THE SHIPWORMS OF THE PHILIPPINE ISLANDS

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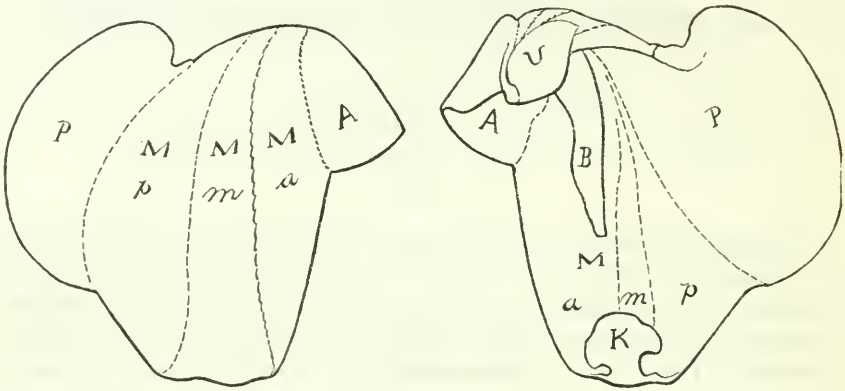
Our card catalogue of the Philippine mollusks contains no reference to shipworms in Philippine waters. I fear that the work during the Philippine Expedition of the United States Bureau of Fisheries Steamer *Albatross* also failed to stress this much neglected field of research. This is not to be wondered at since shipworms are among the most inconspicuous mollusks that the sea harbors. Pilings and drift wood infested by them rarely ever proclaim their presence until they begin to disintegrate, for the tiny punctures on their outer surface are too small to reveal the enemy gnawing at their heart. It is only when a great efflorescence of these forms produces an outbreak that threatens all unprotected shipping in a region, that they come to their own and are allotted a conspicuous status for interfering with the economics of man. The importance which the shipworm problem has assumed since the outbreak in San Francisco Bay, California, during 1919–20 would, were I again to visit the Philippines, cause me to keep a sharper lookout for shallow water forms than I did during the *Albatross* expedition, and I am sure that such an effort would result in the material expansion of the list here offered.

Most of the shipworms here described were taken from pieces of wood brought up by our dredge sometimes from considerable depth, at various stations. It is a remarkable fact that our dredging at the mouth of rivers, even when these emptied into semienclosed bays, yielded only fragments of wood, and these fragments were always honey-combed and riddled by boring mollusks which destroy the water-logged wood in such places and prevents the formation of wood deposits in salt water lagoons.

I wish here to express my appreciation to John A. Mirguet, preparator in the Division of Mollusks of the United States National Museum, for it was his skillful excavating that has kept the pallets associated with the shell to which they belong. Only those who have attempted work of this kind when dealing with dry riddled wood, will realize the great care and patience necessary for this

work. I wish also to express my appreciation to Mrs. E. B. Decker, artist in the Division of Mollusks, for the careful drawing here reproduced.

FIG. 1.—EXTERIOR AND INTERIOR OF SHELL TO SHOW THE TERMINOLOGY USED IN THE DESCRIPTIONS



A. Anterior part. a. Anterior portion of median part. U. Umbones.
M. Median part. m. Middle portion of median part. B. Blade.
P. Posterior part. p. Posterior portion of median part. K. Knob.

Genus BANKIA Gray

1840. *Bankia* GRAY, Synop. British Mus., p. 76.
1922. *Bankia* BARTSCH, Bull. 122, U. S. Nat. Mus., p. 7.

The genus is characterized by having the pallets consisting of a series of cone-in-cone structures, which give to them the appearance of an ear of wheat.

Type.—Teredo bipalmulata Lamarck.

Subgenus BANKIA Gray

1840. *Bankia* GRAY, Synop. British Mus., p. 76.
1922. *Bankia* BARTSCH, Bull. 122, U. S. Nat. Mus., p. 7.

In this subgenus the distal end of the cones terminates in a thin membrane, which is fimbriated at the free margin. The lateral fimbriations form long awnlike projections.

Type.—Teredo bipalmulata Lamarck.

BANKIA (BANKIA) PHILIPPINENSIS, new species

PHILIPPINE SHIPWORM

Plate 53, figs. 1, 3; plate 56, fig. 8; plate 58, figs. 7, 8, 9

Shell small, white. Umbone badly eroded. The anterior portion covered by a heavy callused smooth area which is about one-third as wide as the remaining anterior part. The dental ridges curve suddenly downward, immediately posterior to the callus, and then extend

in an even curve backward. Forty-four of these ridges are present in the type, but this is by no means the entire number, for the early ones are completely eroded at the umbone. The ridges slope a little more abruptly dorsally than ventrally, and are exceedingly finely denticulated at the free margin. The anterior median area is very broad; in fact in the type, which is the only specimen available, it constitutes the entire median area. This, however, may be due to erosion. The dental ridges of this part are almost twice as wide as those on the anterior area. There are 40 in a line parallel to the ventral margin of the anterior part. These ridges are strongly denticulated. Posterior to the denticulated median portion the shell slopes abruptly down into a very narrow shoulder, beyond which only a very slender auricle projects. The middle and posterior median part are apparently absent. Should this prove to be the usual state of affairs, and not merely due to erosion, it will be necessary to transfer this animal to a new genus. Interior bluish white. Suture of the anterior and anterior median portion marked by a raised cord. The posterior border of the median part is thickened and bears the knob at its ventral margin. A very slender auricle is present, which partly glazes over the middle part, forming the merest indication of a shelf almost resembling *Psiloteredo* in its reduction. A narrow irregular slender blade extends two-thirds of the way from the umbone to the ventral margin of the shell. The pallets are slender with a very slender stalk. The membrane on the outside of the evenly rounded segments is finely fimbriated. The inner border appears to be free of fimbriations and is also evenly curved.

The type (Cat. No. 310970, U.S.N.M.) was obtained by the United States Bureau of Fisheries Steamer *Albatross* Philippine Expedition, at station 5243, in 218 fathoms in a piece of wood taken from gray mud bottom, bottom temperature 63.6° in Pujada Bay, eastern Mindanao. It measures: Altitude, 1.3 mm.; length, 1.3 mm.; diameter, 1.3 mm. The pallet measures: Length, 4.6 mm., of which 1.2 mm. go to the stalk; diameter, 0.7 mm.

Another specimen of this species, Cat. No. 310971, U.S.N.M., was collected by the same expedition at station 5252 in 28 fathoms from a piece of wood taken on coral bottom, off Linao Point, Gulf of Davao.

Subgenus NEOBANKIA Bartsch

1921. *Neobankia* BARTSCH, Proc. Biol. Soc., Washington, vol. 34, p. 26.
1922. *Neobankia* BARTSCH, Bull. 122, U.S. Nat. Mus., p. 9.

In Neobankia the pallets consist of cone-in-cone elements, covered by a thin membrane, which is denticulate at the free margin.

Type.—Bankia (*Neobankia*) *zeteki* Bartsch.

BANKIA (NEOBANKIA) JOHNSONI, new species

JOHNSON'S SHIPWORM

Plate 53, figs. 5, 13; plate 56, fig. 7; plate 58, figs. 10, 11, 12

Shell of moderate size, subglobular. The anterior area and the anterior median area flesh-colored. The middle median area tinted with the same shade, the rest white. The extreme anterior area is marked by the usual sinus, which is covered by a white callus, which is reflected slightly over the anterior portion. From this callus the dental ridges radiate backward, curving abruptly downward at the extreme anterior portion and then gently backward. These ridges are about half as wide as the spaces that separate them on the early portion of the shell, but become closer spaced as the shell increases in age. The later ridges are separated by mere impressed grooves. The ridges slope more abruptly dorsally than ventrally and are finely denticulated at their free margin. There are 56 present in the type. The line marking the junction of the anterior area and the anterior median portion is wavy. The anterior median portion is rather broad, marked by rather broad denticulated ridges, which meet the dental ridges of the anterior area in a little more than a right angle. There are 28 of these in a line parallel to the ventral border of the anterior part. The middle median portion is slightly concave and crossed by rather strong, irregularly spaced lines of growth. The posterior median portion is almost as wide as the anterior and middle portion combined, and is marked by fine lines of growth only. The junction of the posterior part and the posterior median portion is marked by a strong constriction. The posterior part or auricle appears without sculpture. The interior of the shell is bluish white. The junction of the anterior and median parts is marked by a tumid ridge. The middle median portion is a rough depressed groove, at the tip of which the usual knob is present. The posterior part overlaps the posterior median portion as a strong spoonlike shelf, half of which projects outward and half inward, leaving a decided cavity. The blade is broad, irregularly roughened at the anterior margin and extends for two-thirds of the length of the shell, springing from under the umbone. The pallets are unfortunately fractured in all the specimens at our command. They are of the cone-in-cone type, with the free margin strongly denticulated all around.

The type (Cat. No. 319956, U.S.N.M.) was collected by the United States Bureau of Fisheries Steamer *Albatross* Philippine Expedition, station 5209, in 100 fathoms in a piece of wood taken on mud bottom at Batangas Bay, Luzon. The shell measures: Altitude, 4.5 mm., length, 5 mm., diameter, 4.4 mm. The pallet is too broken to yield measurements.

An additional lot of specimens taken from the same chunk of wood is entered as Cat. No. 246128, U.S.N.M. Still another lot was

obtained on the same expedition from a piece of wood at station 5191, in 258 fathoms on green mud bottom, temperature 62.8°, in Tanon Strait, off Refugio Island. This is entered as Cat. No. 310967, U.S.N.M.

I take pleasure in naming this species for Rear Admiral Marbury Johnson, who was in command of the *Albatross* at the time of the expedition.

BANKIA (NEOBANKIA) BARTHELOWI, new species

BARTHELOW'S SHIPWORM

Plate 58, figs. 1, 2, 3

Of the present species, only three pallets are known, the two larger of which belong to the same individual, which I shall designate as type. These are of the cone-in-cone type, with the outer margin forming a shallow cup, while the inner face is much produced and about three times the height of the outer. The outer margin of the segments is beautifully denticulated, while the inner is smooth. These pallets are so characteristic that I do not hesitate to describe the species therefrom.

They measure: Length, 7.7 mm., of which 2 mm. go to the stalk; diameter, 1.2 mm.

