SOME PECULIAR FOSSIL FORMS FROM MARYLAND

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The purpose of this paper is to call attention to some peculiar spiral, nearly straight, and irregular objects, probably representing the remains of fossil organisms, which were obtained from the low bluffs along the western shore of Chesapeake Bay, St. Marys County, Md.

In June, 1925, Dr. L. W. Stephenson collected four specimens of the spiral forms from the bluff about 6½ miles south of Cedar Point, one-third mile above the site of the old Langley homestead. As these specimens elicited considerable interest, the writer visited this locality and other localities in near-by bluffs during the following year.

STRATIGRAPHIC SECTIONS

In order to show the relationship of the bed in which these peculiar specimens occur to other beds outcropping in the bluffs, several stratigraphic sections are given below, and these are followed by brief descriptions of the included formations. The first bluff, Langleys Bluff, is about 25 feet high and one-third to half a mile long, and exhibits the section given below. Some parts of this section are obscured by a growth of vegetation.

Section No. 1, Langleys Bluff, about 5½ miles south of Cedar Point

	Feet
Pleistocene:	
5. Unfossiliferous cross-bedded buff sand and gravel with a water seepage along the base	4–15
4. Uniformly deposited unfossiliferous dark-gray sandy clay with a pebbly band at the base	2
3. Oyster zone—dark-colored sedimentary bed with inclusions of a few small pebbles. No unconformity was observed between this bed and the underlying one	0–1
2. Fossiliferous compact bluish sandy clay containing sandy pockets or filled borings. A thin oyster zone is at the base. In this bed are a few pebbles ranging up to 3 inches in diameter and smoothly water-worn cobbles, which are most abundant at the contact with the underlying Miocene	6–8
Unconformity.	
Miocene:	
1. Sandy clay with Miocene (St. Marys) fossils	0–3

Section No. 2, about three-fourths mile below section No. 1 and one-third mile above the site of the old Langley homestead. (Pl. 1, B.)

	Feet
Pleistocene:	
2. Rather stiff arenaceous clay, containing scattered pebbles. A layer of cobbles occupies a position 1 foot above the base	4
Probable unconformity.	
?Miocene, St. Marys (?) formation:	
1. Light gray to ferruginous argillaceous sand containing the following St. Marys forms, which are preserved as casts: *Turritella plebeia* Say, *Natica?*, *Cardium* species, *Tagelus?*, *Spisula?*. Contains also the peculiar spiral and other forms described in this paper. The face of the bluff is uneven, due to protruding indurated sand	4

Section No. 3, about half a mile below section No. 2 and one-third mile below the site of the old Langley homestead

	Feet
Pleistocene:	
4. Sand and gravel. A layer of cobbles occupies a position in the lower part	4
Probable unconformity.	
?Miocene, St. Marys (?) formation:	
3. Unfossiliferous arenaceous clay	1½
Miocene, St. Marys formation:	
2. Sand carrying entire and fragmental St. Marys shells	1½
1. Bluish arenaceous clay carrying well-preserved St. Marys fossils	2½

In the above section the upper surface of bed No. 1 is somewhat irregular, suggesting a slight unconformity; however, no coarse sedimentary beds were found at the contact between beds Nos. 1 and 2 and these beds may be essentially conformable.

Section No. 4, about one-third mile below section No. 3

	Feet
Pleistocene:	
2. Dark clay, sand, and gravel. A layer of cobbles occupies a position near the middle of this bed	4
Probable unconformity.	
?Miocene, St. Marys(?) formation:	
1. Alternating seams of gray arenaceous clay and ferruginous medium-grained sand. Contains casts of *Pholas?* inclosed in a ferruginous matrix as well as the peculiar spiral, nearly straight, and irregular forms. The sandy seams are indurated and protrude from the face of the bluff	4

Section No. 5, about two-thirds mile below section No. 4

	Feet
Pleistocene:	
2. Dark-colored clay, sand, and gravel. A layer of cobbles occupies a position about 1 foot above the base	3½
Probable unconformity.	
?Miocene, St. Marys(?) formation:	
1. Alternating seams of gray argillaceous sand and ferruginous sand. The face of the bluff is irregular, due to the indurated sandy seams and cylindrical and oval indurated ferruginous concretions. Contains casts of the genus *Pholas?* inclosed in a gray to ferruginous semiindurated fine-grained argillaceous sand	4

