absent		present
External thymus	absent		absent		present
Sagitta morphology	moderate-sized, unsculptured, hemispheric-shaped		moderate-sized, unsculptured, hemispheric-shaped		large, laterally compressed, highly sculptured face

* Data for the holotype of *T. delosommatus* from Hureau et al (1979).
† Data for *T. nasus* from Nielsen (1965).
‡ Nielsen (1965, Table 2) gives the following figures for these values: 1.2–14% of SL and 1.6–2.1% of SL. This is a typographic error and should read 12–14% and 16–21%.

Remarks.—*Typhlonus delosommatus*, Hureau et al. (1979), is removed from *Typhlonus* and placed in *Apagesoma* based on characters (see generic diagnosis) it shares with *A. edentatum* but does not share with *Typhlonus nasus*. *Typhlonus* remains monotypic in accordance with the present generic definition (Gunther, 1878; Nielsen, 1965). Table 2 summarizes the principal data and compares *A. edentatum* and *A. delosommatus* with *Typhlonus*.

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ADDRESS: *Virginia Institute of Marine Science, College of William and Mary in Virginia, Gloucester Point, Virginia 23062.*