They were obtained from the same piece of wood from which the type of *Bankia* (*Neobankia*) *johnsoni* was secured at station 5266, in 100 fathoms on mud bottom in Batangas Bay, Luzon. They are Cat. No. 310968, U.S.N.M.

A couple of loose pallets obtained from a piece of wood collected by the *Albatross* at station 5252, in 28 fathoms on coral bottom, off Linao Point, Gulf of Davao, appear to belong to this species.

The species is named for the late Benjamin Barthelow, executive officer of the *Albatross* during her cruise on the Philippine Expedition.

Subgenus BANKIELLA Bartsch

1921. *Bankiella* BARTSCH, Proc. Biol. Soc. Washington, vol. 34, p. 26.
1922. *Bankiella* BARTSCH, Bull. 122, U. S. Nat. Mus., p. 10.

Pallets consisting of a series of cone-in-cone elements covered by a thin membrane which is neither fimbriated nor denticulated at the free margin, but entire.

Type.—Bankia (*Bankiella*) *mexicana* Bartsch.

BANKIA (BANKIELLA) DAVAOENSIS, new species

DAVAO SHIPWORM

Plate 53, figs. 2, 4; plate 56, fig. 3; plate 58, figs. 4, 5, 6

Shell small, subglobular, white. Anterior area rather broad without a strong callus at its extreme anterior sinus, marked by very strong and strongly denticulated dental ridges which slope more abruptly dorsally than ventrally. Of these ridges 35 are present in the type.

They increase in size regularly from the anterior margin backward. At the posterior termination they are about as broad as the spaces that separate them. The anterior median portion is rather broad and is marked by dental ridges which are as wide as those on the anterior area, but a little more closely spaced and provided with much stronger denticles. Of these ridges 14 can be counted in a line parallel to the ventral border of the anterior portion. The median portion of the middle part is narrow and slightly concave, crossed by the curved continuations of the dental ridges of the anterior median portion, which here lose their denticles. The posterior median portion is narrow and marked by rather coarse lines of growth, the coarser of which coincide with the coarser crossing the median portion. The posterior and middle median portions are not quite as wide as the anterior median portion. No auricle is visible externally. It is possible that this may be eroded in the specimens at hand. Interior bluish white. The anterior and median portions are joined by a cord. The middle median portion appears as a roughened groove, which bears the usual strong knob at its ventral termination. The posterior part laps over the middle part as a heavy callus, which is free at the inner border. This portion is marked by slender parallel threads which gives it a somewhat fluted appearance. A slender, somewhat irregular curved blade extends from under the unbones over two-thirds of the shell. The usual knob is present at the ventral margin of the median part. The cone-in-cone shaped segments of the pallets are of rather a peculiar shape. They appear as a series of scoops in which the outer margin is only about one-fifth as high as the inner margin. The free border of the inner margin forms a convex curve while the free margin of the outer border joins the inner portion in an even concave curve.

The type (Cat. No. 310973, U.S.N.M.) was taken from a piece of wood collected during the United States Bureau of Fisheries Steamer *Albatross* Philippine Expedition, at station 5252, in 28 fathoms on coral bottom off Linao Point, in the Gulf of Davao, Mindanao. It measures: Altitude, 1.3 mm.; length, 1.2 mm.; diameter, 1.3 mm. Length of pallets, 3 mm., of which 0.7 mm. go to the stalk; diameter of pallets, 1 mm.

Several additional pallets from the same piece of wood are entered as Cat. No. 310974, U.S.N.M.

Genus TEREDO Linnaeus

1758. *Teredo* Linnaeus, Syst. Nat., ed. 10, p. 651.
1922. *Teredo* Bartsch, Bull. 122, U. S. Nat. Mus., p. 17.

In this genus the pallets are either paddle or spoon shaped. They may be distally cupped or not, or they may even bear a calcareous knob at the terminal portion.

Type.—*Teredo navalis* Linnaeus.

Subgenus COELOTEREDO Bartsch

1923. *Coeloteredo* BARTSCH, Proc. Biol. Soc. of Washington, vol. 36, p. 99.

In this subgenus the blade of the pallet forms a half hollow cone; that is, the outer portion is convex while the inner portion of the blade is almost flat. The entire structure is very thin. The stalk is short with the basal half expanded into an oval knob, which is fully three times as wide as the narrower neck of the stalk.

Type.—Teredo (Coeloteredo) mindanensis Bartsch.

TEREDO (COELOTEREDO) MINDANENSIS Bartsch

MINDANAO SHIPWORM

Plate 53, figs. 10, 12; plate 56, fig. 6; plate 60, figs. 4, 8, 12

1923. *Teredo (Coeloteredo) mindanensis* BARTSCH, Proc. Biol. Soc. Washington, vol. 36, pp. 99–100.

Shell small, subglobular, white, the extreme anterior portion of the anterior part with a moderately deep sinus that is covered with a smooth callus, which is slightly reflected over the exterior portion. The remaining anterior part is crossed by moderately strong dental ridges which first bend downward and then backward in an even, gentle curve, separated at the posterior extremity by spaces about twice as wide as the dental ridges. These dental ridges slope a little more abruptly dorsally than ventrally, and are very finely denticulated at their free border. There are 42 of these in the type, in which the umbone is partly eroded. A perfect specimen would therefore show a large number. The anterior part of the median area is marked by closely crowded dental ridges, which are about as wide as those of the anterior area. The denticles of these are quite fine. Of these ridges 22 are present in a line parallel to the ventral margin of the anterior part. The middle median portion is slightly concave and crossed by the nondenticulated decidedly curved continuations of the dental ridges of the anterior median portion, and fine incremental lines. The posterior median part bends rather abruptly downward to join the auricle. The interior is white. The junction of the anterior and median portion is marked by a rather strong cord. The middle median portion forms a slightly depressed roughened groove, at the basal termination of which the usual strong knob is situated. The auricle overlaps the posterior median portion decidedly and forms a rather strong shelf. The cordlike markings described for the exterior are also apparent on the inside. A strong, somewhat irregular curved blade extends from the inner side of the umbone two-thirds of the way toward the basal knob. The pallets consist of half a hollow

cone; that is, the external portion is curved while the inner portion is almost flat. The cavity of the cone extends to the insertion of the stalk. The stalk is short and bears an expanded knob at its free end.

The type (Cat. No. 310975, U.S.N.M.) was collected in a piece of wood dredged during the United States Bureau of Fisheries Steamer *Albatross* Philippine Expedition, at station 5252, in 28 fathoms on coral bottom off Linao Point, Gulf of Davao, Mindanao. It measures: Altitude, 2.2 mm.; length, 2.2 mm.; diameter, 2.2. The pallets measure: Length, 2.6 mm.; diameter, 1.3 mm., of which 1.2 mm. go to the stalk.

A lot of specimens from the same piece of wood are entered as Cat. No. 246127, U.S.N.M.

Subgenus TEREDOTHYRA Bartsch

1921. *Teredothyra* BARTSCH, Proc. Biol. Soc. Washington, vol. 34, p. 26.
1922. *Teredothyra* BARTSCH, Bull. 122, U. S. Nat. Mus., p. 22.

In this subgenus the pallets are doubly cupped at the terminal portion.

Type.—*Teredo* (*Teredothyra*) *dominicensis* Bartsch.

TEREDO (TEREDOTHYRA) SMITHI, new species

SMITH'S TEREDO

Plate 53, figs. 6, 7; plate 56, fig. 4; plate 59, figs. 10, 11, 12

Shell small, subglobular, milk-white, the extreme anterior margin of the anterior part somewhat excavated and covered by a rather thick callus which is partly reflected over the outside. Posterior to this callus the anterior part is marked by ridges which radiate fan-shaped from the callus posteriorly. They are closely approximated anteriorly, the space between them widening posteriorly. Those on the first half of the shell are much more distantly spaced than the later ones, being about three times as far apart as the ridges themselves, while the later ones are about equal to the spaces that separate them at their posterior margin. The free borders of these ridges are finely denticulated. The spaces between the ridges are finely granulose. The anterior portion of the median part is crossed by 28 strong, denticulated ridges which are separated by mere impressed lines. Of these ridges, 21 are present in a straight line projected from the ventral border of the anterior part across the anterior portion of the median part. The individual denticles are doubly cusped at their free margin. The middle portion of the median part is concave and crossed by the attenuated continuations of the dental ridges

which are here bent outward. The whole area is somewhat rough. The posterior portion of the middle part is about as wide as the anterior and median portions taken together, and is marked by numerous incremental lines and the feeble continuations of the stronger lines referred to for the middle part. The posterior part forms a rather conspicuous auricle which is separated from the posterior portion of the median part by a strongly impressed constriction. The auricle is usually badly eroded and is marked by concentric lines of growth paralleling the ventral margin. Interior bluish-white. The anterior part joins the middle part in a raised tumidity. The middle portion of the median part shows as a rough groove, at the ventral termination of which the strong knob is present. The posterior part extends over the posterior portion of the middle part as a strong shelf; the inner edge of this part is very heavy and the cavity behind it rather deep. The posterior portion when viewed from within is spatulate, the part that extends up to the umbone being the handle. There is a strong oblique irregular blade which springs from the underside of the umbone and extends three-fourths of the way from the umbone to the ventral knob. The pallet is very long and decidedly attenuated basally. There is a deep median fold on the outside which divides it into the two parts. There is also a deep excavation near the terminal lateral margin on the outside. Viewed from the inside the attenuated lateral wings of the expanded portion border the strong median rib which extends attenuatedly to the edge of the distal portion. The two lateral flaps of the distal expanded portion are decidedly concave. The calcareous margins, when viewed from the inside, extend as two pointed horns at the distal end, bearing the horny portion at their tips. There is a deep sinus at the distal end both above and below.

The type (Cat. No. 312919, U.S.N.M.) was collected by the United States Bureau of Fisheries Steamer *Albatross* Philippine Expedition, in a piece of wood dredged at station 5266 off Matocot Point, western Luzon, in 100 to 135 fathoms on mud bottom. It measures: Height, 1.8 mm.; length, 1.5 mm.; diameter, 1.5 mm. Pallet measures: Length, 7.3 mm., of which 2.2 go to the stalk; diameter, 0.9 mm. Cat. No. 246128, U.S.N.M., contains a lot of specimens from the same piece of wood. Cat. No. 312920 contains a lot of specimens taken from a piece of wood dredged at station 5269 off Matocot Point, western Luzon, in 200 fathoms on fine sandy and pebbly bottom.