As shown in sections 1 and 3, the Miocene bed carrying well preserved St. Marys fossils occupies the lower 3 or 4 feet of the exposures. In section 1 the fossiliferous Pleistocene bed rests unconformably upon the Miocene. (Pl. 1, A.) The age and the relationship of the bed containing both the peculiar spiral and uncoiled forms to the known Miocene are a little uncertain. No exposure was seen at which this bed is in direct contact with the Miocene bed carrying well preserved St. Marys fossils. However, it appears to correspond to bed No. 2 in section No. 3, a bed carrying entire and fragmental St. Marys shells. There is a possibility that the material composing the bed containing both the peculiar spiral and uncoiled forms has been reworked and that the contained casts of Miocene shells are stratigraphically out of place, the shells being carried in with sediments of Pleistocene age; but the material is finer grained than most of the Pleistocene material overlying the Miocene.

GENERAL STATEMENTS CONCERNING THE PECULIAR FOSSIL SPECIMENS

In position, the coiled forms stand upright in the deposit, while the uncoiled forms usually are horizontal. The specimens are coiled, nearly straight and branching, or somewhat irregular. The surface of the specimens is usually roughened by rounded or elongated elevations. In cross section the tube reveals two distinct parts. The outer or peripheral part is designated, for convenience, the wall, and the inner part, the core. The material composing the core consists of homogeneous, rather compact, fine-grained, ocherous, micaceous, noncalcareous sand. Prints of fossil mollusks were found in the walls of some specimens, but no organic remains were found in the cores. The inner part of the peripheral wall is porous.

Coiled specimens.—These specimens are either dextrally or sinistrally coiled. The upper part (so inferred) of the specimens is more regularly and symmetrically coiled than the lower. The diameter of the whorls of the coil in cross section in some specimens is nearly constant throughout, whereas in other specimens one end is larger than the other. The wall, in cross section, reveals under magnification fine quartz grains cemented by iron oxide. The material composing the core is similar to that of the wall except that it is less indurated and contains no trace of organic remains. No cellular structure was detected in the thin slides made from the cross sections of the wall.

Uncoiled specimens.—The uncoiled specimens occur in the same bed with the coiled specimens, but the coiled and uncoiled forms were not found attached, consequently the relationship of the two different forms has not been determined. In general they are stem-like in habit. Some are branching. Usually they are horizontally arranged in the bed. One cylindrical specimen possessing a much

thicker wall than common was found in a vertical position in bed No. 1, section 3, which carries well preserved St. Marys fossils. All specimens possess the peripheral wall and central core.

SUGGESTED RELATIONSHIP OF THE COILED SPECIMENS

In appearance the coiled specimens resemble *Daimonelix* [sometimes spelled *Daemonelix* by Barbour and other authors], a name proposed by Barbour[1] for gigantic spiral forms occurring in nonmarine deposits of northwestern Nebraska. According to O'Harra,[2] these peculiar forms occur in the so-called Harrison beds, of lower Miocene age, which form a part of the Arikaree formation. O'Harra[3] says:

> Among the interesting materials of the bad land deposits few have given rise to more speculations as to their origin than what are known as the Devil's Corkscrews of the Harrison beds. Devil's Corkscrews, or Daemonelix, as they are technically called, have been known by the early residents of northwestern Nebraska for many years, but it was not until 1891 when Professor Barbour made a collecting trip to Harrison and the bad lands that these strange objects were brought to the attention of scientific men. What they really represent or how they were formed is still a matter of conjecture. The more typical forms are upright tapering spirals and they twist to the right or to the left indiscriminately. The spiral sometimes encloses a cylindrical body known as the axis but it is more often without the axis. Sometimes the spiral ends abruptly below but more often there projects from the lower part one or two obliquely ascending bodies placed much as the rhizomes of certain plants. The size of the well developed form varies considerably. The height of the corkscrew portion often exceeds the height of a man while the rhizome portion is ordinarily about the size of one's body.
>
> They are known to occur especially between the headwaters of White and Niobrara Rivers chiefly in Sioux County, Nebr., but extend westward to Lusk, Wyo., and eastward to Eagle Nest Butte, S. Dak. The vertical range of strata carrying them is approximately 200 feet. In certain localities they are found in the greatest profusion, sometimes stretching like a forest over many acres and sometimes so closely placed that they are inextricably entangled and fused together.
>
> Professor Barbour, who has given these interesting forms most study, considers them as representing some kind of plant life and has apparently found much to corroborate this view. Some have considered that they represent low plant organisms such as algae, others that they may be remains of higher plants, in which all has decayed away except the cortical layer. Still others, and these with much reason, have considered them as casts of well preserved burrows of animals. Among the earliest to suggest the latter idea were Dr. Theodore Fuchs, of Germany, and Professor Cope. More recently Mr. O. A. Peterson emphasized the latter view as a result of the finding of numerous fossils of burrowing rodents within the corkscrews.

