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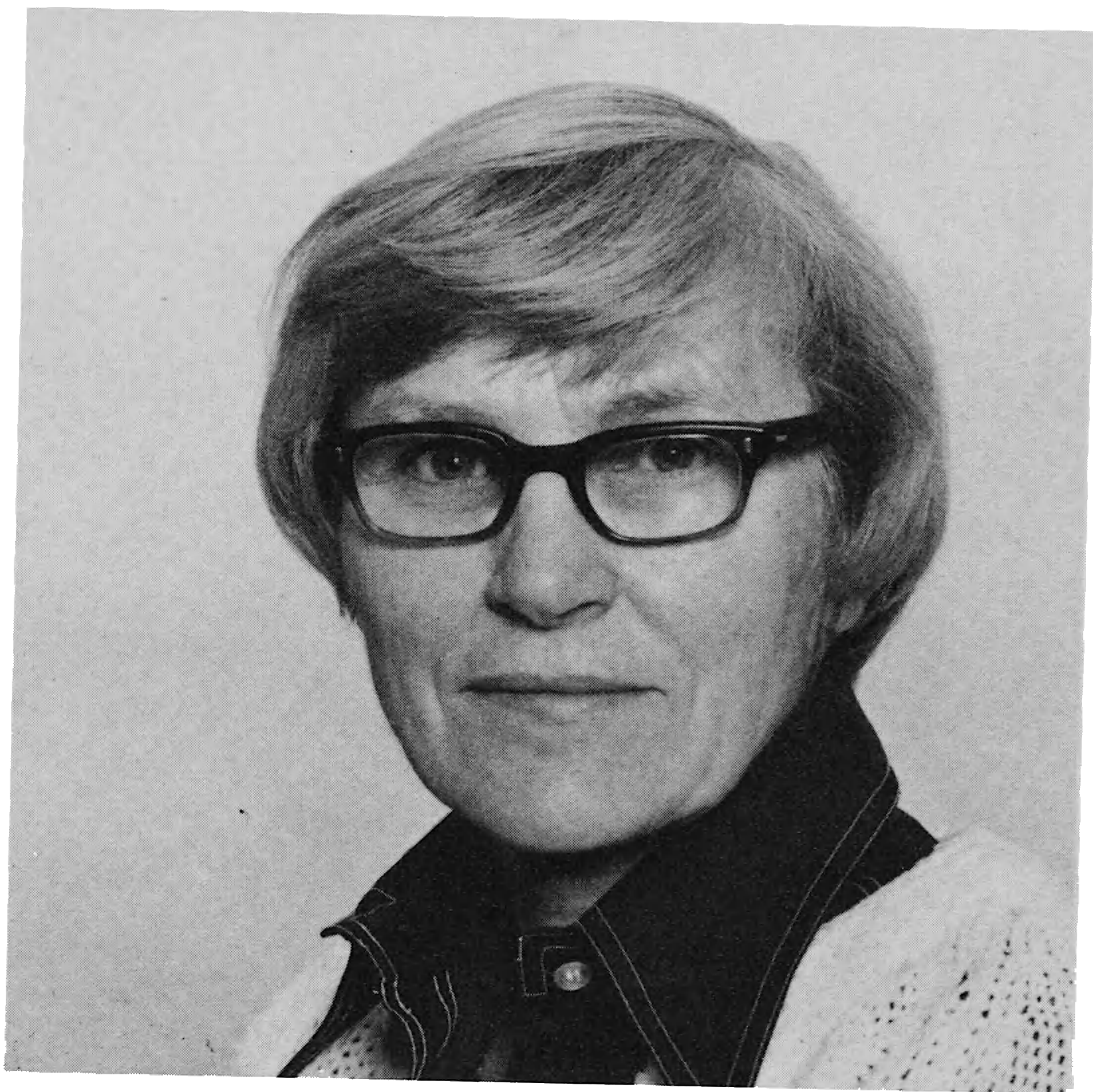
OCCASIONAL PAPERS ON MOLLUSKS

Published by

THE DEPARTMENT OF MOLLUSKS
Museum of Comparative Zoology
Harvard University

VOLUME 4
Numbers 48 to 66

Cambridge, Massachusetts 02138
1974-1984



RUTH DIXON TURNER

RUTH DIXON TURNER

It is with great pleasure that this volume of *Occasional Papers on Mollusks* is dedicated to Professor Ruth Dixon Turner, *Emerita*. During over four decades of association with the Department of Mollusks, she has steadily contributed to the field of malacology, frequently made contributions to this series, and steadfastly supported the efforts of staff and students of the Department in their research and scientific endeavors.

Professor Turner began her professional career in biology as Assistant Curator of Birds at the New England Museum of Natural History of the Boston Society of Natural History (now the Boston Museum of Science). After completing the degrees of Bachelor of Science and Master of Science, she had a chance meeting with Dr. William J. Clench that led to her becoming interested in mollusks. With his encouragement, she received a Ph.D. from Radcliffe College (Harvard University) in 1954. Unlike Ph.D. candidates in biology today, who are often given their tuition and expenses, Professor Turner had to support herself and do her graduate work while serving as an instructor of biology at Vassar College and as biologist at the William F. Clapp Laboratories in Duxbury, Massachusetts, where she began to study the shipworms or bivalve family Teredinidae and other substrate boring bivalves. In 1946 she became Research Assistant in the Department of Mollusks and has served as Lecturer in Biology, Research Associate, Alexander Agassiz Fellow in Zoology and Oceanography, and since 1976 as Professor of Biology and Curator of Mollusks. Her academic kudos include two honorary Doctor of Science degrees. In 1985, she formally entered retirement status as Professor of Biology, *Emerita*; but this has not diminished her research activities and she continues to carry on a vigorous program of scientific investigation, contributing significantly to the intellectual and curatorial activities of the Department of Mollusks.

In pursuit of her researches on the Teredinidae, Professor Turner has had longstanding support from the Office of

Naval Research which has enabled her to study the life cycles of these animals in the laboratory, to perform extensive observations in the field, and to travel extensively to collect samples; she has produced a long series of outstanding contributions on the biology of these bivalves, not the least of which include her critical *A Survey and Illustrated Catalogue of the Teredinidae* (1966) and her revisionary monograph of the generic level taxa in the *Treatise of Invertebrate Paleontology* (1969). Although her studies on these animals have been seminal investigations and central to her work, she has never been limited to these alone because of her broad interest in malacology and in marine biology. Thus, often in co-authorship with Dr. William J. Clench, she contributed several distinguished monographs to the series *Johnsonia*, especially on such prosobranch groups as the Volutidae, Epitoniidae, Tonnidae, Cymatiidae, and Melongenidae. Similarly, she pursued studies of terrestrial pulmonates with her contributions to the Austro-Melanesian caudoenoids.

A list of her travels comprises a veritable delineation of the continents and oceans of the world, but especial mention needs to be made of her particularly successful and numerous visits to the Indian subcontinent, Australia, and the Soviet Far East, most often as an invited guest of the foreign government involved. Of great import has been her nearly two dozen expeditions at sea with vessels from the Woods Hole Oceanographic Institution, particularly on board the deep-diving research vessel *Alvin*; she was among the first of women scientists to study the fauna of the deep-sea *in situ*, and she has made many dives to investigate experimentally the unique organisms of the hydrothermal vents; these deep-sea explorations have taken place in the West Indies, eastern North Atlantic, and the Pacific Ocean, particularly off the Galapagos Islands.

A member of numerous professional organizations, she has been particularly active in the American Association for the Advancement of Science where she was elected a Fellow in 1976 and served as Chairman of the Biology Section of the

Council in 1986; president of the Radcliffe Chapter of the Society of Sigma Xi in 1956 for which she has been a traveling guest lecturer; the American Malacological Union for which she was president in 1956-57; and the Society of Systematic Zoology where she served on the Editorial Board and as a member of the Council. In addition to her contributions to the publications of the Department of Mollusks, she has served in an editorial capacity to both *Occasional Papers* and *Johnsonia* and is a Consulting Editor to *The Nautilus* and a member of the Editorial Board of *Malacologia*. She frequently reviews manuscripts for a number of scientific journals, including *Science*, *The Veliger*, *The Biological Bulletin*, and *Ophelia*.

Professor Turner's success as a teacher — moreover a communicator of enthusiasm for not only the study of malacology, but marine zoology and biology in general — is reflected both in her long-time commitment to instruction in the curriculum of Harvard College and also by her participation in a great many workshops, symposia, and professional meetings. Numerous students at Harvard and other universities have benefited by her advice and tutelage, and for this, many are forever indebted.

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PREFACE

Almost 45 years have passed since the first issues of Occasional Papers appeared. In his Preface to volume one, William J. Clench (1954) commented on what was then thought to be an extensive current literature in malacology: "more than one thousand titles . . . in more than two hundred journals, museum bulletins and other publications." In the Preface to volume three, I similarly noted that the literature in malacology was continually increasing (Boss, 1973) and surmised that in 1970 more than 2,500 papers by over a thousand authors were published. In the most recent issues of the Zoological Record for 1987 (volume 123) and for 1988 (volume 124) between 4,500 and 5,000 titles were listed. The information explosion continues although a great many papers published treat subjects other than systematics and faunistics.

Of interest is the increased number of journals which are solely dedicated to the study of the Phylum Mollusca. In the 1980s, these include publications of national organizations as well as local interest groups; new journals on mollusks have appeared in Texas, Italy, Poland, Portugal, Spain, Switzerland, Brazil, Korea, Japan, Taiwan, and China. Desk-top publishing in our age of the personal computer promises an even greater volume of printed information.

Clench (1954) averred that there may be as many as 200,000 species of living mollusks. A more rigorous estimate indicated that there were fewer than 50,000 species (Boss, 1971). Although this figure is subject to revision and some workers have considered it demeaning to the field of malacology, a more critical estimate has yet to appear.

That we have a literature which is simply burgeoning with descriptions of new taxa can be noted by scanning the table of contents of just about any malacological journal. Descriptions of new species keep appearing and sometimes in very unforeseen abundance in unlikely places. Can it be that there are over twenty species of sphaeriid clams, sixteen of them new, in a small lake on the island of Kunashir in the Kuril Islands (Starobogatov and Budnikova, 1985)? Or can there

be 100 new species of macroscopic mollusks from the shallow waters of an area as well known as the Caribbean (Petuch, 1987)? Also new higher taxa are appearing at an alarming rate, thwarting one purpose of our system of taxonomy: information retrieval. Monotypic taxa are of dubious value in that they tell us nothing of phylogenetic affinities.

The recently published *A Classification of the Living Mollusca* by Kay Cunningham Vaught (1989) has not only provided a valuable work to assist collectors and professionals in placing specimens into their collections but also she has listed more taxa than any other authority. At least 15,000 generic level names are available for living mollusks. Yet the description of generic level taxa continues unabated and one can see new ones being introduced every week. In the last year, according to the *Zoological Record*, nearly 200 such names were proposed for mollusks.

In addition to the superabundance of generic level appellations, there is a similar excess of names available at the family level in the Caenogastropoda and Heterostropha (a part of the old Prosobranchia); Ponder and Warén (1988) list over 1,000 nomina. There are at least as many more in the other molluscan classes.

More serious are the constant elevation of taxa and the creation of new higher level groups, often on uncritical criteria. The Russians have become masters at these approaches. One can cite the paper of Golikov and Starobogatov (1975) where wholesale alterations in the systematics of prosobranchs were introduced. Yet almost year by year they have altered the landscape of the classification of the higher groups in the Mollusca. Thus, in 1979 Minichev and Starobogatov considered the gastropods to be comprised of eight subclasses while more recently Golikov and Starobogatov (1987) divided their Order Cerithiiformes, roughly equivalent to the superfamily Cerithioidea, into several suborders, three of them new, and many subordinate groups with new familial and superfamilial names. This phenomenon has occurred in group after group and we have managed to issue critical translations of papers dealing with the Bivalvia and



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REFERENCES

Boss, K. J. 1971.

Critical estimate of the number of Recent Mollusca. Occasional Papers on Mollusks, 3(40): 81-135.

Boss, K. J. 1973.

Preface. Occasional Papers on Mollusks, 3: x-xi.

Clench, W. J. 1954.

Preface. Occasional Papers on Mollusks, 1: xi-xii.

Golikov, A. N. and Ya. I. Starobogatov. 1975.

Systematics of prosobranch gastropods. Malacologia, 15: 185-232.

Golikov, A. N. and Ya. I. Starobogatov. 1987.

Systematics of the order Cerithiiformes and its position within the subclass Pectinibranchia. Pp. 23-27 [in] Starobogatov, Ya. I., A. N. Golikov, and I. M. Likharev (eds.). Molluscs. Results and Perspectives of Investigation, Eighth Meeting on the Investigation of Molluscs, Zoological Institute, Academy of Sciences, Leningrad [in Russian].

Haszprunar, G. 1988.

On the origin and evolution of major gastropod groups, with special reference to the Streptoneura. Journal of Molluscan Studies, 54: 367-441.

Houbrick, R. S. 1988.

Cerithioidean phylogeny. Malacological Review, Supplement 4, pp. 88-128.

Minichev, Yu. S. and Ya. I. Starobogatov. 1979.

Gastropod subclasses and their phylogenetic relationships. Zoological Journal, 58(3): 293-305 [in Russian with English Summary].

Petuch, E. J. 1987.

New Caribbean molluscan faunas. The Coastal Education and Research Foundation, Charlottesville, Virginia, pp. [vi] + 1-154 + A1-A4, 28 pls.

Ponder, W. F. and A. Warén. 1988.

Appendix. Classification of the Caenogastropoda and Heterostropha — A list of the family-group names and higher taxa. *Malacological Review*, Supplement 4, pp. 288-326.

Schileyko, A. A. 1979.

The system of the Order Geophila (=Helicida) (Gastropoda Pulmonata). *Transactions of the Zoological Institute, USSR*, 80: 44-69 (Boss, K. J. and M. K. Jacobson. 1985b. Translation. Special Occasional Publication, Department of Mollusks, Museum of Comparative Zoology, Harvard University, No. 6, 45 pp., 10 figs.).

Skarlato, O. A. and Ya. I. Starobogatov. 1979.

General evolutionary patterns and the system of the Class Bivalvia. *Transactions of the Zoological Institute, USSR*, 80: 5-38 (Boss, K. J. and M. K. Jacobson. 1985a. Translation. Special Occasional Publication, Department of Mollusks, Museum of Comparative Zoology, Harvard University, No. 5, 67 pp., 7 figs.).

Starobogatov, Ya. I. and L. L. Budnikova. 1985.

Molluscs of the family Pisidiidae (=Sphaeriidae) from the Lake Lagunnoje, Kunashir Island, Kurile Islands. *Transactions of the Zoological Institute, Academy of Sciences, USSR*, 135: 95-114, 17 text-figs. [in Russian].

Turgeon, D. D. (Chair), A. E. Bogan, E. V. Coan, W. K. Emerson, W. G. Lyons, W. L. Pratt, C. F. E. Roper, A. Scheltema, F. G. Thompson, and J. D. Williams. 1988.

Common and scientific names of aquatic invertebrates from the United States and Canada. *American Fisheries*

Society Special Publication 16. Bethesda, Maryland, pp. i-vii + 1-277, 12 colored plates.

Vaught, K. C. 1989.

A Classification of the Living Mollusca. American Malacologists, Inc., Melbourne, Florida, pp. i-xii, 1-189.

Waller, T. R. 1978.

Morphology, morphoclines and a new classification of the Pteriomorphia. Philosophical Transactions of the Royal Society of London (B), 284: 345-365.

Pages i-xvi published August 30, 1989 K.J. Boss

Occasional Papers On Mollusks

Published by

THE DEPARTMENT OF MOLLUSKS

Museum of Comparative Zoölogy, Harvard University
Cambridge, Massachusetts

VOLUME 4 15 NOVEMBER 1974 NUMBER 48*

MONOGRAPH OF THE GENUS *LUCIDELLA* IN CUBA (PROSOBRANCHIA: HELICINIDAE)

By KENNETH J. BOSS AND MORRIS K. JACOBSON

ABSTRACT. Four species of the genus *Lucidella* occur in Cuba; three in the subgenus *Poeniella*, and one in *Poenia*. The Cuban species have zoogeographic affinities with Jamaican and Hispaniolan relatives. The systematics and biology of the genus and the Cuban species are discussed.

INTRODUCTION

This is the sixth recent monograph on the Helicinidae of Cuba. The genera covered in previous revisions were: *Viana*, *Priotrochatella*, *Emoda*, *Glyptemoda*, *Calidviana*, *Ustronia*, *Troschelviana*, *Semitrochatella*, (Clench & Jacobson, 1968; 1970; 1971 a & b), *Ceratodiscus*, and *Alcadia* (Boss & Jacobson, 1973a, and 1973b).

In contrast to the genera revised heretofore, which are either endemic in Cuba, or in which the Cuban fauna is well represented, there are only 4 Cuban species of *Lucidella* of some 40 nominal forms reported from the Neotropics, this fact affording little credence to the suggestion of Clench (1937: 69) that the genus *Lucidella* originated in Cuba.

Boss and Jacobson (1973 b) discussed the zoogeography and distribution of *Alcadia* in Cuba and concluded that representatives of the genus probably reached Cuba directly

*Volume 4 starts with Number 48.

from Jamaica. Occasionally species were derived via Hispaniola. *Lucidella*, which is closely related to *Alcadia*, shows a similar zoogeographic pattern: the Cuban representatives bear a marked resemblance to both Jamaican and Hispaniolan species. *Lucidella rugosa* from Cuba is hardly distinguishable from the Hispaniolan *L. cibaoensis*, and the Cuban *L. tantilla* and *L. granulum* belong to the subgenus *Poeniella* which probably originated in Hispaniola (Baker, 1923). Finally, *L. granum*, a member of *Poenia*, has its closest affinities with Jamaican species.

ACKNOWLEDGMENTS

We here express our gratitude to Dr. R. Robertson of the Academy of Natural Sciences of Philadelphia and Dr. J. Rosewater of the National Museum of Natural History for use of their collections. Dr. W. K. Emerson of the American Museum of Natural History and Dr. R. D. Turner and Mr. R. I. Johnson of the Museum of Comparative Zoology read the manuscript and offered much useful advice. The manuscript was patiently typed and corrected by our secretary, Mrs. G. Dent.

Family HELICINIDAE Latreille, 1825

Subfamily STOASTOMATINAE C. B. Adams, 1849

Genus *Lucidella* Swainson, 1840

Lucidella Swainson, 1840. Treatise on Malacology, p. 330 (type-species, *Helix aureola* Férussac 1822 [La Martinique] by monotypy).

Prosopsis Weinland, 1862. Malak. Blätt 9: 198 (type-species, *Prosopsis sulcata* Weinland 1862 [Haiti] by monotypy), *non* L. Jurine, 1801, *nec* Fabricius, 1804 (Hymenoptera).

Urichia Guppy, 1895. Proc. Victoria Inst. Trinidad, 2: 24 (type-species, *Helicina adamsiana* Pfeiffer, 1848, subsequent designation H. B. Baker, 1927).

Description. Shell between 2 to 9 mm in diameter, lens-shaped, conic, to depressed globose, usually with strongly developed axial or spiral sculpture; body whorl rounded to

depressed carinate, umbilical area depressed or excavated, with a thin, variously sized, basal callus. Aperture without teeth or more or less narrowed by toothlike projections above and below on the peristome often with corresponding external depressions or pits; a shallow notch at the upper insertion of the peristome. Operculum rounded triangular or semilunate, thin, translucent, light buff, somewhat darker at the edges; nucleus subcentral or near the columellar edge, not marginal; calcareous layer thin, glassy, closely pebbled, with a long, rounded, raised sigmoid lamella at the columellar margin; chitinous layer very thin, extending well beyond the margins of the calcareous layer.

Historical remarks. Swainson (1840) introduced *Lucidella* for *Helicina aureola* (Férussac), a species with a discoidal shaped shell and a dentate aperture. He placed the genus in a heterogeneous assemblage, the subfamily Lucerninae or "land volutes" which included widely disparate generic taxa, *Caracolla* (Helicidae), *Anostoma* (Odontostomidae), *Lucerna* (Camaenidae) and *Polymita* (Helminthoglyptidae). The type-species *aureola* was originally described and figured by Férussac (1822; see Kennard, 1942) as *Helix* or *Helicodonta* but was placed in *Helicina* by Gray (1825), who noted its simple operculum and prosobranch affinities. Wood (1828) did likewise and Gray (1842) recognized the genus *Lucidella* in the Helicinidae as "peculiar among operculated shells for having 3 or 4 teeth on the thickened edge of their mouths." Subsequently, Gray (1857) placed *Lucidella aureola* in his family Oligogyrae [sic], presently acknowledged as synonymous with the Helicinidae (Keen, 1960).

Petit de la Saussaye (1851) figured freshly collected specimens. In regard to *Lucidella*, Pfeiffer (1847) suggested a relationship with the vianine *Trochatella* and separated it from *Helicina s. s.* by its lack of a basal callus. He noted that the closest relatives of *aureola* were *leana* Adams and *lineata* Adams from Jamaica (see Jacobson and Boss, 1973 b) and delineated three intermediate to typical *Lucidella*-like forms, *depressa* Gray, *rugosa* Pfeiffer and *lirata* Pfeiffer. In 1848 Pfeiffer cited 98 species in the Heli-

cinidae, allocated to 3 genera, *Helicina*, *Trochatella* and *Lucidella*, with only the single type-species included. In 1850 he figured *aureola* but doubted the scientific correctness of *Lucidella*. In the 1852 edition of the *Monographia*, Pfeiffer listed *aureola* with *Lucidella* and in the 1858 edition added *L. nana*, which he had described in 1857. Later he (1865; 1876) recognized 5 taxa in *Lucidella*. In a more critical and extensive review, Wagner (1910) redefined the genus very much as it is understood today and extended its geographical confines to include species in the Lesser and Greater Antilles as well as in neighboring Central and South America. He suggested that the tiny notch formed where the outer lip inserts on the body whorl serves as an air-hole when the operculum is in place. In his discussion, he omitted many forms and names since, as he admitted, he did not have sufficient material. Two earlier 19th century monographs treated the species of the family Helicinidae in which several *Lucidella* were listed (Sowerby, 1842; 1866; Reeve, 1873). Although the Cuban *Lucidella* have been cited or delineated by Arango (1879), Crosse (1890) and Aguayo and Jaume (1948), no comprehensive review of the Cuban taxa exists.

General characteristics. Members of the genus *Lucidella* are readily recognized. Many species, especially those of *Lucidella s. s.*, have a peristome which is thickened by one or two tooth-like protuberances, a feature uncommon in most Helicinidae with the exception of some *Alcadia*. The rather strong surface sculpture, whether spiral or axial, serves to mark this group off from other helicinids which tend to be smooth (Boss and Jacobson, 1973 b) with the exception of *Glyptemoda*, *Glyptalcadia* and *Stoastoma*. The operculum is somewhat similar to that of *Helicina s. s.* but has a subcentral rather than marginal nucleus. The calcareous layer of the operculum in *Lucidella* is thinner and more fragile, and the columellar lamella relatively higher than in *Helicina*. In some smaller forms, like *L. granulum*, *L. granum* and *L. tantilla*, the labial teeth are obsolete, but the operculum and spiral or axial shell sculpture place them in *Lucidella*.



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in Hispaniola, 3 in Cuba and others in Puerto Rico, Florida, the Bahamas and several islands of the Lesser Antilles.

Anatomical remarks. Baker (1926; 1928) provided some notes on the anatomy of *Lucidella aureola* and *L. lirata*, respectively. He found resemblances in the female sexual apparatus of both, including the V-organ with a prominent ovoid protuberance to the left of its apex, the small bilobed sperm sac imbedded in the provaginal sac with a short, stout stalk, and the provaginal sac flattened and deeply lobed on the left side. In these respects the female anatomy does not differ much from that of *Alcadia* and *Eutrochatella* as shown by Bourne (1911: pl. 35, figs. 25, 26). This emphasizes the conclusions of Bourne (1911: 777) and Baker (1926: 35) that the general uniformity of the genitalia of the Helicinidae makes them useless for diagnostic purposes.

Radula. The radula of *Lucidella* exhibits the essential features of a helicinid (Troschel, 1857): a single central rachidian tooth (R), flanked by A, B, and C centrals and a lateral complex (LC) consisting of a comb-lateral and an accessory plate and a marginal complex (MC) consisting of numerous teeth or uncini. These structures can be abbreviated in the formula: (MC) (LC) C B A R A B C (LC) (MC).

Baker (1922) described and figured parts of the radula of *Lucidella (Poenia) lirata* and *Lucidella (L.) aureola*. The radulas are generally similar, but differences do exist. Although in both cases the uncusped R-centrals are "hooded," the shape of this tooth differs, that of *lirata* being subcircular with a rounded base, while in *aureola* it is broadly anvil-shaped, with a straight base. The number of cusps on the A-, B-, and C-centrals are roughly equal, but in *lirata* the comb-lateral of the lateral complex has only 6 cusps, whereas in *aureola* there are 9 to 10. The differences in the marginals are even greater, there being in *aureola* 2 teeth with 2 cusps, 21 with 3 cusps, and 20 with 4 cusps; in *lirata* there are only 5 with 3 cusps, and 12 with 4. *L. lirata* has 135 teeth in each transverse row of the radula, including 62 marginals, whereas *aureola* has 283 teeth including 136 marginals. It appears that, in the course of

evolution, as *aureola* increased in the size and strength of its labial protuberances it also increased the number and complexity of its radular teeth.

The comb-lateral section of the lateral tooth complex has a terminal post and a large, roughly quadrate, winged, accessory plate which engages only slightly with the comb-lateral. The radula of *Lucidella* roughly resembles that of the subfamily Helicininae. However, because of resemblances with the radula of *Stoastoma*, *Fadyenia*, and *Ceratodiscus*, chiefly in the presence of pauci-cusped inner marginals, Keen (1960) united *Lucidella* with these genera in the subfamily Ceratodiscinae. Boss and Jacobson (1973a) expressed doubts regarding this arrangement chiefly on zoogeographical grounds, namely that *Ceratodiscus* is absent from Jamaica where the genus *Lucidella* radiated.

Baker (1922: 54), finding that the radula of *Stoastoma lindsleyanum* C. B. Adams, 1849, the type-species of the genus *Lindsleya* Chitty, 1857 (synonym of *Fadyenia* Chitty, 1857) was very close to that of *Lucidella lirata*, placed *Lindsleya* (= *Fadyenia*) tentatively as a subgenus of *Lucidella*. He regarded his *Lucidella venezuelensis*, from Venezuela as belonging here as well. However, both the shell and operculum of *Fadyenia* (and also of "*Lucidella*" *venezuelensis*) are so different from *Lucidella* that it is more advisable to regard *Fadyenia* as a full genus, separate from *Lucidella*, a procedure followed by Keen (1960) and Boss (1972).

Habitats. The species of *Lucidella* are mostly ground-dwellers, living under leaves or rocks in damp places. In Cuba Arango (1879) reported *rugosa* as living under stones and *granum* in bushes ("en los arbustos"). Ramsden (1914: 50) discovered "*tantilla*" (= *granulum*) "in dirt at the root of trees." Brown (1913) extensively observed the habitat preferences of two Jamaican species which were found mostly along the borders of woods or on stone walls. Baker (1934) noted that some of the Jamaican species are subarboreal ("good climbers") and ground dwellers.

Enemies. Many specimens from Cuba have a tiny, perfectly circular hole in the shell which was probably drilled

by an unknown predator. Clench and Jacobson (1971b: 409) noticed the same sign of predation in some small Cuban vianine helicininids. Additionally, Clapp (1921: 108) noticed that *Lucidella tantilla* on Chokoloskee Key, Florida, appeared to be a favorite food with some beast that bites them fairly in half.

Zoogeography. Wagner (1910: 337) and Clench and Jacobson (1971b) noted that the distribution of *Lucidella* coincided remarkably with that of *Alcadia* and *Eutrochastella*. Since the latter probably originated in Central America, the point of origin of *Lucidella* may also be sought there, where the species *Lucidella lirata* (Pfeiffer, 1847) has a wide distribution from Venezuela to southern Mexico (Baker, 1928). The mode of dispersal may then have been as follows: the ancestral form, which was possibly related to *L. costata* Simpson, 1894, a Miocene fossil from the Bowden beds of Jamaica (Woodring, 1928), made its way to Jamaica where it underwent a radiation. Some 16 forms of *Lucidella s. l.* are known there today. All the Jamaican forms of *Lucidella* have predominately spiral sculpture, the sort found in *L. lirata* and in the insular form, *L. midyetti* Richards, 1938, from Roatan Island, Honduras. This sculpture is characteristic of the subgenus *Poenia* H. and A. Adams, 1856. In Jamaica, *Lucidella s.s.* developed larger, heavier, more colorful shells with a very much reduced basal callus and with strong lip teeth, greatly constricting the aperture. These features can be seen in *L. aureola* (Férussac), the type-species of the genus. *L. granulosa* (C. B. Adams) developed strong surface nodes, some arranged in vaguely axial rows. The variations in these species have been detailed by Brown (1913) who related them to environmental factors.

Following the routes discussed by Darlington (1938: 295), *Lucidella* appears in Hispaniola where, in addition to 7 species of the Jamaicas subgenus *Poenia*, a new subgenus, *Poeniella*, possibly derived from some form similar to *granulosa*, radiated into the 5 taxa presently found in Hispaniola. From Hispaniola *Lucidella*, in the form of the subgenus *Poeniella*, probably *L. cibaoensis*, made its way

to Cuba. The subgenus *Poenia* came to Cuba from Jamaica where today it is represented by the single species, *L. granum*.

From Jamaica and Hispaniola as centers, the various groups migrated to other areas: *Poenia*, starting from Jamaica where 10 forms are known, migrated to Hispaniola where 7 forms are now recognized and then to Barbados, Swan Island, St. Lucia and other of the Lesser Antilles, Trinidad, Martinique, Cuba and Puerto Rico, with a single species each. *Poeniella*, originating in Hispaniola, expanded to Cuba (3 species), Puerto Rico, the Bahamas, Florida Keys, Grand Cayman and St. Kitts where a single form developed in each locality. The possible routes of invasion in these cases is not known though it is assumed that passive transport, probably modulated by hurricanes, figured in the distribution to Cuba, Florida and the Bahamas. These migrations took place long enough ago for largely endemic forms to have developed in each area.

Plotting these data on Map 1, we note that *Poeniella* is located more to the north, from Florida to St. Kitts, whereas *Poenia* is found from Yucatan to Barbados and Trinidad. That *Poeniella* does not occur on Jamaica at all agrees with the generalizations of Darlington (1938), who concluded that the line of migration was from Jamaica to Hispaniola and Cuba, and not from Hispaniola to Jamaica. There are no species of *Lucidella* s. s. in Cuba and there are no species of either *Poenia* or *Poeniella* on the Isle of Pines. Details of distribution of the species found in Cuba appear in the discussion of each of the Cuban species and are illustrated in Map 2.

The catalogue of *Lucidella* which follows this study (Boss and Jacobson, 1974) includes all the names introduced for this genus and forms the basis for the remarks on the zoogeography of the genus. Lack of material made it impossible to judge the state of all the names independently, and the opinions of various authorities on the subject are included as notes.

Subgenus *Poenia* H. and A. Adams

Poenia H. and A. Adams, 1856. Genera of Recent Mollusca 2: 304 (type-species, *Helicina depressa* Gray, 1825 [Jamaica], subsequent designation, Pilsbry and Brown, 1912).

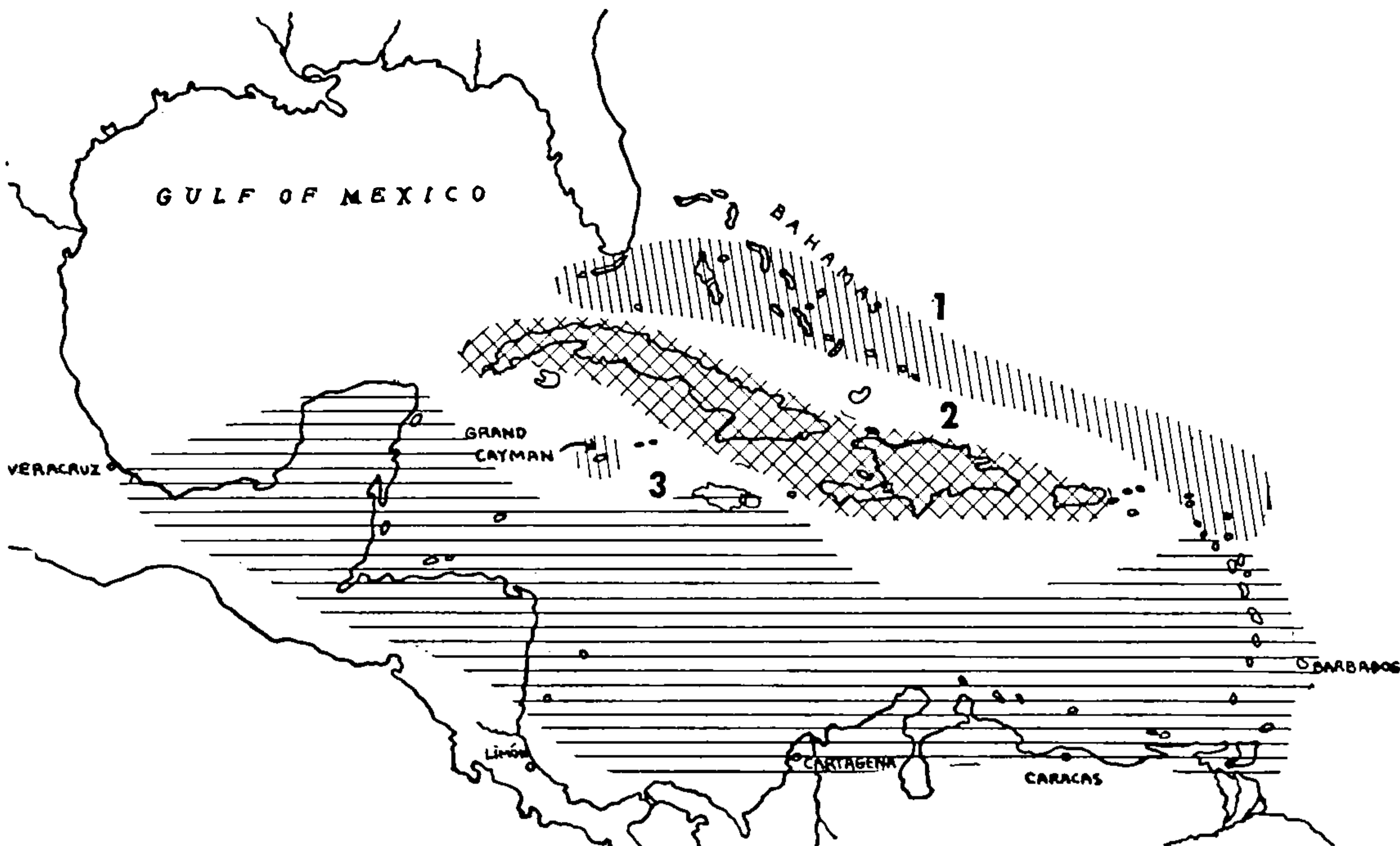
Perenna Guppy, 1867. Ann. & Mag. Nat. Hist. 19: 260 (type-species, by monotypy, *Helicina lamellosa* Guppy, 1867 [Trinidad] [= *H. lirata* Pfeiffer]).