I take pleasure in naming this shipworm for Dr. Hugh M. Smith, formerly Commissioner of Fisheries and director of the *Albatross* Philippine Expedition.

TEREDO (TEREDOTHYRA) RADCLIFFEI, new species

RADCLIFFE'S SHIPWORM

Plate 53, figs. 11, 14; plate 56, fig. 5; plate 59, figs. 7, 8, 9

Shell small, thin, semitransluscent; the extreme anterior portion of the anterior part forms a narrow sinus which is covered by a rather thick callus that is partly reflected over the outside; the rest of the anterior part is covered by numerous slender, closely spaced denticulated ridges, of which 72 are present, and many more must have been lost when the apices of the umbones were eroded. These denticulated ridges become fused at the anterior margin and are separated on the early part of the shell by spaces about twice as wide as the ridges, and on the later portion by spaces about as wide as the ridges at their posterior extremity. Their free margin is finely denticulated; the anterior median area is very broad and marked by numerous ridges that bear strong denticles. Of these ridges 44 are present in a line projected across the area from the ventral border of the anterior part. The denticles are exceedingly fine. The middle portion of the median area is rather broad and crossed by the distantly spaced, outbent continuations of the dental ridges, which here lose their denticles, and fine lines between them. There are also two rather strong radiating lines present. The posterior portion of the middle part is about as wide as the anterior and middle portion combined, and is marked by the decidedly upbent continuations of the lines already referred to for the middle part. The posterior part forms a narrow auricle which is conspicuously constricted off where it joins the posterior portion of the median part. Interior of the shell bluish-white. A strong suture marks the junction of the anterior and middle part; there is a rough area marking the middle portion of the middle part bearing a conspicuous knob at its ventral margin. The posterior part extends over the posterior portion of the middle part as a shelf which is spatulate in shape, the narrowed handle extending up to the umbonal knob. There is a deep cavity behind this shelf. A slender thin blade extends from under the umbone obliquely ventrally through about two-thirds of the shell. The pallets are long and spatulate, the stalk occupying about two-fifths of the length. The expanded portion extends as a narrow wing down the two sides of the stalk; the distal portion of the pallet is deeply impressed to form the two pits, and there is an excavation on the two lateral margins where the calcareous and horny portions join. On the inside the pallets show the continuation of the stalk to almost the distal portion of the calcareous part, the lateral wings of the pallet being concave on each side. The horny portion has two lateral horns.

The type (Cat. No. 312921, U.S.N.M.) was collected by the United States Bureau of Fisheries Steamer *Albatross* Philippine Expedition, from a piece of wood dredged at station 5252 off Linao Point, Gulf of Davao, Mindanao, in 28 fathoms on coral bottom. It measures: Height, 2.1 mm.; length, 2 mm.; diameter, 1.8 mm. The pallet measures: Length, 3.9 mm., of which 1.2 mm. go to the stalk; diameter of expanded blade, 0.6 mm.

I take pleasure in naming this mollusk for Mr. Lewis Radcliffe, Deputy Commissioner of Fisheries, who was a member of the scientific staff during the cruise of the *Albatross* in Philippine waters.

TEREDO (TEREDOTHYRA) TANONENSIS, new species

TANON SHIPWORM

Plate 54, fig. 7; plate 56, fig. 1; plate 59, figs. 1, 2, 3

Shell minute, milk-white, the anterior sinus of the anterior part is bordered by a rather thick callus which is reflected over the margin. From this margin strong denticulated ridges radiate fan-shaped over the rest of the anterior part. These ridges are closely approximated at the callus and become separated at their posterior end, on the early portion of the shell, by a space about four times as wide as the ridges. The last nine, however, are closely approximated at the distal portion. This seems to be a senescent character. The anterior portion of these ridges near the callus bear strong denticles, while the rest is very finely denticulated, the grooves separating the denticles passing down on both the dorsal and ventral margin of the ridges. The posterior termination of the anterior part forms almost an even arc. The anterior portion of the median part is crossed by strong dental ridges which are a little wider than those on the anterior part and very strongly denticulated. Of these ridges, 15 occur in a straight line parallel with the ventral margin of the anterior part. The denticles are somewhat spatulate in shape, the expanded portion being at the posterior margin, while the stalk portion occupies the anterior half. The median portion of the middle part is a slightly concave area almost as wide as the anterior portion of the median part. It is crossed by the feeble continuation of the dental ridges which here, however, are reduced to mere raised lines and without denticles. The posterior portion of the median part is about as wide as the anterior and middle portion combined, and is crossed by the continuation of the ridges just referred to in the middle portion, but these become decidedly enfeebled here. Posterior auricle narrow, almost clawlike, separated from the posterior portion of the median part by a strong constriction. The auricle is marked by rather strong, distantly spaced corrugations. Interior of shell bluish-white, the junc-

tion of the anterior and middle part marked by a somewhat irregular callus; the middle portion of the median part is marked by a rough slightly concave area which terminates ventrally in a strong knob. The posterior auricle extends over the posterior portion of the median part as a shelf with a conspicuous cavity behind it. It is translucent and shows the markings of the outside within. From under the strong umbone a strong, somewhat curved and twisted blade extends for about half the length of the shell. Pallets rather long, the stalk quite long, expanded toward the blade with a strong median groove on the outside which renders the pallet doubly cusped. The expanded blade bears a strong excavation immediately below the two lateral terminal horns. On the inside they are spoonshaped, showing the extension of the stalk prominently almost to the tip of the pallet. The extreme distal portion of the pallets bears thin membranes.

The type (Cat. No. 310964, U.S.N.M.) was collected by the United States Bureau of Fisheries Steamer *Albatross* Philippine Expedition, at station 5189 off Pecador Island, Tenon Strait, in 300 fathoms on green mud bottom, bottom temperature 62.8°. It measures: Height, 2 mm.; length, 1.6 mm.; diameter, 1.8 mm. The pallets measure: Length, 4.2 mm., of which 2.6 go to the stalk; diameter blade, 0.9 mm. Cat. No. 310965, U.S.N.M., contains a lot of specimens taken from the same piece of wood, as well as a large piece of infected wood. Cat. No. 466131–A contains a specimen dredged at station 5243 off Pujada Bay, eastern Mindanao, in 218 fathoms on gray mud bottom, bottom temperature 63.6°.

Ungoteredo, new subgenus

Pallet of the shape of *Coeloteredo*, but with a calcareous portion in the blade which consists of two deep pits with a calcareous border separated by a deep median slit. The expanded portion reminds one, when viewed from the outside, of a goat's hoof with the toes pointing toward the stalk. It is not unlike *Teredothyra*, but the expanded blade is very short and broad. The shell is typically teredine. The posterior auricle extends over the posterior median portion forming a shallow shelf.

Type.—*Teredo* (*Ungoteredo*) matacotana Bartsch.

KEY TO THE SPECIES OF THE SUBGENUS OF UNGOTEREDO

Pallets with a double transverse groove below the double cupped portion. **chamberlaini.**

Pallets without a double transverse groove below the double cupped portion.

Pallets with a single transverse groove below the double cupped portion.

Cups separated by a deep median longitudinal cut ..... **matocotana.**

Cups not separated by a deep median longitudinal cut.

Cups separated by an impressed line only ..... pujadana.

TEREDO (UNGOTEREDO) MATOCOTANA, new species

MATOCOT SHIPWORM

Plate 53, figs. 8, 9; plate 56, fig. 2; plate 60, figs. 5, 6, 7

Shell small, anterior margin of the anterior part with a rather strong sinus which has a thin callus that is not reflected. This part is rather broad and bears strong denticulated ridges which take a sudden turn ventrally at the anterior margin and are then reflected across. They are badly eroded; the last seven only are left in good shape and these are separated at their posterior extremity by narrow grooves much less in width than the raised ridges. The anterior median portion is very broad and bears strong dental ridges which are separated by narrow incised lines. These ridges are a little less in width than those on the anterior part. The last eight only remain; the rest are stripped of their denticles. The denticles are doubly cusped, the anterior cusp being about twice as large as the posterior. The middle portion of the median part is rendered decidedly rough by irregular transverse wrinkles. The posterior portion of the middle part is about as wide as the middle portion and is crossed by lines of growth. The posterior part is very narrow and is separated from the posterior median part by a constriction. Interior bluish-white. The junction of the anterior and median part is marked by a raised thread. The posterior part is not differentiated from the median part within. The anterior portion of the middle part appears cancellated by transmitted light. A long twisted blade extends from under the strong umbonal knob about four-fifths of the distance across the cavity toward the strong ventral knob. The pallets have a rather long stalk which is somewhat roughened. The stalk as well as the basal portion of the expanded part is of pale horn color. The two cups are made up of white calcareous material and are separated on the outside by a deep broad channel. The inner border of these two cups is slender and somewhat perforated. It seems to be made up of bars which run parallel with the outer margin of the septum. The distal portion of the horn-colored part of the expanded pallet forms a slightly curved entire line. The sinus is in the calcareous cup wall only.

The type (Cat. No. 312930, U.S.N.M.) was found in a piece of wood dredged at station 5266 in 102 to 135 fathoms on mud bottom off Matocot Point, Luzon, by the United States Bureau of Fisheries Steamer *Albatross* Philippine Expedition. It measures: Height 1.1 mm.; length, 1.3 mm.; diameter, 1.2 mm. The pallet measures: Length, 3 mm., of which 1.7 mm. go to the stalk; diameter, 1.5 mm.