The manner of coiling of the more regular forms of *Daimonelix* occurring in the "Harrison beds," as shown by the illustrations, and the coiled forms from Maryland is similar; but the latter are diminu-

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[1] Barbour, E. H., Notice of new gigantic fossils: Science, vol. 19, pp. 99–100, 1892.
[2] O'Harra, C. C., S. Dak. School Mines Bull. No. 13, p. 44, 1920.
[3] Idem, pp. 59–61.

tive as compared with some of the gigantic specimens referred to *Daimonelix*. However, the origin and nature of the fossil specimens from the widely separated regions may be different. The "Harrison beds" are considered to be of nonmarine origin, whereas the bed carrying the spiral form in Maryland appears to be of marine origin.

In Europe, peculiar spiral forms or twisted structures have been known for a long time. In 1865, Dr. Oswald Heer [4] called attention to some remarkable spirally twisted structures (Schraubensteine) occurring in various parts of the Molasse, or Miocene, of Switzerland. These structures consist of rodlike bodies about as thick as one's finger, on the side of which are seated spirally twisted branches of equal thickness. The author states that these structures were probably the result of filled-in borings made by some species of Mactrina. In favor of this explanation the author writes that Prof. Carl Mayer found a *Lutraria sanna* Basterot in a specimen taken from a sandstone near the Martinsbruck, in St. Gall. The author also says, on the authority of Doctor Biedermann, that the "screwstones" are found in the uppermost layer of the lower fresh-water Molasse at the boundary of the marine Molasse, which has furnished the material for them.

In 1901, Ludwig von Ammon [5] described a peculiar spiral form under the name *Daemonhelix krameri* from the cyrena-bearing marl in Peissenberg, Germany. The coil of the fragment [6] measured 13 cm. in length and over 5 cm. in diameter. The greater diameter of the spiral whorl in cross section measured 20 mm. The specimen was obtained in a mine from a bed overlying the principal coal-bearing series. The illustration [7] shows a cast of a muscle shell embedded in a whorl and the intraspiral matrix of a *Daemonhelix* coil.

NEW GENUS PROPOSED

The writer has not formulated any particular theory to explain the origin of the coiled or uncoiled forms from Maryland. There is a suggestion that the central part or core was filled in after the outer wall had been formed. If these forms owe their origin to some organism, as they probably do, that of some marine plant, perhaps a fucoid, seems the more likely. The spiral forms are striking and interesting objects, and for convenience of reference it is desirable to name them. I therefore propose the generic name *Xenohelix* for the spiral forms and designate *Xenohelix marylandica* as the genotype.

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[4] Die Urwelt der Schweiz, pp. 438, 439, fig. 326.

[5] Ueber das Vorkommen von "Steinschrauben" (Daemonhelix) in der oligocänen Molasse Oberbayerns, Geognostische Jahreshefte, Dreizehnter Jahrgang, 1900, pp. 55–69, figs. 4, 5, pl. 1, München.

[6] Idem, p. 63, fig. 4.

[7] Idem, p. 67, fig. 5.

XENOHELIX, new genus

XENOHELIX MARYLANDICA, new species

Plate 2, figs. 1–4

The specimen selected as the holotype is not entire, consisting of four remaining whorls. The diameter of the smaller end of the spire is more regularly and symmetrically coiled than the larger end, which suggests an irregularity in the habit of coiling. The surface is roughened by rounded or elongate elevations. The peripheral wall is thin, whereas the core is much thicker and constitutes the greater part of the tube. The character of the peripheral wall and core are as given under the description of coiled forms on page 3.

The measurements of the holotype in centimeters are: Length, 20.3; maximum diameter of larger end, 5, core of same end, 4; maximum diameter of smaller end, 3, core of same end, 2.1. Cat. No. 354137, U.S.N.M.

Type locality: Station 1/1049, low bluff on west shore of Chesapeake Bay, about 6½ miles south of Cedar Point and one-third mile above the site of the old Langley homestead, St. Marys County, Md. Bed No. 1 of section No. 2, page 2. L. W. Stephenson, collector.