Description. Shell small, 3 to 4 mm in diameter, depressed, light colored, weakly to strongly sculptured with spiral lines or ridges, occasionally crossed by much weaker axial striations, sculpture covering entire shell or obsolescent on base; occasionally with more or less densely spaced short, deciduous bristles; lip teeth weakly developed, aperture not strongly constricted.

Remarks. Members of this subgenus are recognized by their small size, light color, and predominantly spiral sculpture though species may also have weak axial striations. The single Cuban species, *L. (Poenia) granum* (Pfeiffer), confined to the easternmost part of the island, must have reached Cuba from Jamaica, possibly via Hispaniola (Map 2). Besides Jamaica, Cuba, Hispaniola, Puerto Rico and Yucatan, the subgenus occurs on the more southerly Lesser Antilles like St. Lucia and Martinique and also on Trinidad, thus in territory lying to the south of the range of *Poeniella*.

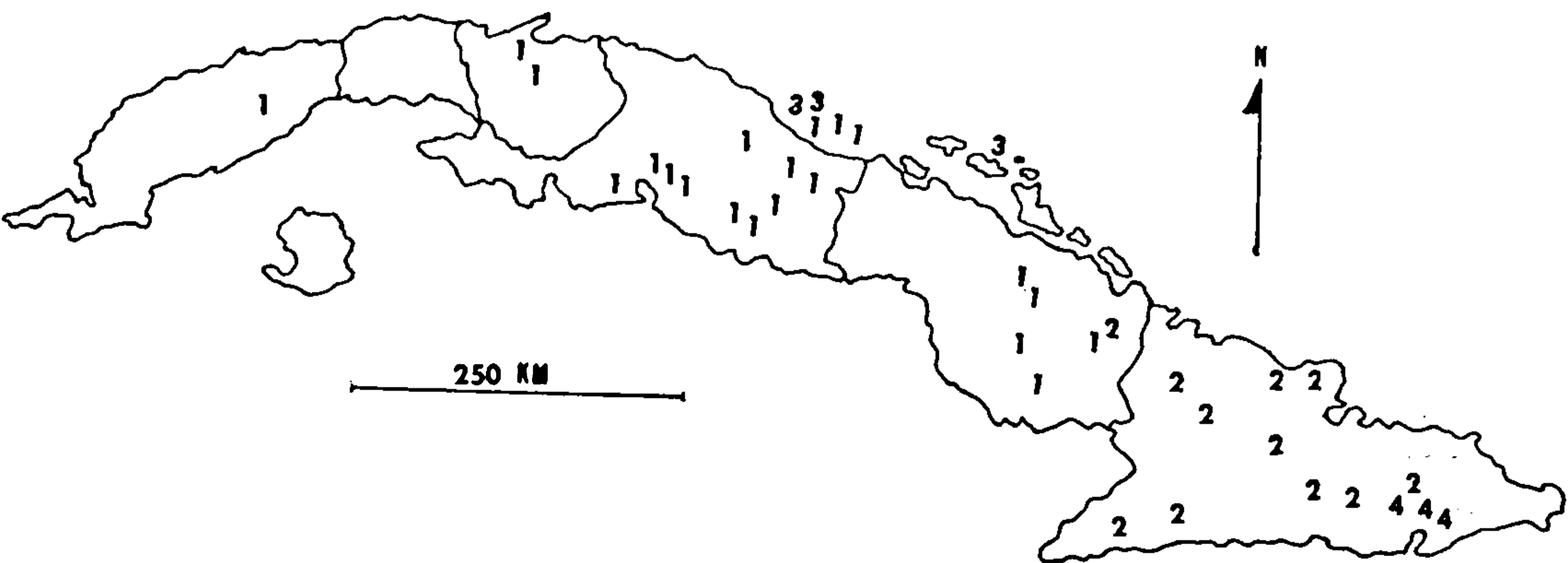
Keen (1960: 288) and others recognized *Perenna* Guppy, 1867 with type-species *lamellosa* Guppy (= *lirata* Pfeiffer) as a valid subgenus. It is difficult to justify the separation of this group from *Poenia* because the only difference cited by Keen is the presence of a keel in *Perenna*, an insufficient character for subgeneric distinction.

Baker (1922: 54) cited *H. unidentata* Pfeiffer, 1849 (= *H. lirata* Pfeiffer, 1847) as the type of *Poenia* following Fischer (1885). However, since Fischer did not actually select a type-species, the designation must date from Baker, 1922. This designation, however, was predated by that of Pilsbry and Brown, 1914, who selected *Helicina depressa* Gray, 1825 as the type-species of *Poenia*.



Map 1

The distribution of subgenera of the genus *Lucidella*. *Poeniella* has a more northern distribution from Florida to St. Kitts (No. 1) while *Poenia* is found in the south from Yucatan to Barbadoes and Trinidad (No. 3). Both overlap in No. 2. *Lucidella* s.s. is found principally in Jamaica.



Map 2

The distribution of the Cuban species of *Lucidella*. 1 = *rugosa*. 2 = *granum*. 3 = *tantilla*. 4 = *granulum*.

Lucidella (*Poenia*) *granum* (Pfeiffer)

Plate 1, figs. 1-6

Helicina granum Pfeiffer, 1856. Novit. Conch. 1: 86, pl. 23, figs. 20-23; 1857. Malak. Blätt. 3: 49 (type locality, Holguín, Oriente, Cuba; neotype, here selected, MCZ 73863, *ex* Gundlach); 1858. Monographia Pneumonopomorum Viventium, suppl. 1, p. 206; 1865. *Ibid.*, suppl. 2, p. 234; 1876. *Ibid.*, suppl. 3, p. 272; Arango, 1879. Contribución Fauna Malacológica Cubana, p. 53; Crosse, 1890. Jour. Conchyl. 38: 321; Reeve, 1873. Conch. Icon. 19: pl. 25, fig. 225.

Lucidella granum Pfeiffer, Sowerby, 1866. Thes. Conch. 3: 270, pl. 278 (13), fig. 468; Wagner, 1910. [*In*] Martini and Chemnitz, Conch. Cab. (2) 1: sect. 18, pt. 2, p. 343, pl. 68, figs. 14, 15.

Description. Shell attaining 3.5 mm in width and 3.0 mm in height, depressed conic, moderately glossy. Color reddish or coppery brown to pale orange yellow, lip often white. Whorls little more than 5, weakly inflated, slowly increasing in size; body whorl well and evenly rounded, barely descending at aperture. Suture well marked, slightly channeled. Spire convex, about equal in height to the body whorl. Aperture oblique, widely semilunate. Parietal wall thin and glassy. Basal callus thin, depressed, surface with wide, rounded wrinkles. Lip entire, thickened, barely expanded centrally. Columella short, concave. Sculpture of well marked, subregularly spaced spiral ridges, generally narrower than the intervals. Protoconch $1\frac{1}{8}$ whorls, well rounded, lightly raised, faintly and closely punctate. Periostracum wanting. Operculum as in genus.

Height Width

mm mm

3.0	3.2	Botanic Garden, Cienfuegos, Las Villas
2.6	3.5	Vilche's Hill, Soledad, Las Villas
2.5	3.3	Holguín, Oriente (neotype)
2.4	3.3	Cerro Canada de Jagüeyes, Holguín, Oriente
2.1	3.5	Loma Aguada de Puig, Retrete, Banes, Oriente



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Remarks. This is the only species of the subgenus *Poenia* in Cuba. Its range is limited to the eastern end of the island in Oriente and the easternmost part of the neighboring Camagüey Province. The occurrence in and around the Botanic Garden of Cienfuegos and Soledad in western Las Villas, with no intervening records, is probably due to accidental introductions, possibly with plants.

In Cuba this species is readily identifiable by the presence of spiral sculpture.

Specimens examined. ORIENTE. *Miranda*: Cato del Rey, ca. 20 km from Miranda; Arroyo de Agua, near Miranda; Upper Mercedes Valley; top of hill N of Mercedes Valley; Nipe Hills, Tibisi; mogote, 8 km SE of Miranda (all ANSP). Florida Blanca, Alto Songo (MCZ). *Guantánamo*: Sierra Canasta, Romelia Woods; Monte Verde (both USNM); Guasa River, Mte. Líbano (MCZ). *Holguín*: Cerro Cariblanco, 16 km NE of Holguín; Unas, 12½ km NW of Holguín; Cerro Corralito, 17 km NE of Holguín; 2 km N of Unas; Cerro Canada de Jagüeyes; Buenavista, Bayamo (all MCZ); new road E of Ensenada de Mora; 1 km inland, W of river, Mota (both ANSP); Mogote Santa Ana, San Luis; Camayén, Santa Lucía; La Silla, Santa Lucía; Antilla, Bahía de Nipe (all USNM); Loma de la Aguada de Puig, Retrete, Banes (MCZ). CAMAGÜEY. El Jacinto, Cascorro. LAS VILLAS. Jardin Botánico, Cienfuegos; Vilches Hill, 2½ mi. E of Soledad, Cienfuegos (both MCZ).

Subgenus *Poeniella* H. B. Baker

Poeniella H. B. Baker, 1923. Occ. Papers Mus. Zool. Univ. Michigan no. 137, p. 23 (type-species, *Helicina plicatula christophori* Pilsbry, 1897, St. Kitts, West Indies, original designation).

Poeniella "H. B. Baker" Clench, 1961. Occ. Papers Moll., Harvard Univ. 2 (26): 238 [error for *Poeniella*].

Description. Shell small, 2–4 mm in diameter, depressed to moderately raised or subconic; sculpture of regular, variously strong, occasionally sigmoid, slanting axial riblets,

spiral striae weak or absent; labial denticles weak or obsolete.

Remarks. The members of this subgenus are small, with generally pale shells differing from those in *Poenia* by having predominantly axial instead of spiral sculpture. This group is absent from Jamaica and probably originated in Hispaniola which has at least 7 species. In addition to Cuba and Hispaniola, this subgenus occurs in Puerto Rico, St. Kitts, Grand Cayman Island, the Bahamas, and the Florida Keys. It occupies a more northerly area than the subgenus *Poenia*, the area of overlap occurring in the Greater Antilles (see Map 1).

The 3 Cuban species are all small. Of the three, only *rugosa* seems to have an island-wide distribution (Map 2), thinning out considerably in the two outer provinces, Oriente and Pinar del Río. *L. granulum* is limited to the environs of Guantánamo, and *tantilla*, which also occurs in the Bahamas and Florida Keys, is found principally on a few islands off the north central coast of Cuba (Map 2).

Baker (1923: 23) cited the type-species of *Poeniella* as *Helicina (plicatula) [sic] christophori* Pilsbry. The misplaced parentheses caused some confusion in the literature. Pilsbry (1948) repeated the illogical original citation, while Aguayo and Jaume (1948) wrote *H. (Plicatula) christophori*, and Thiele (1929: 88) and Wenz (1938: 466) cited the type-species as *L. (P.) christophori*. The correct name is as given above and can be found on p. 22 in Baker (1923).

Lucidella (Poeniella) rugosa (Pfeiffer)

Plate 2, figs. 1-6

Helicina rugosa Pfeiffer, 1839. Wiegmann's Arch. Naturg. 1 (5): 355 (type-locality, Palenque and Pan de Matanzas, Matanzas; type, destroyed); 1852. Monographia Pneumonopomorum Viventium, p. 341; 1858. *Ibid.*, suppl. 1, p. 180; 1865. *Ibid.*, suppl. 2, p. 217; Sowerby, 1842. Thes. Conch. 1: 14, pl. 3, fig. 132; Arango. 1879, Contribución Fauna Malacológica Cubana, p. 45; Reeve, 1873. Conch. Icon. 19: pl. 14, fig. 120.

Lucidella rugosa Pfeiffer, Sowerby, 1866. Thes. Conch. 3: 281, pl. 268 (Helicina 3) figs. 81, 82; Wagner, 1910. [In] Martini & Chemnitz, Conch. Cab. (2) 1: sect. 18, p. 347, pl. 69, figs. 8, 9.

Description. Shell small, 3–4 mm in width and 2–3 mm in height, depressed conic, moderately glossy. Color lemon-yellow, lip white. Whorls about 5, weakly rounded, slowly increasing in size. Suture well impressed. Spire low, convex. Aperture semilunate, constricted near both terminations, acutely angled above. Parietal wall strongly sigmoid. Basal callus depressed, thin, glossy, minutely punctate. Peristome thickened, reflected, widened and slightly bent downward, with a tiny notch at insertion in body whorl and a long, low, toothlike tubercle on basal portion. Columella short, concave, smoothly curved at insertion to basal lip. Early teleoconch punctate, later whorls marked by strong, slanting, regularly spaced axial ridges, wider than their interspaces. Protoconch $1\frac{1}{2}$ whorls, rounded, moderately raised, minutely punctate. Periostracum wanting. Operculum as in genus.

Height	Width	
mm	mm	
2.3	3.7	Casa Blanca, Pinar del Río
2.3	3.6	Paso Paredones, Cubitas, Camagüey
2.3	3.6	Harvard House, Soledad, Las Villas
2.2	3.6	El Mamey, Sagua La Grande, Las Villas
2.2	3.5	Cayo Lucas, Caibarién, Las Villas

Remarks. This species is separated from other Cuban *Poeniella* by its larger size and stronger sculpture. *L. granulum* which also has a weakly flaring peristome, reaches only about one-half the size of *rugosa* and the axial sculpture is much weaker. Moreover in *granulum* the labial swelling is barely perceptible and the notch at the upper labial insertion is minute. *L. rugosa* is closely related to several *Poeniella* from Hispaniola (see Hjalmarson and Pfeiffer, 1858: 145). The basal labial swelling and the tiny notch at the upper insertion of the lip are characteristic of *rugosa*.

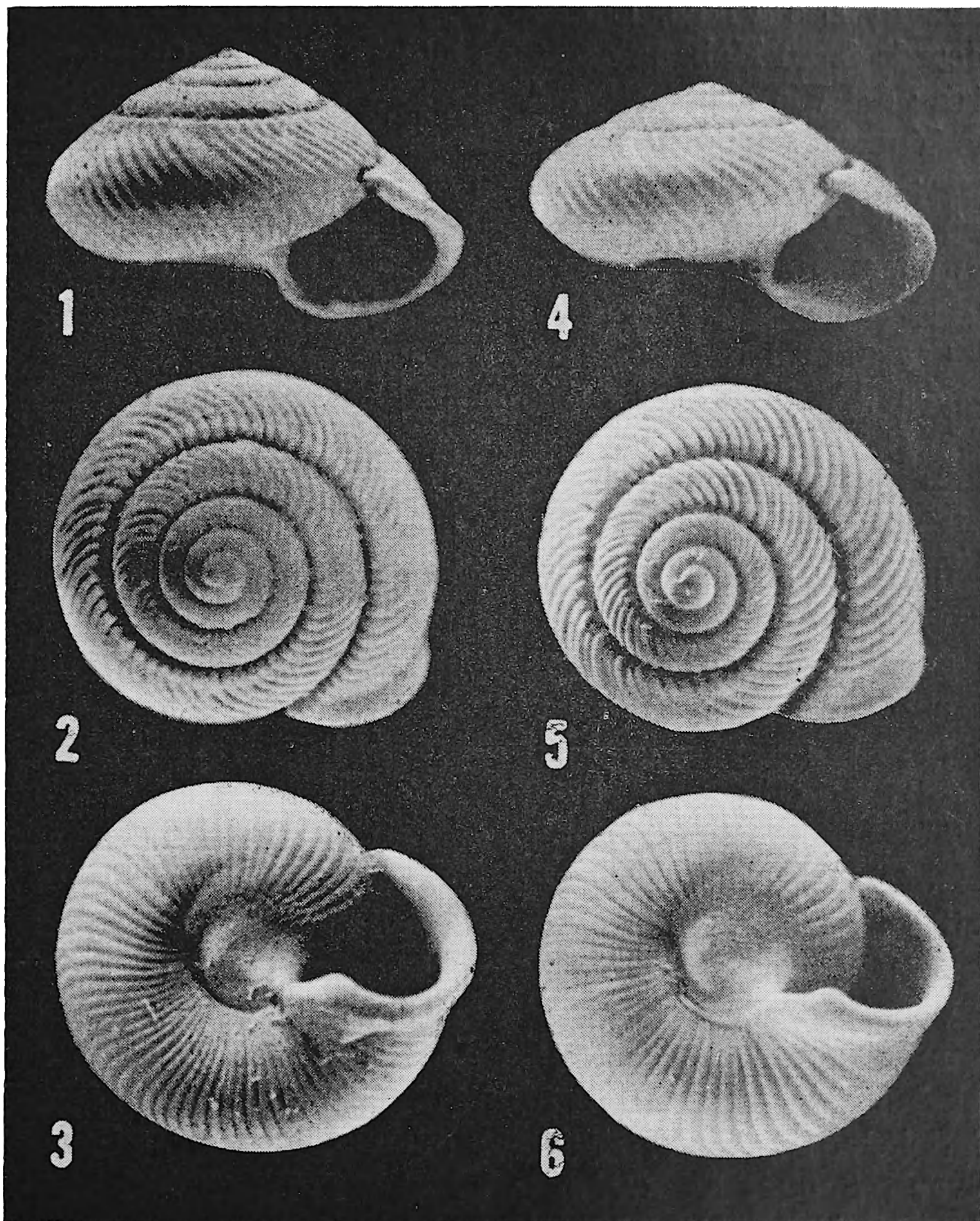


Plate 2

Lucidella (Poeniella) rugosa (Pfeiffer)

Figs. 1-3. San Martín de Biaya, Camagüey, 3.5 mm \times 2.2 mm, MCZ 128780.

Figs. 4-6. Arroyo Hondo, Camagüey, 3.8 mm \times 1.8 mm, MCZ 277240.

The distribution of *rugosa* centers around the middle of Cuba in Las Villas, Camagüey, and Matanzas Provinces. Records from Habana are few, and those from Oriente and Pinar del Río are scattered. Arango (1879) cited it from the Yunque de Baracoa in Oriente and Almendares in Havana; Aguayo and Jaume (1948) add Camoa and Sierra del Grillo in Havana. But Jaume (1945) did not find it on the Pan de Guajaibón in Pinar del Río, and the specimens from Sierra Canasta and Florida Blanca, Guantánamo, in Oriente in the Ramsden Collection in the USNM labelled *rugosa* proved to be *granulum*. Farfante (1942: 50) reported it from Camoa and Somorrostro, Havana, and stated that "se encuentra en toda la Isla bajo las piedras y hojarasca." Aguayo and Jaume (1953: 27) found it in small numbers in Baracoa, Havana and the Bosque de la Habana (1939: 238). They stated that the species is very restricted in the western area of Cuba and that it does not occur alive around the city of Habana. It is obvious that documentation of the presence of *rugosa* at the two ends of the island is still desirable.

Specimens examined. PINAR DEL RÍO. Casa Blanca [2 km SE of Palacios]. MATANZAS. 1 km W of Río Canímar; Coliseo, near Matanzas. LAS VILLAS. *Soledad*: Harvard House; Limones Seburoco, 1 mi SE of Soledad; Monte de la Vequita; Vilches Hill, 2½ mi E of Soledad; Guabairo; ½ mi E of Guabairo; Seboruco Portuguesa, 2 mi NE of Soledad; Seboruco, 2 mi NE of Soledad; Seboruco, 2 mi NW of Soledad; Los Portugueses; limestone hills on Caranao River. *Sagua La Grande*: San Miguel; Chinchila; El Mamey. *Vega Alta*: Murciélagos; El Hoyon; La Sinaloa; Piedras. Monte del Pico, El Roble, Cienfuegos; Loma el Ternero, San Juan de las Yeras; mogote near El Palenque de Remedios; loma near San Agustín, Zulueta; La Vigía, Mayajigua; La Veterana, San Diego de Valle; Canon del Yigre, Yaguajay; El Zanjón; Cueva de la Virgen, Corazón de Jesús; El Capiro [5 km S of Cabo Iguare]. *Off Caibarien*: Cayo Aguado; Cayo Conuco, 1 mi off Caibarien; Cayo Lucas. CAMAGÜEY. Paso Paredones, Cubitas Mts.; Corrales de Canilgones, Cubitas Mts.; El Cacaotal, Najaza

Mts.; Arroyo Hondo; San Martín de Biaya; Sibanicu, San Martín.

Lucidella (*Poeniella*) *granulum* (Pfeiffer)

Plate 3, figs. 1–3

Helicina granulum "Gundlach" Pfeiffer, 1864. Malak. Blätt. 11: 161 (type-locality, Monte Toro, Guantánamo [Oriente], Cuba; holotype, destroyed (Clench and Jacobson, 1971: 101); neotype ANSP 110769, selected by Jacobson, 1973: 108, fig. 1; between Nimfitas and La Victoria, Monte Toro, Guantánamo, Oriente, Cuba); 1865. Monographia Pneumonopomorum Viventium, suppl. 2, p. 233; 1876. *Ibid.*, suppl. 3, p. 271; Arango, 1879. Contribución Fauna Malacológica Cubana, p. 53; Crosse, 1890. Jour. Conchyl. 38: 321.

Lucidella tantilla 'Pilsbry' Ramsden, 1914. Nautilus 28: 50, pl. 2, fig. 5, *non* Pilsbry, 1902.

Lucidella (*Poenia*) *granulum* (Pfeiffer). Aguayo and Jaume, 1948. Catálogo Moluscos de Cuba, no. 495.

Troschelviana (*Microviana*) *granulum* (Pfeiffer). Clench and Jacobson, 1971. Bull. Mus. Comp. Zool. 141 (7): 441.

Lucidella (*Poeniella*) *granulum* (Pfeiffer). Jacobson, 1973, Nautilus 87: 107–9, fig. 1.

Description. Shell very small, reaching only about 2.7 mm in width and 1.5 mm in height, glossy, translucent; whorls 4+, moderately swollen, increasing slowly in width, the last whorl only slightly wider than the penultimate, slightly descending at aperture; color light greenish-yellow. Spire slightly raised. Aperture oblique, widely semilunate; umbilical area covered; peristome rounded and reflected, narrower near the basal insertion where it terminates in a wide, very shallow notch. Columella short, evenly concave; suture well impressed especially at later whorls. Early teleoconch marked only with closely set punctations, last two whorls with regular, diagonal axial ribs gradually widening but becoming obsolete near the aperture where the only sculpture consists of even, irregularly spaced axial striae. Protoconch one whorl, slightly raised, distinct,

dulled by closely set irregular punctations. Periostracum thin, persistent. Operculum unknown.

Height	Width	
mm	mm	
1.4	2.6	Florida Blanca, Alto Songo, Oriente
1.3	2.4	km 54, Sierra Canasta, Santiago de Cuba, Oriente
1.0	2.2	neotype, Monte Toro, Guantánamo, Oriente

Remarks. The rarity of this obscure species, overlooked until recently, has been detailed by Jacobson (1973). Pfeiffer (1865: 233) reprinted his original description verbatim and later (1876: 271) merely listed the name. Sowerby (1866: 296) listed it as an unidentified species, and Reeve (1874) and Wagner (1910) omitted it. Fulton (1915) did not mention it among the names omitted by Wagner. Arango (1879), Crosse (1890), and Aguayo and Jaume (1948) repeated only the locality given originally by Pfeiffer. Clench and Jacobson (1971 b) tentatively referred it to the genus *Troschelviana*, subgenus *Microviana*, although Pfeiffer had made no reference to a mucronate protoconch, a feature characteristic of the helicinine tribe Vianini in which the genus *Troschelviana* belongs. Aguayo and Jaume (1948) placed *granulum* in *Lucidella*.

Lucidella granulum is easily confused with *L. tantilla* to which it must be very closely related. Chiefly, *granulum* has the lips of the peristome clearly expanded and it does not have a noticeable basal notch. Further, the axial riblets are stronger or heavier in *granulum* and its shell is lighter in color, with a more glossy appearance. The outline of the peristome in *granulum* tends to be rounded rather than ovately expanded as it is in *tantilla* and the insertion of the peristome basally is incurved rather more sharply than in *tantilla*.

Specimens of this tiny species were found by Ramsden (1914) "in dirt at the root of a large tree." Its small size and secretive habitat make this a difficult species to collect, possibly explaining the disjunctive distribution and the paucity of records.



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Specimens examined. Oriente: Florida Blanca, Alto Songo; km 54, Sierra Canasta, Santiago de Cuba; La Cueva, Diego Cobas, Majaguabo (all Ramsden Collection in USNM); Guaso River, Monte Líbano, Guantánamo (USNM); Monte Toro, Guantánamo (USNM and ANSP).

***Lucidella (Poeniella) tantilla* (Pilsbry)**

Plate 4, figs. 1–3

Helicina tantilla Pilsbry, 1902. Nautilus 16: 53. (type-locality, Palm Beach, Florida; holotype ANSP 77349).

Lucidella (Poeniella) tantilla (Pilsbry), 1948. Land Mollusca of North America north of Mexico, Monograph 3, Acad. Nat. Sci. Philadelphia 2: 1085, fig. 580.

Lucidella tantila "Pilsbry" Vanatta, 1923. Nautilus 37: 69, error for *tantilla*.

Description. Shell very small, reaching nearly 3.0 mm in width and 1.5 mm in height, depressed, moderately glossy. Color faintly yellowish. Whorls $4\frac{1}{4}$, barely inflated, slowly increasing except body whorl which is twice as wide as the penultimate; body whorl depressed, subcarinate, not descending at aperture, base excavated. Suture well impressed, spire low, domelike. Aperture oblique, rounded triangular, almost straight above, well rounded below. Basal callus rather strong, minutely pebbled. Peristome thickened, barely expanded, with a slight dip above, labial teeth obsolescent. Columella short, concave, inserting into basal lip with a moderately acute rounded angle. Sculpture of fine, regular, slanting, slightly curved axial ribs, about as wide as their intervals. Protoconch $1\frac{1}{2}$ whorls, rounded, barely raised, minutely pitted. Periostracum thin. Operculum as in genus.

Height	Width	
mm	mm	
1.4	2.9	Caicos Id., Bahamas
1.4	2.5	Farallón Don Pepe, Cayo Las Brujas, Caibarién, Las Villas, Cuba
1.3	2.6	Pumpkin Key, Florida
1.2	2.5	Cayo Cobas, Caibarién, Las Villas, Cuba

Remarks. As mentioned previously, *Lucidella tantilla* is most closely related to *granulum*; these species, because of their extremely small size, are easily confused. However, *tantilla* does not have the lips of the peristome expanded and it does have a noticeable basal notch. Further, Pilsbry (1902) based his description on a single specimen taken in an undisturbed woodland on the beach near the city of Palm Beach, Florida, a type-locality since destroyed. Pilsbry (1948) called his specimen, "a hurricane-borne waif from Cuba." The species is known from Cuba, the Florida Keys (Pilsbry, 1905; Vanatta, 1912; Walker, 1917) and the Bahamas (Clapp, 1913; 1921; Clench, 1937; 1942). In Cuba it is found on only a few keys off the north central coast. Aguayo and Jaume (1948) cited the species from Cayo Guillermo of the northern Coast of Camagüey and the MCZ has one lot each from Cayo Cobas near Cayo Francés, and Cayo de las Brujas, both of which are small keys lying off the northern coast of Las Villas near Caibarién. A single, broken specimen of *tantilla* (MCZ 237756) is from Cafetal Virginea, Guantánamo, but we have no other records from the mainland of Cuba and consider this doubtful.

It is difficult to speculate on the place of origin of *L. tantilla*, since both the Florida Keys and the Bahamas are geologically quite recent and since *tantilla* was apparently transported there by hurricane. We assume that *tantilla* originated in Cuba, and presently occupies refugia along the north central coast of the island.

Specimens examined. FLORIDA: Eliot Key; Pumpkin Key (both MCZ). BAHAMA IDS.: California and NW Point, S. Bimini; Sand Bank, Crossing Bay, Great Abaco; More's Id., 32 mi NW of SW Point, Great Abaco; NW Point, Little Inagua; Cornucopia, Acklins Id.; Cape Comete, E. Caicos, Caicos Ids. (all MCZ). CUBA: *Las Villas*: Farallón de Don Pepe, Cayo de las Brujas, Caibarién; Cayo Cobas, near Cayo Francés, Caibarién (both MCZ). *Oriente*: Guantánamo: Cafetal Virginea (MCZ)?.

BIBLIOGRAPHY

- ADAMS, H. AND A. ADAMS. 1856. The genera of Recent Mollusca. London, Vol. 2, 661 pp.
- AGUAYO, C. G. AND M. L. JAUME. 1939. Moluscos semifósiles del Bosque de la Habana. Mem. Soc. Cubana Hist. Nat. 13: 229-245, 2 figs.
- _____. 1948. Catálogo Moluscos de Cuba, No. 495 (mimeographed).
- _____. 1953. Moluscos terrestres de la región de Baracoa, Habana. Mem. Soc. Cubana Hist. Nat. 21 (3): 267-310, pls. 30-35.
- ARANGO, R. 1879. Helicinidae [in] Contribución Fauna Malacológica Cubana, pp. 41-57.
- BAKER, H. B. 1922. Notes on the radula of *Helicina*. Proc. Acad. Nat. Sci. Philadelphia 74: 29-67, pls. 3-7.
- _____. 1923. The Mollusca collected by the University of Michigan-Williamson Expedition in Venezuela. Occ. Papers Mus. Zool., Univ. Mich., No. 137, 59 pp., 5 pls.
- _____. 1926. Anatomical notes on American Helicinidae. Proc. Acad. Nat. Sci. Philadelphia 78: 35-56, pls. 4-8.
- _____. 1927. Guppy's groups of Helicinidae. Nautilus 41: 22-23.
- _____. 1928. Mexican mollusks collected for Dr. Bryant Walker in 1926, I. Occ. Papers Mus. Zool., Univ. Mich., No. 193, 64 pp., 6 pls.
- _____. 1934. Jamaican land snails. Nautilus 48: 1-14, 1 pl.
- BLAND, T. 1858. On the absorption of parts of the internal structure of their shells by the animals of *Stoastoma*, *Lucidella*, *Trochatella*, *Helicina* and *Proserpina*. Ann. Lyceum Nat. Hist. New York, 6: 75-77.
- BOSS, K. J. 1972. Minute Jamaican prosobranch gastropods: *Stoastoma* and its congeners. Breviora, No. 393, 13 pp., 2 pls.
- _____. AND M. K. JACOBSON. 1973a. Monograph of *Ceratodiscus*. Occ. Papers Moll., Harvard Univ. 3 (45): 253-279, pls. 45-48.
- _____. 1973b. Monograph of the genus *Alcadia* in Cuba. Bull. Mus. Comp. Zool., Harvard Univ. 145 (7): 311-358, 6 pls.
- BOURNE, G. C. 1911. Contributions to the morphology of the group Neritacea of the aspidobranch gastropods, part 2, the Helicinidae. Proc. Zool. Soc. London, pp. 759-809, pls. 30-42.
- BROWN, A. P. 1913. Variation in two species of *Lucidella* from Jamaica. Proc. Acad. Nat. Sci. Philadelphia, pp. 3-21, pl. 1.
- CLAPP, G. H. 1913. Land shells collected on the Bimini Islands, Gun and Cat Cays, Bahamas. Nautilus 27: 63-64.

- _____. 1921. Land shells of Chokoloskee Key and Cape Sable, Florida. *Nautilus* 34: 108.
- CLENCH, W. J. 1937. Shells of Mariguana Island, with a review of the Bahama Helicinidae and descriptions of new Bahama species. *Proc. New England Zool. Club* 16: 57-79, pl. 3.
- _____. 1942. Land shells of the Bimini Islands, Bahama Islands. *Proc. New England Zool. Club* 19: 53-67.
- _____. AND M. K. JACOBSON. 1968. Monograph of the Cuban genus *Viana*. *Breviora*, No. 298, 25 pp., 4 pls., 5 maps.
- _____. 1970. The genus *Priotrocharella* of the Isle of Pines and Jamaica. *Occ. Papers Moll., Harvard Univ.* 3 (39): 61-80, pls. 17-20, 1 map.
- _____. 1971a. Monograph of the Cuban genera *Emoda* and *Glyptemoda*. *Bull. Mus. Comp. Zool.* 141: 99-130, 7 pls.
- _____. 1971b. A monograph of the genera *Calidviana*, *Ustronia*, *Troschelviana*, and *Semitrochatella* in Cuba. *Ibid.* 141 (7): 403-463, 8 pls., 2 figs.
- CROSSE, H. 1890. Faune malacologique terrestre et fluviatile d l'ile de Cuba. *Jour. de Conch.*, 38: 173-335.
- DARLINGTON, P. J., JR. 1938. The origin of the fauna of the Greater Antilles, with discussion of dispersal over water and through the air. *Quart. Rev. Biol.* 13 (3): 274-300, 5 figs.
- FARFANTE, ISABEL PÉREZ. 1942. Moluscos de la región de Camoa y Somorrostro y sus condiciones de vida. *Mem. Soc. Cubana Hist. Nat.* 16 (1): 45-56.
- FÉRUSSAC, J. B. L. A. 1819-1832. (see Kennard, 1942). Histoire naturelle générale et particulière des Mollusques terrestres et fluviatiles. Paris, 2 vols. and atlas.
- _____. 1822. (see Kennard, 1942). Tableaux systématiques des animaux mollusques . . . Prodrôme Général . . . Tableau systématique de la famille des Limaçons. Paris, 90 pp.
- FISCHER, H. 1885. Helicinidae [in] *Manuel de Conchyliologie*, pp. 794-798, figs. 554-556.
- FULTON, H. C. 1915. On Dr. Anton Wagner's Monograph of Helicinidae in the Conchylien-Cabinet, 1911. *Proc. Malac. Soc. London* 11: 237-241, 324-326.
- GRAY, J. E. 1825. Monograph of the genus *Helicina*. *Jour. Zool.* 1: 62-71, pl. 6.
- _____. 1842. Synopsis of the contents of the British Museum. 44th Ed. London, 308 pp.
- _____. 1857. Guide to the systematic distribution of Mollusca in the British Museum. Part 1. London, 230 pp.
- GUPPY, R. J. L. 1867. Description of a new land shell from Trinidad. *Ann. Mag. Nat. Hist.* (3) 19: 260.