TEREDO (UNGOTEREDO) CHAMBERLAINI, new species

CHAMBERLAIN'S SHIPWORM

Plate 54, figs. 1, 2; plate 57, fig. 5; plate 60, figs. 9, 10, 11

Shell minute, thin, semitransparent. The anterior sinus is narrow with a thin callus which is reflected over a small portion of the outside of the anterior part, free at the reflected edge. The anterior part is crossed by slender denticulated ridges which spread fan-shaped from the anterior callus where they are closely approximated posteriorly. At their posterior margin they are separated by spaces about as wide as the ridges. Of these ridges 50 are present in the type. These ridges are rather coarsely denticulated near the anterior margin and very finely so on their free edge throughout the rest of their length. The junction of the anterior and anterior median area forms an even curve. The anterior median area is moderately broad and marked by very slender denticulated ridges which are separated by mere impressed lines. These ridges are a little less wide than those on the anterior area. Twenty-eight of them occur in a straight line projected across the anterior median area from the ventral margin of the anterior part. The median portion of the middle part forms a slightly concave groove which extends from the umbones to the ventral margin. It bears in its middle a rounded cord and is crossed by the feeble continuations of the dental ridges which here make a decided curve and are not denticulated. The posterior portion of the middle part is about one and one-half times as wide as the anterior and median portions combined, and is crossed by numerous lines of growth which lend to it a somewhat corrugated aspect. The posterior part forms a very strong, broadly expanded auricle which is marked from the posterior median portion by a strong constriction. It is rendered somewhat fluted by incremental lines. There is a strong knob at the junction of the median and posterior part at the ventral margin. Interior bluish-white. The suture of the anterior and median part marked by a raised line. The middle portion of the median part forms a somewhat rough depressed groove which extends from the umbone to the ventral margin where it terminates in an elongated knob. The posterior part projects over the posterior median portion as a narrow shelf with a shallow cavity behind it. There is a rather long slender oblique somewhat twisted blade which extends two-thirds of the distance from the umbone to the ventral knob. The pallets are paddle-shaped, the stalk being expanded basally with two constrictions in it that give it a somewhat nodulose aspect, decidedly contracted where it joins the expanded portion of the pallet. The outside of the base of the expanded portion is lunate and, like the stalk, of a translucent horn color. This part appears to form a cup in which two calcareous cups, which resemble the horn

portion of the hoofs of a sheep, are placed, with the toe end extending into the cup before mentioned. These two elements are separated by a deep groove. The inside of the expanded portion is triangular in shape and the distal margin has a moderately deep cut in its middle.

The type (Cat. No. 312922, U.S.N.M.) comes from a piece of wood collected by the United States Bureau of Fisheries Steamer *Albatross* Philippine Expedition, at station 5252 off Linao Point, Gulf of Davao, Mindanao in 28 fathoms on coral bottom. It measures: Height, 1.4 mm.; length, 1.3 mm.; diameter, 1.2 mm. Pallet measures: Length, 1.5 mm., of which 0.8 go to the stalk; diameter, 0.7 mm. The species is named for the late Frederick M. Chamberlain, naturalist of the *Albatross* during her Philippine cruise.

TEREDO (UNGOTEREDO) PUJADANA, new species

PUJADA SHIPWORM

Plate 54, figs. 8, 10; plate 57, fig. 3; plate 60, figs. 1, 2, 3

Shell small, subglobular, the anterior part with a moderately broad sinus which is bordered by a narrow smooth callus. Radiating from this callus are strong broad denticulated ridges which equal those of the anterior median portion in strength. Those on the early part of the shell have been worn away and only about a dozen near the ventral margin remain. These are separated here by grooves a little narrower than the ridges at their posterior margin, and they are finely denticulated at the free border, the grooves demarking the denticles passing down both dorsally and ventrally over the ridge. The anterior median portion is exceedingly broad and is marked by 31 dental ridges in a straight line projected from the ventral margin of the anterior part. All but the anterior eight are badly worn; these have rather broad denticles. The median middle portion is narrow and slightly concave and here is where the shell terminates. The posterior median and auricular portion are not present and have probably been eroded. Interior showing the external sculpture by transmitted light. The anterior and median part meet in a straight suture. There is no indication of a posterior auricle on the inside. There is a strong knob on the anterior median portion and a long, somewhat twisted and sinuous blade extending from under the umbone. The pallets are rather large, paddle-shaped; the stalk is slender, twisted, and slightly nodulose basally. On the outside the basal expanded portion is lunate; a strong deep groove separates this part from the doubly cup-shaped distal area, the two cups being separated by a deep groove. On the inside the pallets are slightly concave, marked by numerous fine incremental lines with a mere indication of a median sinus at the distal end.

The type (Cat. No. 246131, U.S.N.M.) was collected by the United States Bureau of Fisheries Steamer *Albatross* Philippine Expedition, in a piece of wood dredged at station 5243 in Pujada Bay, eastern Mindanao in 218 fathoms on gray mud, bottom temperature 63.6°. It measures: Height, 1.4 mm.; length, 1.6 mm.; diameter, 1.4 mm. The pallet measures: Length, 3 mm., of which 1.9 mm. go to the stalk; diameter, 1.6 mm.

Subgenus LYRODUS Gould

1870. *Lyrodus* GOULD, Invert. Mass., p. 34.
1922. *Lyrodus* BARTSCH, Bull. 122, U. S. Nat. Mus., p. 24.

In this subgenus the terminal portion is not cupped, but ends in two lateral forks, covered with a periostracum.

Type.—Teredo (*Lyrodus*) *chlorotica* Gould.

TEREDO LYRODUS LINAOANA, new species

LINAO SHIPWORM

Plate 55, figs. 1, 4; plate 57, fig. 6; plate 59, figs. 4, 5, 6

Shell small, subglobular, white. The extreme anterior portion of the anterior part forms a shallow sinus and is covered by a rather thick callus which is reflected partly over the outer part of the anterior area. Posterior to this callus the anterior part is crossed by slender ridges which radiate fan shaped from the callus posteriorly, being closely approximated; in fact, fused at the callus and separated by spaces a little wider than the ridges at their posterior margin. Of these ridges there are 51 in the type and many have been lost by the erosion at the umbone. These ridges are very finely denticulated at their free margin. The anterior portion of the median area is narrow and marked by slender denticulated ridges which are much narrower than those on the anterior portion and are separated by mere incised lines only. Of these ridges, 26 occur in a straight line across the anterior portion of the median area parallel to the ventral margin of the anterior part. The individual denticles on these ridges are exceedingly fine and closely spaced. The junction of the anterior portion and the anterior portion of the median part forms a somewhat sinuous line. The middle portion of the median part is almost as wide as the anterior portion and is crossed by the continuation of the decidedly flexed dental ridges which here are without denticles. These appear as a series of distantly spaced raised threads. The posterior portion of the median part is considerably wider than the anterior and middle portion of the median part combined, and is crossed by the continuation of the strong lines that cross the middle median portion, but here these threads become decidedly upturned. There

is a strong constriction between the posterior termination of the median part and the posterior auricle. The posterior auricle is large and projects prominently and is marked by a series of ridges that give it a somewhat corrugated appearance. Interior bluish-white. The junction of the anterior and median part is indicated by a strongly impressed straight line. The median part forms a roughened area which extends from the umbone to the ventral margin where it terminates in a strong knob. The posterior portion extends over the posterior median portion as a shelf with a shallow cavity behind its anterior edge. This shelf extends from the umbone to the angular junction at the ventral margin of the auricle and the median part. The umbone forms a strong knob from the basal part of which a strong oblique somewhat twisted blade extends toward the ventral knob. Pallets rather long and slender with a narrow spatulate calcareous shaft beyond the stalk covered with a brown periostracum which terminates distally in a calcareous knob.

The type (Cat. No. 312917, U.S.N.M.) was collected by the United States Bureau of Fisheries Steamer *Albatross* Philippine Expedition, from a piece of wood dredged at station 5252 off Linao Point, Gulf of Davao, Mindanao, in 28 fathoms on coral bottom. The type measures: Height, 2 mm.; length, 2 mm.; diameter, 1.8 mm. The pallet measures: Length, 2.6, of which 1.2 go to the stalk; diameter of blade, 0.3 mm. Cat. No. 312918, U.S.N.M., contains an additional lot of specimens from the same piece of wood. Cat. No. 246131–B, U.S.N.M., contains a specimen collected at station 5243 in Pujada Bay, eastern Mindanao, in 218 fathoms on green mud bottom, bottom temperature 63.6°.

Subgenus PSILOTEREDO Bartsch

1922. *Psiloteredo* BARTSCH, Bull. 122, U. S. Nat. Mus., p. 36.

In this subgenus the auricle fuses with the posterior median portion on the inside in such a manner that no shelf projects. In fact, in some of the species it is difficult to note even a suture. The pallets are spoon shaped, with the outer distal portion slightly excavated.

Type.—Teredo dilatata Stimpson.

?TEREDO (PSILOTEREDO?) ESCARCEOANA, new species

ESCARCEO SHIPWORM

Plate 54, figs. 3, 9; plate 57, fig. 4

Shell small, semitransluscent, bluish-white. Anterior portion eroded at the umbone, with a narrow callus at that part of the anterior margin which is left uneroded. From this slight callus the ridges radiate backward in a fan-shaped manner. At their posterior margin they are about as wide as the spaces that separate them. Of these

ridges, which are very finely denticulated at their free margin, 21 are left in the type. A large number must have been eroded at the umbone. The junction of the anterior part with the anterior margin of the median part forms a shallow curve. The anterior portion of the median part is marked by slender denticulated ridges which are separated by deep narrow grooves. Of these ridges 17 are present in a straight line across the anterior median part from the basal margin of the anterior part. The individual denticles of these ridges bear doubly denticulated cusps, the anterior denticle being about twice as large as the posterior. The middle portion of the median part is moderately broad, the anterior half of which is slightly convex, while the posterior half is slightly concave; both are crossed by the continuation of the dental ridges of the anterior portion which here take a decided turn, become much enfeebled and edentulous. The posterior portion of the median part is about as wide as the anterior and middle portion combined. It passes in a gentle depression directly into the posterior auricle and bears a continuation of the fluted wavy sculpture of this part. The posterior auricle is moderately large and poorly differentiated from the posterior portion of the median part. It is marked by rather regularly disposed rib-like raised wavy elements which are parallel with its ventral margin in disposition. Interior bluish-white. The anterior and median portion are joined in a distinct raised thread; the middle median portion is slightly roughened and terminates ventrally in a strong rounded knob; the auricle fuses with the posterior median portion without any demarkation or shelving; it is for that reason that I am placing this shell in the subgenus *Psiloteredo*, with a question mark; the umbones are strong and from their ventral margin an oblique somewhat irregular blade extends parallel with the middle area through four-fifths the length of the shell. The pallets of this species have not been found, and it will require their presence before we can give a fixed systematic status to this species.