The following bibliography of *Daimonelix* and other coiled forms has been prepared. Although this may be irrelevant to the subject of this paper, it will, however, serve as a reference to the literature on these very interesting forms referred to *Daimonelix*.

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EXPLANATION OF PLATES.

PLATE 1.

A, Photograph of Langleys Bluff, St. Marys County, Md. The head of the hammer shows the contact between the Pleistocene deposit and the St. Marys formation. See p. 1, section No. 1, for description.

B, Photograph of a low bluff about one-third mile above the site of the old Langley homestead, St. Marys County, Md. A—A indicates the probable unconformity between the lower bed and the upper bed. The peculiar spiral and other forms came from the lower bed, occuring more abundantly in the lower part, as indicated by the head of the hammer. See p. 2, section No. 2, for description.

PLATE 2.

FIGS. 1–4, *Xenohelix marylandica* Mansfield. Type of new genus and species. Cat. No. 354137, U.S.N.M. p. 6.

1. Upright position of coil, about three-fourths natural size.
2. Cross section of peripheral wall cut from specimen No. 1, showing porous character of wall. (X 3.)
3. Photomicrograph of peripheral wall in cross section, cut from specimen No. 1. (X 3.)
4. Cross section of larger end of specimen No. 1, about natural size, showing peripheral wall and central core.

PLATE 3

FIGS. 1, 2. *Xenohelix marylandica* Mansfield. Topotypes. Cat. No. 354138, U.S.N.M. Slightly reduced.

3. Fragment in cross section of *Xenohelix marylandica*. *a*, Shows a cast of a bivalve shell imbedded in the inner margin of the peripheral wall. Slightly reduced.

PLATE 4

FIGS. 1, 3. Irregular, apparently branching form, taken from the same bed at the same locality as the type of *Xenohelix marylandica* Mansfield. Cat. No. 354139, U.S.N.M. Slightly reduced.

2. Longitudinal section of a nearly straight and tapering form, taken from the same bed and at the same locality as Figures 1 and 3. Horizontally placed in the bank. Cat. No. 354140, U.S.N.M. Slightly reduced.

PLATE 5

FIG. 1. Small, elongate, nearly cylindrical form associated with *Xenohelix marylandica* at the type locality. Cat. No. 354139, U.S.N.M. Slightly reduced.

2, 3. Fragment of nearly straight and cylindrical form taken from the upper part of bed No. 1 of section 3 (p. 2) of the St. Marys formation, about one-third mile below the site of the old Langley homestead. Cat. No. 354141, U.S.N.M. Slightly reduced.

2. Upright position of specimen.

3. Cross section of larger end of same specimen showing thick peripheral wall and central core.

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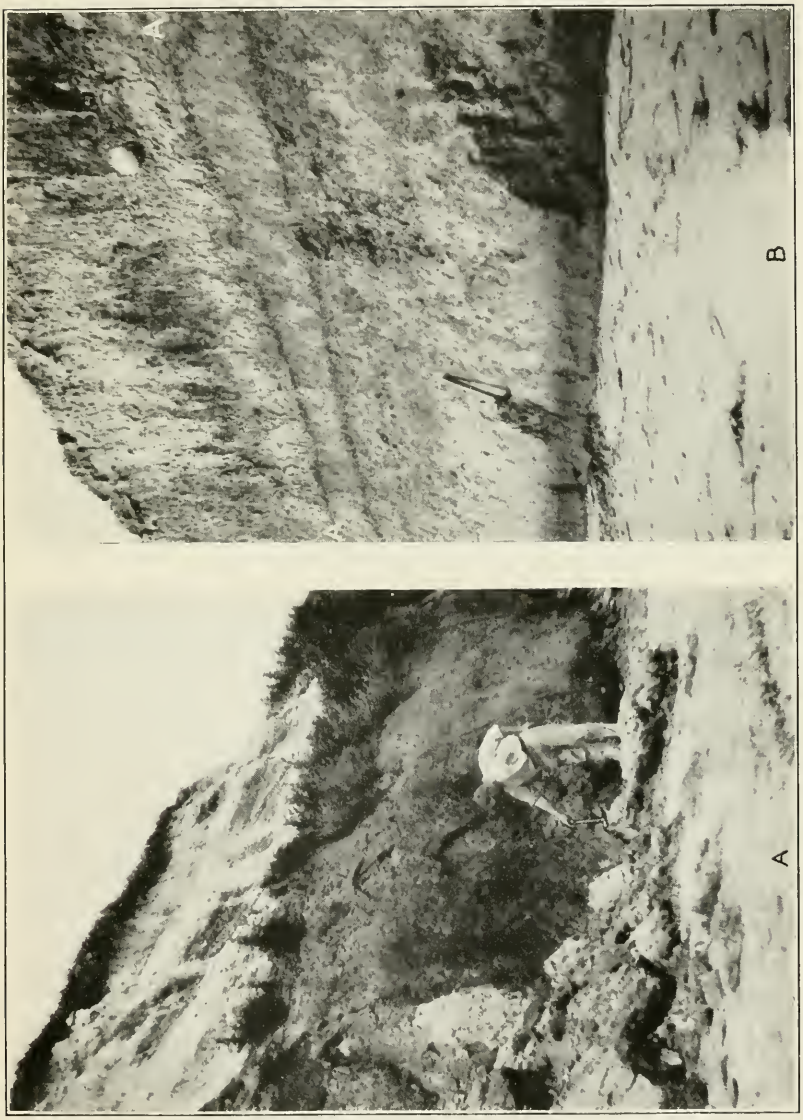