- _____. 1868. On the terrestrial mollusks of Dominica and Grenada, with an account of some new species from Trinidad. *Ann. Mag. Nat. Hist.* (3) 19: 429-442.
- _____. 1895. On a land shell of the genus *Helicina* from Grenada and on the classification of the Helicinidae. *Proc. Victoria Inst. Trinidad*, 2: 72-77.
- HJALMARSON, J. AND L. PFEIFFER. 1858. Beiträge zur Fauna von Westindien. *Malak. Blätt.* 5: 135-155, pls. 2, 3.
- JACOBSON, M. K. 1973. On the identity of *Helicina granulum* Pfeiffer (Prosobranchia). *Nautilus*, 87: 107-109.
- _____. AND K. J. BOSS. 1973. The Jamaican land shells described by C. B. Adams. *Occ. Papers Moll., Harvard Univ.*, 3 (47): 305-519, pls. 54-91.
- JAUME, M. L. 1945. Excursión malacológica al Pan de Guajaibón. *Revista Soc. Malac. "Carlos de la Torre"* 3: 73-83.
- JOHNSON, R. I. 1973. Distribution of Hydrobiidae, a family of fresh and brackish water gastropods, in peninsular Florida. *Occ. Papers Moll., Harvard Univ.*, 3 (46): 281-304, pls. 49-53.
- KEEN, A. M. 1960. Helicinidae [in] Moore, R. C. (ed.), *Treatise on Invertebrate Paleontology, Mollusca*. Vol. 1, pp. 285-288, figs. 186-187.
- KENNARD, A. S. 1942. The *Histoire* and *Prodrome* of Férussac. *Proc. Malac. Soc. London* 25: 12-17.
- PETIT DE LA SAUSSAYE, M. 1851. Notice sur plusieurs genres des coquilles terrestres. *Jour. de Conch.* 2: 79-86.
- PFEIFFER, L. 1847. Aphorismen zur Geschichte der Helicinaceen. *Zeitschr. f. Malak.* 4: 151-156.
- _____. 1848. Methodische Anordnung bekannter Helicinaceen. *Ibid.* 5: 81-89.
- _____. 1850. Helicinaceen [in] Martini and Chemnitz, *Conchylien-Cabinet*, (2): 1: sect. 18, pt. 1, 70 pp., 10 pls.
- _____. 1852. *Monographia Pneumonopomorum Viventium*. Cassell, 439 pp.
- _____. 1857. Descriptions of thirty-one new species of land shells from the collection of Hugh Cuming, Esq. *Proc. Zool. Soc. London*, pp. 107-113.
- _____. 1858. *Monographia Pneumonopomorum Viventium. Supplementum primum*. Cassell, 249 pp.
- _____. 1865. *Monographia Pneumonopomorum Viventium. Supplementum secundum*. Cassell, 284 pp.
- _____. 1876. *Monographia Pneumonopomorum Viventium. Supplementum tertium*. Cassell, 479 pp.
- PILSBRY, H. A. 1902. A new Floridian *Helicina*. *Nautilus* 16: 53.
- _____. 1905. Land shells of the Florida Keys. *Nautilus* 19: 37-41.

-
- _____. 1948. Helicinidae [in] Land Mollusca of North America north of Mexico. Acad. Nat. Sci. Philadelphia, Monograph 3, Vol. 2 (2): 1078-1090, figs. 576-581.
-
- _____ AND A. P. BROWN. 1912. The land Mollusca of Montego Bay, Jamaica; with notes on the land Mollusca of the Kingston region. Proc. Acad. Nat. Sci. Philadelphia 63: 572-588, figs. 1-2, pl. 43.
-
- _____. 1914. List of land and freshwater mollusks of Antigua. Proc. Acad. Nat. Sci. Philadelphia 66: 429-431.
- RAMSDEN, C. T. 1914. Notes on some land shells of eastern Cuba. Nautilus 28: 49-51, pl. 2.
- REEVE, L. A. 1873-1874. Conchologia Iconica, Helicinidae. Vol. 19, London. 34 pls. and letter press.
- RICHARDS, H. G. 1938. Land mollusks from the island of Roatan, Honduras. Proc. American Philos. Soc. 79: 167-178, 3 pls.
- SIMPSON, C. T. 1894. Distribution of the land and freshwater mollusks of the West Indian Region, and their evidence with regard to past changes of land and sea. Proc. U. S. Nat. Mus. 17: 423-450, pl. 16.
- SOWERBY, G. B., II. 1842. Thesaurus Conchyliorum, London, Vol. 1, monograph of the genus *Helicina*, pp. 1-16, 3 pls.
-
- _____. 1866. Thesaurus Conchyliorum, vol. 3, second monograph of the genus *Helicina*. London, pp. 227-302, 13 pls.
- SWAINSON, W. 1840. A Treatise on Malacology. London, 419 pp.
- THIELE, J. 1929. Helicinidae [in] Handbuch der Weichtierkunde, pp. 84-91, figs. 57-67.
- TROSCHEL, F. H. 1856-1863. Das Gebiss der Schnecken. Vol. 1. Berlin. 252 pp., 20 pls.
- VANATTA, E. G. 1912. Land shells of southern Florida. Nautilus 26: 31-34.
- WAGNER, A. J. 1910. *Lucidella* [in] Martini and Chemnitz, Conchylien-Cabinet (2): 1: sect. 18, pt. 2, pp. 337-351, pls. 67-69.
- WALKER, B. 1917. A list of shells from the east coast of Florida. Nautilus 31: 53-57.
- WENZ, W. 1938. Helicinidae [in] Handbuch der Paläozoologie, Gastropoda, Berlin, Vol. 6, pt. 1, pp. 435-448, figs. 1071-1118.
- WOOD, W. 1825. Index Testaceologicus. London, 246 pp., 59 pls.
-
- _____. 1828. Supplement to the Index Testaceologicus. London, 59 pp., 8 pls.
- WOODRING, W. P. 1928. Miocene mollusks from Bowden, Jamaica. Gastropoda. Carnegie Inst. Washington, Publ. 385, 564 pp., 40 pls.

BOOK REVIEW

GÖTTING, KLAUS-JÜRGEN. 1974. *Malakozoologie. Grun-driss der Weichtierkunde*. Gustav Fischer, Stuttgart, X + 320 pp., 160 figs.

Götting presents a modern summary of the biology of mollusks for the use of students and shell collectors with an interest in zoology. After introducing the archetypal structure of mollusks, he reviews each Class by providing a definition of it and then discussing its general organization. A series of rather detailed sections on the various biological systems — integumentary, muscular, alimentary, circulatory, respiratory, excretory, reproductive and nervous complements a brief discussion of the group's ecology. Finally a taxonomic section, following Thiele and Zilch, lists each family with a concise diagnosis and with the citation of representative genera and their geographic ranges. The illustrations are usually taken from recent publications and include original and composite anatomical figures which are considerably diagrammatic.

Götting incorporates the expanded classificatory hierarchy proposed by Salvini-Plawen so that the Phylum is divided into the Aculifera and Conchifera which comprise 8 Classes, including the unfamiliar Caudofoveata. Götting over-estimates the diversity of the Phylum by stating that there are 128,000 molluscan species when it is known that there are fewer than 50,000 species (see *Occasional Papers* No. 40). Relying on Salvini-Plawen again, he lists an unrealistic number of genera of Solenogastres.

The bibliography of nearly 600 titles is useful and includes, as might be expected, numerous European papers with which American workers may not be acquainted. To those who are familiar with the old classical German malacological texts such as von Martens or Hescheler, Götting's volume constitutes an up-dating and extension of a scholarly tradition.

— K. J. BOSS



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Miss S. M. Wells, British Museum (Natural History), London. Dr. R. D. Turner and Mr. R. I. Johnson reviewed the manuscript.

ABBREVIATIONS

- ANSP — Academy of Natural Sciences, Philadelphia
 BMNH — British Museum (Natural History), London
 IZW — Instytut Zoologiczny Warszawa, Poland
 MCZ — Museum of Comparative Zoology, Cambridge, Massachusetts
 NMB — Naturhistorisches Museum, Bern, Switzerland
 USNM — United States National Museum of Natural History, Washington
 SMF — Senckenbergische Naturforschende Gesellschaft, Frankfurt, West Germany.

abbotti Vanatta, *Helicina*, 1920. Proc. Acad. Nat. Sci. Phila. 72: 205, pl. 6, fig. 12, 14 (1 mi NW of Sanchez, Santo Domingo, Hayti Id. [*sic*], [Hispaniola]; type, ANSP 44370a).

adamsiana Pfeiffer, *Helicina*, 1848. Proc. Zool. Soc. London, p. 119 (Jamaica; type, destroyed; Wagner, 1910. [*in*] Martini and Chemnitz, Conch.-Cab. (2) 1: sect. 18, pt. 2, p. 344, pl. 68, figs. 18–20). NOTE: type-species of *Urichia* Guppy 1895.

areola (Férussac) Petit de la Saussaye, *Helix*, 1851. Jour. de Conch. 2: 86, pl. 1, fig. 10, error for *aureola* Férussac.

aureola Férussac, *Helix*, 1822. Histoire naturelle général et particulière des mollusques terrestres et fluviatiles, cover of livraison 17 (see: Kennard, 1942), pl. 48, fig. 1; assigned to the subgenus *Helicodonta* in Tableaux systématiques des animaux mollusques . . . Prodrome Général . . . Tableau systématique de la famille des Limaçons, no. 90, p. 33 (La Martinique).

barbadensis Pfeiffer, *Helicina*, 1853. Proc. Zool. Soc. London, p. 60 (Barbadoes; type, destroyed).

beatensis Bartsch, *Lucidella*, 1932. Proc. U.S. Nat. Mus.

- 81 (2929): 3, pl. 2, figs. 4–6 (Beata Is., Island of Haiti [Dominican Republic, Hispaniola]; type, USNM 403920).
- caymanensis** Pilsbry, *Lucidella*, 1930. Proc. Acad. Nat. Sci. Phila. 82: 230, pl. 15, figs. 1, 1a, 1b (½ mi S of North Side Area, Grand Cayman Id.; type, ANSP 150867).
- christophori** Pilsbry, *Helicina plicatula*, 1897. Nautilus 10: 118 (St. Kitts; type, ANSP 62062a). NOTE: type-species of *Poeniella* H. B. Baker 1923.
- cibaoensis** Crosse, *Helicina rugosa* var., 1891. Jour. de Conch. 39: 185 (Cibao, Santo Domingo, Hispaniola; type, lost); Pilsbry 1928. Proc. Acad. Nat. Sci. Phila. 80: 480 (neotype designated, ANSP 14796a, pl. 27, fig. 1 and 2; Puerto Plata, Santo Domingo, Hispaniola). NOTE: Crosse merely gave a name to var. B of Hjalmarson and Pfeiffer 1858, Malak. Blätt. 5: 145, var. of *rugosa*.
- conoidea** Pilsbry, *Lucidella* (*Poeniella*), 1933. Proc. Acad. Nat. Sci. Phila. 85: 133, pl. 7, figs. 7, 7a (Del Monte Plantation, near Salvation, Santo Domingo, 3000 ft.; type, ANSP 160982).
- coronula** (Shuttleworth) Pfeiffer, *Helicina*, 1862. Malak. Blätt. 9: 155 (Jamaica; type, destroyed); Wagner, 1910. [*in*] Martini and Chemnitz, Conch.-Cab. (2) 1: sect. 18, pt. 2, p. 345, pl. 68, fig. 21.
- costata** Simpson, *Lucidella*, 1894. Proc. U.S. Nat. Mus. 17: 449, pl. 16, fig. 6 (marl stratum of Miocene beds, Bowden, St. Thomas, Jamaica; type, USNM 115766).
- cruciata** Weinland, *Helicina*, 1880. Jahrb. Malak. Gesell. 7: 351, pl. 12, fig. 7 (Port au Prince, Haiti, Hispaniola; type, not located). NOTE: synonym of *paivana* Pfeiffer 1866.
- decussata** Boettger, *Helicina*, 1887. Jahrb. Malak. Gesell. 14: 102, pl. 4, fig. 8 (Miragoane, Haiti, [Hispaniola]; type, SMF 181169 a). NOTE: subspecies of *paivana* Pfeiffer 1866.
- denseplicata** Wagner, *Lucidella*, 1910. [*in*] Martini and Chemnitz, Conch.-Cab. (2) 1: sect. 18, pt. 2, p. 348, pl. 69, figs. 14–15 (St. Lucia, Lesser Antilles; syntypes, IZW 9100).

- depressa** Gray **Helicina**, 1825. Zoological Jour. 1: 69, pl. 6, fig. 14 (West Indies; holotype, BMNH 1874.99.8). NOTE: Type-species of *Poenia* H. and A. Adams 1856.
- euglypta** Crosse, **Helicina**, 1874. Jour. de Conch. 22: 119, 204, pl. 4, fig. 4 (near Fort-de-France, Martinique; type, not located). NOTE: Wagner (1910) cited this as a synonym of *plicatula* Pfeiffer 1848.
- foxi** Pilsbry, **Lucidella**, 1899. Nautilus 13: 56 (Cave at Port Antonio, Jamaica; type, ANSP 61848a); Wagner, 1910, [*in*] Martini and Chemnitz, Conch.-Cab. (2) 1: sect. 18, pt. 2, p. 343, pl. 68, figs. 10–11.
- gonavensis** Pilsbry, **Lucidella** (**Poeniella**), 1928. Proc. Acad. Nat. Sci. Phila. 80: 481, pl. 27, figs. 8–9 (Gonave Id., Haiti, Hispaniola; type, ANSP 146698).
- granulosa** C. B. Adams, **Lucidella aureola**, 1850. Contrib. Conch. no. 6: 89 (Jamaica; lectotype, MCZ 156170, Jacobson and Boss, 1973, p. 358, pl. 84, figs. 1–3).
- granulum** (Gundlach) Pfeiffer, **Helicina**, 1864. Malak. Blätt. 11: 161 (Monte Toro, district of Guantánamo, Oriente, [Cuba]; type, destroyed; neotype, ANSP 110769, designated and figured by Jacobson, 1973, p. 108, fig. 1).
- granum** Pfeiffer, **Helicina**, 1856. Novit. Conch. 1: 86, pl. 23, figs. 20–23; 1857. Malak. Blätt. 3: 49 (Holguín, Oriente, Cuba; type, destroyed; neotype, MCZ 73863, designated and figured, Boss and Jacobson, 1974, p. 11, pl. 1, figs. 1–3).
- holoserica** Wagner, **Lucidella**, 1910. [*in*] Martini and Chemnitz, Conch.-Cab. (2) 1: sect. 18, pt. 2, p. 350, pl. 69, figs. 16–19 (Barbadoes; syntypes, IZW 9101).
- ignicoma** Guppy, **Helicina**, 1868. Ann. Mag. Nat. Hist. (4) 1: 441 (Trinidad; type, not in the BMNH, probably lost in the fire of the Victoria Institute, Trinidad, in 1920).
- inaequalis** Pfeiffer, **Helicina** (**Lucidella**), 1859. Proc. Zool. Soc. London, p. 28 (Jamaica; holotype, BMNH 1974.1).
- indecora** Pilsbry, **Lucidella pilsbryi**, 1930. Proc. Acad. Nat. Sci. Phila. 82: 243, pl. 17, fig. 5 (Little Swan Id.; [Caribbean Sea]; type, ANSP 150881).
- interrupta** Simpson, **Lucidella aureola** var., 1894. Proc. U.S. Nat. Mus. 17: 449 (Duncan's, Trelawney, Jamaica; type,

- USNM). NOTE: Probable synonym of *montegoensis* Brown, *fide*, H. B. Baker (1934).
- jeremiensis** Pilsbry, *Lucidella*, 1929. Proc. Acad. Nat. Sci. Phila. 28: 479, pl. 27, figs. 3–5 (near General's Cave, 1 mi W of Jérémie, Haiti, [Hispaniola]; holotype ANSP 118250a).
- kobelti** Wagner, *Lucidella*, 1910. [*in*] Martini and Chemnitz Conch.-Cab. (2) 1: sect. 18, pt. 2, p. 350, pl. 69, figs. 12 and 13 (Jamaica; holotype, IZW 9097).
- lamellosa** Guppy, *Helicina* (*Perenna*), 1867. Ann. Mag. Nat. Hist. (3) 19: 260, pl. 10, fig. 4 (Trinidad; syntype, BMNH 1874.10.30.12). NOTE: synonym of *H. lirata* Pfeiffer 1847; monotype of *Perenna* Guppy 1859.
- lasellensis** Clench and Aguayo, *Lucidella* (*Poeniella*), 1937. Mem. Soc. Cubana Hist. Nat. 11 (2): 63, pl. 7, fig. 6 (La Visite, La Selle Range, Haiti, [Hispaniola]; holotype, MCZ 110626).
- leana** C. B. Adams, *Helicina*, 1845. Proc. Boston Soc. Nat. Hist. 2: 11 (Jamaica; type, lost, see Jacobson and Boss, 1973, p. 375). NOTE: C. B. Adams (1851) called this a synonym of *depressa* Gray.
- Lindsleya** Chitty, 1857. Proc. Zool. Soc. London, pp. 167 and 169 (type-species, *Stoastoma lindsleyanum* C. B. Adams, 1849, by virtual tautonymy). NOTE: H. B. Baker (1922: 54) found that the radula of the type-species was very close to *Lucidella lirata* Pfeiffer 1847. Hence, in spite of the *Stoastoma*-like shell, he placed the taxon tentatively as a subgenus of *Lucidella*. He also placed *Lucidella venezuelensis* H. B. Baker 1922, in this subgenus. However, Keen (1960) associated this genus, a synonym of *Fadyenia* Chitty 1857, with *Stoastoma* as did Boss (1972).
- lineata** C. B. Adams, *Helicina*, 1845. Proc. Boston Soc. Nat. Hist. 2: 12 (Jamaica; lectotype, MCZ 177223, designated and figured by Jacobson and Boss, 1973, p. 378, pl. 86, figs. 9–11).
- lirata** Pfeiffer, *Helicina*, 1847. Zeits. Malak. 4: 150 (Yucatan, México; type, destroyed); Wagner, 1910. [*in*] Martini and Chemnitz, Conch.-Cab. (2) 1: sect. 18, pt. 2,

- p. 341, pl. 68, figs. 5–7. NOTE: *lamellosa* Guppy 1867, *rusticella* Morelet 1849, *semistriata* Sowerby 1866, and *unidentata* Pfeiffer 1849 are synonyms.
- Lucidella** Swainson, 1840. Treatise on Malacology, p. 330 (type-species, *Helix (Helicodonta) aureola* Férussac 1822, by monotypy).
- manni** Clench and Aguayo, *Lucidella*, 1932. Proc. New England Zool. Club 13: 35 (Furcy, Haiti, [Hispaniola]; holotype, MCZ 23414); 1937, Mem. Soc. Cubana Nat. His. 11 (2): 63, pl. 7, fig. 8.
- midyetti** Richards, *Lucidella*, 1938. Proc. American Philos. Soc. 79: 175, pl. 3, figs. 3–4 (between Coxen Hole and French Harbor, Roatan Id., Honduras; holotype ANSP 170021).
- minor** “Pfeiffer” Brown, *Lucidella aureola*, 1913. Proc. Acad. Nat. Sci. Phila., p. 16, *nomen nudum*. NOTE: we were unable to find this reference in Pfeiffer.
- montegoensis** Brown, *Lucidella aureola*, 1913. Proc. Acad. Nat. Sci. Phila. 65: 21, pl. 1, figs. 22–26 (Orange Hill, Montego Bay, Jamaica; type, ANSP 104482a). NOTE: probable synonym of *interrupta* Simpson, 1894, *teste* H. B. Baker (1934).
- nana** Pfeiffer, *Lucidella*, 1857. Proc. Zool. Soc. London, p. 111 (Jamaica; syntypes, BMNH 1974.4); Wagner, 1910. [*in*] Martini and Chemnitz, Conch.-Cab. (2) 1: sect. 18, pt. 2, p. 342, pl. 68, figs. 12 and 13. NOTE: *tridens* (Shuttleworth) Sowerby 1866 is a synonym; *trochiformis* Pilsbry 1899 is probably a synonym (Pilsbry and Brown 1911).
- paivana** Pfeiffer, *Helicina*, 1866. Malak. Blätt. 13: 89 (Platon, Haiti, Hispaniola; type, lost); Wagner, 1910. [*in*] Martini and Chemnitz, Conch.-Cab. (2) 1: sect. 18, pt. 2, p. 346, pl. 69, figs. 1–2. NOTE: *cruciata* Weinland 1880 is a synonym, *teste* Wagner 1910.
- peasei** Pilsbry, *Lucidella (Poeniella)*, 1933. Proc. Acad. Nat. Sci. Phila. 85: 133, pl. 7, figs 8–8 a (Del Monte) Plantation, 5 or 6 mi W of Barahono, near Salvation, Santa Domingo, 3000 ft., [Hispaniola]; type, ANSP 160986).

- Perenna** Guppy, 1867. *Ann. Mag. Nat. Hist.* (3) 19: 260 (type-species, *Helicina lamellosa* Guppy 1867 [= *H. lirata* Pfeiffer 1847], by monotypy). NOTE: synonym of *Poenia* H. and A. Adams 1856.
- persculpta** Pilsbry and Brown, *Lucidella*, 1912. *Proc. Acad. Nat. Sci. Phila.* 63: 584, fig. 1 (Orange Hill and Rosemont Bay, Jamiaca; type, ANSP 104402). NOTE: Baker (1964) gives the type-number as 104415a.
- pilsbryi** Clapp, *Lucidella*, 1914. *Nautilus* 27: 97, pl. 6, figs. 5 and 6 (Swan Island; [Caribbean Sea]; type, MCZ 22890).
- plicatula** Pfeiffer, *Helicina*, 1849. *Proc. Zool. Soc. London*, p. 123 (Island of Martinique; syntypes, BMNH 1974.2); Wagner, 1910. [*in*] Martini and Chemnitz, *Conch.-Cab.* (2) 1: sect. 18, pt. 2, p. 349, pl. 69, figs. 4–7.
- Poenia** H. and A. Adams, 1856. *Genera of Recent Mollusca* 2: 304 (type-species, *Helicina depressa* Gray 1825, subsequent designation, Pilsbry and Brown 1912). NOTE: H. B. Baker (1922) stated that the type-species was *Helicina unidentata* Pfeiffer 1849 [= *H. lirata* Pfeiffer 1847], following the designation by Fischer (1885). However, this designation is invalid because Fisher did not use the word "type." A correct designation was given by Pilsbry and Brown (1912).
- Poeniella** H. B. Baker, 1923. *Occ. Pap. Mus. Zool., Univ. Michigan*, no. 137, p. 23 (type-species, *H. plicatula christophori* Pilsbry 1897, original designation).
- Prosopis** Weinland, 1862. *Malak. Blätt.* 9: 198 (type-species, *Prosopis sulcata* Weinland, 1862, by monotypy), *non* Jurine 1801, *nec* Fabricius 1804 (Hymenoptera). NOTE: synonym of *Lucidella* Swainson 1840.
- rugosa** Pfeiffer, *Helicina*, 1839. *Wiegmanns Arch. Naturgesch.* 1 (5): 355 (Palenque and Pan de Matanzas, Cuba; type, destroyed); 1848 [*in*] Martini and Chemnitz, *Conch.-Cab.* (1) 1: sect. 18, pt. 1, p. 13, pl. 4, figs. 28–30).
- rusticella** Morelet, *Helicina*, 1849. *Testacea novissima* 1: 21 (Carmen Id., Yucatan [Mexico]; syntypes, BMNH 1893.2.4). NOTE: synonym of *lirata* Pfeiffer 1847.

- samana** Pilsbry, **Lucidella** (**Poeniella**), 1928. Proc. Acad. Nat. Sci. Phila. 80: 481, pl. 27, figs. 6–7 (1 mi NW of Sanchez, Samana Bay, Santo Domingo, [Hispaniola]; type, ANSP 146696).
- semistriata** Sowerby, **Helicina**, 1866. Thes. Conch. 3: 281, pl. 268 (3), fig. 86 (no locality given; type, destroyed, not in BMNH). NOTE: synonym of *lirata* Pfeiffer 1847.
- striatula** Potiez and Michaud, **Helicina**, 1838. Galerie des Mollusques, Museum de Douai 1: 231, pl. 23, figs. 13–14 (no locality given; type, not located), *non* Sowerby 1866.
- striatula** Sowerby, **Helicina**, 1842. Proc. Zool. Soc. London, p. 6 (no locality given); Thes. Conch., vol. 1, *Helicina*, p. 3, sp. 6, pl. 1, fig. 43 (Martinique; type BMNH 1974. 3), *non* Potiez and Michaud 1838.
- striatula** (Rang) Pfeiffer, **Helicina**, 1852. Monographia Pneumonopomorum Viventium, p. 340 (Martinique); “in sched. Cuming,” *nomen nudum*. NOTE: is *plicatula* Pfeiffer 1849, *fide* Pfeiffer.
- sublaevis** H. B. Baker, **Lucidella adamsiana**, 1934. Nautilus 48: 9, pl. 2, fig. 4 (nr. Newleigh Hotel, E of Mandeville, S of Williamsfield-Mandeville Road, Jamaica; type, ANSP 162731).
- sulcata** Weinland, **Prosopis**, 1862. Malak. Blätt. 9: 198 (surroundings of Jérémie, Haiti, [Hispaniola]; type, not located).
- tantila** (Pilsbry) Vanatta, **Lucidella**, 1923. Nautilus 37: 69, error for *tantilla*.
- tantilla** Pilsbry, **Helicina**, 1902. Nautilus 16: 53 (Palm Beach, Florida) holotype, ANSP 77349; 1948. Land Mollusca of North America north of Mexico, Monograph 3, Acad. Nat. Sci. Phila. 2: 1085, fig. 580.
- tridens** (Shuttleworth) Sowerby, **Lucidella**, 1866. Thes. Conch., vol. 3, *Helicina*, p. 282, pl. 268 (3), figs. 90–91 (Jamaica; syntypes, BMNH). NOTE: synonym of *nana* Pfeiffer 1857, *teste* Wagner 1910.
- trochiformis** Pilsbry, **Lucidella**, 1899. Nautilus 13: 56 (Jamaica; type, ANSP 76441a). NOTE: probable synonym of *nana* Pfeiffer 1857, *teste* Pilsbry and Brown (1911).



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yallahsensis Pilsbry and Brown, *Lucidella* 1911. Proc. Acad. Nat. Sci. Phila. 63: 585, fig. 2 (Yallahs, Parish of St. Thomas, Jamaica; type, ANSP 10211).

LITERATURE CITED

- ADAMS, C. B. 1851. Description of new species and varieties of the land shells of Jamaica, with notes on some previously described species. Contributions to Conchology, no. 9, pp. 153-174.
- BAKER, H. B. 1922. Notes on the radula of *Helicina*. Proc. Acad. Nat. Sci. Phila. 74: 29-67, pls. 3-7.
- . 1927. Guppy's groups of Helicinidae. Nautilus 41: 22-23.
- . 1934. Jamaican land snails. Nautilus 48: 1-14, 1 pl.
- . 1964. Type land snails in the Academy of Natural Sciences of Philadelphia. Part III. Limnophile and thalassophile Pulmonata. Part IV. Land and freshwater Prosobranchia. Proc. Acad. Nat. Sci. Phila. 116(4): 149-193.
- BOSS, K. J. 1972. Minute Jamaican prosobranch gastropods: *Stoastoma* and its congeners. Breviora, No. 393, 13 pp., 2 pls.
- and M. K. JACOBSON. 1974. Monograph of the genus *Lucidella* in Cuba (Prosobranchia: Helicinidae). Occ. Papers Moll., Harvard Univ., 4 (48): 1-27, 4 pls.
- FISCHER, H. 1885. Helicinidae [in] Manuel de Conchy. pp. 794-798, figs. 554-556.
- HJALMARSON, J. and L. PFEIFFER. 1858. Beiträge zur Fauna von Westindien. Malak. Blatt. 5: 135-155, pls. 2, 3.
- JACOBSON, M. K. 1973. On the identity of *Helicina granulum* (Pfeiffer) (Prosobranchia). Nautilus, 87: 107-109.
- and K. J. BOSS. 1973. The Jamaican land shells described by C. B. Adams. Occ. Papers Moll., Harvard Univ., 3(47): 305-519, pls. 54-91.
- KEEN, A. M. 1960. Helicinidae [in] Moore, R. C. (ed.), Treatise on Invertebrate Paleontology, Mollusca, Lawrence, Kansas: Univ. of Kansas Press. Vol. 1, pp. 285-288, figs. 186-187.
- KENNARD, A. S. 1942. The *Histoire* and *Prodrome* of Férussac. Proc. Malac. Soc. London 25: 12-17.
- PILSBRY, H. A. and A. P. BROWN. 1912. The land Mollusca of Montego Bay, Jamaica; with notes on the land Mollusca of the Kingston region. Proc. Acad. Nat. Sci. Phila. (1911) 63: 572-588, figs. 1-2, pl. 43.
- WAGNER, A. 1910. Helicinidae [in] Martini and Chemnitz, Conchylien-Cabinet, (2)1: sect. 18, pt. 2, 391 pp., 70 pls.

Occasional Papers On Mollusks

Published by

THE DEPARTMENT OF MOLLUSKS

Museum of Comparative Zoölogy, Harvard University
Cambridge, Massachusetts

VOLUME 4

15 NOVEMBER 1974

NUMBER 50

APICAL SHELL SCULPTURE OF SOME NORTH AMERICAN FRESHWATER LIMPETS (GASTROPODA: BASOMMATOPHORA)

By J. B. BURCH AND P. T. LOVERDE

ABSTRACT. The present paper describes the apical sculpture of some North American ancyloid mollusks in a more detailed way than has been possible previously. The microsculpture of representative groups was studied by the use of the Scanning Electron Microscope (SEM). The clearer observations of the shell apical microsculpture have not shown the need of any generic revisions in the present system of classification in which the generic groups are already based on apical sculpture.

Apical shell sculpture traditionally has been important in the delineation of generic groups in the freshwater limpet family Ancyliidae. Because of the greater resolution afforded by the Scanning Electron Microscope (SEM) in studying surface details of minute objects, we employed the SEM for a closer, more detailed look at ancyloid shell apex microsculpture than has been possible in the past. The present paper describes the apical sculpture of some North American ancyloid mollusks with the use of the SEM.

METHODS AND MATERIALS

The shells of ancyloid mollusks were cleaned by immersing them in sodium hypochlorite (commercial "Clorox"), removing the periostracum and rinsing the shells in distilled

water. They were then air-dried and glued with Duco cement or aluminum paint to the holder to be used in the SEM. The shells were coated with gold and viewed and photographed with a JEOL (Ltd.) JSM-U3 Scanning Electron Microscope. Photographs were taken variously at magnifications of $100\times$, $200\times$, $300\times$, $600\times$ and $1000\times$ with Polaroid P-51 P-N film.

The specimens used in this study were as follows:

Ferrissia rivularis (Say 1817) (Pl. 5, Fig. 1; Pl. 6, Figs. 1, 2) UMMZ 69189. Muscle Shoals, Tennessee River, Lauderdale County, Alabama. H. H. Smith.

Ferrissia shimeki (Pilsbry 1890). Pl. 5, Fig. 2; Pl. 6, Figs. 3, 4) UMMZ 69610. Deadman's Run, Lincoln, Lancaster County, Nebraska. Bryant Walker Collection.

Ferrissia walkeri (Pilsbry and Ferriss 1906). (Pl. 5, Fig. 3; Pl. 7, Fig. 1). UMMZ 101984. Camp Colfax, La Porte, La Porte County, Indiana. Daniels Collection.

"*Gundlachia*" *californica* Rowell 1863. (Pl. 5, Fig. 4; Pl. 7, Fig. 2). UMMZ 143954. Near Oakland, Alameda County, California. Kent Science Institute Collection.

Laevapex diaphanus (Haldeman 1841). (Pl. 5, Fig. 5; Pl. 7, Figs. 3, 4; Pl. 8, Figs. 1, 2). UMMZ 68922. Tennessee River, Knoxville, Knox County, Tennessee. W. B. Barber.

Laevapex fuscus (Adams 1841). (Pl. 5, Fig. 6). UMMZ 100445. Headwater of the Miami River, Ohio. J. B. Henderson Collection.

Hebetancylus excentricus (Morelet 1851). (Pl. 5, Fig. 7; Pl. 8, Figs. 3, 4). UMMZ 100404. Gargitas Creek, Victoria County, Texas. J. D. Mitchell.

Rhodacmea filosus (Conrad 1834). (Pl. 5, Fig. 8; Pl. 9, Figs. 3, 4). UMMZ 69215. Tallaseehatchee Creek, 4 miles above Childersburg, Talladega County, Alabama. H. H. Smith.

Rhodacmea (Rhodocephala) rhodacme Walker 1917.
(Pl. 5, Fig. 9; Pl. 9, Figs. 1, 2). UMMZ 68928.
Coosa River, Leoto Shoals, St. Clair County, Ala-
bama. H. H. Smith.

OBSERVATIONS

Ferrissia rivularis. At the exact center of the apex is a very regular pit (the "apical scar" of Pilsbry, 1896 and Bourguignat, 1853) surrounded by a relatively smooth circular area with a radius of about 0.1 mm. From this central smooth area radiate narrow grooves, uniform in width and more or less equally spaced. As the grooves radiate outward from the apex toward the shell apertural margin, the spaces between them widen, and new grooves are formed. In the grooves are concentric, irregularly spaced concentric ridges (? "growth lines"), rather regularly spaced down the length of the groove. The radial grooves terminate rather abruptly about 0.4–0.5 mm distally from the apical scar.

Ferrissia shimeki. The apical sculpturing of the two specimens studied was nearly identical, and basically quite similar to that described for *F. rivularis*. The concentric ridges in and running transversely to the direction of the grooves are a little more prominent in *F. shimeki*.

Ferrissia walkeri. The apical sculpture of this species seems to be practically identical to that of the two species described above.

"*Gundlachia*" *californica*. The apical sculpture is nearly identical to that observed in the three species of *Ferrissia* above. The radiating grooves extend out a bit farther from the apical pit, to 0.7–0.8 mm before they terminate. Basch (1963) places "*G.*" *californica* in the synonymy of *F. fragilis* (Tryon).

Laevapex diaphanus. At the exact center of the apex is a small pit like that observed in each of the three *Ferrissia* species described above, and in the two genera which follow. Also, as in *Ferrissia*, there is a relatively smooth

area surrounding the central pit. Beginning at about 0.1 mm from the pit is an area of faint, very shallow, radiating ridges and grooves, which extend distally for 0.4 to 0.6 mm. This sculpturing is very weak, hardly visible, and would seem to be perhaps the degeneration of a sculpture that was once similar to that of *Ferrissia*. The radiating ridges and grooves are about equal in width, and at some places are more prominent than at others. Crossing this obsolescent radial sculpture are concentric, irregularly spaced "growth" wrinkles.

Laevapex fuscus. The sculpturing of this species is nearly identical to that of *L. diaphanus*, except being a little less noticeable, and originating a little farther distally from the central pit. As with *L. diaphanus*, one has the impression that this is the obsolescent pattern of a once much more prominent sculpturing.