The type (Cat. No. 312931, U.S.N.M.) was collected by the United States Bureau of Fisheries Steamer *Albatross* Philippine Expedition, in a piece of wood dredged at station 5294 off Escarceo Point, northern Mindoro, in 244 fathoms on sand and pebbly bottom; bottom temperature, 48.4°. It measures: Height, 2 mm.; length, 2.1 mm.; diameter, 2 mm. Another specimen (Cat. No. 365932) comes from station 5294 of Escarceo Point, Northern Mindoro, in 244 fathoms on sand and pebbles; bottom temperature, 48.4°.

Genus EOTEREDO Bartsch

1923. *Eoteredo* Bartsch, Proc. Biol. Soc. Wash., vol. 36, p. 98.

Blade not projecting from the under side of the inside of the umbones, but attached to the middle of the broad shelf that constitutes

the inward projection of the posterior part of the shell. Pallets unknown.

Type.—Eoteredo philippinensis Bartsch.

All the shipworms so far examined have the blade extending from the inside of the umbone. The present form marks an entirely different type of departure, for here it is attached to the middle of the shelf formed by the inward projection of the auricle. I deem this sufficiently distinct to merit generic separation. It is unfortunate not to have the pallets of this species, which would at once show to which of the three genera that I have recognized in my monograph the present genus is most nearly related.

EOTEREDO PHILIPPINENSIS Bartsch

PHILIPPINE EOTEREDO

Plate 54, figs. 4–6; plate 57, fig. 7

1923. *Eoteredo philippinensis* BARTSCH, Proc. Biol. Soc. Wash., vol. 36, pp. 98, 99.

Shell subglobular, yellowish white, with the posterior portion forming the merest trace of an auricle on the outside. Umbones eroded even in very young specimens. The anterior part very broad with its anterior portion terminating in a somewhat curved sinus, the edge of which is slightly reflected posteriorly as a thin callus. The rest of the anterior part is marked by dental ridges, which make an even open curve from the anterior margin ventrally, then posteriorly to their posterior termination, where they join with the dental ridges of the posterior median part. Eighty-two of these ridges remain in the type and a good many more must have been eroded at the umbone. The ridges of this anterior portion are triangular with their free border finely, evenly serrated. The posterior median portion covers two-thirds of the median part, and is marked by dental ridges which join those of the anterior part at right angles. The denticles here are broad and sharply cusped. The median middle portion is about one-eighth the width of the posterior median portion and is marked by curved rough lines of growth. The posterior median portion is about as wide as the middle median portion and marked by feebler continuations of the lines of growth than those that characterize the middle median portion. The posterior part, or auricle constitutes a very small projection when viewed from the outside, the merest indication of a claw, as it were. Interior bluish-white. The junction of the anterior and median portion is marked by a roughened suture. The umbonal and ventral knobs are prominent. The erosion of the posterior umbonal region, even in young specimens, forms an opening in this region to the inside which is anteriorly bordered by a strong shelf that extends from the umbone

to the posterior ventral margin. From the under side of the middle of this shelf the broad blade bends down toward the ventral knob. It is the peculiar position of the blade in this instance which has prompted me to give to this form a generic designation. Pallets unknown.

The type (Cat. No. 311281, U.S.N.M.) comes from a piece of wood dredged at United States Bureau of Fisheries Station 5243, off Uanivan Island Pujada Bay, Southeast Mindanao in 218 fathoms on gray mud bottom. The type, the largest specimen, measures: Height, 4.2 mm.; length, 3.9 mm.; thickness, 4.2 mm.

Cat. No. 311282, U.S.N.M., contains additional specimens which were obtained at the same station.

?TEREDO (subgenus?) MINDOROANA, new species

MINDORO SHIPWORM

Plate 55, figs. 3, 5; plate 57, fig. 1

Shell of medium size, subglobular, the anterior area with a rather large sinus which is bordered by a slender callus that is reflected over the anterior area at the edge. From this callus the dental ridges pass first a little ventrally, then across the anterior area. They are closely approximated at their anterior margin and separated by spaces a little wider than the ridges at the posterior edge of the later part, and fully twice if not three times as wide on the early part. Of these ridges 56 are present in the type, and many more have been eroded at the umbone. They are very finely denticulated at their free margin. The anterior median portion is very broad and marked by very broad denticulated ridges which are separated by very deep narrow channels. Of these ridges 40 occur in a line projected across this area from the ventral margin of the anterior part. The individual denticles are doubly cusped, the anterior one being about twice as wide as the posterior. The middle portion of the median part is slightly concave and marked by the continuations of the dental ridges of the anterior portion which are here bent and edentulous. They render this portion rather rough in appearance. The posterior portion is about as wide as the anterior portion of the middle part and is distinguished from the posterior auricle by a deep constriction. It is marked by concentric lines of growth which are parallel with its ventral margin in curving. The posterior auricle is large and projects like a strong claw. It is marked by conspicuous wavelike corrugations which agree with the ventral margin in disposition. Interior bluish-white. A conspicuous cord is present on the suture of the anterior and median part. The posterior part is projected decidedly over the posterior portion of the median part, almost half extending into the cavity of the shell. This part is ear-shaped and its inner border is free and leaves a shallow

cavity behind it. It terminates dorsally in a strengthened cord which separates the expanded portion conspicuously from the narrowed dorsal border that extends to the umbone. The inside, like the outside, is marked by concentric corrugations. A strong broad blade extends from under the heavy umbone ventrally. It is broken so that we can not tell the limit of its extent.

The type (Cat. No. 312933, U.S.N.M.) was collected by the United States Bureau of Fisheries Steamer *Albatross* Philippine Expedition, from a piece of wood dredged at station 5294, in 244 fathoms on sand and pebble bottom, bottom temperature 48.4°, off Escarceo point. Northern Mindoro. No pallets were found. We are therefore unable to assign a definite systematic position to this species. Its shell characters distinguished it from any of the other known forms, and we add it for completeness of record. The type measures: Height, 3.8 mm. (it should be here stated that the ventral portion of the valve is broken—a complete specimen would probably measure 4.2 mm.); length, 5 mm.; diameter of single valve, 2.4 mm.

? TEREDO (subgenus?) LUZONENSIS, new species

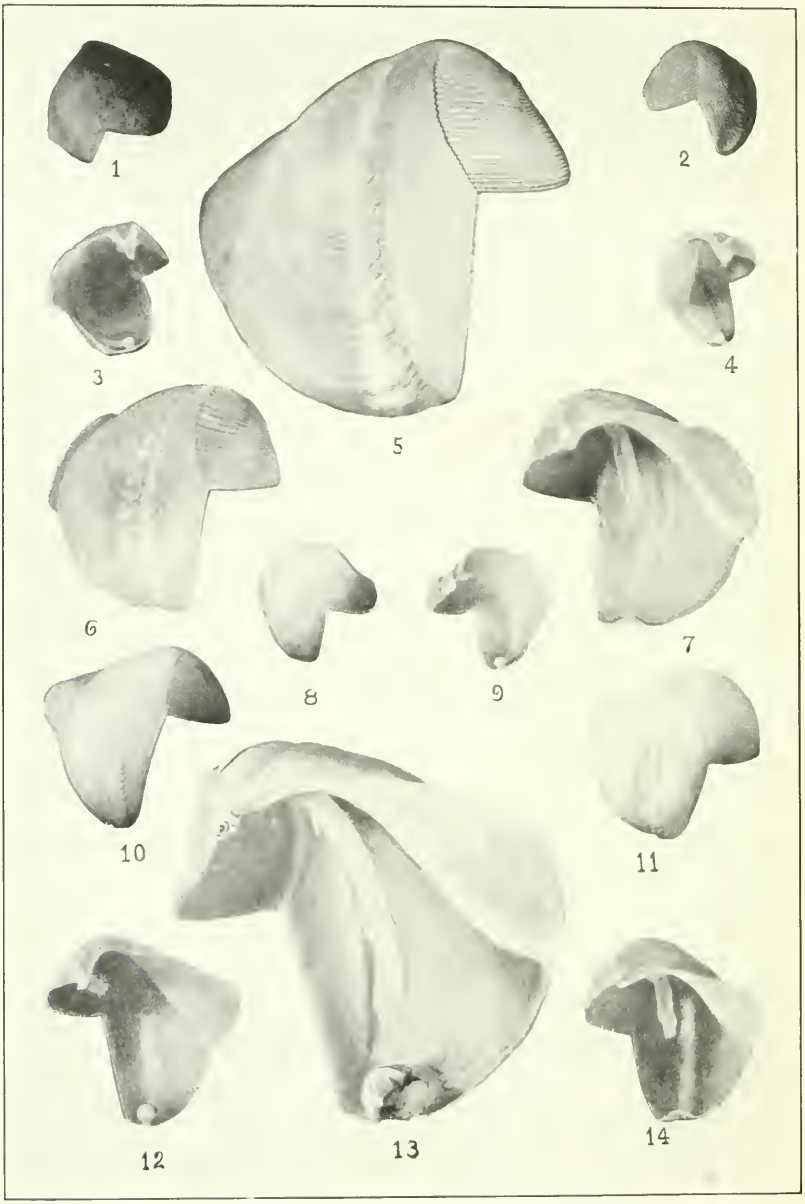
LUZON SHIPWORM

Plate 55, figs. 2, 6; plate 57, fig. 2

Shell moderately large, flesh colored with a pinkish flush, the anterior area with a sinus that is bordered with a strong callus which is reflected over part of the anterior area. From the edge of the callus the denticulated ridges spread fan-shaped posteriorly. They are closely approximated at the anterior edge, and the early ones are about twice as far apart as the ridges at their posterior termination, while the later are separated by spaces no wider than the ridges. These ridges are finely denticulated at their free border. Fifty-nine of these are present in the type. The junction of the anterior and posterior median area forms an even curve. The anterior portion of the median area is marked by rather strong dental ridges which are separated by very deep, narrow grooves. Of these ridges 32 are present in a line projected across this area from the ventral border of the anterior part. The denticles borne on these ridges are doubly cusped and where they have been eroded they leave a basal area which is separated into a wider anterior portion and a narrower posterior raised line. The middle portion of the median part consists of an anterior convex portion which is crossed by the continuations of the denticular ridges which are reflected across it in an open arc but do not bear denticles here, and a slightly concave posterior portion about as wide as the anterior which is crossed by feebler continuations of these lines with finer elements between them. The posterior median part is considerably wider than the anterior and middle portion of the median part, and is marked by fine curved

lines which are in reality the continuations of those of the middle part. The posterior part is distinguished from the median part by a profound constriction. It forms an immense auricle which is very high and which is marked by feeble concentric lines which coincide with its basal margin. The junction of the anterior and median part is marked by a tumid area. Interior bluish white, the middle portion is rather roughened and terminates ventrally in a very strong knob. The posterior part is wing-shaped, very broadly expanded and placed upon the posterior portion of the median part in such a way that it projects over it as a decided shelf which is very thick at its free border and contains a large cavity behind it that extends to the ventral margin. The umbonal portion, that is, about one-fourth of the length of the posterior part, is narrow and very much thickened, while the rest is very broadly expanded and concave, and marked by wavelike corrugations which coincide with the ventral margin in disposition. There is a strong blade which extends obliquely from over the umbone toward the ventral knob. The pallet is unknown. We are therefore unable to give this form subgeneric or even generic designation. The shell, however, is so characteristic that, for the sake of completeness, we felt that the species must be recognized.