VIEWS AT AND BELOW LANGLEYS BLUFF, ST. MARYS COUNTY, MARYLAND

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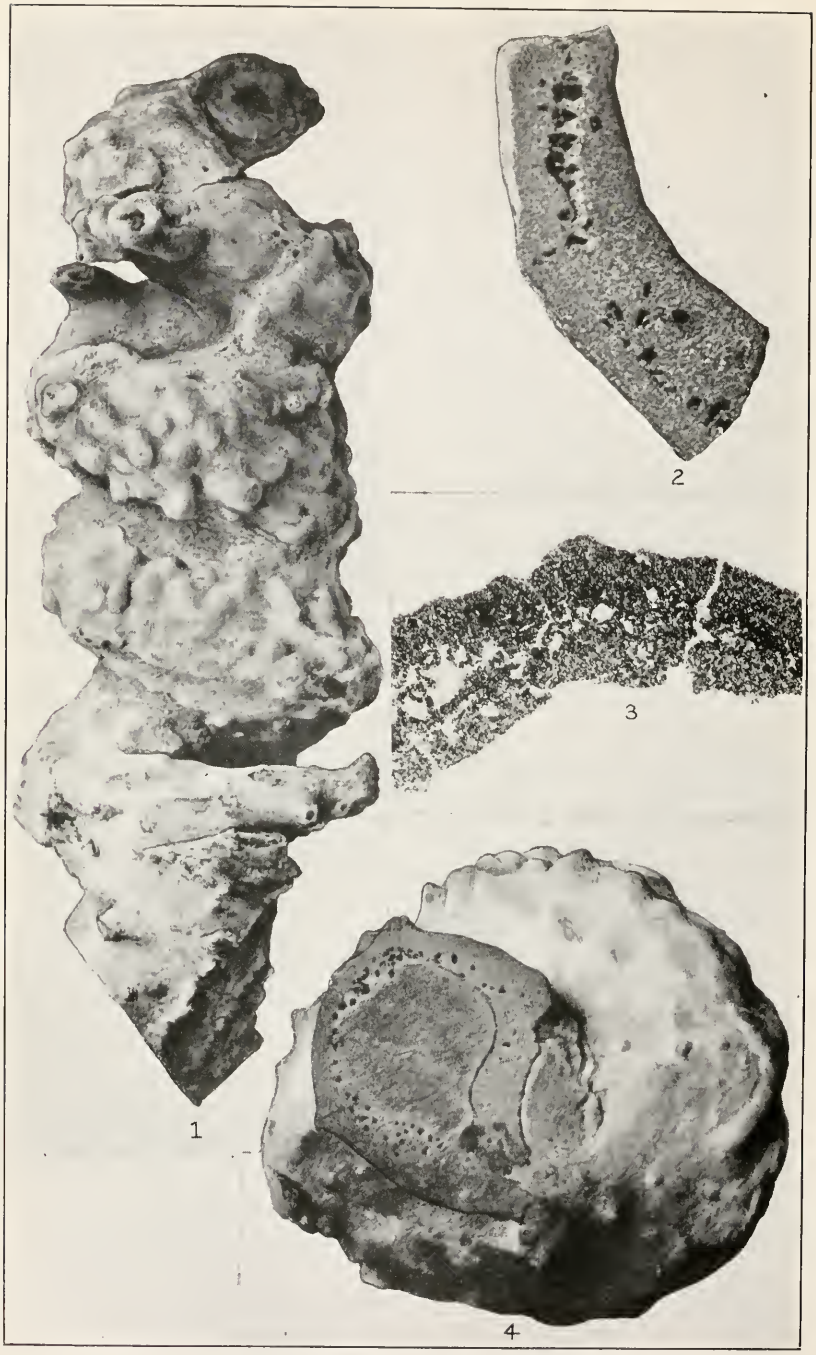