Hebetancyclus excentricus. At the center of the apex is a pit surrounded by a nearly smooth area. Beginning about 0.1–0.2 mm from the apex are radiating grooves, very shallow and crooked. Although somewhat different from those of *Laevapex*, once again these lines seem to be the remnants of what was once a stronger sculpture in some ancestor. We are tentatively following Basch (1963) in assigning Morelet's "*Ancylus*" *excentricus* to *Hebetancyclus*. It has previously been assigned to both *Ferrissia* and *Laevapex* by other authors.

Rhodacmea filosus. The apical tip of the shell is "pushed in" or "dimpled," and lacks strong sculpturing, although the surface is irregular and appears somewhat malleated. A more distinct and patterned sculpture begins about 0.1–0.2 mm radially from the exact center of the apex. This sculpture, weak at first, rapidly becomes prominent. Radiating ridges account for the strongest part of the pattern. Most of them are more or less equally spaced at first. As they radiate distally they diverge, and new, weak radial ridges emerge. The radial ridges continue distally to the apertural edge of the shell, although they



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smooth, showing only a slight radial sculpturing which suggests the degenerative remnants of a once stronger radial sculpture.

The present investigation has not shown the need for any taxonomic revisions from the clearer observations of the shell apical microsculpture as afforded by the SEM. However, our study has shown the apical sculpture of *Ferrissia* in much clearer detail; it has shown that the apices of *Laevapex* and *Hebetancyclus excentrica* are not totally smooth as previously thought, but have faint obsolete radiating sculpture, and it has shown the apical sculpture of *Rhodacmea* clearly for the first time. Similar SEM studies on ancyloid taxa from other geographic areas may show further apical sculptural differences or similarities, and may help in making phylogenetic assessments in this systematically difficult group.

LITERATURE CITED

- BASCH, P. F. 1963. A review of the Recent freshwater limpet snails of North America (Mollusca: Pulmonata). Bull. Mus. Comp. Zool. Harvard, 129(8): 401-461.
- BOURGUIGNAT, M. J. R. 1853. Catalogue des espèces du genre *Ancylus*. J. Conchyliol., 4: 169.
- PILSBRY, H. A. 1896. New American Ancyliidae. Nautilus, 9(12): 137-139.
- . 1913. Land and fresh-water molluscs of the Stanford expedition to Brazil. Proc. Acad. Natur. Sci. Philad., 65: 618.
- . 1924. South American land and freshwater mollusks. Notes and descriptions. Proc. Acad. Natur. Sci. Philad., 76: 49-66
- WALKER, B. 1902. Surface sculpture in *Ancylus*. Nautilus, 16(8): 85-88.
- . 1903. Notes on eastern American ancyli. Nautilus, 17(2): 13-18; (3): 25-31.
- . 1912. A revision of the ancyli of South Africa. Nautilus, 25(12): 139-144.

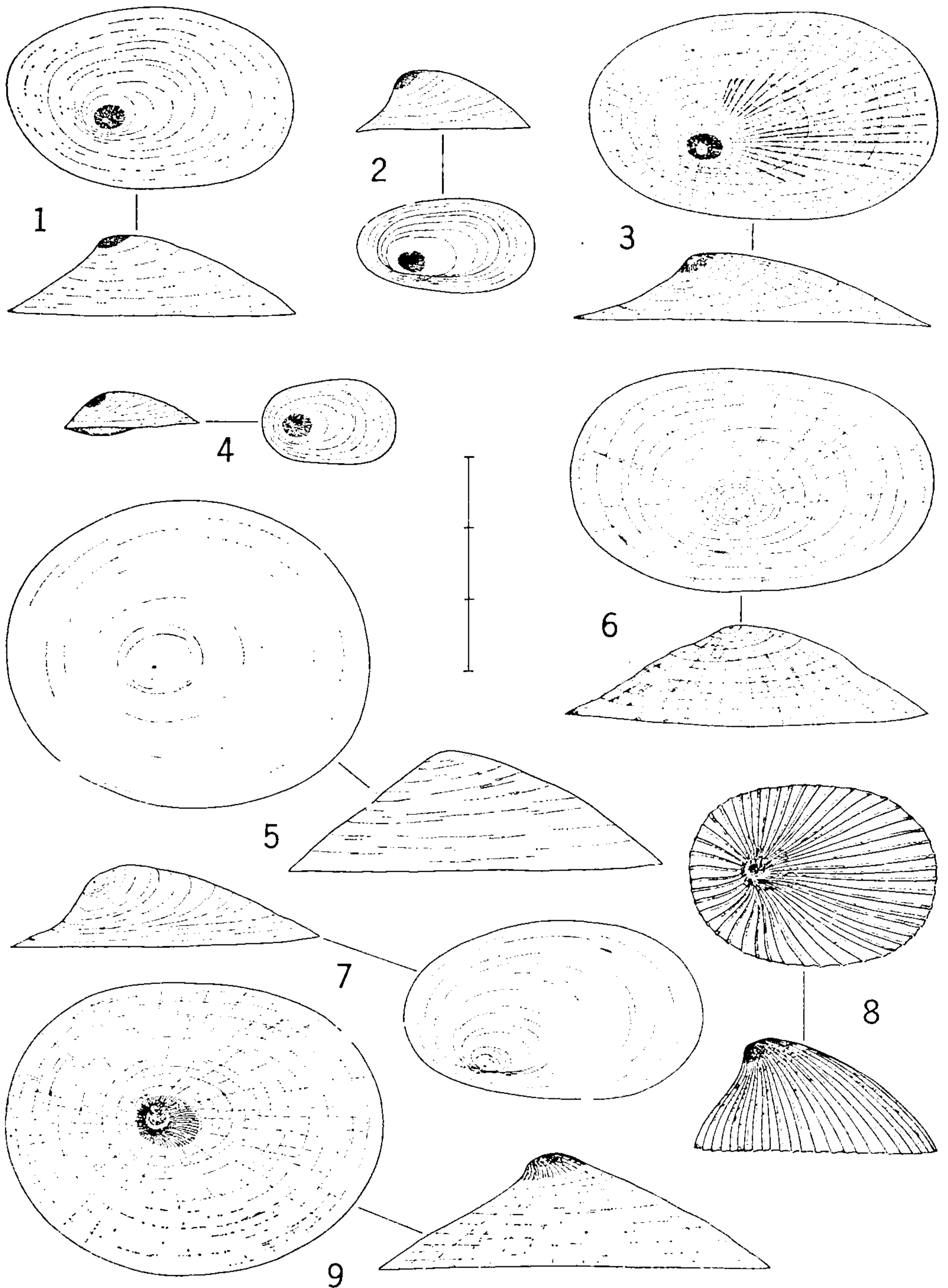


Plate 5. Ancyliidae: Top and right side views.
Scale line = 3 mm

Fig. 1. *Ferrissia rivularis* (Say). UMMZ 69189. Fig. 2. *F. shimeki* (Pilsbry). UMMZ 69610. Fig. 3. *F. walkeri* (Pilsbry and Ferriss). UMMZ 101984. Fig. 4. "*Gundlachia*" *californica* Rowell. UMMZ 143954. Fig. 5. *Laevapex diaphanus* (Haldeman). UMMZ 68922. Fig. 6. *L. fuscus* (Adams). UMMZ 100445. Fig. 7. *Hebetanicylus excentricus* (Morelet). UMMZ 100404. Fig. 8. *Rhodacmea filorus* (Conrad). UMMZ 69215. Fig. 9. *R. (Rhodocephala) rhodacme* Walker. UMMZ 68928.

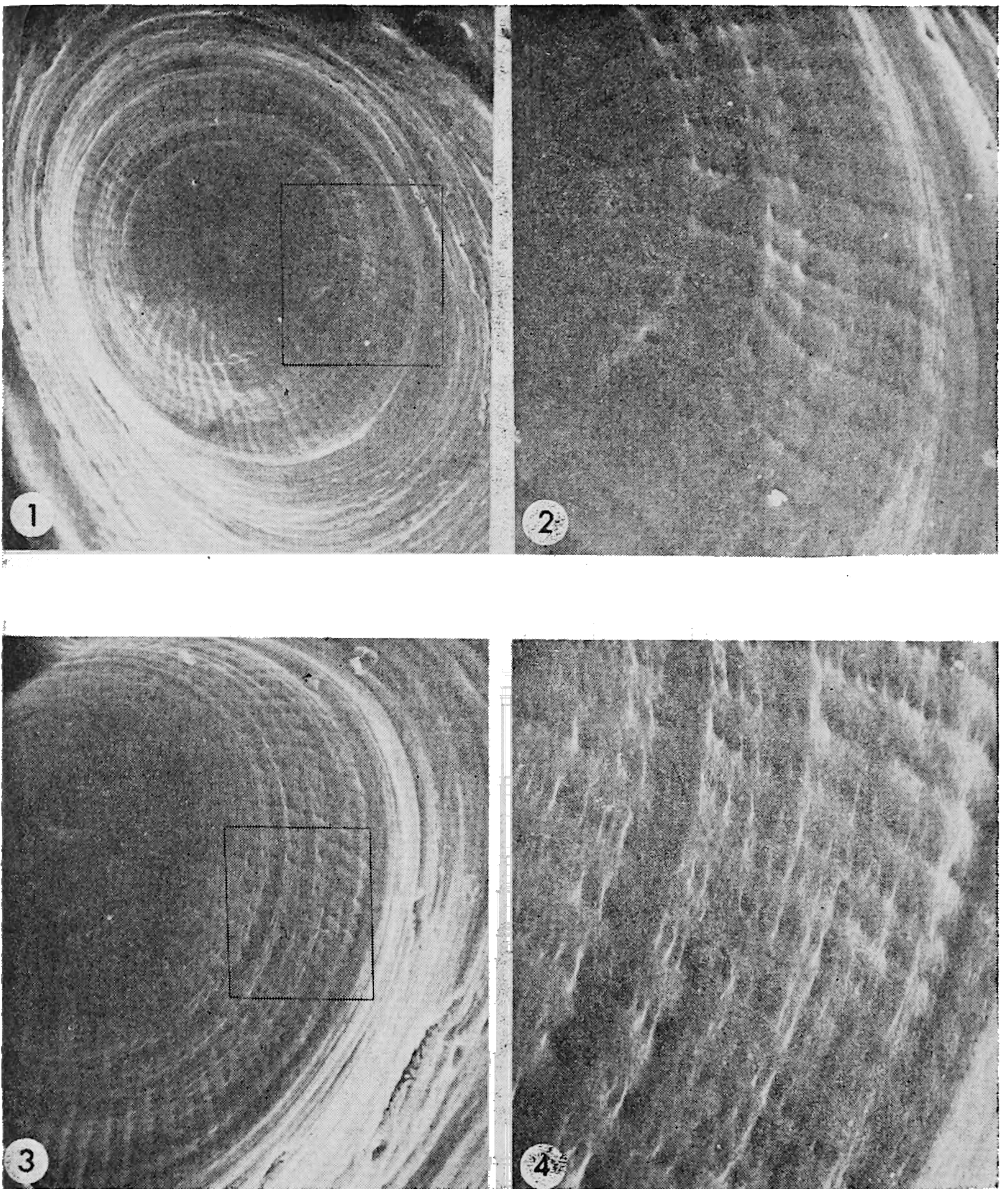


Plate 6.

Fig. 1. *Ferrissia rivularis* (Say). UMMZ 69189 (ca. 110X).
Fig. 2. *F. rivularis*. UMMZ 69189 (ca. 340X). Enlargement of area
marked in Fig. 1. Fig. 3. *F. shimeki* (Pilsbry). UMMZ 69610 (ca.
170X). Fig. 4. *F. shimeki*. UMMZ 69610 (ca. 560X). Enlargement
of area marked in Fig. 3.

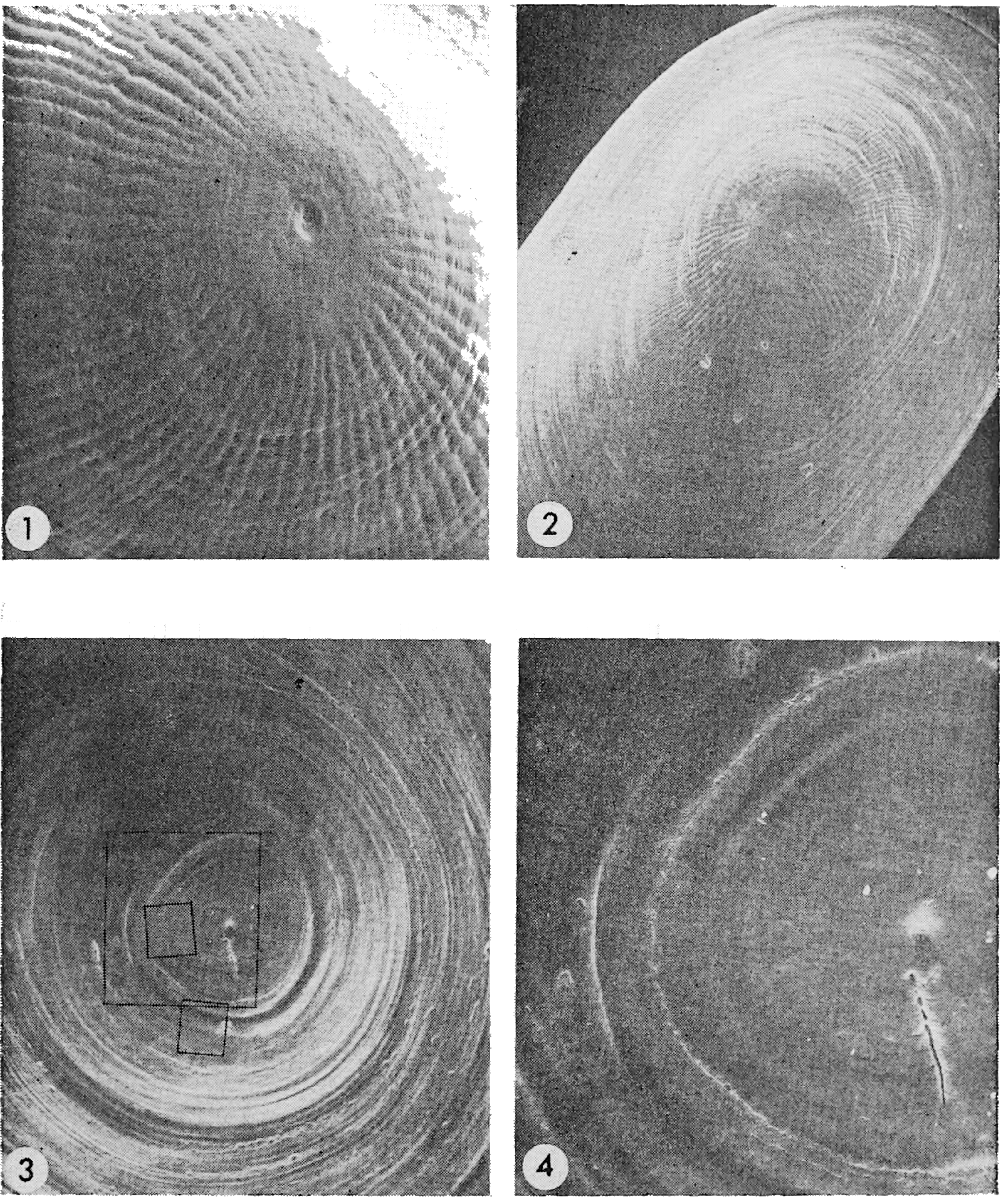


Plate 7.

Fig. 1. *Ferrissia walkeri* (Pilsbry and Ferriss). UMMZ 101984 (ca. 170 \times). Fig. 2. "*Gundlachia*" *californica* Rowell. UMMZ 143954 (ca. 56 \times). Fig. 3. *Laevapex diaphanus* (Haldeman). UMMZ 68922 (ca. 56 \times). The three squares mark the areas enlarged in Fig. 4 and Pl. 8, Figs. 1 and 2. Fig. 4. *L. diaphanus*. UMMZ 68922 (ca. 170 \times).

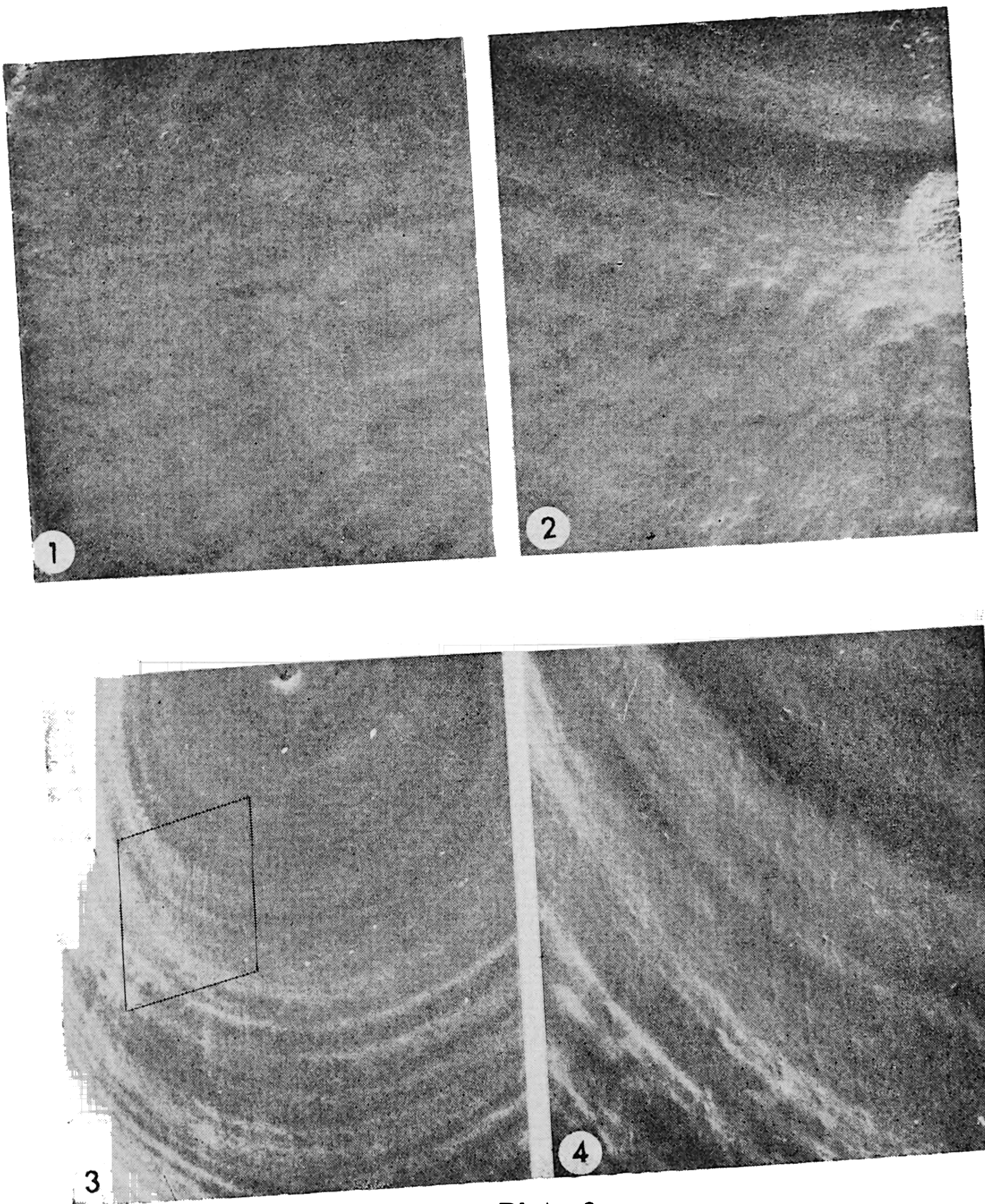


Plate 8.

Fig. 1. *Laevapex diaphanus* (Haldeman). UMMZ 68922 (560 \times). Enlargement of area marked in Pl. 7, Fig. 3. Fig. 2. *Laevapex diaphanus*. UMMZ 68922 (ca. 560 \times). Enlargement of area marked in Pl. 7, Fig. 3. Fig. 3. *Hebetancylus excentricus* (Morelet) UMMZ 100404 (ca. 170 \times). The square marks the area enlarged in Fig. 4. Fig. 4. *H. excentricus*. UMMZ 100404 (ca. 560 \times).

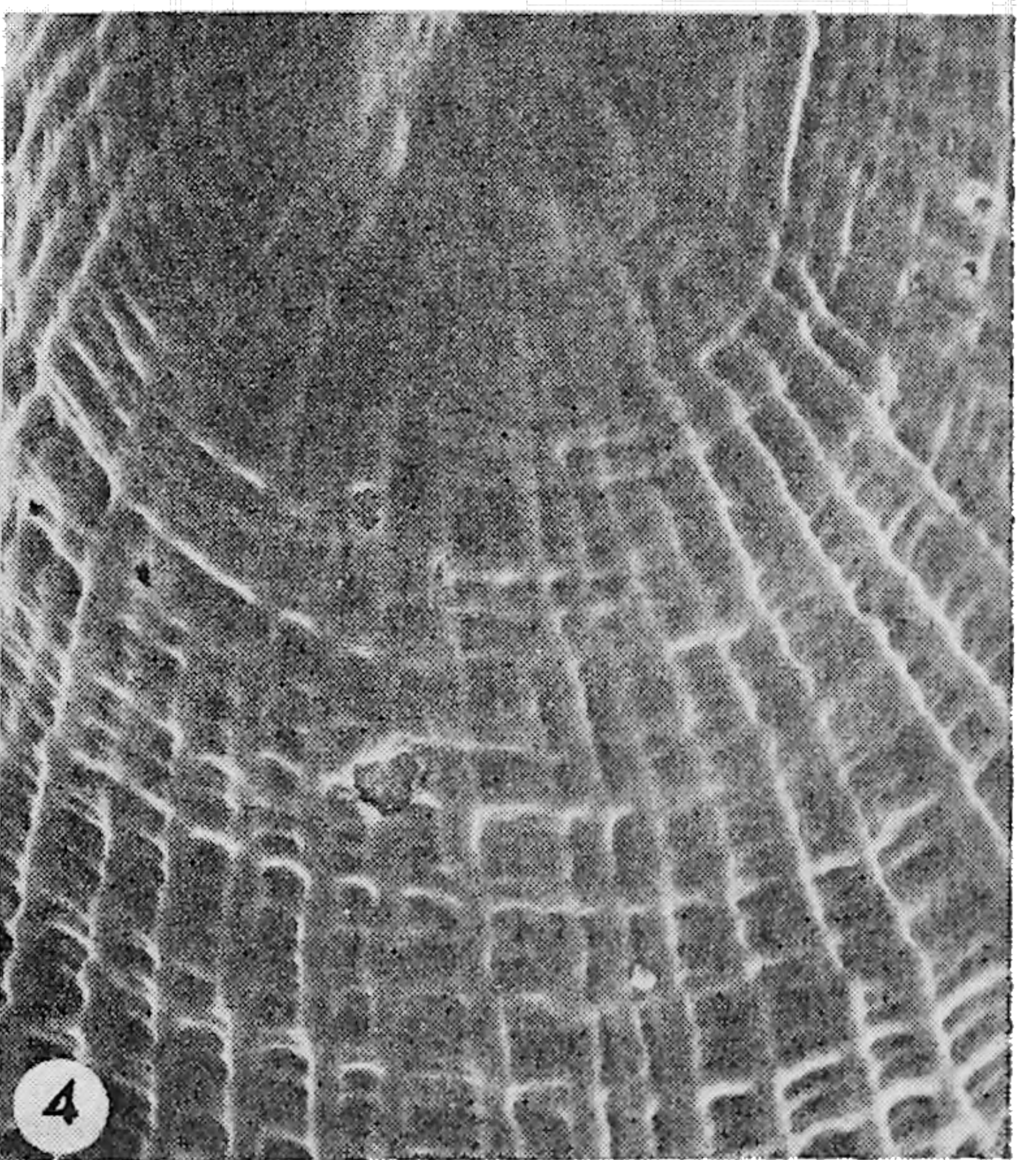
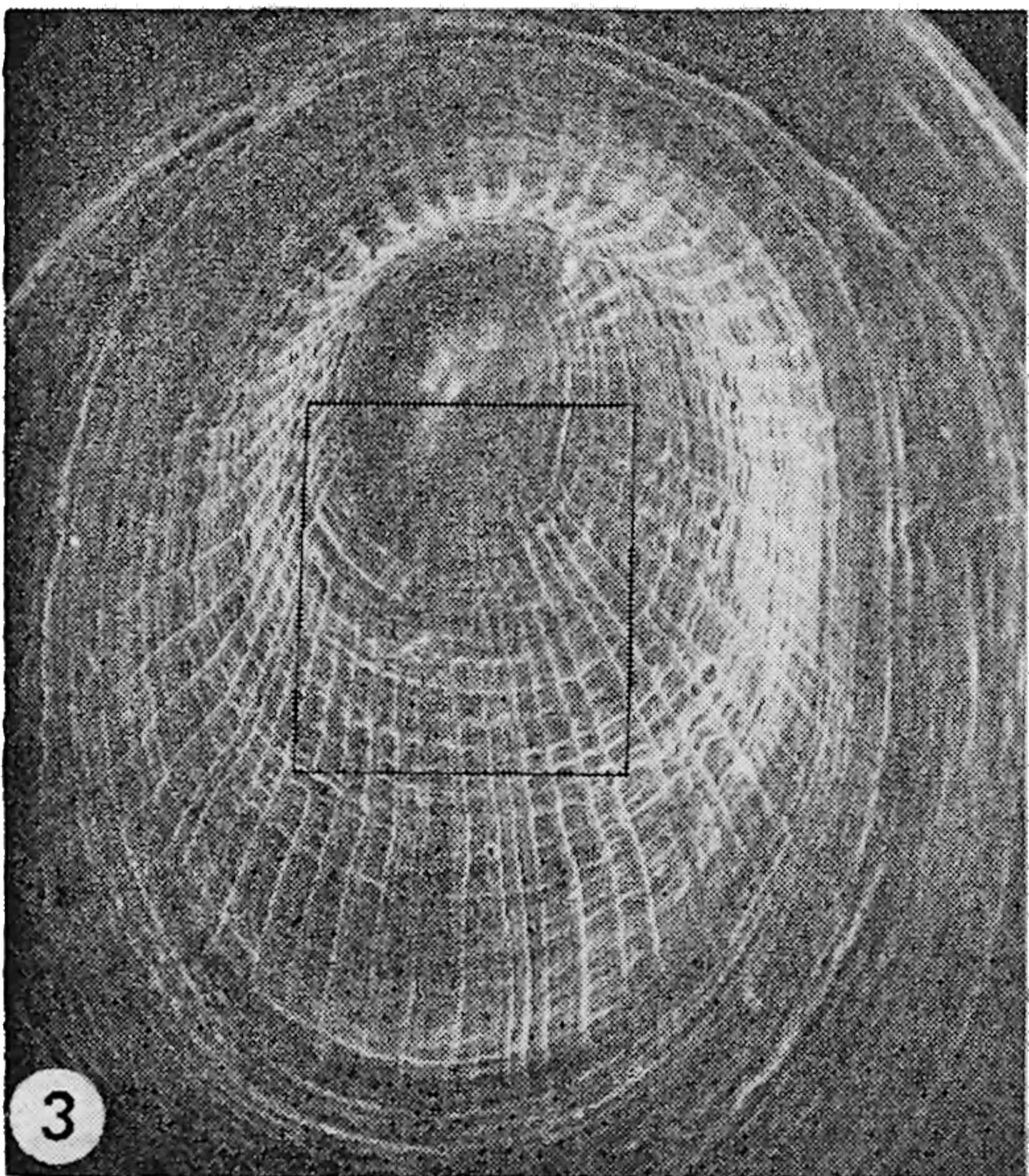
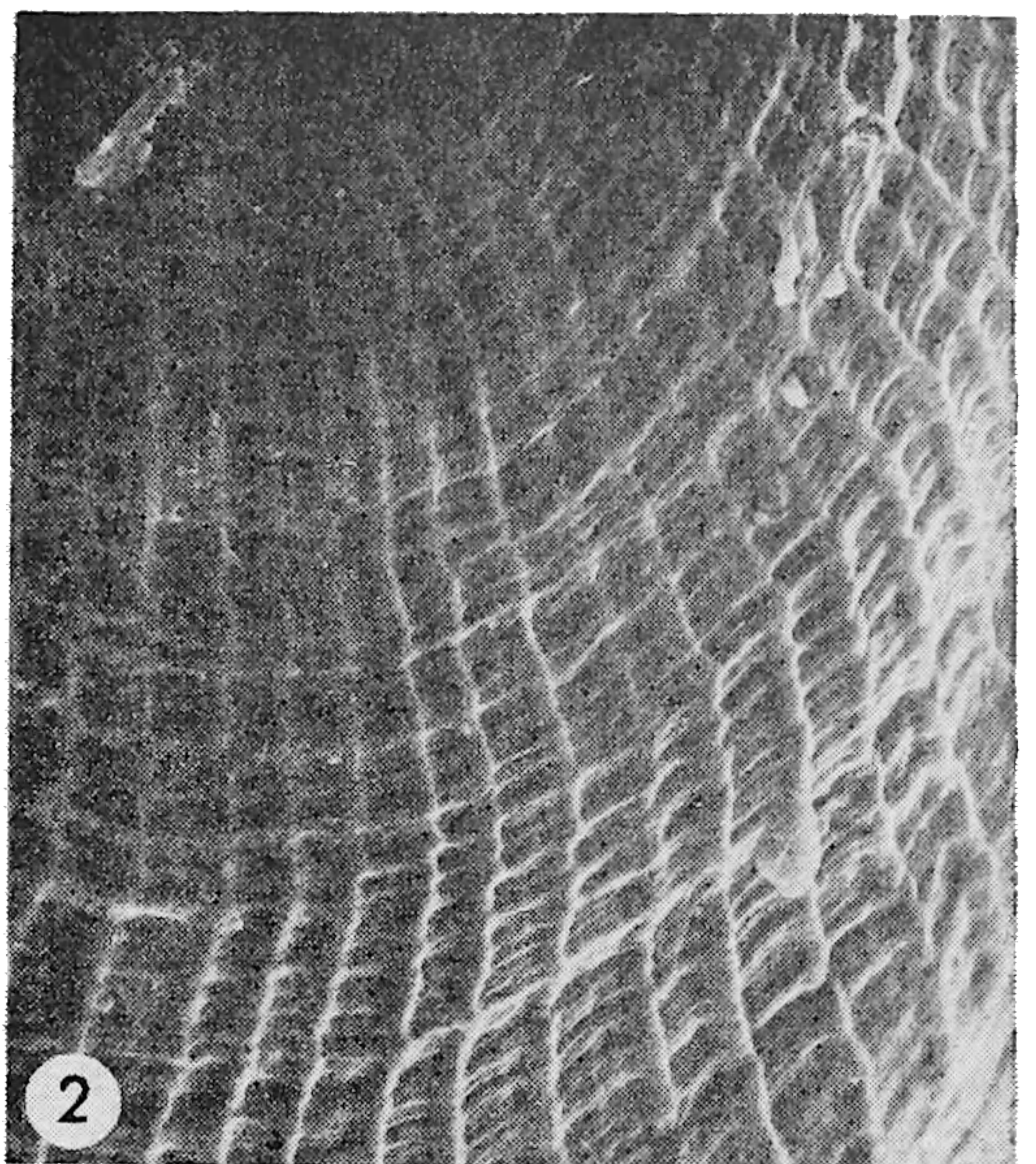


Plate 9.

Fig. 1. *Rhodacmea* (*Rhodocephala*) *rhodacme* Walker. UMMZ 68928 (ca. 56 \times). Fig. 2. *R.* (*Rhodocephala*) *rhodacme*. UMMZ 68928 (ca. 170 \times). Fig. 3. *R. filosus* (Conrad). UMMZ 69215 (ca. 56 \times). The square marks the area enlarged in Fig. 4. Fig. 4. *R. filosus*. UMMZ 69215 (ca. 170 \times).

THOMAS WYATT AND EDGAR ALLAN POE,
A PAIR OF CONCHOLOGICAL PLAGIARISTS

By RICHARD I. JOHNSON

In the introduction to his *Manual of Conchology*, Wyatt (1838) wrote that, "We have endeavored to give a free translation of Lamarck's system, as simplified by De Blainville." The text is, indeed, a simple translation of the descriptions of some of the shells and genera found in Blainville (1825). The "Glossary" was lifted from Brown (1833). According to Wyatt, "The plates were drawn and colored with great care and accuracy from the natural shells in our own cabinet, under the superintendence of Mr. James Ackerman, artist." This is a bold lie; most of the figures are copied from Blainville, and plate 18 is a copy of Blainville's plate 40, without an attempt at disguise.

According to Allen (1926: 442-443) Wyatt's book had proved so expensive to publish that Harpers would not reprint it. It appears that Wyatt paid Poe \$50.00 for the use of his name on a new cheaper edition, designed for elementary school use, hoping by the use of Poe's name to further sales and to avoid trouble over the copyright with Harpers, the effect of which was to alienate the 'affections' of that firm from Poe.

According to Robertson (1934) Poe was directly responsible only for the preface and the introduction which was a paraphrase of Brown, with the printing arranged by Isaac Lea, who, it should be remembered, was not only a conchologist but a partner of Carey, Lea, and Blanchard, publishers.



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POE, E. A. 1839. The conchologist's first book; a system of testaceous malacology, arranged expressly for the use of schools, in which the animals, according to Cuvier, are given with the shells, a great number of new species added, and the whole brought up, as accurately as possible, to the present condition of the science. pp. 156. pls. 1-12. 12 mo. Philadelphia.

———. 1840. Ibid. Second edit. pp. 166. 12 pls.

———. 1845. Ibid. Third edit. pp. 166, 12 pls.

ROBERTSON, JOHN W. 1934. Bibliography of the writings of Edgar A. Poe. vol. 1, pp. 277. San Francisco: Russian Hill Private Press.

WYATT, T. 1838. Manual of Conchology, according to the system laid down by Lamarck, with the late improvements by De Blainville. pp. 191, 36 col. pls. 8 vo. New York: Harper and Brothers.

Occasional Papers On Mollusks

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VOLUME 4

1 OCTOBER 1975

NUMBER 51

PROSERPINE SNAILS OF THE GREATER ANTILLES (PROSOBRANCHIA; HELICINIDAE)

By KENNETH J. BOSS AND MORRIS K. JACOBSON

ABSTRACT. The zoogeography and phylogeny of the species and genera of the subfamily Proserpininae are discussed in detail and the endemic subgenera *Proserpina* s. s. and *Despoenella* are treated. The subfamily Proserpininae has 7 Antillean species and constitutes a peculiar group of helicimid prosobranchs which has lost the operculum and which envelops the shell with the mantle. A mainland propagule of the Central American proserpine stock gave rise to both *Proserpina* s. s. and *Despoenella*. *Proserpina* s. s. evolved autochthonously in Jamaica while *Despoenella*, which is more primitive, dispersed to Cuba, where disjunct populations of two species occupy sometime Pleistocene refugia.