The type (Cat. No. 311063, U.S.N.M.) was collected by the United States Bureau of Fisheries Steamer *Albatross* Philippine Expedition, from a piece of wood dredged at station 5269 off Matocot Point, western Luzon, in 220 fathoms on fine sand and pebbly bottom. It measures: Height, 6.3 mm.; length, 6.5 mm.; diameter of half shell 3 mm. Cat. No. 312934, U.S.N.M., contains another valve taken from the same piece of wood.



SHIPWORMS OF THE PHILIPPINE ISLANDS

FOR EXPLANATION OF PLATE SEE PAGE 555

EXPLANATION OF PLATES

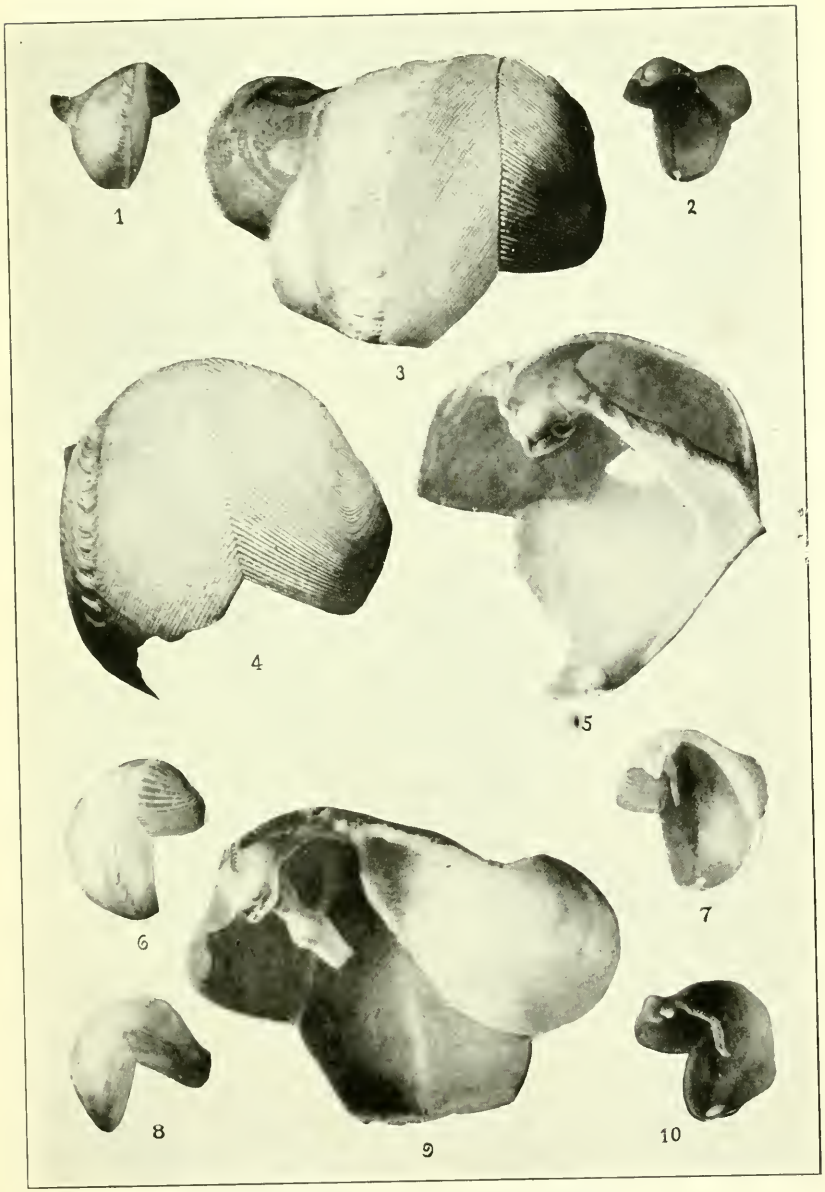
All figures of the shell have been given the same enlargement. This is also true of the detail of the shell sculpture, but this is of much greater magnification than that of the shell.

Plate 53

Fig. 1. *Bankia (Bankia) philippinensis.*
2. *Bankia (Bankiella) davaoensis.*
3. *Bankia (Bankia) philippinensis.*
4. *Bankia (Bankiella) davaoensis.*
5. *Bankia (Neobankia) johnsoni.*
6. *Teredo (Teredothyra) smithi.*
7. *Teredo (Teredothyra) smithi.*
8. *Teredo (Ungoteredo) matocotana.*
9. *Teredo (Ungoteredo) matocotana.*
10. *Teredo (Coeloteredo) mindanensis.*
11. *Teredo (Teredothyra) radcliffei.*
12. *Teredo (Coeloteredo) mindanensis.*
13. *Bankia (Neobankia) johnsoni.*
14. *Teredo (Teredothyra) radcliffei.*

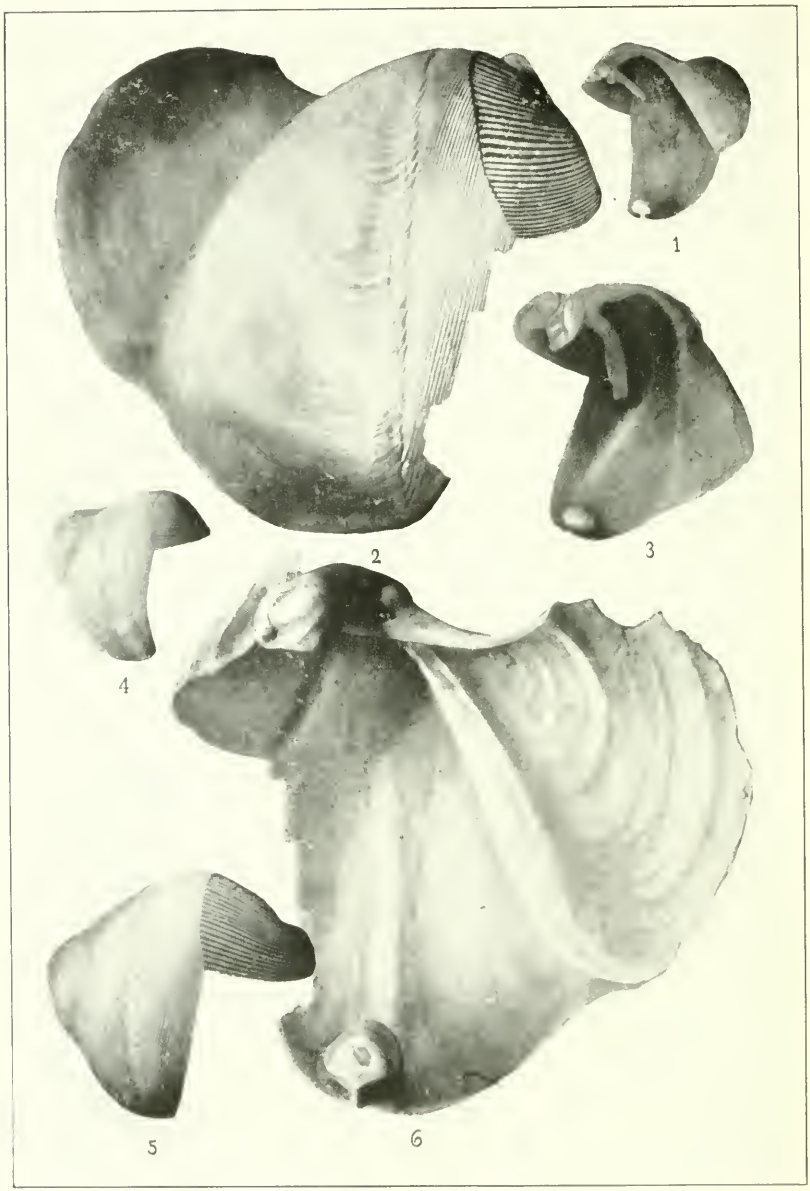
PLATE 54

FIG. 1. *Teredo* (*Ungoteredo*) *chamberlaini*.
2. *Teredo* (*Ungoteredo*) *chamberlaini*.
3. *Teredo* (*Psiloteredo?*) *escarcoana*.
4. *Eoteredo philippinensis*.
5. *Eoteredo philippinensis*.
6. *Eoteredo phillippinensis*.
7. *Teredo* (*Teredothyra*) *tanonensis*.
8. *Teredo* (*Ungoteredo*) *pujadana*.
9. *Teredo* (*Psiloteredo?*) *escarcoana*.
10. *Teredo* (*Ungoteredo*) *pujadana*.