XENOHELIX MARYLANDICA MANSFIELD

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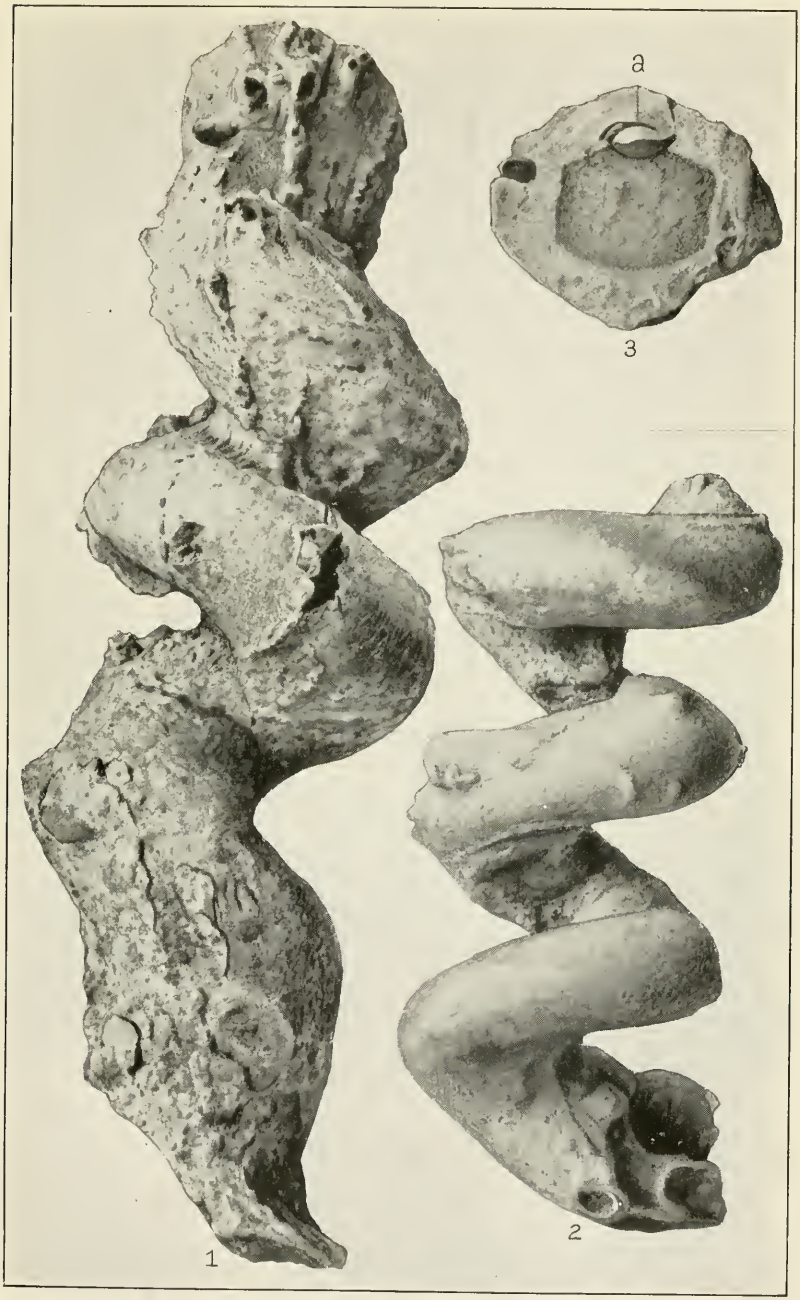