INTRODUCTION

Proserpina and its allies constitute a unique group of prosobranch land snails in that they have lost the characteristic operculum, have developed apertural lamellae, and have a mantle which may extend and envelop the shell, much in the manner of the marine cowries or cypraeids. Indicative of true affinities, their rhipidoglossate radula allies them with the family Helicinidae, especially in a rather close phylogenetic relationship to such taxa as *Viana* and *Eutrochatella*. Geographically the group is developed in the New World tropics, including Mexico, South America and Cuba, Jamaica, and Hispaniola in the West Indies.

As in the previous series of papers on the Helicinidae, especially of Cuba (e.g. *Viana*, *Priotrochatella*, *Emoda*, *Glyptemoda*, *Calidviana*, *Ustronia*, *Troschelviana*, *Semistrochatella* (Clench and Jacobson, 1968; 1970; 1971 a & b) and *Ceratodiscus*, *Alcadia*, and *Lucidella* (Boss and Jacobson, 1973 a; 1973 b; 1974 a), we herein treat the species of the Greater Antilles and add remarks on the mainland forms. As in the case of our study of *Lucidella* (Boss and Jacobson 1974 b) we append a list of all the nominal taxa of the Proserpininae.

ACKNOWLEDGMENTS

We here express our gratitude to Drs. R. Robertson and G. Davis of the Academy of Natural Sciences of Philadelphia, Dr. J. Rosewater of the National Museum of Natural History, Dr. W. K. Emerson of the American Museum of Natural History, Dr. A. Solem of the Field Museum of Natural History, and Mr. G. Goodfriend of the University of Chicago for the loan of specimens. Dr. R. D. Turner and Mr. R. I. Johnson of the Museum of Comparative Zoology read the manuscript and offered much useful advice. The manuscript was patiently typed and corrected by our secretary, Mrs. G. Dent.

ABBREVIATIONS

- ANSP — Academy of Natural Sciences, Philadelphia
 MCZ — Museum of Comparative Zoology, Cambridge
 USNM — National Museum of Natural History, Washington
 FM — Field Museum, Chicago

HISTORICAL REMARKS

Proserpina has a complicated nomenclatorial history. The correct authorship of the genus, the valid designation of a type-species, the introduction of unnecessary substitute nomina and the exact familial placement of the genus contribute to this complexity.

The name *Proserpina* was first introduced by G. B. Sowerby II (1839: 124, fig. 274) when he published the binomen *Proserpina nitida* and a recognizable figure. Under the International Code of Zoological Nomenclature (1964), this constitutes sufficient indication both for the genus and its type-species. In 1842, Sowerby repeated the name (p. 237) and the figure (fig. 274) and stated that this was "a small shell belonging to the Helix tribe, to which, it is believed, Mr. Gray has applied the name *Prosperpina nitida*. We do not know how the genus is defined." Earlier, listing the species in *Helicodonta*, he (1839: 124) had also thought the species had affinities with the pulmonate helicids. Gray had indeed used the name *Proserpina* in 1840 (pp. 129, 153, or 125 and 149), also placed in the Helicidae, and subsequently misspelled as *Procerpena* (Gray, 1847: 182), but Sowerby's published figure and binomen has priority, notwithstanding that several authorities have credited it to Gray or even Guilding.

Odontostoma was introduced by Orbigny in 1842 for the two Cuban species of *Proserpina* but since that name is preoccupied by Turton 1830, H. B. Baker (1923) substituted the name *Despoenella*, with *O. depressa* Orbigny as type-species. The misspellings, *Odostoma* and *Despaenella* are errors in Gray (1856) and Neave (1939), respectively.

Newton (1891), supposing that *Prosperpina* Sowerby 1839 was preoccupied by *Proserpinus* Hübner 1816, introduced the substitute name *Despoena*. But since *Proserpina* is not really preoccupied, *Despoena* falls into synonymy.

Proserpina nitida is the type-species of *Proserpina* by monotypy (Sowerby 1839, p. 124). Gray (1847: 182) incorrectly selected *Helicina linguifera* Jonas as the type-species, a procedure in which he was followed by several authors including Wenz (1938: 448). It is clear that the designation is incorrect and subsequent to that of Sowerby, but, fortunately, the generic characteristics of both *P. linguifera* (= *pulchra* C. B. Adams) and *P. nitida* are the same, so that no serious problem was created.

SYSTEMATIC POSITION

The true placement of *Proserpina* with the Helicinidae was suggested by Orbigny (1842: 237) when he wrote that *Odontostoma* (= *Proserpina*) was closer to *Helicina* because of the "encroûtment columellaire" and probably formed "le passage entre les deux familles, Helicidae et Helicinidae." He doubtfully referred the genus to the family Cyclostomidae. In 1847, Gray recognized the phylogenetic affinities of *Proserpina* by establishing the distinct unit, the family Proserpinidae, and placing it in association with the Oligyridae [= Helicinidae], a procedure which he followed subsequently (Gray, 1857) as did Poey (1854) and H. and A. Adams (1856). Such an arrangement was arrived at by a further knowledge of the anatomy of the animal and the structure of the shell. In a personal communication from Shuttleworth in Basel, Gray was informed that *Proserpina* had two subulate tentacles with sessile eyes at their outer bases, a prosobranch feature. Further, as in *Helicina* and other genera, notably the Auriculidae [= Ellobiidae = Melampidae], *Proserpina* absorbs the walls of the whorls internally (Bland, 1858). Pfeiffer (1848; 1850; 1853; 1859) placed the group in the Helicidae or in juxtaposition with the Ellobiidae or Auriculacea (1856; 1857). Later (1876) he grouped the genera *Ceres*, *Proserpina*, *Proserpinella* and *Cyane* as the Proserpinacea in the prosobranchs, relating them to the Helicinidae.

Newton (1891) erected the family Despoenidae with prosobranchiate placement on his new name *Despoena*, an unnecessary replacement name for *Proserpina*.

Wagner (1905-1911) did not treat *Proserpina* as a member of the Helicinidae but Thiele (1929) and Wenz (1938) both recognized a helicinid subfamily, the Proserpininae, for *Proserpina*, *Ceres*, *Cyane* and *Proserpinella*. Earlier for *Proserpina* and *Ceres*, Thiele (1925) had introduced the subfamilial nomen, Cererinae, which is synonymous with the Proserpininae.



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in its own monotypic subfamily, the Dimorphoptychinae (Wenz, 1938; Keen, 1960).

These taxa and the inclusive species are appended in the following paper (Boss and Jacobson, 1975).

MORPHOLOGY

General anatomy. No thorough anatomical study of any member of the Proserpininae has been published and only two reports on radulae have appeared. The general proso-branch and helicimid affinities were indicated by Gray (1856) and followed by Pfeiffer (1859). The animal possesses a mantle capable of some extension about the shell but without lateral membranous fringes or "beards" typical of neritids. Only two subulate tentacles are present on the head, and the sessile eyes, not set on separate peduncles, are on the outer bases of these tentacles. The proboscis is short, broad and annulated. The foot is short, anteriorly truncated, dorsally keeled, and pointed posteriorly. Respiration is facilitated by an open vascularized cavity and the sexes are separate (gonochoristic).

The shell. Members of the Proserpininae have spirally coiled shells which are depressed to subconic in shape and which have a lunate aperture provided with one or more lamellae; the peristome is simple and acute. The whorls are totally contiguous and tightly pressed while internally the septa are resorbed. Externally a highly polished or glossy enamel coating or wash is typical except in the genus *Ceres*. The umbilicus is covered by a heavy callosity. An operculum is absent.

The mantle. The mantle in the Proserpininae is unique in its extension and covering of the shell. Jacobson (1956: 3) observed that the mantle of *P. nitida* of Jamaica, when the animal is active, completely covers the shell, an observation made previously by Baker (1934b: 151) who also noticed the same characteristic in other Jamaican proserpinines: *linguifera* Jonas, *bidentata* C. B. Adams and *pisum* C. B. Adams. Jacobson explained that in the case of *P. depressa* of Cuba, however, the mantle at any one

time seemed to cover the shell only partially, leaving the central portion and the apex frequently uncovered. Baker (1934b) added the following remarks on the animals: "In *P. nitida* Swby., *P. linguifera* Pfr. (*sic*) and *P. bidentata* C. B. A. [the mantles] are yellowish green with black maculations, but in *P. pisum* C. B. A. are bright green. The foot, which is similarly colored, is very long, slender and carinate; progression is relatively rapid and is mainly accomplished by lateral, snake-like undulations, although some vague movement appears to take place in the very narrow middle zone of the sole. The animals are very active; when disturbed, they quickly draw in the mantle-flaps and lash their tails back and forth with remarkable strength for small snails."

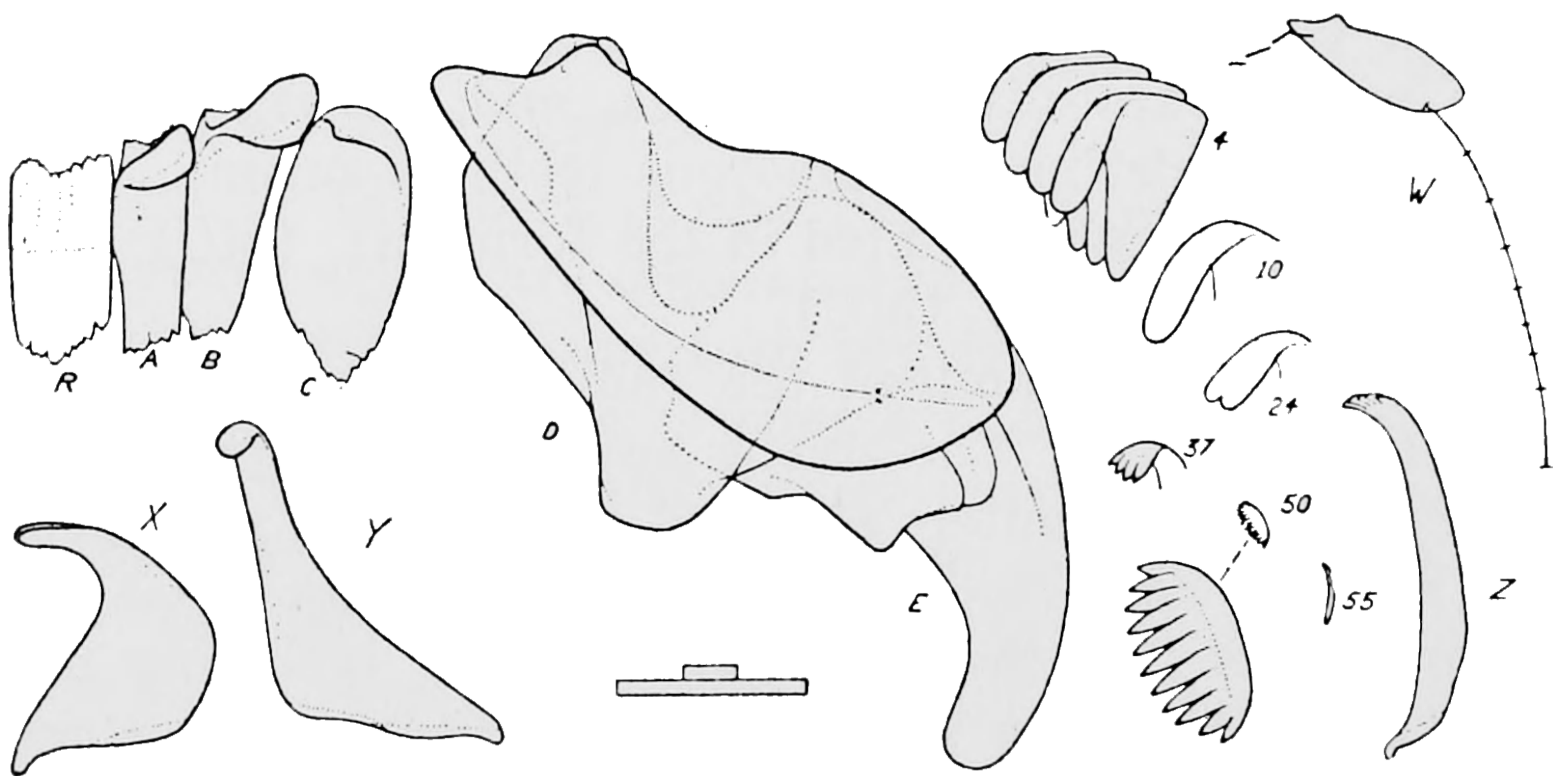
The radula. The radula of *Proserpina* exhibits the essential rhipidoglossate features of a helicimid (Troschel, 1857): a single central rachidian tooth (R), flanked by A-, B-, and C-centrals and a lateral complex (LC) consisting of a comb-lateral and an accessory plate, sometimes known as the capituliform complex, and a marginal complex (MC) consisting of numerous teeth or uncini. These structures can be abbreviated in the formula: (MC) (LC) C B A R A B C (LC) (MC).

Baker (1926b) examined the radula of *Proserpina depressa* (Text-fig. 1). The strong anvil- or T-shaped lateral complex with its minutely serrated cutting edge and rather large, roughly rhomboidal accessory plate shows that *Proserpina* is allied to the vianine helicimids, including such genera as *Viana*. The radula differs in having an almost vestigial R-central tooth consisting of a thin plate with parallel sides and a weakly notched anterior edge without a reflection. The A-central is more elongate and smaller and the accessory plate is relatively larger than in vianine helicimids. Additionally, the A-central is smaller than the B-central which is just the reverse in the vianine taxa.

The first 22 uncini are unicuspid, the innermost tooth being broadly triangular, basally thickened, twisted posteriorly and reflected at the upper angle. The teeth increase in length from the inside outwardly and the blades become

longer to about the 12th tooth. The outer marginals are narrow and elongate (ligulate), the outermost with broad, reflected tips and numerous cusplets. The A-, B-, and C-central teeth are otherwise similar to those of the vianine helicininids with simple, heavy, cutting edges.

Baker (1926b: 451) noted a remarkable resemblance of the radula of *Proserpina depressa* from Cuba to *Calybium mouhoti* Pfeiffer from Indo-China which he had studied earlier (Baker, 1922: 59, 64, pl. 6, fig. 29). *Calybium*, by its radular structure, also shows affinities with such West Indian genera as *Viana* and *Eutrochatella*. Further, *C. massiei* Morlet, which is related to *C. mohouti*, has parietal lamellae and a degenerate, linear, horny operculum, for which reason Morlet (1892: 326) took it to be an intermediate form between *Eutrochatella* and the Proserpininae. The Paleocene *Dimorphoptychia arnoudii* (Michaud) from outcrops near Rheims, France may by its shape and aper-



Text-figure 1. The radula of *Proserpina depressa*. Diagram (W) in upper right hand corner represents positions of highly refractive backs of teeth in right half of a transverse row. Both scales represent lengths of 50 microns (.05 mm); upper one is for diagram (W), lower one for remainder of drawings. In detailed figures, intervals between R and A, between B and C, and between C and D are increased so as to free edges of teeth. Block of first 4 marginals (foreshortened), and tips of 10th, 24th, 37th, 50th (also shown enlarged), and 55th (cusps omitted) are oriented simply with respect to long axis of ribbon. X is an isolated second marginal; Y probably about the 25th; Z probably about the 40th (after Baker 1926b).

tural lamellae have a place in such an arrangement, being referable to the subfamily Proserpininae.

Gray (1856) figured the radula of *Ceres salleana* from Cordera, Vera Cruz, Mexico, showed it to be typically rhipidoglossate, and was followed by Troschel (1857: 84, pl. 6, fig. 2). Although Gray stated that the teeth were unlike *Helicina*, further investigations have shown that the radula of *Ceres* is indeed very similar to *Helicina* (Baker, 1922). Baker (1926b) went so far as to suggest that the radula which Gray figured was a *Helicina* rather than a *Ceres*. That the original shell specimen of *Ceres salleana* was not a *Helicina* is indicated by Gray's statement that his specimen lacked an operculum. Evidently, as Baker suspected, there was some sort of mixup at the time of Gray's description since the figure provided by Gray is more like *Helicina* and rather unlike *Proserpina* in that the A- and B- centrals are cusped, the lateral complex (which is mounted in reverse position in Gray's figure) multiply cusped, the innermost uncinus tricuspid and the next 10-11 bicuspid. The cusped nature of these teeth is similar to what is found in several species of *Helicina* while, with the exception of some outer marginals, *Proserpina* does not have multiply cusped cardinals, laterals or inner marginals. As Baker (1926b: 461) suggested: "if Gray's figure be even approximately correct, *Ceres* would belong in a different family [i.e. subfamily, according to the present system], from *Proserpina*, as it would evidently be derived from a quite different helicimid stock."

ZOOGEOGRAPHY

The Proserpininae (Table 1) are solely New World in distribution with four groups occurring on the mainland in Mexico and South America and two other groups in the Greater Antilles, with the exception of Puerto Rico, in the West Indies. The groups are mainly distinguished by the development of apertural teeth. Most of the mainland forms have a single apertural denticle, on the columella in *Linidiella* and *Staffola* and on the parietal surface in *Pro-*

TABLE I

The species and generic units of the Proserpininae (for more specific data on the nomina, see Boss and Jacobson 1975).

1. *Ceres* Gray (Spire sculptured, not glossy; 6 denticles).

<i>eolina</i> Duclos	Mexico
<i>salleana</i> Gray	Mexico
<i>nelsoni</i> Dall	Mexico

2. *Proserpina* s. s. Sowerby (Parietal, columellar, and palatal lamellae present).

<i>nitida</i> Sowerby	Jamaica
<i>linguifera</i> Jonas	Jamaica

3. *Despoenella* Baker (Parietal and columellar lamellae only).

<i>bidentata</i> C. B. Adams	Jamaica
<i>pisum</i> C. B. Adams	Jamaica
<i>depressa</i> Orbigny	Cuba
<i>globulosa</i> Orbigny	Cuba
<i>marcanoi</i> Clench	Hispaniola

4. *Staffolia* Dall (Heavy columellar lamella only).

<i>blandiana</i> H. Adams	Peru
<i>cousini</i> Jousseaume	Ecuador
<i>orbignyi</i> Ancey	Bolivia
<i>derbyi</i> Dall	Bahia, Brazil

5. *Linidiella* Jousseaume (Thin columellar lamella only).

<i>swifti</i> Bland	Venezuela
<i>cinnamomea</i> Sykes	Ecuador
<i>sulfureus</i> Thompson	Chiapas, Mexico

6. *Proserpinella* Bland (Shell fragile, parietal denticle only).

<i>berendti</i> Bland	Mexico
<i>hannae</i> Dall	Tres Mariás Ids., Mexico

serpinella. The Mexican *Ceres* has a total complement of 6 denticles: 1 columellar, 2 parietal, and 3 palatal. The West Indian groups are divisible into *Proserpina* s.s. limited to Jamaica, with 5 lamellae: 1 columellar, 2 parietal and 2 palatal; and *Despoenella* in Jamaica, Hispaniola and Cuba, all with 2 lamellae: 1 columellar and 1 parietal.

Without any substantive fossil evidence, the zoogeographic and phyletic relationships of the Proserpininae must be based on inferential evidence and assumption. Zoogeographically, the West Indies are essentially receivers of immigrants from the mainland areas of North-Central America and South America. As Darlington with his own emphases surmises (1938: 288): "I think it is safe to conclude . . . that the Greater Antillean fauna is an *accumulation* of immigrants, not a *residue* of a larger fauna." Occasionally West Indian propagules have invaded Florida or the Bahamas (*e.g.*, *Lucidella tantilla*, Boss and Jacobson 1974 a: 23) or have radiated within the Antilles themselves.

Phylogenetically, it may be assumed that the loss of the operculum in the Proserpininae was a specialization diverging from the fundamental prosobranchiate structure of the Helicinidae, specifically, and the Neritacea, in general. The elaboration of apertural lamellae may be considered a further specialization so that the ultimate in their development is the elaboration of numerous lamellae, a condition reached in *Proserpina* s.s. with 5 lamellae and *Ceres* with 6. The stem, or most primitive, proserpinine stock, on inferences both geographic and phyletic, must be the lineage comprising *Linidiella*, *Staffola* and *Proserpinella* of Mexico and South America, each with only a single lamella, be it columellar or parietal.

One line of this primitive stock gave rise to *Ceres* with its full complement of lamellae and another to the Antillean representatives including both *Proserpina* s. s. and *Despoenella*. Of the Antillean representatives, *Despoenella* is the more primitive and older, having two apertural lamellae and a wider geographic range, including Jamaica,

Hispaniola and Cuba while *Proserpina s. s.* appears to have evolved autochthonously in Jamaica to a more specialized condition with a fuller complement of 5 apertural lamellae.

Thus, the similarity of apertural configurations in *Ceres* and *Proserpina s. s.* appears to be convergent and represents advancement and specialization over the primitive, weakly protected apertures of *Linidiella-Staffola* and *Proserpinella*. Further, *Ceres* is surely dissimilar in size being larger than *Proserpina s. s.* and both keeled along its body whorl and radially sculptured on the upper whorl surface unlike *Proserpina s. s.*

It is probable that, like the mammalian invasions of South America which have taken place principally since the closure of the Isthmus of Panama in the Pliocene just a few million years ago, the South American proserpinine snails are relatively new arrivals. All of them are referable to the primitive *Linidiella-Staffola* lineage having just a single apertural lamellae on the columella. There has probably not been time for a multiply lamellate form to have arisen in South America.

The distribution of the Proserpininae in the West Indies is more restricted than most other groups of the Helicidae, especially such genera as *Alcadia*, *Lucidella* and *Helicina s. s.* Only two subgenera, *Proserpina s. s.* and *Despoenella* represent the proserpinine lineage in the Greater Antilles, including 2 species on Cuba, 4 on Jamaica and 1 on Hispaniola. The fact that the subfamily is restricted to 3 of the 4 Greater Antilles and does not occur on Puerto Rico or any of the Lesser Antilles seems to suggest a relatively late arrival of the group from the mainland. Unfortunately, no definite time-scale can be postulated for either the arrival of a proserpinine propagule on Jamaica, which was the center of the Antillean radiation in proserpinines, or the subsequent invasions of the group in Cuba and Hispaniola.

Proserpina s. s. is represented by two species, *P. nitida* and *P. linguifera*, both of which arose on the island of Jamaica (Map 1), probably from a *Despoenella*-like precursor which already had at least 2 apertural lamellae.



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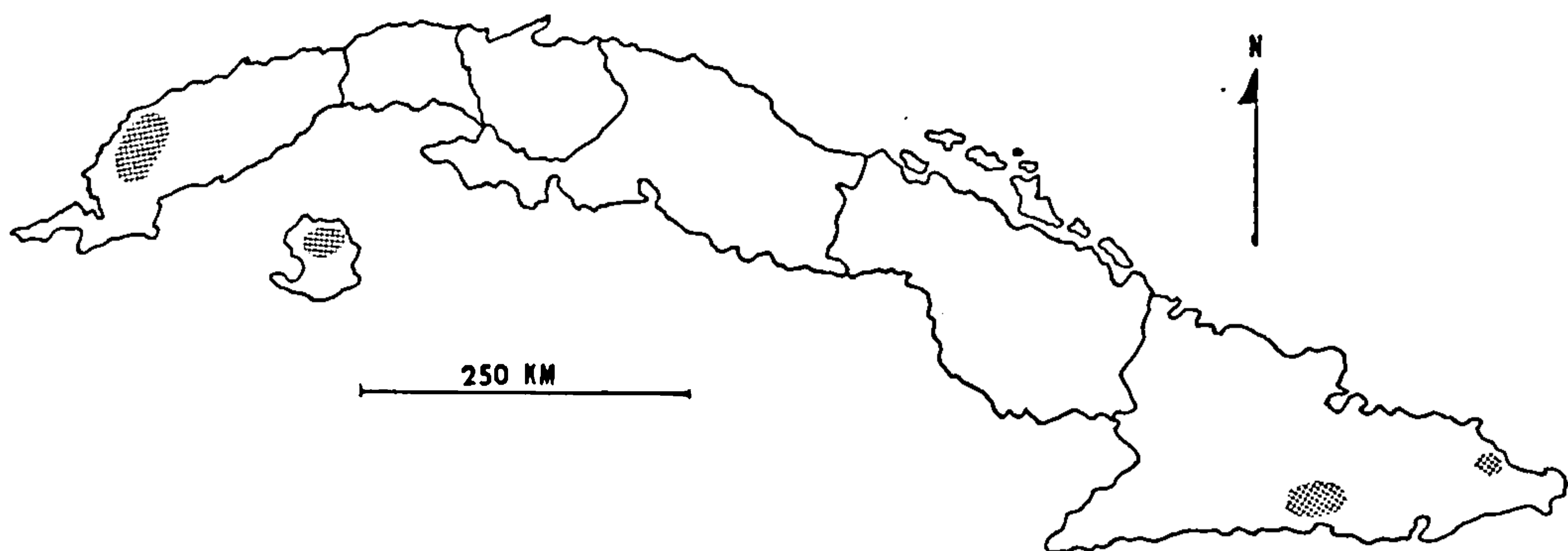
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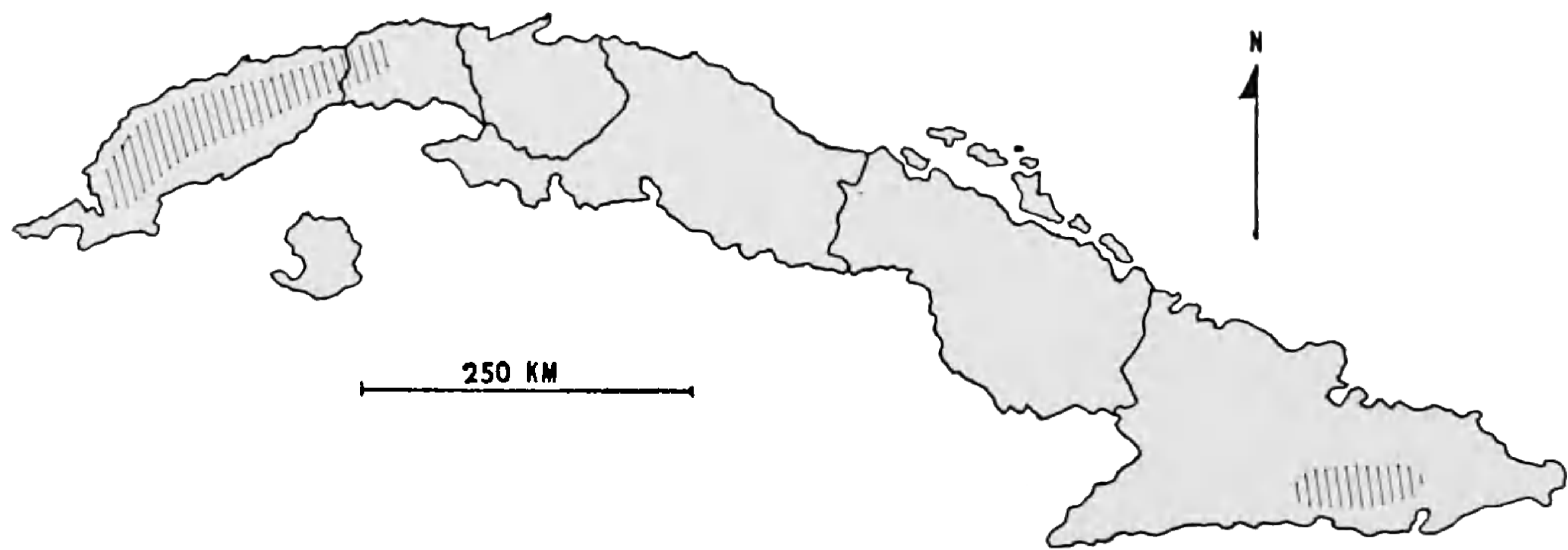
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species, *P. depressa* occupies a similar range, including Oriente, Pinar del Río and Habana Provinces but excluding the Isle of Pines (Map 3).



Map 2. The disjunctive distribution of *Proserpina (Despoenella) globulosa* in Cuba.

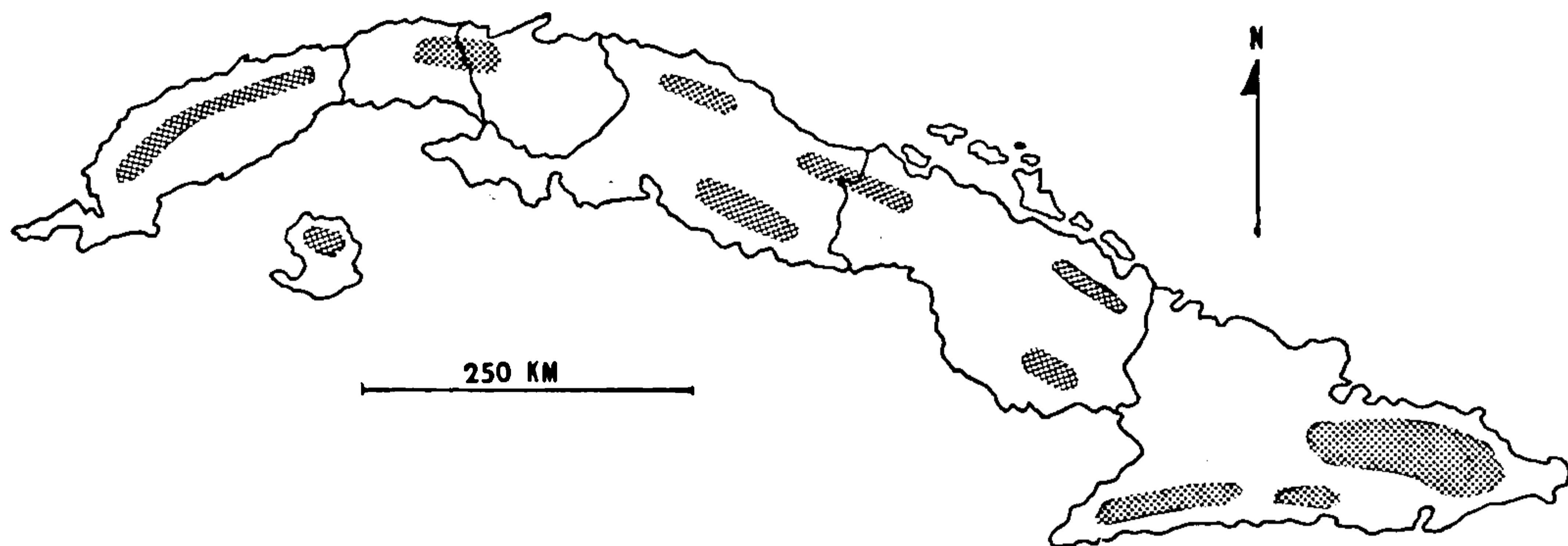
The distinctions which separate the Cuban from the Jamaican forms are greater for the *pisum-globulosa* lineage than they are for the *bidentata-depressa* line, indicating that *globulosa* probably arrived and evolved earlier than did *depressa*. In the features of the shell, the Cuban *globulosa* is more distinct from the Jamaican *pisum* than the Cuban *depressa* is from Jamaican *bidentata*. Further, zoogeographic fact supports the supposition of *globulosa's* earlier arrival and evolution. Having had longer to expand geographically, an older invading stock should have a greater range, even after the exigencies of the Pleistocene. This assumption is apparently true in this case since *P.*



Map 3. The disjunctive distribution of *Proserpina (Despoenella) depressa* in Cuba.

globulosa has reached the Isle of Pines while *depressa* has not.

The distinctive ranges of both species of Cuban *Despoenella* lend credence to the following hypothesis: the Cuban species of *Despoenella* were derived from Jamaica by hurricane borne propagules, which in becoming separated from the mother stocks in Jamaica, speciated and spread widely in Cuba. During the Pleistocene, they became locally extinct or contracted their ranges to emergent refugia (Map 4) as did some reptiles (Schwartz, 1970) and possibly such other helicininids as *Alcadia*, *Idesa* and *Hjalmarsona* (Boss and Jacobson, 1973b: 315-318), leaving disjunctive populations in Pinar del Río, Oriente, and the



Map 4. Pleistocene refugia in Cuba (modified from Schwartz 1970).

Isle of Pines. Apparently *globulosa* was derived from *pisum* of southwestern Jamaica earlier than Cuban *depressa* was from *bidentata* of the montane regions of northeastern Jamaica. Considering the distances involved, it is most probable that the invasion took place from Jamaica to Oriente.

Family HELICINIDAE Latreille, 1825

Subfamily PROSERPININAE Gray, 1847

Genus *Proserpina* Sowerby

Proserpina Sowerby, 1839. Conchological Manual, 1st Ed., p. 124, fig. 274 (type-species, *Proserpina nitida* Sowerby 1839, by monotypy); Gray, 1840. Synopsis Con-

tents British Museum, ed. 42, p. 129, 153, *non Proserpinus* Hübner 1816 (Lepidoptera).

Procerpena Gray, 1847. Proc. Zool. Soc. London, pt. 15, p. 182, cited as misprint for *Proserpina*.

Despoena Newton, 1891. Systematic List British Oligocene and Eocene Mollusca in the British Museum, p. 255, new name for *Proserpina* Sowerby 1839, *non* Hübner 1816.

Description. Shell ranging from 3 to 10 mm in diameter, imperforate, globose to depressed, smooth and polished; suture perceptible but barely impressed, umbilical region moderately sunken; aperture with one to 3 parietal denticles or lamellae and with zero to 2 palatals; outer lip thin, entire, usually retreating centrally.

Remarks. Details on the zoogeography, nomenclature and subgenera of *Proserpina* appear in the *Introduction*.

KEY TO PROSERPINA S.S. AND DESPOENELLA

1. Columellar, parietal, and palatal lamellae present (*Proserpina* s.s.) 2
 Columellar and parietal lamellae only (*Despoenella*) 3
2. Shell larger, diameter to 10 mm, somewhat depressed, apertural lamellae less strongly developed *nitida*
 Shell smaller, diameter to 6 mm, somewhat globose, apertural lamellae more strongly developed.. *linguifera*
3. Shell depressed 4
 Shell globose 6
4. Shell larger, diameter to 8 mm; Cuba *depressa*
 Shell smaller, diameter to 5 mm; Jamaica and Hispaniola 5
5. Proportionately less postembryonic growth; Jamaica *bidentata*
 Proportionately greater postembryonic growth; Hispaniola *marcanoi*
6. Slightly smaller size, diameter to 5 mm; profile lower; Cuba *globulosa*
 Slightly larger size, diameter to 6 mm; profile higher; Jamaica *pisum*

Subgenus *Proserpina* s.s.

Description. Shell depressed or subglobose, with 2 or 3 parietal and 2 palatal lamellae.

Remarks. As noted in the *Introduction*, the nominate subgenus is confined geographically to Jamaica where it is represented by 2 allopatric species.

***Proserpina (Proserpina) nitida* Sowerby**

Plate 10, figs. 1–5; Map 1

Proserpina nitida Sowerby 1839. *Conchological Manual*, 1 Ed., p. 124, fig. 274; 1842, 2 Ed., p. 237, fig. 274 Pfeiffer 1848, *Monographia Heliceorum Viventium* 1: 12 (Habitat in insula Jamaica; type, ? BMNH).