SHIPWORMS OF THE PHILIPPINE ISLANDS

FOR EXPLANATION OF PLATE SEE PAGE 556



SHIPWORMS OF THE PHILIPPINE ISLANDS

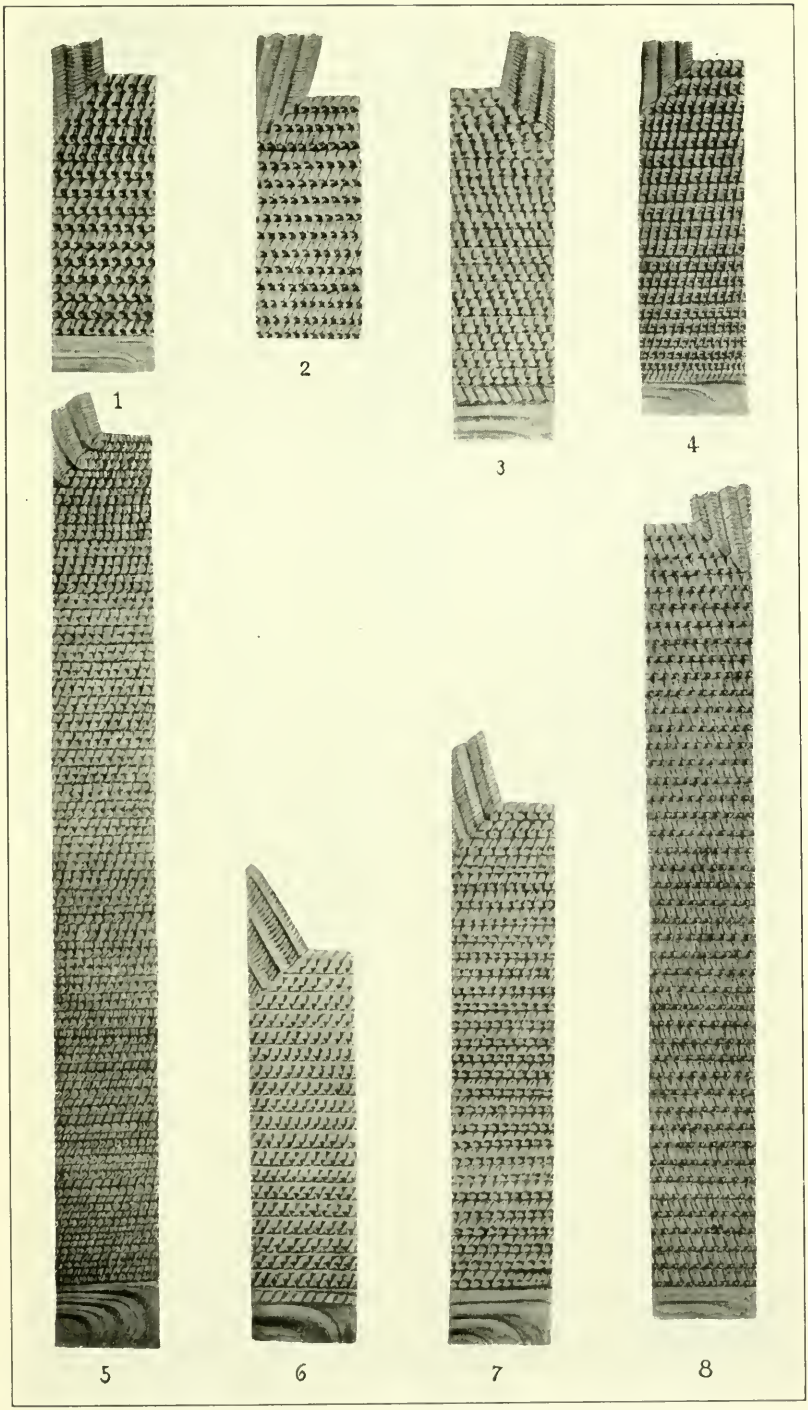
FOR EXPLANATION OF PLATE SEE PAGE 557

Plate 55

Fig. 1. *Teredo* (*Lyrodus*) *linaoana*.
2. *?Teredo* (subgenus?) *luzonensis*.
3. *?Teredo* (subgenus?) *mindoroana*.
4. *Teredo* (*Lyrodus*) *linaoana*.
5. *?Teredo* (subgenus?) *mindoroana*.
6. *?Teredo* (subgenus?) *luzonensis*.

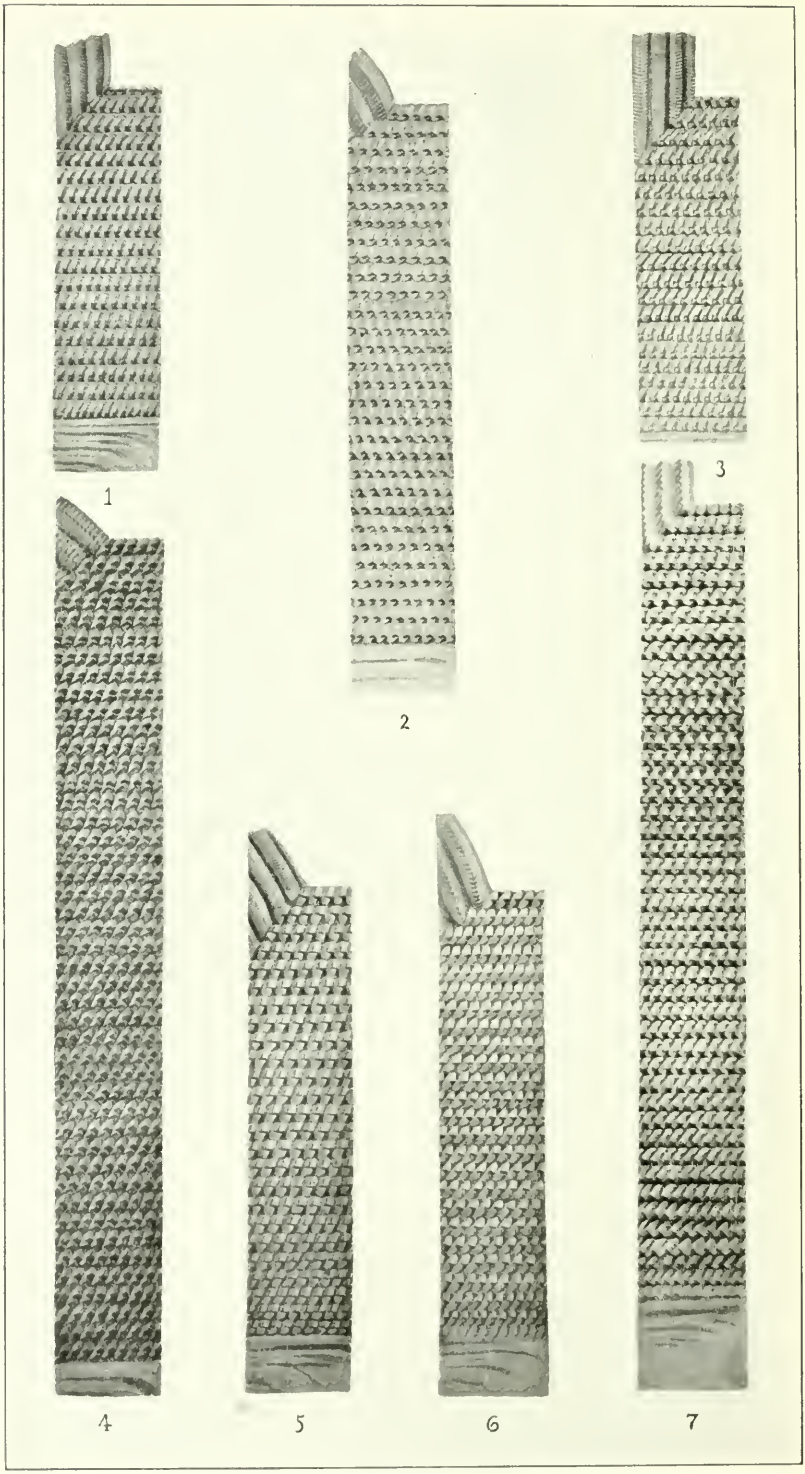
PLATE 56

FIG. 1. *Teredo (Teredothyra) tanonensis.*
2. *Teredo (Ungoteredo) matocotana.*
3. *Bankia (Bankiella) davaoensis.*
4. *Teredo (Teredothyra) smithi.*
5. *Teredo (Teredothyra) radcliffei.*
6. *Teredo (Coeloteredo) mindanensis.*
7. *Bankia (Neobankia) johnsoni.*
8. *Bankia (Bankia) philippinensis.*



SHIPWORMS OF THE PHILIPPINE ISLANDS

FOR EXPLANATION OF PLATE SEE PAGE 558



SHIPWORMS OF THE PHILIPPINE ISLANDS

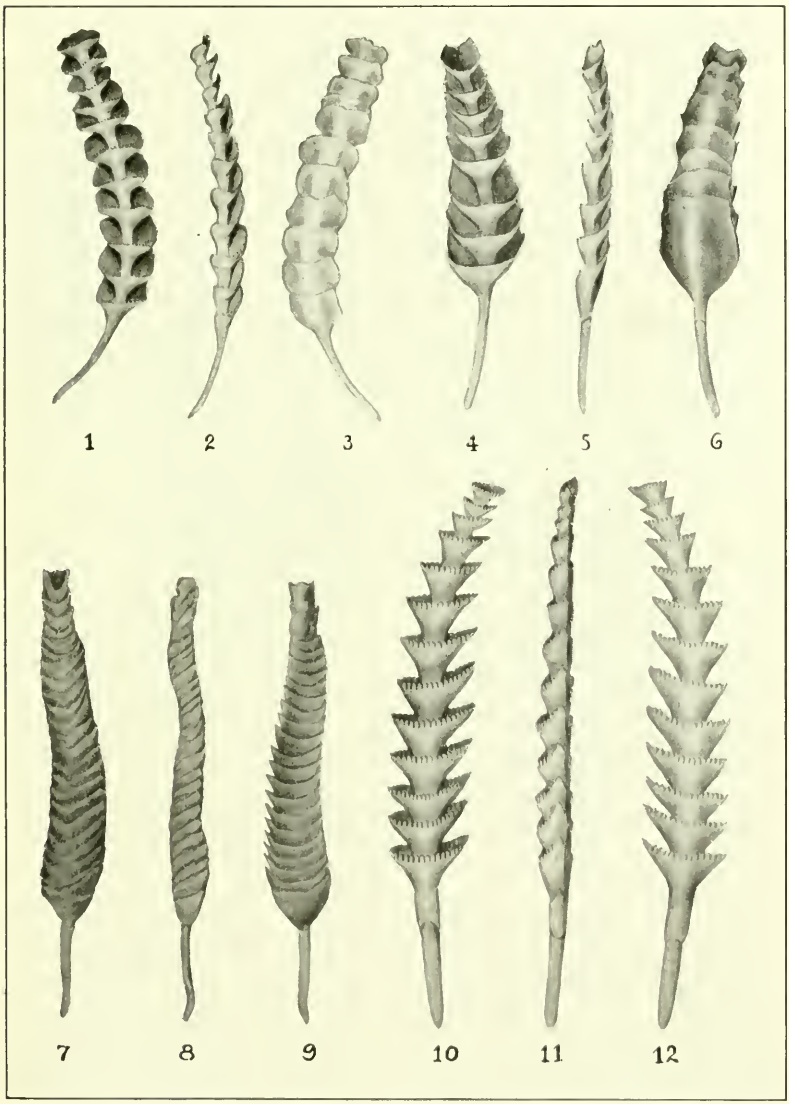
FOR EXPLANATION OF PLATE SEE PAGE 539

Plate 57

Fig. 1. *?Teredo* (subgenus?) *mindoroana.*
2. *?Teredo* (subgenus?) *luzonensis.*
3. *Teredo* (*Ungoteredo*) *pujadana.*
4. *Teredo* (*Psiloteredo*) *escarceoana.*
5. *Teredo* (*Ungoteredo*) *chamberlaini.*
6. *Teredo* (*Lyrodus*) *linaoana.*
7. *Eoteredo philippinensis.*