XENOHELIX MARYLANDICA MANSFIELD

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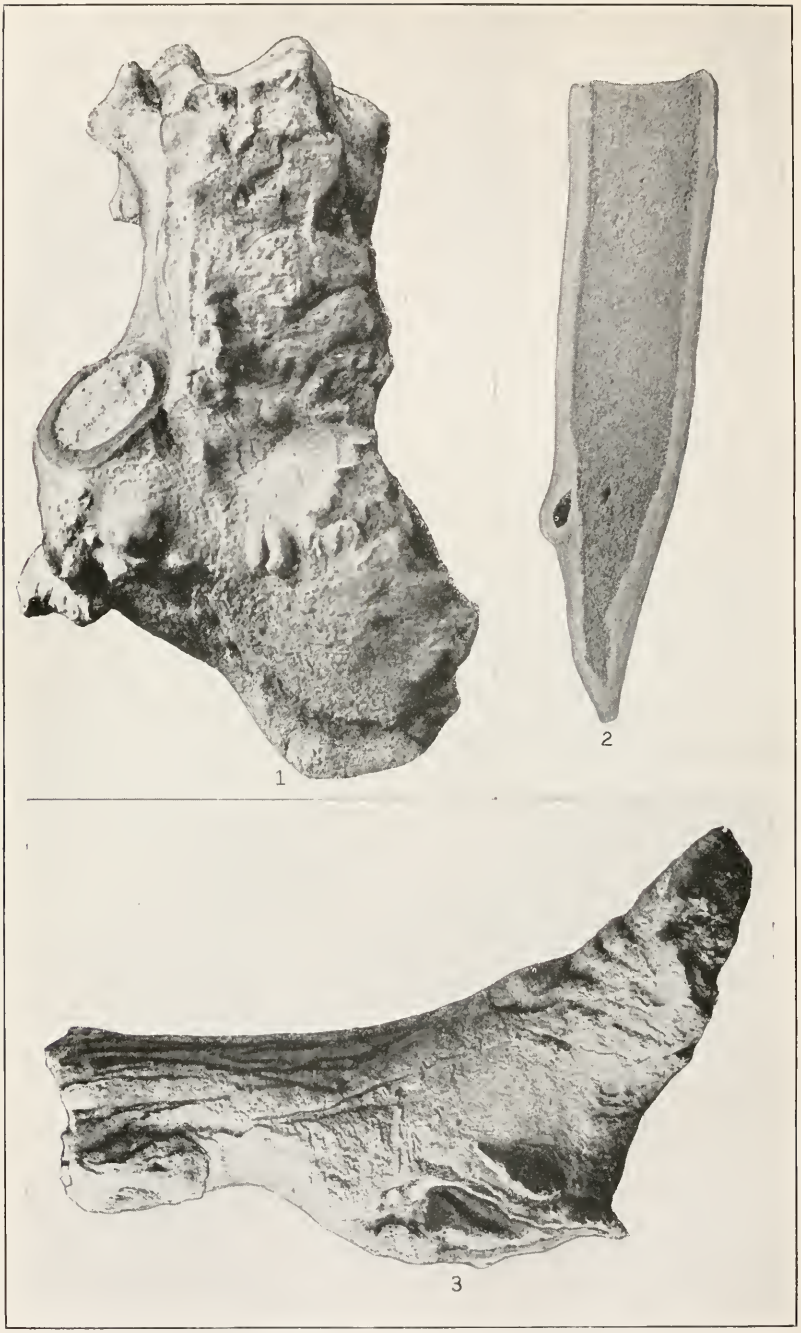

IRREGULAR FORMS ASSOCIATED WITH XENOHELIX MARYLANDICA MANSFIELD

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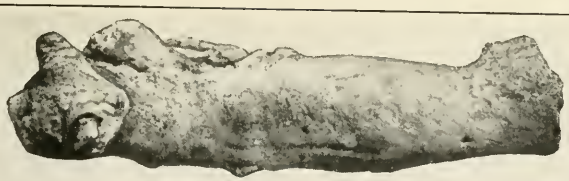

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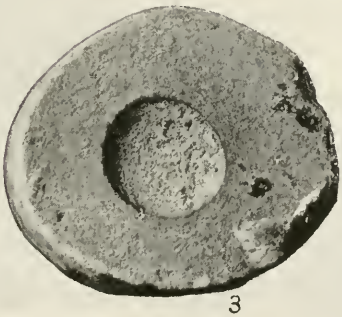

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CYLINDRICAL FORMS FROM BELOW LANGLEYS BLUFF

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