Helix Proserpina (sic) Pfeiffer 1845. *Zeitschrift für Malakozoologie* 2: 84 (Jamaica; type, destroyed, Clench and Jacobson 1971a: 101).

Odontostoma nitidum (Sowerby). Pfeiffer 1848. *Monographia Heliceorum Viventium* 1: 12.

Proserpina nitida planulata C. B. Adams 1850. *Contributions to Conchology*, No. 9: 174 (Jamaica; lectotype, MCZ 276092, selected by Jacobson and Boss 1973: 405, pl. 85, figs. 3–4).

Description. Shell reaching 10.4 mm in diameter, 5.4 mm in height, imperforate, depressed, polished; color very pale lemon yellow or white, apex and earlier teleoconch frequently darker; whorls 5–6, almost flat, the last one twice the width of the penultimate; body whorl narrowly rounded, almost obtusely keeled, periphery somewhat above the center; suture barely impressed, bordered by an opaque white line; umbilical area weakly sunken, translucent; spire very low to almost flat, gently and weakly rounded; aperture oblique, widely subtriangular, with 5 lamellae: a thin thick upward directed one on the columella, a thick horizontal one just above, both projecting somewhat beyond the apertural margin, and a third, still higher in the aperture and more deeply set in the body whorl, and a thin basal and palatal lamella beginning somewhat within the aperture; outer lip entire, slightly thickened, somewhat

retreating centrally; sculpture of barely impressed growth lines under surface glaze; protoconch $1\frac{1}{2}$ whorls, glassy, minute punctations ($50\times$); periostracum and operculum lacking.

Height	Width	
4.4 mm	10.4 mm	lectotype of <i>planulata</i>
5.4	9.4	Mandeville, St. James
5.2	9.1	Windsor Caves, Trelawny
5.2	8.9	Spring Mount, St. James
4.5	7.8	Mocho, St. James

Remarks. *P. nitida*, the type-species of the genus *Proserpina*, is most closely related to *P. linguifera*. Both species inhabit the island of Jamaica and are characterized conchologically by the development of numerous apertural lamellae: one columellar, 2 parietal and 2 palatal. In *nitida*, these lamellae tend to be less strongly developed or thickened, especially in smaller individuals. Additionally, the uppermost of the parietal lamellae is usually set further back in the aperture. *P. nitida* is larger in overall size, has a less conic, more sublenticular shape and has a proportionately lower outline than *linguifera*. Further, the species have distinct ecological niches and geographic ranges on the island. *P. nitida* is widely distributed from around Montego Bay in St. James' Parish east to the vicinity of Yallahs in St. Thomas'. Data concerning altitudinal preferences show that the species is found principally in elevations above 1000 ft. and extending to 2600 ft. In contrast, *P. linguifera* is restricted to the southwestern portion of the island and usually lives at elevations below 600 ft. (Map 1). Baker (1934a: 63) pointed out that the species aestivates under rocks but rapidly climbs rockfaces during rains. Gloyne (1872: 45) cited the common widespread occurrence of this species and noted the existence of variations in size and color.

Specimens examined (selected). JAMAICA: *Westmoreland* (MCZ). *St. James*: Orange Hill and Spring Mt., Montego Bay (ANSP; MCZ); SE of Catadupa Station (ANSP); Mocho (MCZ); Retreat and Phoenix (FM).

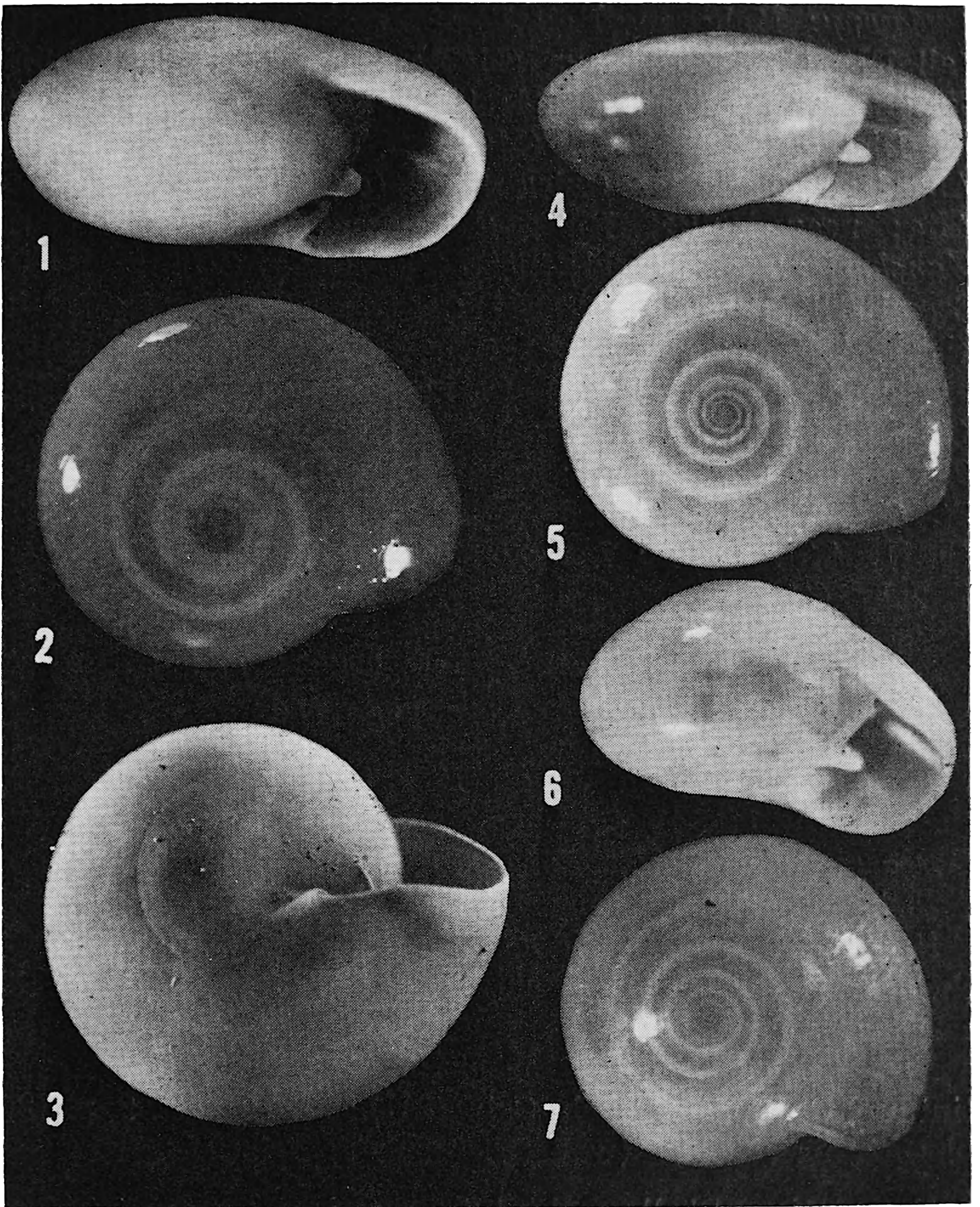


Plate 10

Figs. 1-3. *Proserpina* (*Proserpina*) *nitida* Sowerby. Windsor Cave, Trelawny, Jamaica, 8.1 mm \times 3.9 mm, MCZ 94053.

Figs. 4 and 5. Lectotype of *Proserpina nitida planulata* C. B. Adams selected by Jacobson and Boss 1973: 405, pl. 85, figs. 3-4, Jamaica, 10.4 mm \times 4.4 mm, MCZ 276092.

Figs. 6 and 7. *Proserpina* (*Proserpina*) *linguifera* (Jonas). Lectotype of *Proserpina pulchra* C. B. Adams, selected by Jacobson and Boss 1973: 409, pl. 85, figs. 5-6, [Westmoreland], Jamaica, 5.5 mm \times 3.5 mm, MCZ 275999.

Trelawny: Mahogany Hall, W of Hastings, Burnthill Road (all FM); Windsor Cave (MCZ). *St. Ann*: White Cliff and Pedro River, Lillyfield; Schwallensburgh (all FM); Mt. Diablo, 1500-2600 ft. (MCZ). *St. Elizabeth*: Ipswich; Aberdeen; Redgate; Quick Step (all Goodfriend); Mt. Alta; near Bullett Hall; Balaclava Station (ANSP). *Manchester*: Bloomfield; Bloomsville Cave; Cabbage Hall; Crawl Hill, Bellfield (all FM); Cedar Hill; Comfort Hall (both ANSP); Endeavor; Calway; Heartsease; Knockpatric; Martin Hill (all FM); vicinity of Mandeville (ANSP); Spitzbergen; Topshan; Upper Lincoln (all FM). *Clarendon*: Cumberland; Spaldings, Kyle Hill (both FM). *St. Catherine*: Camperdown and Holly Mountain (both FM). *St. Andrew*: Long Mountain (FM). *St. Thomas*: Yallahs (MCZ).

***Proserpina (Proserpina) linguifera* (Jonas)**

Plate 10, figs. 6-7; Map 1

Helicina linguifera Jonas 1839. Wiegmann's Archiv Naturgesch. 1: 341 (Patriam ignoro).

Proserpina allognota Jonas 1846. Zeitschrift für Malakozologie 3: 12, new name for *H. linguifera* Jonas 1839.

Proserpina pulchra Adams 1850, Contribution to Conchology No. 5: 81 (Jamaica; lectotype, MCZ 275999, selected by Jacobson and Boss 1973: 409, pl. 85, figs. 5-6).

Proserpina linguifera Jonas. Pfeiffer 1850. [in] Martini and Chemnitz, Conch. Cab. (2) 1: pt. 12, sect. 2, p. 12, pl. 103, figs. 12-15 (wahrscheinlich Jamaika).

Description. Shell reaching 5.7 mm in diameter, 3.8 mm in height, imperforate, raised discoidal, smooth, glossy; color white, spire frequently pale lemon yellow; whorls about 4-5, barely inflated, the last more than twice the width of penultimate; body whorl wellrounded, the periphery central; suture visible but barely impressed, bordered with opaque white line; umbilical area sunken; spire weakly raised, domelike, the last whorl in adult individuals shelved so that the outline of the spire does not form a straight line; aperture oblique, narrowly semilunate with



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According to Baker (1934a: 63), *linguifera* aestivates under rocks but rapidly climbs rockfaces during rains; the localities he lists for the species, all presently preserved as samples in the Academy of Natural Sciences of Philadelphia, show that the species lives mainly at altitudes between sea level and 600 ft. In contrast *P. nitida* lives at higher elevations in more eastern sections of the island.

Specimens examined: JAMAICA: *Westmoreland:* Bluefield (USNM); Grange Hill (Goodfriend); Mt. Pleasant; Orange Hill (both USNM); Retreat; Sweetwater; Waterwheel (all ANSP). *St. Elizabeth:* Luana Spring (MCZ); near Black River (USNM).

Subgenus *Despoenella* H. B. Baker

Odontostoma Orbigny, 1848. Mollusques [in] Sagra, Histoire Physique, Politique et Naturelle de l'Ile de Cuba 1:237 (type-species, *Odontostoma depressa* Orbigny, 1842, by subsequent designation H. B. Baker, 1923: 84) *non* Turton 1830 (Moll.), *nec* Agassiz 1846 (Moll.), *nec* Mörch 1852 (Moll.).

Odostoma Orbigny. Gray, 1856. Proc. Zool. Soc. London, pt. 24, p. 99, error for *Odontostoma*.

Despoenella H. B. Baker, 1923. Nautilus 36: 85 (type-species, *Odontostoma depressa* Orbigny, 1842, new name for *Odontostoma* Orbigny, 1842, *non* Turton 1830 *etc.*

Despaenella H. B. Baker. Neave, 1939. Nomenclator Zoologicus 2: 51, error for *Despoenella*.

Description. Aperture with one columellar and one parietal lamella; no palatal lamellae.

Remarks. As discussed under *Zoogeography* in the *Introduction* (q.v.), *Despoenella* is found in Jamaica, Cuba, and Hispaniola. Like *Proserpina* s.s., the subgenus does not occur on the mainland. *Despoenella* probably originated in Jamaica from an ancient continental parental stock and subsequently dispersed to Cuba, and, perhaps, later to Hispaniola. In Cuba and Hispaniola, it is the only subgenus of *Proserpina* s. l. present.

***Proserpina (Despoenella) depressa* (Orbigny)**

Plate 11, figs.1-3; Map 3; text fig. 1

Odontostoma depressa Orbigny, 1842. Mollusques [in] Sagra, Histoire Physique, Politique, et Naturelle de l'île de Cuba, 1: 238, pl. 18, figs. 4-7 (type-locality, intérieur de l'île; restricted by Aguayo and Jaume, 1947: No. 88, Pan de Guajaibón, Pinar del Río; holotype, BMNH).

Odontostoma depressum Orbigny. Pfeiffer, 1848, Monographia Heliceorum Viventium 1: 11.

Helicina ptychostoma Pfeiffer, 1848. Monographia Heliceorum Viventium 1: 12, footnote (type-locality, Callajabas (*sic*) [= Cayajabos, Pinar del Río]; holotype, destroyed, Clench and Jacobson 1971a: 101).

Proserpina depressa (Orbigny). Pfeiffer 1853. Monographia Heliceorum Viventium 3: 291.

Proserpina depressa rubrocincta (Torre MS) Aguayo and Jaume, 1947, Catálogo Moluscos de Cuba, No. 88 (*nomen nudum*): Aguayo and Jaume, 1957, Mem. Soc. Cubana Hist. Nat. 23: 124, pl. 1, fig. 10 (type-locality, Los Acostas, Luiz Lazo, Provincia Pinar del Río; holotype, MP 5520).

Description. Shell reaching 8.2 mm in diameter, imperforate, depressed and polished; color pale lemon yellow or white; whorls 4-5, barely inflated, rapidly increasing in size, the last whorl twice the width of the penultimate; body whorl narrowly but evenly rounded at the periphery and somewhat shelved in mature specimens; suture indicated but barely impressed; umbilical area shallowly excavated, somewhat more translucent than rest of shell; spire low, dome-shaped, apex barely raised above succeeding whorl; aperture oblique, with two entering lamellae: the upper (parietal) lamella strong, well raised, the lower (columellar) weaker, rising directly from the evenly rounded, concave columella; palatal lamellae wanting; outer lip thin, entire, somewhat retreating centrally; sur-

face smooth, polished with fine regular pebbling, (at 50 ×), sculptured with irregular barely perceptible growth lines; protoconch 1½ whorls, scarcely elevated, smooth except for microscopic pebbling; periostracum and operculum wanting.

Height	Width	
3.7 mm	8.2 mm	Sierra Anafe, Havana
4.2	7.4	Sierra Paso Real, Guane
3.8	6.2	Sierra Anafe, Havana

Remarks. *P. depressa* is closely related to *P. bidentata* from Jamaica and *P. marcanoi* from Hispaniola (see Remarks under *bidentata* and *marcanoi*). *P. bidentata* is considerably smaller in size and is less depressed in outline, having a somewhat more subglobose body whorl. As discussed elsewhere, *P. depressa* was probably derived from *P. bidentata* and presently occupies disjunct, mainly montane refugia in Cuba (see Map 3 and *Zoogeography* in the *Introduction*).

Of the two species of *Despoenella* found in Cuba, *P. depressa* is larger, more depressed in outline and has its columellar lamella rising directly from the columella and not from a small elevation as in *P. globulosa*. Geographically *P. depressa* is isolated in two disjunct areas (see Map 3). It has a wide distribution in western Cuba reaching from Mendoza near Guane to the central part of Havana Province. In the region of Viñales it is an exceedingly abundant species and is found in large numbers in every suitable location. However, unlike *globulosa*, it does not occur on the Isle of Pines. In eastern Cuba, it has been reported only from the southeastern section of Oriente Province in an area extending from around Miranda to Guantánamo.

The name, *P. depressa rubrocincta*, was given to an isolated population around Luis Lazo, Pinar del Río, in which the shells have a wide orange band around the peri-



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phery. However, in the 3 lots from the type-locality in the collection of the MCZ, specimens are found in which the band has been only partially developed near the aperture and others in which the band is missing entirely. There is little reason to view this variable feature in a localized population as worthy of taxonomic distinction, particularly since red or reddish coloring in the shell, whatever its adaptive significance, occurs in other proserpine snails. Pfeiffer (1857: 149) reported a variety of *linguifera* Jonas from Jamaica with a red apex, the South American *P. cousini* Jousseume from Ecuador has a narrow deep red spiral band, and *P. nitida* has reddish variations in its populations (Gloyne, 1872).

Several authors have noted the abundance and provided documentation for local occurrences of *P. depressa* (Richards, 1933; Farfante, 1942; Jaume, 1945; Jacobson, 1970).

Specimens examined. PINAR DEL RIO: Canalete; Rangel; Mogote de la Villa María, Consolación del Norte; El Mamey, Cayajabos; Sierra la Güira; La Furnia, La Güira; Mogotes de Cerro de Cabras; Ensenada de los Burros, Cabezas; Echevarría, San Diego de los Baños; Finca Balastena, Bahía Hondo; Farallón de Juan Alonso, Sierra Quemado, Isabel María; Sierra la Chorrera, San Vicente; Hoyo Jutía (Hutía), 1 km E of San Vicente. *Guane*: Mendoza; Sierra Paso Real; Sierra de Guane. *Viñales*: Hoyo del Niajagual, Cierra del Ancón; Mogote de la Dinamita; El Queque; Mogote Largo; Laguna de Piedras; Km 14 between Pinar del Río City and Viñales; Mogote Capón; Potrero Manuel Sánchez; Mogotico de Torres; mogote between Cayos de San Felipe and Loma de Isabel. HAVANA: Finca la Alianza, Cotorro; Somorrostro, near Jamaica; Loma de Camao; Peña Blanca, Sierra Anafe; Esperón, Sierra Anafe; Managua; Guayabel, Sierra Anafe (all MCZ). ORIENTE: Monte Toro, Guantánamo (MCZ); San Felipe, Monte Toro (USNM). *Miranda*: Nipi Hills, Tibisí; La Cueva, near Júcaro, Tibisí; Birán; Upper Mercedes Valley; top of hill, N of Mercedes Valley; Arroyo del Agua; Cuyo del Rey, near Miranda (all ANSP).

Proserpina (Despoenella) bidentata C. B. Adams

Plate 12, figs. 4-6; Map 1

Proserpina bidentata C. B. Adams 1850. Contributions to Conchology No. 5: 81 (Jamaica; holotype, MCZ 186126, figured by Jacobson and Boss 1973: 328, pl. 85, figs. 1-2).

Description. Shell reaching 4.0 mm in diameter, 22 mm in height, imperforate, thin, smooth, polished and translucent; color pale yellowish or greenish white; whorls 3-4, weakly inflated, rapidly increasing, the last more than three times the width of the penultimate; body whorl narrowly and unevenly rounded, the periphery distinctly above the center; suture weakly impressed, bordered by an opaque white line; umbilical area weakly sunken; spire depressed; aperture oblique, semilunate with 2 lamellae, one, the smaller one, on the columella, the other, twice the width, set closely above; no palatal lamella; outer lip thin, entire, somewhat retreating centrally; sculpture of weak, irregular growth lines, surface appears weakly punctate and with fine, regular internal lineations, obsolete basally (50 ×); protoconch 1½ whorls, glassy, microscopically punctate, barely raised; periostracum and operculum lacking.

Height

Width

2.2 mm

4.0 mm holotype

Remarks. *P. bidentata* is very closely related to, and probably gave rise to, *P. marcanoi* of Hispaniola, from which it is virtually indistinguishable. Although *bidentata* and *marcanoi* may prove to be conspecific, the widely separated populations represented by extremely small sample sizes are herein treated as separate species (see *Remarks* under *marcanoi*).

The Cuban *P. depressa*, was also probably derived from *P. bidentata*. The latter is considerably smaller in size and differs in being noticeably less depressed with its body whorl somewhat more subglobose than *depressa*.

Nothing is known about the biology of *P. bidentata*. Specific locality records thus far indicate that the species occurs in eastern Jamaica, notably the John Crow Mountains in the Parish of Portland (Map 1).

Specimens examined. JAMAICA: holotype (MCZ); *Portland*: 6.5 mi from Port Antonio, near Nonsuch (ANSP); 3.2 and 4.2 mi S of junction with Route A4, E side of road to Ecclesdown (both Goodfriend); W of Haining (ANSP).

***Proserpina (Despoenella) marcanoii* Clench**

Plate 12, figs. 1-3

Proserpina marcanoii Clench 1962. *Breviora*, No. 173, p. 2, pl. 1, fig. 3 (Colonia Ramfis, 20 km W of San Cristobal, Santo Domingo [Hispaniola]; holotype, MCZ 188911).

Description. Shell reaching 4.7 mm in diameter, 2.4 mm in height, imperforate, depressed, smooth, polished, thin, fragile, translucent; color light whitish green; whorls 4, barely inflated, rapidly expanding, the last 3 times the width of the penultimate whorl; body whorl well rounded, periphery slightly above the center; suture weakly impressed, somewhat stronger at the body whorl; umbilical area slightly sunken; spire depressed: aperture narrowly semilunate, with a low columellar lamella and a higher parietal one; palatal lamellae lacking; outer lip thin, entire, slightly retreating centrally; sculpture of irregular, very fine growth lines; protoconch 1½ whorls, glassy, transparent, smooth; periostracum and operculum lacking.

Height	Width	
2.4 mm	4.7 mm	holotype
2.2	4.4	paratype
2.1	4.3	paratype

Remarks. Although Clench (1962: 3) remarked on the possible relationship of *marcanoii* with *depressa* of Cuba and differentiated these species thusly:



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'It [*marcanoii*] differs from *depressa* by being smaller in size, proportionally higher, and in having a columellar lamella nearly twice as high as the Cuban species.', *P. marcanoii* is virtually indistinguishable from *P. bidentata* from Jamaica. Unfortunately the series of specimens available for either of these species are limited, and in most every feature the shells of the two species appear to be identical. However, considering the great geographic distance separating these populations and taking into account the extremely small sample size, under close scrutiny we were able to detect some minute differences, which though appearing to be minor in importance may prove to be of a specific diagnostic value once larger samples become available. *P. marcanoii* exhibits a proportionately greater post-embryonic growth than *P. bidentata*. That is to say, that the whorl number of *marcanoii* is greater than that of *bidentata* in specimens of the same size. For example the holotype of *marcanoii* which measures 4.7 mm in diameter has 4 postembryonic whorls while a similarly sized specimen of *bidentata* (ANSP 139451), measuring 4.8 mm in diameter, has only 3½ to 3¾ whorls. The same relationship obtained in other measured comparisons. Lastly, there may be some color differences between the Jamaican and Hispaniolan forms where *bidentata* may be more strongly infused with a greenish tint. We have decided on the basis, especially of biogeographic considerations in combination with the whorl number difference noted above, to maintain *marcanoii* and *bidentata* as separate, but very closely related species, the former probably having been derived from the latter.

Specimens examined. Known only from the type-locality.

***Proserpina* (*Despoenella*) *pisum* C. B. Adams**

Plate 13, figs. 1–3; Map 1

Proserpina pisum C. B. Adams 1850. Contribution to Conchology No. 7: 108 (Jamaica; lectotype, MCZ 177263, selected by Jacobson and Boss, 1973: 404, pl. 71, figs. 10–11).

Description. Shell reaching 6.1 mm in width, 5.6 mm in height, imperforate, globose, smooth, polished; color white or pale lemon yellow; whorls 4–5+, slightly inflated, slowly increasing, the last whorl little wider than the penultimate; body whorl high, well rounded, shelved in adult individuals, the periphery central; suture well impressed, especially at the body whorl, umbilical area weakly sunken; spire well raised, domelike; aperture slightly oblique, narrowly semilunate, with a columellar lamella closely set to and slightly smaller than a parietal lamella; outer lip thin, simple, somewhat retreating centrally; sculpture of weak, barely perceptible growth lines; the surface weakly punctate and with fine, regularly spaced obsolete internal lineations, obsolete basally ($50\times$); protoconch $1\frac{1}{2}$ whorls, microscopically punctate, slightly raised; periostracum and operculum wanting.

Height	Width	
5.6 mm	6.1 mm	lectotype
4.6	5.9	New Hope, Westmoreland
4.2	5.1	paralectotype

Remarks. *Proserpina pisum* is one of two species of *Despoenella* which live on the island of Jamaica (Map 1). It is easily distinguished from *P. bidentata* by its rounded, globose shape; further, the species are distinctly separated geographically, with *pisum* living in the western regions of the island, from the Parishes of Westmoreland, St. James and Trelawney, and *bidentata* occurring only in the east in the John Crow Mountains. According to Baker (1934a) both species aestivate under rocks during hot and dry periods but emerge to climb rock faces during rain. Gloyne (1872) remarked on the great rarity of the occurrence of *P. pisum*.

P. pisum is most closely related to the Cuban *P. globulosa* with which it shares a similar globular shape and to which it probably gave rise (see *Zoogeography* in the *Introduction*).

Specimens examined. JAMAICA: *Westmoreland*: New Hope (MCZ); *St. James*: 2 to 4 mi SE of Catadupa Station (ANSP); *Spring Mount* (MCZ); *Trelawney*: 200 ft. W of streambed and entrance to Windsor Cave (Goodfriend).

***Proserpina* (*Despoenella*) *globulosa* (Orbigny)**

Plate 13, figs. 4–6; Map 2

Odontostoma globulosa Orbigny 1842. Mollusques [in] Sagra, *Histoire Physique, Politique, et Naturelle de l'île de Cuba*, 1: 239, pl. 18, figs. 8–11 (type-locality, intérieur de l'île; holotype, BMNH).

Odontostoma globulosum Orbigny. Pfeiffer 1848. *Monographia Heliceorum Viventium* 1: 11.

Proserpina globulosa (Orbigny). Pfeiffer 1850. [in] Martini and Chemnitz, *Conch. Cab.* (2) 1: pt. 12, sect. 2, p. 12, figs. 19–21.

Description. Shell reaching 5.2 mm in diameter, 4.2 mm in height, imperforate, subglobose, smooth, polished; color pale lemon yellow or white; whorls almost 4–5, quite flat, slowly increasing in width, the last whorl only slightly wider than the penultimate; body whorl well rounded at the periphery; suture very weakly impressed; spire little raised, domelike, apex barely elevated; aperture oblique, narrowly semilunate, with 2 lamellae; parietal lamella stronger; columellar lamella rising from a low elevation in columellar curve; palatal lamellae absent; umbilical area weakly excavated; outer lip entire, somewhat retreating centrally; surface finely punctate and with regularly, closely spaced axial striae becoming obsolete basally (50 ×); punctate; protoconch 1½ whorls, microscopically pebbled, barely elevated; periostracum and operculum lacking.



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Height	Width	
4.2 mm	5.2 mm	La Chorrera, San Vicente, Pinar del Río
3.5	5.2	Mogote de Justo, Viñales, Pinar del Río
3.4	4.2	Cayos de San Felipe, Viñales, Pinar del Río
3.2	5.2	Sierra de Casas, Isle of Pines

Remarks. *P. globulosa* is most closely related to, and probably a derivative of *P. pisum* of western Jamaica. It is distinguished by its slightly smaller size, less globose body whorl, larger aperture and lower profile. From the other Cuban *Despoenella*, *P. depressa*, with which it is sympatric in Viñales, Pinar del Río, *P. globulosa* can be readily recognized by its smaller size, its higher, sub-globular outline, and its columellar lamella which rises from an elevation on the columella rather than directly from the columella itself.

As discussed earlier (see *Zoogeography* in the *Introduction*), *P. globulosa* arose on Cuba having been derived from a Jamaican stock like *P. pisum*. Although Arango wrote (1879: 58) that *globulosa* is found "en casi toda la isla" we have found no records, either published or in museum collections, to support this statement. Presently the species occurs (Map 2) in 4 disjunctive localities: 1) in the west from northwestern Pinar del Río around Luiz Lazo and Viñales; 2) on the Isle of Pines; 3) in the east in south central Oriente around Jarahueca and Florida Blanca; and 4) near the extreme eastern portion of Oriente at Baracoa. It is the only species of *Proserpina* in the Isle of Pines (Henderson, 1916) and unlike *P. depressa*, its range does not extend to Havana Province. Probably at one time *P. globulosa* was widely distributed on the island but now it only lives in several isolated, disjunctive, mainly montane refugia.

Specimens examined. PINAR DEL RÍO: *Viñales*: Mogote Cabrera; Sumidero, Luis Lazo; Hoyo Jaruco; Mogote Marmol; Mogote Cayo de San Felipe; Mogote La Mina;

km 14 between Pinar del Río City and Viñales; Mogote Rinconada; Mogote Zacarías; Mogote Coco Sola; Ensenada Hutía; Mogote Dos Hermanos; Pan de Azucar; El Abra; Paredones de la Puerta del Ancón; Guajaní; Laguna de Piedras; Mogote Palmarito (all USNM); Mogote de la Dinamita; Mogote de Justo; El Cuajaní, Sierra de Viñales; Cayos de San Felipe; Santo Tomás (all MCZ). *San Vicente*: La Chorrera; Costanera de San Vicente (both USNM); Cuevas del Río; Cove of Delight; mogotes in middle of west side, Ensenada de San Vicente; Mogote Justo, Baños de San Vicente (all ANSP). ISLE OF PINES: Sierra Caballos; Sierra Columbo; Sierra de Casas; Sierra Bibijagua (all USNM). ORIENTE: Florida Blanca; Subida de la Hembra; Los Alemanes, La Leonora, Jarahueca (all USNM); El Yunque de Baracoa (MCZ).

BIBLIOGRAPHY

- ADAMS, C. B. 1850. Descriptions of supposed new species and varieties of terrestrial shells, which inhabit Jamaica. Contributions to Conchology, No. 5, pp. 76-84.
- ADAMS, H. AND A. ADAMS. 1856. The genera of Recent Mollusca. London, Vol. 2, 661 pp.
- AGUAYO, C. G. AND M. L. JAUME. 1947-1951. Catálogo Moluscos de Cuba, Nos. 1-725 (mimeographed).
- ARANGO, R. 1878-1880. Contribución a la Fauna Malacológica Cubana. Havana. 280 pp. (+ 35, index and errata).
- BAKER, H. B. 1922. Notes on the radula of the Helicinidae. Proc. Acad. Nat. Sci. Philadelphia 74: 29-67, pls. 3-7.
- . 1923. Proserpinidae. Nautilus 36: 84-85.
- . 1926a. Anatomical notes on American Helicinidae. Proc. Acad. Nat. Sci. Philadelphia 78: 35-56, pls. 4-8.
- . 1926b. The radula of *Proserpina*. Proc. Acad. Nat. Sci. Philadelphia 78: 449-451.
- . 1934a. Jamaican land snails. Nautilus 48: 6-14, 60-67, pl. 2.
- . 1934b. The animal of *Proserpina*. Nautilus 47: 151.
- . 1956. Familial names for land operculates. Nautilus 70: 28-31.
- BLAND, T. 1858. On the absorption of parts of the internal structure of their shells by the animals of *Stoastoma*, *Lucidella*, *Trochatella*, *Helicina* and *Proserpina*. Ann. Lyceum Nat. Hist. New York 6: 75-77.

- BOSS, K. J. 1972. Minute Jamaican prosobranch gastropods: *Stoastoma* and its congeners. *Breviora*, No. 393, 13 pp., 2 pls.
- BOSS, K. J. AND M. K. JACOBSON. 1973a. Monograph of *Ceratodiscus*. *Occ. Papers Moll., Harvard Univ.* 3 (45): 253-279, pls. 45-48.
- . 1973b. Monograph of the genus *Alcadia* in Cuba. *Bull. Mus. Comp. Zool., Harvard Univ.* 145 (7): 311-358, 5 pls., 2 figs., 3 maps.
- . 1974a. Monograph of the genus *Lucidella* in Cuba. *Occ. Papers Moll., Harvard Univ.* 4 (48): 1-27, pls. 1-4.
- . 1974b. Catalogue of the taxa of *Lucidella*. *Occ. Papers Moll., Harvard Univ.* 4 (49): 29-38.
- . 1975. Catalogue of the taxa of the subfamily Proserpininae. *Occ. Papers Moll., Harvard Univ.* 4 (52): 93-102.
- CLENCH, W. J. 1962. New species of land mollusks from the República Dominicana. *Breviora*, No. 173, 5 pp.
- CLENCH, W. J. AND M. K. JACOBSON. 1968. Monograph of the Cuban genus *Viana*. *Breviora*, No. 298, 25 pp., 4 pls., 5 maps.
- . 1970. The genus *Priotrochatella* of the Isle of Pines and Jamaica. *Occ. Papers Moll., Harvard Univ.* 3 (39): 61-80, pls. 17-20, 1 map.
- . 1971a. Monograph of the Cuban genera *Emoda* and *Glyptemoda*. *Bull. Mus. Comp. Zool., Harvard Univ.* 141 (3): 99-130, 7 pls.
- . 1971b. A monograph of the genera *Calidviana*, *Ustronia*, *Troschelviana*, and *Semitrochatella* in Cuba. *Ibid.* 141 (7): 403-463, 8 pls., 2 figs.
- DARLINGTON, P. J., JR. 1938. The origin of the fauna of the Greater Antilles, with discussion of dispersal over water and through the air. *Quart. Rev. Biol.* 13 (3): 274-300, 5 figs.
- FARPANTE, ISABEL PÉREZ. 1942. Moluscos de la región de Camoa y Somorrostro y sus condiciones de vida. *Mem. Soc. Cubana Hist. Nat.* 16 (1): 45-56.
- GLOYNE, C. P. 1872. Notes sur le mode de station, les moeurs et les habitudes des Mollusques terrestres de la Jamaïque, avec la description d'une espèce nouvelle. *Jour. de Conch.* 20: 26-47.
- GRAY, J. E. 1840. Synopsis of the contents of the British Museum. 42nd Ed. London, 156 pp.
- . 1842. Synopsis of the contents of the British Museum. 44th Ed. London, 308 pp.
- . 1847. A list of the genera of Recent Mollusca, their synonyms and types. *Proc. Zool. Soc. London*, pt. 15, pp. 129-219.
- . 1856. On the position of the genus *Proserpina* in the system, and a description of its dentition. *Proc. Zool. Soc. London*, pt. 24, pp. 99-102.