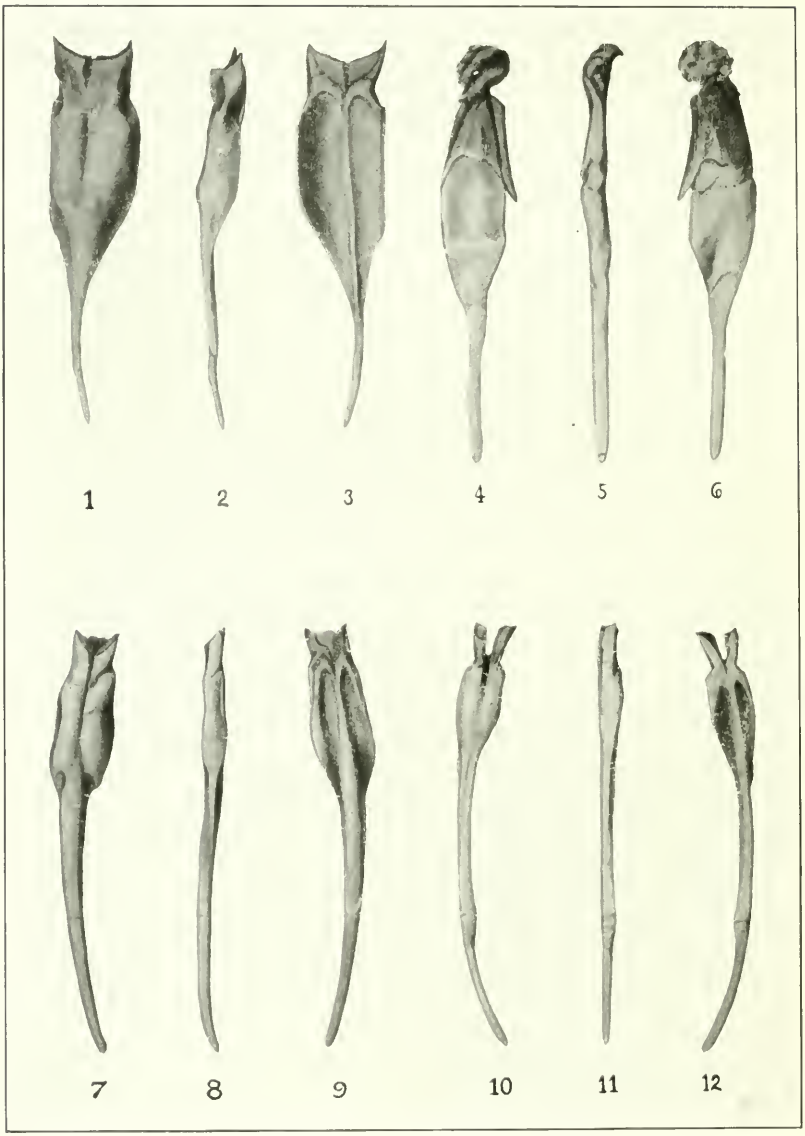
PLATE 58

FIG. 1. *Bankia (Neobankia) barthelowi.*
2. *Bankia (Neobankia) barthelowi.*
3. *Bankia (Neobankia) barthelowi.*
4. *Bankia (Bankiella) davaoensis.*
5. *Bankia (Bankiella) davaoensis.*
6. *Bankia (Bankiella) davaoensis.*
7. *Bankia (Bankia) philippinensis.*
8. *Bankia (Bankia) philippinensis.*
9. *Bankia (Bankia) philippinensis.*
10. *Bankia (Neobankia) johnsoni.*
11. *Bankia (Neobankia) johnsoni.*
12. *Bankia (Neobankia) johnsoni.*



SHIPWORMS OF THE PHILIPPINE ISLANDS

FOR EXPLANATION OF PLATE SEE PAGE 560



SHIPWORMS OF THE PHILIPPINE ISLANDS

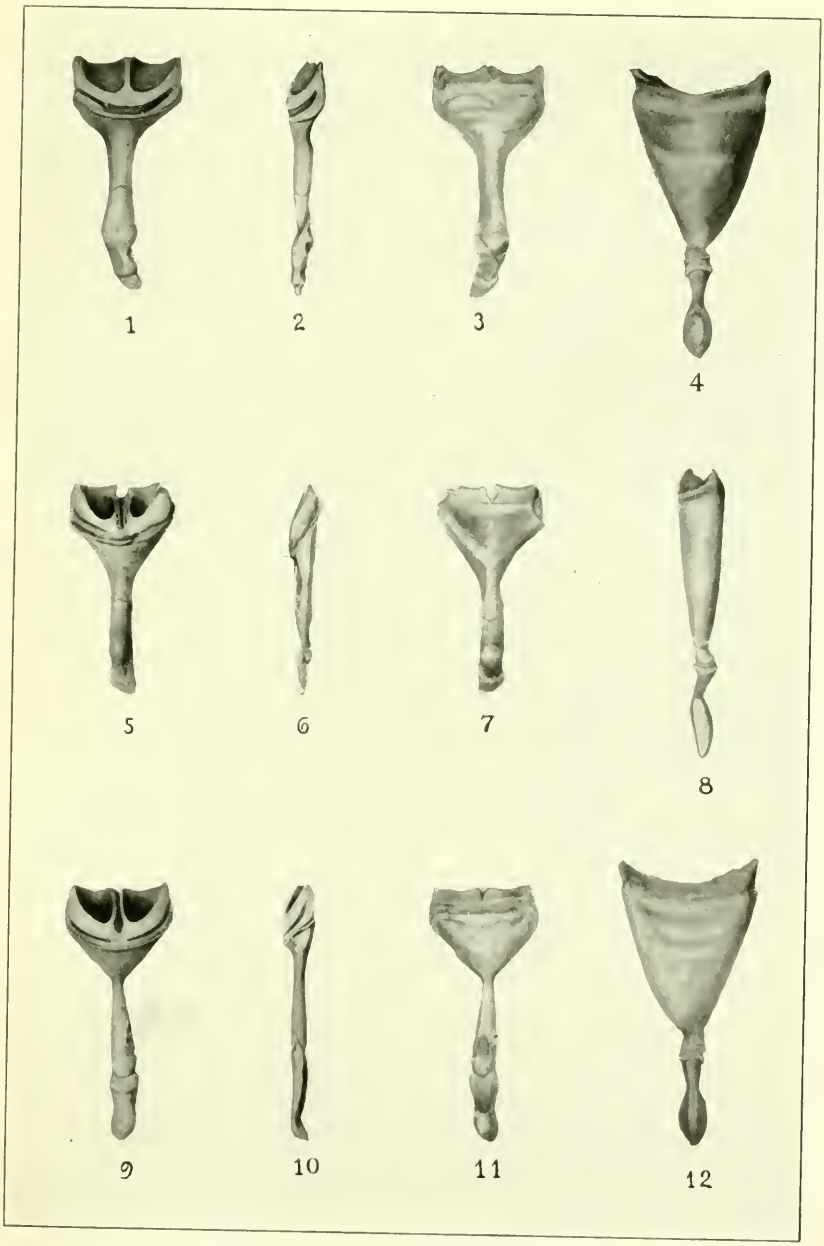
FOR EXPLANATION OF PLATE SEE PAGE 561

Plate 59

Fig. 1. *Teredo* (*Teredothyra*) *tanonensis*.
2. *Teredo* (*Teredothyra*) *tanonensis*.
3. *Teredo* (*Teredothyra*) *tanonensis*.
4. *Teredo* (*Lyrodus*) *linaoana*.
5. *Teredo* (*Lyrodus*) *linaoana*.
6. *Teredo* (*Lyrodus*) *linaoana*.
7. *Teredo* (*Toredothyra*) *radcliffei*.
8. *Teredo* (*Teredothyra*) *radcliffei*.
9. *Teredo* (*Teredothyra*) *radcliffei*.
10. *Teredo* (*Teredothyra*) *smithi*.
11. *Teredo* (*Teredothyra*) *smithi*.
12. *Teredo* (*Teredothyra*) *smithi*.

PLATE 60

FIG. 1. *Teredo* (*Ungoteredo*) *pujadana*.
2. *Teredo* (*Ungoteredo*) *pujadana*.
3. *Teredo* (*Ungoteredo*) *pujadana*.
4. *Teredo* (*Coeloteredo*) *mindanensis*.
5. *Teredo* (*Ungoteredo*) *matocotana*.
6. *Teredo* (*Ungoteredo*) *matocotana*.
7. *Teredo* (*Ungoteredo*) *motocotana*.
8. *Teredo* (*Coeloteredo*) *mindanensis*.
9. *Teredo* (*Ungoteredo*) *chamberlaini*.
10. *Teredo* (*Ungoteredo*) *chamberlaini*.
11. *Teredo* (*Ungoteredo*) *chamberlaini*.
12. *Teredo* (*Coeloteredo*) *mindanensis*.



SHIPWORMS OF THE PHILIPPINE ISLANDS

FOR EXPLANATION OF PLATE SEE PAGE 562