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- RICHARDS, H. G. 1933. A conchological expedition to Cuba. Proc. Penn. Acad. Sci. 7: 167-172.
- SCHWARTZ, A. 1970. A systematic review of *Ameiva auberi* Cocteau (Reptilia, Teiidae) in Cuba and the Bahamas. III. Discussion. Ann. Carn. Mus. 41 (4): 152-168.
- SOWERBY, G. B. II. 1839. A conchological manual, London, 5 + 130 pp., 488 figs.
- . 1842. A conchological manual, London, 2nd ed.
- THIELE, J. 1925. [in] Kükenthal and Krumbach. Handbuch der Zoologie, 5: (3): 1-160.
- . 1929. Helicinidae [in] Handbuch der systematischen Weichtierkunde, pp. 84-91, figs. 57-67.
- THOMPSON, F. G. 1967. A new land snail of the family Proserpinidae from Chiapas, Mexico. Proc. Biol. Soc. Washington 8: 61-64, figs. 1-3.
- THOMPSON, F. G. 1968. *Ceochasma*, a remarkable new land snail from Colima, Mexico (Gastropoda Prosobranchia, Helicinidae) Proc. Biol. Soc. Washington 81: 45-52.
- TROSCHEL, F. H. 1857. Proserpinacea [in] Das Gebiss der Schnecken. Berlin 1: 84-85, pl. 6, fig. 2.
- WAGNER, A. 1905-1906. Helicinen Studien. Denkschriften der mathem-naturwissen. Klasse, Vol. 77: 357-450, pls. 1-9; Vol. 78: 203-248, pls. 10-14.
- . 1907-1911. Helicinidae. [in] Martini and Chemnitz, Conchylien-Cabinet, (2): 1: sect. 18, pt. 2, 391 pp., 70 pls.
- WENZ, W. 1938. Helicinidae [in] Handbuch der Paläozoologie, Gastropoda, pp. 435-448, figs. 1071-1118.

WORLD'S LARGEST SHELL OF THE
PAPER NAUTILUS
(*ARGONAUTA ARGO* LINNAEUS)

BY RICHARD I. JOHNSON

Sometime during the middle of the last century, Col. Thomas H. Perkins, then one of the richest merchants of Boston, purchased the world's largest female Paper Nautilus shell. Perkins paid the astonishing sum of \$500.00 for it. Upon his demise it was presented, by his family, with the rest of his shell collection, to the Boston Society of Natural History.

Perkins was not a man who knowingly made foolish investments. How did he know he was purchasing the world's largest known specimen? Dr. Cabot (1856: 370), speaking before the members of the Society, affords a clue: "Orbigny ([in] Férussac and Orbigny, 1840: 168) gives the measurements of the largest *Argonauta* he had examined: greatest length of the shell, 9.5 inches." Férussac and Orbigny's sumptuously illustrated monograph of the Cephalopoda was then the last word on the subject.

Since Perkins, like many of his contemporaries, only kept a cabinet of curios, he must have consulted with learned members of the Society before making the purchase. Most likely, he was advised by Dr. Augustus A. Gould, then one of the leading conchologists in the United States. In a report to the members of the Society, acknowledging the receipt of the collection, Gould (1854: 35) gave the measurements of the shell as 11.75 by 7.5 inches, noting that, "the next largest specimen, in the College of Surgeons, London, measures .75 inches less than this."

Tryon (1885: 136), in his admirable monograph on the Cephalopoda, called attention to the world's largest *Argonauta*, but, alas, by then the specimen had *shrunk* to a diameter of 10 inches. Johnson (1917: 1, 5) figured the specimen, at which time it had a diameter of $10\frac{3}{8}$ inches.

Although the Society began transferring its non New England specimens to the Museum of Comparative Zoology in 1914, it was not until just a few years ago that the now Museum of Science relinquished the world's largest Paper Nautilus (now MCZ 293001). Surprisingly, it still has the same diameter it had in Johnson's time.

Is Gould's measurement of 11.75 inches a misprint, in which case the London specimen would still measure .75 inches less than the Perkins specimen, or was he peradventure obfuscating the fact that he had subsequently become aware of the existence of a larger shell elsewhere, and did not want to admit it?

It matters not, the mania for having the world's largest Paper Nautilus is past, and we conclude, in this bit of pedantry, with the observation that Perkins paid too much for the world's largest Paper Nautilus, even if its size is not challenged.

BIBLIOGRAPHY

- CABOT, J. E. 1856. [Remarks in] Proc. Boston Soc. Nat. Hist. 5: 370.
- FÉRUSSAC, A. E. D' A. and A. D'ORBIGNY. 1835, 1840, 1848. Histoire Naturelle Générale et Particulière des Céphalopodes . . . , pp. i - ix, 11 - 96, i - lvi, 1 - 361, Atlas of 144 pls. mostly colored.
- GOULD, A. A. 1854. [Remarks in] Proc. Boston Soc. Nat. Hist. 5: 34.
- JOHNSON, C. W. 1917. Bull. Boston Soc. Nat. Hist. no. 9: 1-9.
- TRYON, G. W. 1885. Manual of Conchology 1: 1-316, 112 pls. mostly colored.



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Of the nomina introduced by the various authors for the Proserpininae we conclude on the basis of personal observations and the consultation of the literature, that there are two generic level taxa, *Ceres* and *Proserpina s. l.*, the latter having 5 subgeneric units: *Proserpina s.s.*, *Despoenella*, *Staffola*, *Linidiella* and *Proserpinella*, and 19 valid species. A further examination of some of the nominal species, specimens of which we have difficulty in procuring, especially those from South America, may lead to still further reductions.

Ceres was described by Gray (1856: 100) for its uniquely keeled, rather large helicoid shell, the spire of which is sculptured and the aperture of which is provided with 6 lamellae or denticles. Kobelt (1879: 203) subsequently designated *Caracolla eolina* as the type-species which was originally thought to have helicid affinities. Presently recognized as a distinctive genus, *Ceres* includes three species.

<i>eolina</i> Duclos	Mexico
<i>salleana</i> Gray	Mexico
<i>nelsoni</i> Dall	Mexico

Proserpina s.s. was introduced by Sowerby (1839: 124) with *Proserpina nitida* Sowerby as type-species by monotypy. *Procerpena* Gray and *Despoena* Newton are synonyms of *Proserpina s.s.*

With the exception of *Ceres*, all other superspecific taxa are considered as subgenera of *Proserpina s. l.*, namely *Proserpina s.s.*, *Despoenella*, *Staffola*, *Linidiella*, and *Proserpinella*.

Proserpina s.s. is geographically restricted to Jamaica and consists of two species, both of which have parietal, columellar and palatal lamellae.

<i>nitida</i> Sowerby	Jamaica
<i>linguifera</i> Jonas	Jamaica

Baker (1923: 85) established *Despoenella*, herein considered as a subgenus of *Proserpina s. l.*, with *Odontostoma depressa* Orbigny as type-species. *Odontostoma* Orbigny, *Odostoma* Orbigny, and *Despaenella* 'Baker' Neave are synonymous.

The species of *Despoenella* have parietal and columellar but not palatal lamellae and are all found in the Greater Antilles.

<i>bidentata</i> C. B. Adams	Jamaica
<i>pisum</i> C. B. Adams	Jamaica
<i>depressa</i> Orbigny	Cuba
<i>globulosa</i> Orbigny	Cuba
<i>marcanoï</i> Clench	Hispaniola

Cyane H. Adams 1870 from eastern Peru was introduced for a species with "the base of the columella is truncate instead of being furnished with a spiral plate . . . and both palatal and parietal lamellae are wanting." In establishing *Staffola*, Dall (1905) felt that "this appearance of truncation is due to the fact that there is only a narrow notch between the columellar lamella and the basal margin." Since *Cyane* is preoccupied by Felder 1861 (Lepidoptera) the name *Staffola* with 4 South American species takes its place. Although Keen (1960) considered *Staffola* to be a subgenus of *Linidiella* and it may well be that *Staffola* could be completely synonymized, it is herein treated as a subgenus of *Proserpina s. l.* with 4 South American species.

<i>blandiana</i> H. Adams	Peru
<i>cousini</i> Jousseaume	Ecuador
<i>orbignyi</i> Ancey	Bolivia
<i>derbyi</i> Dall	Bahia, Brazil

Linidiella was introduced by Jousseaume (1889:256) for a species of *Proserpina* in which only a single fine columellar tooth is present. *P. swifti* Bland was designated as type-species for this group by Baker (1923: 84). We accord it subgeneric rank and include three species. *Cher-sodespoena* Sykes 1900 is synonymous.

<i>swifti</i> Bland	Venezuela
<i>cinnamomea</i> Sykes	Ecuador
<i>sulfureus</i> Thompson	Mexico

Proserpinella was introduced by Bland (1865:157) with *P. berendti* as type-species by monotypy for small, fragile shells with only a single parietal apertural tooth from

Mexico. Two species are currently referable to this taxon which is herein assigned subgeneric rank.

<i>berendti</i> Bland	Mexico
<i>hannae</i> Dall	Tres Mariás Ids., Mexico

SPURIOUS TAXA

The species *Helix arnoudii* Michaud from the Paleocene near Reims, France, once thought to be referable to *Ceres*, was rejected as such by Sandberger (1871: 149) and placed in the monotypic *Dimorphoptychia* in the Endodontidae near *Sesara infrendens* Gould. Wenz (1938: 435), considering *arnoudii* close to the Vianinae erected for it the subfamily Dimorphoptychiinae within the Helicinidae, where, under the corrected name Dimorphoptychinae it was retained by Keen (1960: 286). If the species is indeed a fossil helicinid, it seems wisest, for the reasons given by Sandberger, to separate it from the neotropical taxa although its shape and apertural lamellae suggest a relationship with the subfamily Proserpininae.

The following taxa, noted with an asterisk (*) in the subsequent list, are referable to groups other than the Proserpininae: *arnoudii*, *arnouldi*, *Dimorphoptychia*, *discoidea*, *hyalina*, *lyelli*, *margarita*, *opalina*, and *woodwardi*.

allognota Jonas, **Proserpina**. 1846. Zeitschrift für Malakozoologie 3: 12, new name for *H. linguifera* Jonas 1839.

***arnoudii** Michaud, **Helix**. 1837. Guerin's Magazine de Zoologie 6: Cl. 5, p. 3, pl. 81, figs. 7-9 (fossile du calcaire siliceux du gypse de la montagne de Reims [Paleozän, Thanet, Calcaire de Rilly, Rilly-la-Montagne bei Reims, Dép. Marne, teste Wenz 1938: 435]; holotype, ? Lyon Mus., teste Dance 1966: 294).

***arnouldi** 'Michaud' Boissy, **Helix**. 1848. Mem. Soc. Geol. de France, ser. 2, 3 (1): 272, pl. 5, fig. 12 a-c, error for *arnoudii*.

berendti Bland, **Proserpinella**. 1865. Ann. Lyc. Nat. Hist. New York 8: 157, fig. 2 (Mirador, Atlantic slope, 3000 to 4000 ft. elevation, Mexico; holotype, ?)



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- Despoena** Newton. 1891. Systematic List British Oligocene and Eocene Mollusca in the British Museum, p. 255, new name for *Proserpina* Sowerby 1839, *non* Hübner 1816.
- Despoenella** H. B. Baker. 1923. Nautilus 36: 85 (type-species, *Odontostoma depressa* Orbigny, 1842, new name for *Odontostoma* Orbigny, 1842, *non* Turton 1830 etc.).
- ***Dimorphoptychia** Sandberger. 1871. Land.-und Susswasser-Conchylien der Vorwelt, p. 149, pl. 7, figs. 1 a-d (type-species, *Helix arnoudii* Michaud 1837, by monotypy). NOTE: A monotypic helicimid genus in the subfamily Dimorphoptychinae.
- ***discoidea** C. B. Adams, *Proserpina*. 1850. Contributions to Conchology No. 5: 81 (Jamaica; lectotype, MCZ 247-211, selected by Jacobson and Boss 1973: 345, pl. 86, figs. 12-14). NOTE: Not a *Proserpina* but a member of *Proserpinula* Albers, 1860, in the family Sagdidae. See also *opalina* Adams.
- eolina** Duclos, *Caracolla*. 1834. Guerin's Magazine de Zoologie, 3, Cl. 5, pl. 30 (no locality given [Mexico, Kobelt 1879: 203]; holotype, ?).
- globulosa** Orbigny, *Odontostoma*. 1842. Mollusques [in] Sagra, Histoire Physique, Politique et Naturelle de l'île de Cuba 1: 239, pl. 18, figs. 8-11 (intérieur de l'île de Cuba; holotype, BMNH).
- hannae** Dall, *Proserpinella*. 1926. Proc. California Acad. Sci. ser. 4, 15 (15): 486, pl. 36, figs. 6-8 (type-locality, Maria Madre, Tres Marias Islands, Mexico; holotype, CAS 2211).
- ***hyalina** (C. B. Adams MS) Pfeiffer, *Helix*. 1845. Zeitschrift für Malakozoologie 3: 83, *nomen nudum*, as synonym of *margarita* Pfeiffer.
- linguifera** Jonas, *Helicina*. 1839. Wiegmann's Archiv Naturgesch. 1: 341 (Patriam ignoro; type, ?). NOTE: *allognota* Jonas and *pulchra* C. B. Adams are synonyms.
- Linidiella** Jousseume. 1889. Mem. Soc. Zool. France 2: 256 (type-species, *Proserpina swifti* Bland 1863, by subsequent designation, Baker 1923: 84).

- ***lyelli** Moore, *Proserpina*. 1867. Proc. Geol. Soc. London 27: 549, pl. 15, figs. 3-4 (Lias; holotype ?). NOTE: probably not a *Proserpina*; possibly a helicoid (Sykes, 1900: 138) or a marine snail.
- marcanoi** Clench, *Proserpina*. 1962. Breviora, No. 173, p. 2, pl. 1, fig. 3 (Colonia Ramfis, 20 km W of San Cristobal, Santo Domingo [Hispaniola]; holotype, MCZ 188911).
- ***margarita** Pfeiffer, *Helix*. 1845. Zeitschrift für Malakozoologie 3: 83 (Jamaica; holotype, ? Cuming Colln. BMNH). NOTE: not a *Proserpina*; synonym of the sagdid *opalina* C. B. Adams.
- nelsoni** Dall, *Ceres*. 1898. Nautilus 12 (3): 27; 1902, Proc. U. S. Nat. Mus. 24 (1264): 501, pl. 28, figs. 1, 3, 5, 8 (Pilitla, San Luis Potosi, Mexico; USNM 107823).
- nitida** Sowerby, *Proserpina*. 1839. Conchological Manual, 1 Ed., p. 124, fig. 274; 1842, 2 Ed., p. 237, fig. 274 (Habitat in insula Jamaica; type, ? BMNH). NOTE: *Proserpina* Pfeiffer and *planulata* C. B. Adams are synonyms.
- Odontostoma** Orbigny. 1848. Mollusques [in] Sagra, Histoire Physique, Politique et Naturelle de l'Ile de Cuba 1: 237 (type-species, *Odontostoma depressa* Orbigny, 1842, by subsequent designation H. B. Baker, 1923: 84), *non* Turton 1830 (Moll.), *nec* Agassiz 1846 (Moll.), *nec* Morch 1852 (Moll.).
- Odostoma** Orbigny. Gray, 1856. Proc. Zool. Soc. London, pt. 24, p. 99, error for *Odontostoma*.
- ***opalina** C. B. Adams, *Helix* 1845. Proc. Boston Soc. Nat. Hist. 2: 16 (W part of St. Mary's, Jamaica; lectotype, MCZ 247210, selected by Jacobson and Boss 1973: 395, pl. 78, figs. 11-12). NOTE: First described in *Helix* but later referred to *Proserpina* (Adams. 1851. Contributions to Conchology No. 9: 186). Not a *Proserpina* but a member of *Proserpinula* Albers, 1860, in the family Sagdidae. See also *discoidea* Adams.
- orbignyi** Ancy, *Cyane*. 1892. Le Naturaliste, ser. 2, no. 130, p. 178 (Santa Cruz de la Sierra, Bolivie; holotype, Brussels Mus., *teste* Dance 1966: 278).

- pisum** C. B. Adams, *Proserpina*. 1850. Contributions to Conchology No. 7: 108 (Jamaica; lectotype, MCZ 177263, selected by Jacobson and Boss, 1973: 404, pl. 71, figs. 10-11).
- planulata** C. B. Adams, *Proserpina nitida*. 1850. Contributions to Conchology, No. 9: 174 (Jamaica; lectotype, MCZ 276092 selected by Jacobson and Boss 1973: 405, pl. 85, figs. 3-4). NOTE: Synonym of *nitida* Sowerby.
- Procerpena** Gray. 1847. Proc. Zool. Soc. London, pt. 15, p. 182, cited as misprint for *Proserpina* Sowerby 1839.
- Proserpina** (*sic*) Pfeiffer, *Helix*. 1845. Zeitschrift für Malakozoologie 2: 84 (Jamaica; type, destroyed, *teste* Clench and Jacobson, 1971a: 101). NOTE: synonym of *Proserpina nitida* Sowerby 1839.
- Proserpina** Sowerby. 1839. Conchological Manual, 1st Ed., p. 124, fig. 274 (type-species, *Proserpina nitida* Sowerby 1839, by monotypy); Gray, 1840. Synopsis Contents British Museum, Ed. 42, p. 129, 153, *non Proserpinus* Hübner 1816 (Lepidoptera). NOTE: In the 2nd edition of the Manual (1842: 237) Sowerby credited Gray for having suggested the genus, but Gray first published the name in 1840 (Synopsis of the Contents of the British Museum, pp. 129, 153).
- Proserpinella** Bland. 1865. Ann. Lyc. Nat. Hist. New York 8: 157 (type-species, *Proserpinella berendti* Bland 1865, by monotypy).
- Proserpinella** Pilsbry 1949. Nautilus 63: 43, *non* Bland 1865, error for **Proserpinula** Albers 1860.
- ptychostoma** Pfeiffer, *Helicina*. 1848. Monographia Heliceorum Viventium 1: 12, footnote (Callajabas (*sic*), Cuba [Cayajabos, Pinar del Río]); holotype, destroyed, *teste* Clench and Jacobson (1971a: 101). NOTE: Synonym of *Proserpina depressa* (Orbigny, 1842).
- pulchra** C. B. Adams, *Proserpina*. 1850. Contributions to Conchology No. 5: 81 (Jamaica; lectotype, MCZ 275-999, selected by Jacobson and Boss 1973: 409, pl. 85, figs. 5-6). NOTE: Synonym of *Helicina linguifera* Jonas, 1839.



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- CLENCH, W. J. AND M. K. JACOBSON. 1971. Monograph of the Cuban genera *Emoda* and *Glyptemoda* (Mollusca: Archaeogastropoda: Helicinidae). Bull. Mus. Comp. Zool. 141 (3): 99-130, 7 pls.
- DALL, W. H. 1905. A new proserpinoid land shell from Brazil. Proc. Biol. Soc. Washington 18: 201-202.
- DANCE, S. P. 1966. Shell Collecting: An Illustrated History. Univ. Calif. Press, Berkeley, 344 pp., 35 pls.
- GRAY, J. E. 1856. On the position of the genus *Proserpina* in the system and a description of its dentition. Proc. Zool. Soc. London, pt. 24, pp. 99-102.
- JACOBSON, M. K. AND K. J. BOSS. 1973. The Jamaican land shells described by C. B. Adams. Occ. Papers Moll., Harvard Univ., 3 (47): 305-519, pls. 54-91.
- JOUSSEAUME, F. 1889. Voyage de M. Eugène Simon. Mollusques du Venezuela. Mém. Soc. Zool. France 2: 232-259, pl. 10.
- KEEN, M. 1960. Helicinacea. [in] R. C. Moore, ed. Treatise on Invert. Paleontology, Lawrence, Kansas: Univ. of Kansas Press. Mollusca, Vol. 1, pp. 285-288, figs. 186-187.
- KOBELT, W. 1879. Illustriertes Conchylienbuch. Nürnberg, Vol. 2, pt. 7-8, pp. 177-264, pls. 61-80.
- SANDBERGER, C. L. F. 1870-1875. Die Land und Süßwasser-Conchylien der Vorwelt. Wiesbaden, 1000 pp., 36 pls.
- SOWERBY, G. B. II. 1839. A conchological manual, London, 130 pp. 488 figs.
- SYKES, E. K. 1900. On *Despoena cinnamomea*, n. sp. and type of a new subgenus, *Chersodespoena*, with notes on some allied forms. Proc. Malac. Soc. London 4: 136-138.
- WENZ, W. 1938. Helicinidae [in] Handbuch der Palaeozoologie, Gastropoda, Berlin, vol. 6, pt. 1, pp. 435-448, figs. 1071-1118.

UNIQUE PURPLE SHELL OF THE
PAPER NAUTILUS
(*ARGONAUTA ARGO* LINNAEUS)

BY RICHARD I. JOHNSON

On October 7, 1873, Dr. Augustine Shurtleff wrote the Museum of Comparative Zoology, offering for sale the collection of shells made by his late father, Dr. Samuel A. Shurtleff, who, before his death, was an active member of the Boston Society of Natural History.

“My late father left a very large and complete cabinet of shells. In the year 1840 it was one of the most extensive collections in New England.”

J. G. Anthony, then in charge of conchology, but in ill health, turned the correspondence over to his young assistant, Charles E. Hamlin, who wrote on November 15:

“Mr. Anthony’s long experience makes his opinion of the money value of your collection worth knowing, while mine is not. He has said to me, and would probably not object to my repeating to you, that he regards from \$800 to \$1000 as a fair valuation of your shells. They doubtless cost your Father more, but as you are aware all such collections are disposed of at a cruel sacrifice, if put to sale. The dispersion of private cabinets and libraries after the death of their gatherers is one of the saddest things in the world.”

In a further letter, December 9, 1873, Hamlin wrote: “With regard to the purple Paper Nautilus, Messrs. Anthony, Jenks and myself conversed about it last week. Mr. A., who is familiar with all the tricks of dealers, pronounced the color to be artificial — the result of some dying process adopted to make it a rare specimen. As he is a very *positive* man he will probably adhere to his notion. But from your account of the shell it seems to me its color is probably genuine. The species is doubtless *Argonauta argo*, ordinarily white, as you are aware, but in this case colored by reason of some unusual conditions of its life or habitat.”

The collection was not purchased. Anthony died in 1877 and Hamlin, who was more interested in paleontology, did not pursue its acquisition.

In 1922, William F. Clapp, then Curator of Mollusks, was requested by Francis Shurtleff to remove a shell collection from his home in Cambridgeport. To help him pack the collection Clapp enlisted the aid of a young enthusiast, William J. Clench, who recalls that they were told that the purple Paper Nautilus had cost \$1000.00 and that the collection had not been made by the donor. (While S. Shurtleff probably paid a high price for the shell, after two generations of non conchologists, Anthony's maximum value of the collection must have remained in their minds as the price of the single specimen.) It contained little else of scientific interest save a paratype of *Unio shurtleffianus* Lea (MCZ 175566). Clapp, unaware of the provenance of the collection, merely accessioned it as the Shurtleff collection. Upon examining the Nautilus (MCZ 293002), now more pink than purple, Clench noticed that it was covered with a number of very small pink barnacles. Without knowing it, he had confirmed what old Anthony had known, though almost blind when he had declared it: the purple Paper Nautilus is a fake.

ACKNOWLEDGEMENTS

Thanks are due to Ms. Ann Blum, Archivist of the Museum of Comparative Zoology, who enthusiastically made available correspondence, and to Dr. William J. Clench, Curator Emeritus, my mentor of old, who kindly recalled his memory.



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When he was scarcely 5 years old, Felipe and his family moved to France and settled in Pau in the lower Pyrenees. Here he received his primary education. When his father died, his mother moved back to Havana, leaving her son in a boarding school in Pau for 3 more years. Here he contracted what seems to have been polio and he was left for the rest of his life with a paralyzed right side. Chardon (1949:239) wrote that he had “una imperfección física en una pierna” but it was apparently much more serious. Charles Wright, the American botanist and collector, met Poey, and on July 24, 1865 wrote in a letter to Asa Gray at Harvard as follows: “Poey [is] a jolly old soul who takes short strolls where the walking is smooth, swinging about his semi-paralytic arm and leg. His right side is partially paralytic. He writes with his left hand and straight down the page like the Chinese, or he turns the paper side-wise to him — the lines running up and down.” As a result of this life-long infirmity, Poey spent very little time in the field. Almost all the new species of mollusks he described were brought to him by colleagues whom he mentions in the descriptions. Friends also probably secured for him the insects, birds, and fishes he worked with. Many of his fishes were given him by the fishermen of Cojímar and Boquete de La Habana who provided him with specimens for more than 35 years.¹ In 1884, when the great American ichthyologist David Starr Jordan was in Havana, he found that when he visited the Calle San Nicolás near the embarcadero to look over the catch of the fishermen, the words “‘amigo de Don Felipe’ were a passport to friendly help” (Jordan 1884: 547). The slogan of these fishermen was ‘Para todo pez nuevo, busca a Don Felipe’ (with every new fish, go looking for Don Felipe). With this sort of help

¹Although Poey did very little collecting, he did visit fishing ports often to study and draw fresh specimens. According to Carlos de la Torre, Poey made his outlines placing the specimens over a piece of paper to obtain exact reproductions. This is why some of his original drawings, like those of some sharks, are huge (Canet, *pers. com.*)



Plate 14

FELIPE POEY Y ALOY

1799-1891

he turned out the greatest work on Cuban fishes ever written and one of the outstanding ichthyological treatises.

In the lovely region around Pau the crippled little boy, separated by his ailment from his companions, developed his deep love for nature. However, his mother used to insist that this interest was innate and that even as an infant he spent an entire hour on his belly watching the activities of a colony of ants (Sánchez Roig 1955: 50).

Back in Havana, he attended the Royal Seminaries of San Carlos and San Ambrosio, the most prestigious preparatory schools of Havana. He studied philosophy under Félix Varela and the law under Justo Vélez, and both his theses dealing with philosophy and law, as well as a paper on economics, were published before he graduated.

He received his degree as bachelor of laws in 1820 and in the same year became a member of the Sociedad Patriótica (later the Amigos del País), a learned society of Cubans interested in the cultural, economic and social development of the island. At the same time he began to make collections of plants, animals, while also contributing articles to "El Observador Habanero," a periodical devoted to politics, the sciences, and literature.

To please his mother he went to Madrid to complete his studies in law and received his degree with honors as doctor of laws at the Universidad Central de Madrid in 1822. For a while he taught law in the Nacional Academia de Ambas Jurisprudencias in Madrid. His lectures were popular because of his easy flow of language and his passionate devotion to liberty. He had to leave Spain because he opposed the oppressive regime of Fernando VII, and he returned to Cuba in 1823. While in Spain he visited the archives, searching for manuscripts dealing with the discovery, conquest, and colonization of America. His intellectual interests were always varied.

Once again in Cuba he supported himself by teaching in the colegios of San Cristóbal, Carraguao, and San Francisco de Asís. He never showed any interest in engaging in the actual practice of law.



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In 1840 he published textbooks on mineralogy and geography and collaborated in the *Repertorio Médico Habanero*, a monthly review founded by Nicolás José Gutiérrez and others. In this year he also met Juan Gundlach, the gentle and devoted cubanized German with whom he formed a lifelong friendship. Some of the few collecting expeditions in which Poey participated were undertaken with his young disciple Carlos de la Torre. They visited Cárdenas in Matanzas, the Isle of Pines, and Rangel and San Diego de los Baños in Pinar del Río. In 1833 he collected butterflies in Banes, in Oriente (Sánchez Roig 1955: 50).

In 1842 Poey began his long association with the University of Havana which lasted until his death in 1891.¹ It is sufficient merely to list his activities there to show how greatly he influenced the transformation of that ancient institution. In 1842 he introduced the studies of Zoology and Comparative Anatomy, writing the text books and contributing many articles on his investigations to various periodicals. Through his long teaching career, he instructed in diverse disciplines in the natural sciences, including zoology, botany, mineralogy, geology and paleontology. In 1873, he became the Dean of the Faculties of Philosophy, Letters, and Sciences, but in 1880, he retained only the post of Dean of Sciences. In his last years in the University, he taught Vertebrate Zoology and the Zoography of the Vertebrates.

While he was occupying his various positions at the University, he compiled, between the years 1851 and 1861, his *Memorias Sobre la Historia Natural de la Isla de Cuba* in two volumes with many illustrations (see Norman, 1938). His chief contributions to our knowledge of Cuban land shells appear in this work. Of the articles which are part of the *Memorias*, 16 dealt exclusively with mollusks, mainly the descriptions of new species. The degree of enthusiasm with which Poey pursued many of his multiple interests, and the literary skill he utilized, can be seen in

¹His very appointment as professor of zoology was, as Sánchez Roig (1955: 36) writes, an "excepción única," because his only degree was a Ph.D. in law.

his account of his trip to Rangel [he had arrived at the end of the arid season and the ground was still quite dry]: “Here I was, on the seventh day after my arrival, spending much time vainly trying to conjure the fleeting clouds to give up their moisture, when at 2 in the afternoon — it began to rain. Don’t get excited, worthy reader, it was not one of your stupendous downpours. I repeat, it merely began to rain, but enough rain fell to lure the living mollusks out, to refresh them in their hiding places, to let them know of the presence of the malacozoologist Poey who had arrived to do them the honor of letting the whole world know of their existence so that later they could say with pride, ‘So we are worth something after all.’”

Another example of Poey’s persevering powers of observation and of the lively style in which parts of the *Memorias* are written is seen in his account of the behavior of *Megalomastoma* (= *Farcimen*), an example of the proverbial snail and its pace (Mem. 1: 401): “It is not an easy matter to observe these animals moving about, since they show such a tremendous amount of laziness and torpor when the time comes to be active. After newly collected living specimens are placed in a humid environment [on a table], and when one of them gets ready to take a walk, he begins by extending his foot very very slowly, taking long resting periods in between. When his head is finally free of the shell, as much as an entire hour can go by without any more movement. It sits there, tentacles drooping, as though dead. Finally there is a slow movement, the heavy shell falls to one side and then plunges to the floor, its weight dragging the owner along, ‘owner’ of course only in a literary sense since shell and animal are one.”

Poey’s greatest work is his *Ictiología Cubana*. The text, in French, was completed in 1877 and the Atlas in ten large folio volumes plus a supplement, in 1878. The atlas consists of 1040 plates with 1300 figures in color and natural size (except sharks) illustrating 758 species of Cuban fishes, all executed magnificently by Poey himself. (Though Poey showed himself to be a superb artist and draftsman in his illustrations of fishes, insects, and other creatures, the gen-

erally simple shape of some land shells offered little challenge to him and they are sometimes less successful than his other drawings.) The manuscript won prizes at the Amsterdam Fair in 1883 and gained the author two coveted foreign titles of honor.¹ Although the British Museum and the Smithsonian Institution both bid high prices for the work, Poey preferred to sell it at a much lower price to the Spanish government, and it remains largely unpublished in the library of the Museum of Natural History in Madrid to this day. In the 1930's, the government of President Machado in Havana set aside \$10,000 to arrange for its publication, and although two prominent naturalists, Dr. Carlos de la Torre and Felipe García Cañizares, worked to prepare it for publication, this was prevented, as Alvarez (1958: 232) writes, by "crisis económicas sucesivas." In 1955, under the editorship of Mario Sánchez Roig and Federico Gómez de la Maza, a first volume in Spanish of 372 pages appeared in Havana, containing an introduction and part of the text. Apparently this work was not continued and the superb illustrations have never appeared in print as of this date. Further efforts are planned to print Poey's *Ictiología* (Duarte Bello, 1962).

Another important work connected with Poey was the *Repertorio Físico Natural de la Isla de Cuba* (see Norman, 1938), a compilation of articles on various fields of natural history which he conducted from 1865 to 1868. Here contributions by most of the well-known Cuban scientists appeared, among them Juan Gundlach, F. Sauvalle, Manuel J. Presas, Nicolás José Gutiérrez, Rafael Arango, Fernández de Castro and many others. In the *Repertorio* Poey published his anthropological article on the deliberately deformed cranium of a Caribe Indian. This study displayed his interest in anthropology and on October 7, 1877, Poey helped found the Sociedad Antropología de Cuba.

Poey was instrumental in founding other Cuban societies of learning. On April 8, 1861 he was one of the founders

¹King William III conferred on him the decoration of the order of the "Lion Néerlandais" and the King of Spain distinguished him with the title "Encomendador de la Order de Isabel la Católica."



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the series of publications of the Academy is named *Poeyana* in honor of the famous man.

Among the foreign titles which Poey enjoyed were the following: a co-founder of the Entomological Society of France, corresponding member of the Royal Zoological Society of London, The Smithsonian Institution of Washington, the Academy of Natural Sciences and the Entomological Society in Philadelphia, the Lyceum of Natural History of New York, and the Essex Institute in New England. He was an honorary member of other groups like the Natural History Society of Berlin and Natural History Society of Buffalo.

In an effulgent fashion, the Cuban writers (Dihigo, 1915; Jaume, 1955; Mestre, 1891; Montané, 1918; Torre, 1942) shower reams of almost hysterical praise upon Poey. At times the reader has to struggle through many pages of dithyrambic prose before he can garner a single sober fact. Nevertheless, it must be admitted that this talented and industrious man added much to the intellectual life of his country. He contributed significantly to the knowledge of Cuba's bewilderingly rich fauna and he deserves to be better known.

NOTE TO THE CATALOGUE

Poey frequently included taxa ostensibly introduced by other authors into articles authored by himself. In such cases, he adopted one of two different procedures: he either added the abbreviation "mss." plus the author's name to the taxon or he printed the author's name alone. It is easy to assume that when Poey used "mss." he used the manuscript name alone and that the description itself was written by Poey. Such a taxon should be credited to him. On the other hand, when he used the author's name without "mss." it may be assumed that he merely copied the description of that author and that thus the name should be credited to the author. We have no way of knowing whether Poey really had this in mind, or, if he did, whether he consistently followed this practice.

Unfortunately these two assumptions are not always valid. In some cases, e.g. *Cyclostoma deficiens* Gundlach 1858, Poey added "mss." to the taxon in the *Memorias*. But Gundlach actually had introduced the taxon together with a complete description (which Poey later copied) in an article authored by himself in 1857 (Malak. Blätt. 4: 42). In this case we can only assume that Gundlach sent Poey a description in the manuscript which he (Gundlach) later had published without informing Poey of this fact. This shows that Poey's use of "mss." was not always consistent with our two earlier assumptions.

In spite of this we have assigned all names with the rubric "mss." to Poey unless we found that, as in the case immediately above, the name and the description belong to another author, in which case we have made suitable adjustments. In the other instances where "mss." was omitted, we have, for the sake of completeness, included such names, adding the rubric "[in] Poey" unless the name has been previously published. We have checked both subsequent references for all species as well as the extensively documented summary of the Cuban molluscan fauna by Arango (1878-1880).

For the dates of the pages and plates of the *Memorias* and *Repertorio*, in which Poey described nearly all his species of mollusks, we have relied on Norman (1938).

Dr. R. D. Turner, Dr. I. F. Canet and Mr. R. I. Johnson reviewed the manuscript and made many useful suggestions.

BIBLIOGRAPHY TO BIOGRAPHICAL REMARKS ON POEY

- ALVAREZ, C. J. 1958. Historia de la Zoología en Cuba. Havana, 15 + 369 pp., illustrated.
- ARANGO, R. 1878-1880. Contribución a la Fauna Malacológica Cubana. Havana. 280 pp. (+ 35, index and errata).
- CHARDON, C. E. 1947. Longevity and casualties among naturalists in tropical America. *Scientific Monthly* 64 (3): 198-207.
- . 1949. Los naturalistas en la América Latina. 7 + 386 pp., 26 pls. Ciudad Trujillo (Santo Domingo), República Dominicana.
- DIHIGO, J. M. 1915. Poey en su aspecto literario y lingüístico. *Mem. Soc. Cubana Hist. Nat.* 1: 111-131.

- DUARTE BELLO, P. P. 1962. Ictiología Cubana (from the unpublished MS of Felipe Poey). Com. Nacional, Acad. Ciencias, República de Cuba, Inst. de Biología, Dept. de Biología Marina, 6 pp., 1 picture of Poey; 1 p. note by Bello and 2 pp. prologue by Antonio N. Jiménez, Havana.
- GUNDLACH, J. 1857. Malakologische Notizen aus dem Norden und Westen von Cuba. Malak. Blätt. 4: 41-47.
- JAUME, M. L. 1955. Poey, padre espiritual de los naturalistas cubanos. Mem. Soc. Cubana Hist. Nat. 22 (2): 93-96.
- JORDAN, D. S. 1884. Sketch of Professor Felipe Poey. Popular Science Monthly 25: 547-552.
- . 1922. The Days of Man. 2 vols. World Book Co., Yonkers, N. Y. 28 + 703 pp.; 18 + 906 pp., illustrated.
- MESTRE, A. 1891. Elogio de F. Poey. Revista Cubana 13: 1-16.
- MONTANÉ, L. 1918. Alrededor de la psicología de Poey. Mem. Soc. Cubana Hist. Nat. 3: 21-29.
- NORMAN, J. R. 1938. Notes on the dates etc. of the 'Memorias', 'Repertorio', 'Synopsis' and 'Enumeratorio' of Felipe Poey. Jour. Soc. Bibliog. Nat. Hist. 1: 135-137.
- SÁNCHEZ ROIG, M. (assisted by F. Gómez de la Maza). 1955. La monumental obra de don Felipe Poey y Aloy, Ictiología Cubana, vol. 1, Havana, 372 pp., illustrated.
- TORRE, C. DE LA. 1942. Don Felipe Poey. Figuras Cubanas de la Investigación Científica. Publ. Ateneo de la Habana 2: 313-345.

CATALOGUE OF MALACOLOGICAL TAXA
INTRODUCED BY POEY AND
THEIR LATEST REPLACEMENT

- abdita* Poey, *Subulina* 1858. Mem. 2: 29, pl. 2, figs. 15-16 (Almendares, prope Habanam); *Leptinaria striosa* var. *abdita* (Poey), teste Pilsbry 1906: 297.
- acuminata* (Velasquez MS) Poey, *Helicina* 1851 (pl. 5). Mem. 1: 112, 119, pl. 5, figs. 13-14 (San Diego [de los Baños, Pinar del Río]); *Ustronia acuminata* (Poey), teste Clench & Jacobson 1971b: 415, type-locality there restricted, Viñales, Pinar del Río.
- adamsiana* Poey, *Cylindrella* 1854. Mem. 1: 448 (Cuba), non Pfeiffer 1851. renamed *gundlachiana* (q.v.); *Brachypodella* (*Gyraxis*) *gundlachiana* (Poey), teste Pilsbry 1904: 60, pl. 62, figs. 24, 25; pl. 64, fig. 8.



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- blainiana** Poey, *Achatina* 1852 (pl. 12). Mem. 1: 206, 212, pl. 12, figs. 4-6 (en la loma de Rangel [Pinar del Río]); *Liguus blainianus* (Poey), *teste* Pilsbry 1899: 174-5.
- briarea** Poey, *Helicina* 1852 (pl. 11). Mem. 1: 108, 119, pl. 11, figs. 9-12 (San Diego de los Baños [Pinar del Río] (*sic*); lectotype MCZ 73854, Clench & Jacobson, 1971a: 116; type-locality, Trinidad mountains, Las Villas); *Emoda briarea* (Poey). Note: The original type-locality was in error; the species is found only in Las Villas Province (Clench & Jacobson, 1971a: 116-7).
- callosa** Poey, *Helicina* 1854. Mem. 1: 430, pl. 33, figs. 13-14 (en la Isla de Pinos); *Troschelviana (Microviana) callosa* (Poey), *teste* Clench & Jacobson 1971b: 441.
- chrysochasma** Poey, *Helicina* 1853 (pl. 25). Mem. 1: pl. 25, figs. 17-19 [figure only]; 1858. 2: 26 [description]; (Rangel [Pinar del Río]); *Troschelviana (Troschelviana) chrysochasma* (Poey), *teste* Clench & Jacobson 1971b: 419.
- ciliata** Poey, *Helicina* 1852 (pl. 11). Mem. 1: 109, 119, pl. 11, figs. 5-8 (Trinidad [Las Villas]); *Emoda ciliata* (Poey), *teste* Clench & Jacobson 1971a: 110.
- claudicans** Poey, *Cyclostoma* 1851 (pl. 7). Mem. 1: 100, 106, 444-446, pl. 7, figs. 8-11 (in insula Pinorum); *Chondrothyrella (Plicathyrella) claudicans claudicans* (Poey), *teste* Torre & Bartsch 1938: 311.
- coerulans** Poey, *Cylindrella* 1858. Mem. 2: 9, 37, pl. 1, fig. 14 (Guane, de rupibus elevatis pendens [Pinar del Río]); *Gongylostoma (Poeciloptis) coerulans* (Poey), *teste* Pilsbry 1903: 253; 1941: 70.
- collare** (Poey MS) Torre, Bartsch & Morrison, *Farcimen seminudum* 1942: 18, pl. 4, figs. 7-9, La Cantarilla, San Juan de las Yeras, Santa Clara Province [Las Villas]; USNM 535909.
- comes** Poey, *Helix* 1858. Mem. 2: 29 (Insula Pinorum); *Cepolis (Cysticopsis) comes* (Poey), *teste* Pilsbry 1894: 187.
- confertum** Poey, *Cyclostoma* 1851 (pl. 8). Mem. 1: 99, 106, pl. 8, figs. 1-3 (no locality); synonym of *Chondropoma*

(*Chondropomorus*) *canescens* (Pfeiffer 1851), *teste* Torre & Bartsch 1938: 367.

contractus Poey, *Bulimus* 1853. Mem. 1: 205, 212, pl. 26, figs. 19-21 (San Diego de los Baños [Pinar del Río]); synonym of *Opeas micra* (Orbigny 1835), *teste* Pilsbry 1906: 193-5.

coronadoi (Arango MS) Poey, *Cyclostoma* 1867. Rep. 2: 174 (Jaruco, en las isla Cuba); *Annularia* (*Annularops*) *coronadoi coronadoi* ([Arango] Poey), *teste* Torre & Bartsch 1941: 296.

coronatum (Poey MS) [*in*] Pfeiffer, *Ctenopoma* 1856. Malak. Blätt. 3: 59 (Cuba); [*in*] Pfeiffer 1856, Nov. Conch. 1: 96, pl. 26, figs. 17-19; 1858 (as *Cyclostoma*), Mem. 2: 24, pl. 1, figs. 11-12 (Managua, in terris Cl. Franc. Calderon; super rupes sylvarum umbrosas [Habana]); *Rhytidopoma coronatum* (Poey [*in*] Pfeiffer), *teste* Torre & Bartsch 1941: 151.

decurrens Poey, *Cyclostoma* 1858. Mem. 2: 23 (no locality, subsequently given as Dubroc, immediately south of Punta Sabanilla, Matanzas, by Torre & Bartsch 1938: 352, pl. 31, fig. 11); *Chondropoma* (*Chondropoma*) *moestum decurrens* (Poey), *teste* Torre & Bartsch 1938: 352.

denegatum Poey, *Cyclostoma* 1858. Mem. 2: 2, 23 (Matanzas, Cárdenas); synonym of *Rhytidopoma clathratum clathratum* (Gould 1842), *teste* Torre & Bartsch 1941: 161.

dilatata Poey, *Helicina* 1858. Mem. 2: 26 (Trinidad [Las Villas]); synonym of *Troschelviana* (*Microviana*) *petitiana* (Orbigny 1842), *teste* Clench & Jacobson 1971b: 434.

discors Poey, *Cylindrella* 1858. Mem. 2: 9, 38. (Sierra de Guane [Pinar del Río]); *Gongylostoma* (*Poecilocoptis*) *discors* (Poey), *teste* Pilsbry 1903: 250; 1941: 70.

dissimulans Poey, *Helicina* 1858. Mem. 2: 35, pl. 4, figs. 8-9 [8-10] (Guane, in montibus [Pinar del Río]); *Alcadia* (*Penisoltia*) *dissimulans* (Poey), *teste* Boss & Jacobson 1973: 334.

- elliotti** Poey, *Cylindrella* 1858. Mem. 2: 9, 37, pl. 5, figs. 1-4 (Guane [Pinar del Río]), *Gongylostoma* (*Callonia*) *elliotti* (Poey), *teste* Pilsbry 1903: 200.
- elongata** (Poey MS) [*in*] Pfeiffer, *Truncatella* 1856. Monographia Auriculaceorum Viventium 1: 193 (in provincia orientali insulae Cubae); Poey 1858, Mem. 2: 25, pl. 2, figs. 23-24 (Holguín [Oriente]); *Geomelania* (*Merrilliana*) *elongata* (Pfeiffer), *teste* Clench & Turner 1948: 182.
- exacuta** Poey, *Helicina* 1851 (pl. 5). Mem. 1: 114, 120, pl. 5, figs. 7-9 (en las lomas de Cayajabos [Pinar del Río]); synonym of *Troschelviana* (*Cubaviana*) *pyramidalis* (Sowerby 1842), *teste* Clench & Jacobson 1971b: 424.
- fabreana** (Poey MS) Pfeiffer, *Cylindrella* 1860. Malak. Blätt. 6 (for 1859): 96, footnote (Seborucal de San Antonio [Havana]); Poey, 1861. Mem. 2: 405 (name only): *Gongylostoma* (*Esochara*) *fabreana* ('Poey' Pfeiffer), *teste* Pilsbry 1903: 190.
- fossulata** Poey, *Helicina* 1858. Mem. 2: 25 (Trinidad [Las Villas]); *Emoda ciliata* (Poey), *teste* Clench & Jacobson 1971a: 110.
- francisca** Poey, *Limnaea* [*sic*] 1858. Mem. 2: 9, 32 (Güines [Havana]); synonym of *Lymnaea columella* (Say), *teste* Hubendick 1951: 188.
- fuscolabiata** Poey, *Helix* 1858. Mem. 2: 7, 29, new name for *H. subfusca* Poey (1853) (*q.v.*), *non* (Beck MS) Pfeiffer 1848; *Cepolis* (*Hemitrochus*) *fuscolabiata* (Poey), *teste* Pilsbry 1894: 184.
- gigas** Poey, *Stenogyra* 1854. Mem. 1: 395 (name only); 1858. 2: 8 (listed as a synonym of *S. maximus* (Poey), *nomen nudum*).
- gonostoma** (Gundlach MS) Poey, *Helicina* 1858. Mem. 2: 87 (San Juan de Letran, prope Trinidad [Las Villas]); *Alcadia* (*Penisoltia*) *gonostoma* (Poey), *teste* Boss & Jacobson 1973: 336, pl. 5, figs. 1-3.
- gouldianum** Poey, *Cyclostoma* 1854. Mem. 1: 419 (Matanzas), 1858. 2: 43-44; *Chondropoma* (*Chondropoma*) *pictum gouldianum* (Poey), Torre & Bartsch 1938: 337.



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- incrustata** Poey, *Helix* 1852 (pl. 12). Mem. 1: 208, 212, pl. 12, figs. 11-16 (Puentes Grandes y . . . Santa Cruz de los Pinos [Havana]); *Thysanophora incrustata* (Poey), *teste* Pilsbry 1894: 57-58; Aguayo & Jaume 1947: no. 86
- incultum** Poey, *Cyclostoma* 1851 (pl. 8). Mem. 1: 98, 106, pl. 8, figs. 4-5 (not 3) (en las montañas de Trinidad [Las Villas]); *Troschelvindex* (*T.*) *inculta* (Poey), *teste* Torre & Bartsch 1941: 331.
- infanda** (Shuttleworth MS) Poey, *Pupa* 1858. Mem. 2: 29, 60 (no locality) (Punta Gorda hasta Punta de Guanós, en Matanzas [Arango 1879: 100]); *Cerion infanda* (Poey), *teste* Clench 1957: 149.
- johannis** Poey, *Polygyra* 1858. Mem. 2: 6 (name only); 2: 36 (as *Helix*), pl. 4, figs. 15-17 (Guane . . . la catalina prope Guane [Pinar del Río]); *non* Mortillet 1853, renamed *poeyi* by Aguayo & Jaume 1947: no. 5; *Polygyra* (*Daedalochila*) *poeyi*, *teste* Aguayo & Jaume 1947: no. 5.
- jugulata** Poey, *Helicina* 1858. Mem. 2: 34, pl. 4, figs. 3-4 (Guane [Pinar del Río]; lectotype, MCZ 73780, selected by Clench & Jacobson 1971b: 422); *Troschelviana* (*T.*) *jugulata* (Poey), *teste* Clench & Jacobson 1971b: 422.
- juliana** Poey, *Helix* 1853. Mem. 1: 208, 212, pl. 25, figs. 13-16 (Cabo Cruz, donde termina la Sierra-Maestra [Oriente]); synonym of *Cepolis* (*Coryda*) *dennisoni* (Pfeiffer, 1853), *teste* Pilsbry 1894: 181.
- laetum** (Gutierrez MS) Poey, *Cyclostoma* 1858. Mem. 2: 33, pl. 4, fig. 1 (Jibara (Gibara) [Oriente]); *Chondropoma* (*Ch.*) *laetum* (Poey), *teste* Torre and Bartsch 1938: 359.
- lembeyana** Poey, *Helicina* 1854. Mem. 1: 420, pl. 33, figs. 20-24 (no locality); *Helicina lembeyana* Poey, *teste* Arango 1879: 55 who added the locality, Punta de San Juan de los Perros.
- lepida** Poey, *Helix* 1853. Mem. 1: 209, 212, pl. 26, figs. 6-10 (en la costa del Sud), *non* Reuss 1849; synonym of

Hemitrochus lucipeta (Poey 1854), *teste* Pilsbry 1889: 32.

lirata Poey, *Truncatella* 1858. Mem. 2: 25, 89 (Jibara [Gibara] prope Holguín [Oriente]; cotypes MCZ 181277 and 158267); *Geomelania* (*Merrilliana*) *lirata* (Poey), *teste* Clench & Turner 1948: 182.

lucida Poey, *Achatina* 1852 (pl. 12). Mem. 1: 207, 212, pl. 12, figs. 30-31 (en Matanzas, cerca del Río Canímar); synonym of *Opeas micra* (Orbigny 1835), *teste* Pilsbry 1906: 195.

lucipeta Poey, *Helix* 1854. Mem. 1: 447; 1858. 2: 51. New name for *picturata* Poey 1853, *non* C. B. Adams 1849; *Hemitrochus lucipeta* (Poey), *teste* Pilsbry 1889: 32.

luteoapicata Poey, *Helicina* 1854. Mem. 1: 394, 446. Invalid emendation of *H. luteopunctata* Poey 1851, synonym of *Troschelviana* (*Cubaviana*) *scopulorum* (Morelet 1849), *teste* Clench & Jacobson 1971b: 428.

luteopunctata Poey, *Helicina* 1851 (pl. 5). Mem. 1: 115, 120, pl. 5, figs. 10-12 (no locality), synonym of *Troschelviana* (*Cubaviana*) *scopulorum* (Morelet 1849), *teste* Clench & Jacobson 1971b: 428.

mactum Poey, *Cyclostoma* 1852. Mem. 1: 97, 393, 444; 1854. 2: 4 (no locality); *Annularia* (*Annularita*) *majuscula macta* (Poey) from Rangel, Pinar del Río, *teste* Torre & Bartsch 1941: 325.

macta Poey, *Succinea* 1858. Mem. 2: 61 (Cuzco, N. de la Paz y Morejón [Pinar del Río]); *Succinea macta* Poey, *teste* Aguayo & Jaume 1947: no. 84.

maculifera (Gutierrez MS) Poey, *Helix* 1858. Mem. 2: 28, pl. 2, figs. 1-5 (Santa Cruz . . . Puerto Príncipe [Camagüey]); *Cepolis* (*Hemitrochus*) *maculifera* (Poey), *teste* Pilsbry 1894: 185.

mani Poey, *Cyclostoma* 1851 (pl. 7). Mem. 1: 393, 404 (as *Megalomastoma*), pl. 7 (as *Cyclostoma*), figs. 19-22; pl. 13, figs. 23-24 (en la loma de Rangel, cerca de Santa Cruz [Pinar del Río]); *Farcimen* (*Farcimen*) *mani* (Poey), *teste* Torre *et al.* 1942: 30.

- marielinus** Poey, *Bulimus* 1852 (pl. 12). Mem. 1: 204, pl. 12, figs. 32-33 (Banes [Oriente]); synonym of *Drymaeus dominicus* (Reeve 1850), *teste* Pilsbry 1899: 3.
- maxima** Poey, *Stenogyra* 1854. Mem. 1: 422, pl. 34, figs. 9-11 (Cuba); *Obeliscus (Stenogyra) maximus* (Poey), *teste* Pilsbry 1906: 260.
- mayarina** Poey, *Helicina* 1854. Mem. 1: 417, pl. 34, figs. 6-8 (Mayari [Oriente]), *Emoda mayarina mayarina* (Poey), *teste* Clench & Jacobson 1971a: 117.
- modesta** Poey, *Cylindrella* 1858. Mem. 2: 9, 93 (Pan de Matanzas [Matanzas]); *Gongylostoma (Tetrentodon) camoensis* var. *modesta* (Poey), *teste* Pilsbry 1903: 275.
- neglecta** (Arango MS) Poey, *Vertigo* 1858. Mem. 2: 30, pl. 2, figs. 17-18 (prope Cárdenas [Matanzas]); synonym of *Vertigo ovata* Say 1822, *teste* Aguayo & Jaume 1950: no. 662.
- newcombiana** Poey, *Helix* 1858. Mem. 2: 7 (*nomen nudum*), 28 (in synonymy of *velasqueziana* Poey); synonym of *Hemitrochus lucipeta* (Poey 1854), *teste* Pilsbry 1889: 32.
- nigrata** Poey, *Melania* 1858. Mem. 2: 33 (San Juan de los Remedios . . . quoque in montibus Trinitariis [Las Villas]); *Pachychilus nigratus* (Poey), *teste* Aguayo & Jaume 1947: no. 41.
- nobilis** Poey, *Succinea* 1853. Mem. 1: 210, 213, pl. 26, figs. 25-26 (no locality); *Succinea nobilis* Poey, *teste* Aguayo & Jaume 1947: no. 85.
- nobilitatum** (Gundlach MS) Poey, *Cyclostoma* 1858. Mem. 2: 87, pl. 8, figs. 23-25 (Enramada, Santiago de Cuba), *Tudora (Ramsdenia) nobilitata nobilitata* (Poey), *teste* Torre and Bartsch 1941: 259.
- nodulatum** Poey, *Cyclostoma* 1851 (pl. 5). Mem. 1: 104, 106, pl. 5, figs. 21-23 (en la cueva de Cotilla [Matanzas]); *Rhytidopoma nodulatum nodulatum* (Poey), *teste* Torre & Bartsch 1941: 153.
- notata** Poey, *Helix* 1858. Mem. 2: 94, 434 (1861), new name for *H. johannis* Poey 1858, *non* Mortillet 1853; *Poly-*



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- pennicillata** Poey, *Helix* 1858. Mem. 2: 51, error for *penicillata* Poey.
- pfeifferianum** Poey, *Cyclostoma* 1854. Mem. 1: 419; 1858. 2: 44 (no locality); Guane, Pinar del Río (Arango 1879); *Chondropoma* (*Chondropoma*) *pfeifferianum pfeifferianum* (Poey), teste Torre and Bartsch 1938: 331.
- picturata** Poey, *Helix* 1853. Mem. 1: 209, 212, pl. 26, figs. 1-5 (de la costa del Sud) non C. B. Adams 1849; synonym of *Hemitrochus lucipeta* (Poey 1854), teste Pilsbry 1889: 32.
- Pineria** Poey 1854. Mem. 1: 428 (type-species, *Pineria beathiana* Poey 1854, subsequent designation Albers and von Martens 1861: 293 [Isle of Pines]).
- plicata** Poey, *Cylindrella* 1858. Mem. 2: 31, pl. 2, figs. 9-10 (no locality); Lomas de Candela, Guines, Habana; *Gongylostoma* (*Tetrentodon*) *plicata* (Poey), teste Pilsbry 1903: 277.
- politula** Poey, *Helicina* 1851 (pl. 5). Mem. 1: 113, 120, pl. 5, figs. 4-6 (la cordillera frente á Santa Cruz, en tiérras de D. Francisco Adolfo Sauville [Pinar del Río]); synonym of *Troschelviana* (*Cubaviana*) *pyramidalis* (Sowerby 1842), teste Clench & Jacobson, 1971b: 424.
- procax** Poey, *Cyclostoma* 1851 (pl. 7). Mem. 1: 104, 106, pl. 7, figs. 12-14 (Cuba), *Adamsiella* (*Cubadamsiella*) *procax* (Poey), teste Torre & Bartsch 1942: 243.
- procer** Poey, *Megalomastoma* 1854. Mem. 1: 393, 404, pl. 13, figs. 12-18 (as *Cyclostoma tortum* var.) *Farcimen* (*Farcimen*) *procer* (Poey), teste Torre et al. 1942: 38.
- rangelinum** Poey, *Cyclostoma* 1851 (pl. 8). Mem. 1: 98, 106, pl. 8, figs. 13-19 (Sierra de Rangel [Pinar del Río]); *Tudorina rangelina* (Poey), teste Torre & Bartsch 1941: 280.
- redfieldiana** (Poey MS) [*in*] Arango, *Helix* 1879: 74, *nomen nudum*.
- remota** Poey, *Helicina* 1858. Mem. 2: 87, pl. 8, fig. 26 (Guane, Montem Cubae occidentalem [Pinar del Río]); synonym of *Ustronia acuminata* (Poey), teste Clench & Jacobson 1971b: 415.

- retracta** Poey, *Helicina* 1852. Mem. 1: 116, 120, pl. 12, figs. 22-26 (Cayajabos [Pinar del Río]); synonym of *Alcacia* (*Idesa*) *rotunda* (Orbigny 1842), *teste* Boss & Jacobson 1973: 323.
- revictum** Poey, *Cyclostoma* 1854. Mem. 1: 393, error for *revinctum* Poey.
- revinctum** Poey, *Cyclostoma* 1851 (pl. 5). Mem. 1: 99, 106, pl. 5, figs. 24-27 (en la punta de San Juan de los Perros [Las Villas]); *Chondropoma* (*Chondropomorus*) *revinctum revinctum* (Poey), *teste* Torre & Bartsch 1938: 364.
- rotundatum** Poey, *Cyclostoma* 1854. Mem. 1: 419, pl. 34, figs. 19-21 (entre Santa Cruz y Bahía Honda [Pinar del Río]); *Tudora* (*Eutudorex*) *rotundata* (Poey), *teste* Torre and Bartsch 1941: 252.
- rubrocincta** Poey, *Helicina* 1854. Mem. 1: 417, pl. 33, figs. 16-19 (probablemente en el departamento oriental); synonym of *Emoda pulcherrima* (Lea 1834), *teste* Clench & Jacobson 1971a: 107.
- rufo-apicata** Poey, *Helix* 1858. Mem. 2: 29 (Jibara [Gibara, Oriente]); *Cepolis* (*Hemitrochus*) *rufoapicata* (Poey), *teste* Pilsbry 1894: 185.
- sagebieni** Poey, *Cyclostoma* 1858. Mem. 2: 33 (Guane [Pinar del Río]); *Chondropometes* (*Chondrothyroma*) *sagebieni sagebieni* (Poey), *teste* Torre & Bartsch 1938: 217.
- saxosa** Poey, *Cylindrella* 1858. Mem. 2: 31, 61, pl. 3, figs. 10-11 (Mons Rangelinus [Pinar del Río]); *Gongylostoma* (*Liocallonia*) *saxosa* (Poey), *teste* Pilsbry 1903: 206.
- scabrosa** Poey, *Helix* 1854. Mem. 1: 421, pl. 34, figs. 1-5; 1858. Mem. 2: 57, 67, pl. 6, fig. 13 (Trinidad [Las Villas]); *Zachrysia* (*Chrysius*) *scabrosa* (Poey), *teste* Pilsbry 1929: 586.
- sculpta** Poey, *Pulpa* [*sic*] 1858. Mem. 2: 30, pl. 2, fig. 22 (Cubana); northern coast of Pinar del Río; *Cerion sculpta* (Poey), *teste* Clench 1957: 163.

- seminudum** Poey, *Megalomastoma* 1854. Mem. 1: 393, 405 (en Trinidad [Las Villas]); *Farcimen* (*Farcimen*) *seminudum* (Poey), *teste* Torre *et al.* 1942: 17 ff. (pl. 4, figs. 22-24 illustrates the nominate subspecies).
- sepulcralis** Poey, *Bulimus* 1852 (pl. 12). Mem. 1: 203, 211, pl. 12, figs. 27-29 (Habana); *Bulimulus* (*Bulimulus*) *sepulcralis* (Poey), *teste* Aguayo & Jaume 1948: no. 427.
- shuttleworthiana** Poey, *Cylindrella* 1858. Mem. 2: 31, pl. 1, fig. 24 (Almirante . . . prope Managua [Havana]); *Gongylostoma* (*Pycnoptychia*) *shuttleworthiana* (Poey), *teste* Pilsbry 1903: 196.
- solenatum** Poey, *Cyclostoma* 1851. Mem. 1: pl. 7, figs. 17-18; 1861. Mem. 2: 435; synonym of *Farcimen* (*Farcimen*) *auriculatum auriculatum* (Orbigny), *teste* Torre *et al.* 1942: 25.
- stellata** (Velasquez MS) Poey, *Helicina* 1851 (pl. 5). Mem. 1: 117, 120, pl. 5, figs. 18-20 (en la Isla de Pinos, sobre la Sierra de Casas (*sic*), falda del sud); *Priotrochastella stellata* (Poey), *teste* Clench & Jacobson 1970: 70. Note: The actual habitat is the neighboring Sierra de Caballos (Clench & Jacobson, *ibid*).
- strangulata** Poey, *Cylindrella* 1858. Mem. 2: 31, pl. 1, figs. 20-22 (Güines, Loma de Candela [Havana]); *Gongylostoma* (*Esochara*) *strangulata* (Poey), *teste* Pilsbry 1903: 189.
- strictus** Poey, *Bulimus* 1853. Mem. 1: 205, 212, pl. 26, figs. 16-18 (no locality) (Manzanilla, Bayamo, Cabo Cruz . . . Isla de Pinos [Arango 1879: 91]); *Obeliscus* (*Stenogyra*) *strictus* (Poey), *teste* Aguayo & Jaume 1950: no. 10.
- subdepressa** Poey, *Helicina* 1854. Mem. 1: 420, pl. 34, figs. 22-26 (Cojimar [Havana]); *Helicina subglobulosa subdepressa* Poey, *teste* Wagner 1907-1911: 332.
- subfusca** Poey, *Helix* 1853. Mem. 1: 210, 213, pl. 26, figs. 11-15 (en la costa del Sud), *non* (Beck MS) Pfeiffer 1848, renamed *fuscolabiata* (*q.v.*); *Cepolis* (*Hemitrochus*) *fuscolabiata* (Poey), *teste* Pilsbry 1894: 184.



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- ungula Poey, *Megalomastoma* 1858. Mem. 2: 24, pl. 3, figs. 1-4 (Santiago de Cuba), *Farcimen (Farcimen) ungula ungula* (Poey), teste Torre et al. 1942: 9.
- velasqueziana Poey, *Helix* 1858. Mem. 2: 28, pl. 1, figs. 1-5 (Santiago de Cuba); *Hemitrochus lucipeta* var. *velasqueziana* (Poey), teste Pilsbry 1889: 32.
- velutina Poey, *Helicina* 1858. Mem. 2: 35, pl. 4, figs. 6-7 [5-7] (Guane [Pinar del Río]); *Alcadia (Penisoltia) velutina* (Poey), teste Boss & Jacobson 1973: 337.
- venusta Poey, *Pupa* 1858. Mem. 2: 30 (Cuba); *Cerion venusta* (Poey), teste Clench 1957: 167.
- verecundum Poey, *Cyclostoma* 1851 (pl. 7). Mem. 1: 102, 106, pl. 7, figs. 5-7 (San Diego de los Baños [Pinar del Río]); synonym of *Chondrothyretes shuttleworthi* (Pfeiffer 1851), teste Torre & Bartsch 1938: 273.

BIBLIOGRAPHY TO CATALOGUE OF MALACOLOGICAL TAXA
INTRODUCED BY POEY

- AGUAYO, C. G. 1935. Espicilegio de moluscos Cubanos. Mem. Soc. Cubana Historia Natural 9 (2): 107-128, pl. 9.
- 1946. *Gundlachia* y *Hebetancylus* en Cuba. Rev. Soc. Malac. "Carlos de la Torre" 4 (2): 55-62.
- AGUAYO, C. G. AND M. L. JAUME. 1947. Nuevos Gasteropodos de Cuba. Rev. Soc. Malac. "Carlos de la Torre" 5 (2): 53-58, 3 figs.
- . 1947-1951. Catálogo Moluscos de Cuba, Nos. 1-725 (mimeographed).
- ALBERS, J. C. AND E. VON MARTENS. 1861. Die Heliceen. Leipzig, 359 pp.
- ARANGO, R. 1878-1880. Contribución a la Fauna Malacológica Cubana. Havana. 280 pp. (+ 35, index and errata).
- BOSS, K. J. AND M. K. JACOBSON. 1973. Monograph of the genus *Alcadia* in Cuba (Mollusca: Prosobranchia: Helicinidae). Bull. Mus. Comp. Zool. 147 (7): 311-358, 6 pls.
- CLENCH, W. J. 1957. A catalogue of the Cerionidae (Mollusca-Pulmonata). Bull. Mus. Comp. Zool. 116: 121-169.
- CLENCH, W. J. AND C. G. AGUAYO. 1951. The Cuban genus *Jeaneretia*. Rev. Soc. Mal. "Carlos de la Torre" 7 (3): 81-92, pls. 13-14.
- CLENCH, W. J. AND M. K. JACOBSON. 1968. Monograph of the Cuban genus *Viana* (Mollusca: Archaeogastropoda: Helicinidae). Breviora No. 298: 1-25, 4 pls., 5 maps.

- . 1970. The genus *Priotrochatella* (Mollusca: Helicini-
dae) of the Isle of Pines and Jamaica, West Indies. *Occ. Papers*
Moll., Harvard Univ. 3 (39): 61–80, pls. 17–21.
- . 1971a. Monograph of the Cuban genera *Emoda* and
Glyptemoda (Mollusca: Archaeogastropoda: Helicinidae). *Bull.*
Mus. Comp. Zool. 141 (3): 99–130, 7 pls.
- . 1971b. A monograph of the genera *Calidviana*,
Ustronia, *Troschelviana* and *Semitrochatella* (Mollusca: Arch-
aeogastropoda: Helicinidae) in Cuba. *Bull. Mus. Comp. Zool.*
141 (7): 403–463, 8 pls., 2 figs.
- CLENCH, W. J. AND R. D. TURNER. 1948. A catalogue of the family
Truncatellidae with notes and descriptions of new species. *Occ.*
Papers Moll., Harvard Univ. 1 (13): 157–212, pls. 22–25.
- FREIRE, J. A. AND P. ALAYO. 1946. Excursiones a casa azul. *Rev.*
de la Soc. Malac. "Carlos de la Torre" 4 (2): 65–69.
- HUBENDICK, B. 1951. Recent Lymnaeidae. Their variation, mor-
phology, taxonomy, nomenclature, and distribution. *Kungl.*
Svenska Vetenskapsakademiens Handlingar (4), 3 (1): 223 pp.,
5 pls.
- PILSBRY, H. A. 1889. Helicidae. [in] Tryon-Pilsbry. *Manual of*
Conchology (2) 5: 1–216, 64 pls.
- . 1894. Helicidae. Guide to the Study of Helices. [in]
Tryon-Pilsbry. *Manual of Conchology* (2) 9: i-xxviii + 1–366,
frontispiece + 71 pls.
- . 1895. Index to the Helices. [in] Tryon-Pilsbry.
Manual of Conchology (2) 9: 1–126.
- . 1899. American Bulimulidae: North American and
Antillean *Drymaeus*, *Leiostracus*, *Orthalicinae* and *Amphibu-*
liminae. [in] Tryon-Pilsbry. *Manual of Conchology* (2) 12:
i-iii + 1–258, 64 pls.
- . 1903. Urocoptidae. [in] Tryon-Pilsbry. *Manual of*
Conchology (2) 15: i-viii + 1–323, 65 pls.
- . 1904. Urocoptidae, Achatinidae. [in] Tryon-Pilsbry.
Manual of Conchology (2) 16: i-xi + 1–329, 68 pls.
- . 1906. Achatinidae: *Stenogyrinae* and *Coeliarinae* [in]
Tryon-Pilsbry. *Manual of Conchology* (2) 18: i-xii + 1–357,
51 pls.
- . 1907–1908. Oleacinidae, Ferussacidae. [in] Tryon-
Pilsbry. *Manual of Conchology* (2) 19: i-xxvii + 1–366, 52 pls.
- . 1929. Studies on West Indian mollusks: The genus
Zachrysia. *Proc. Acad. Nat. Sci. Philadelphia* 80 (1928): 581–
606, figs. 1–19, pls. 28–30.
- . 1941. New names for subdivisions of *Gongylostoma*.
Nautilus 55 (2): 70.

- TORRE, C. DE LA AND P. BARTSCH. 1938. The Cuban operculate land shells of the subfamily Chondropominae. Proc. U. S. Nat. Mus. 85 (3039): 193-423, figs. 71-101, pls. 7-39.
- . 1941. The Cuban operculate land mollusks of the family Annulariidae, exclusive of the subfamily Chondropominae. Proc. U. S. Nat. Mus. 89 (3096): 131-385, pls. 9-57.
- TORRE, C. DE LA, P. BARTSCH AND J. P. E. MORRISON. 1942. The cyclophorid operculate land mollusks of America. Smithsonian Institution, USNM Bull. 181: i-iv + 1-306, 42 pls.
- WAGNER, A. 1907-1911. Helicinidae. [in] Martini & Chemnitz, Conchyl.-Cab. (2): 1: sect. 18, pt. 2, 391 pp., 70 pls.
- WENZ, W. 1938-1944. Gastropoda. [in] Handbuch der Paläzoologie. Berlin Vol. 6, 1: 1-1639, 4211 figs.



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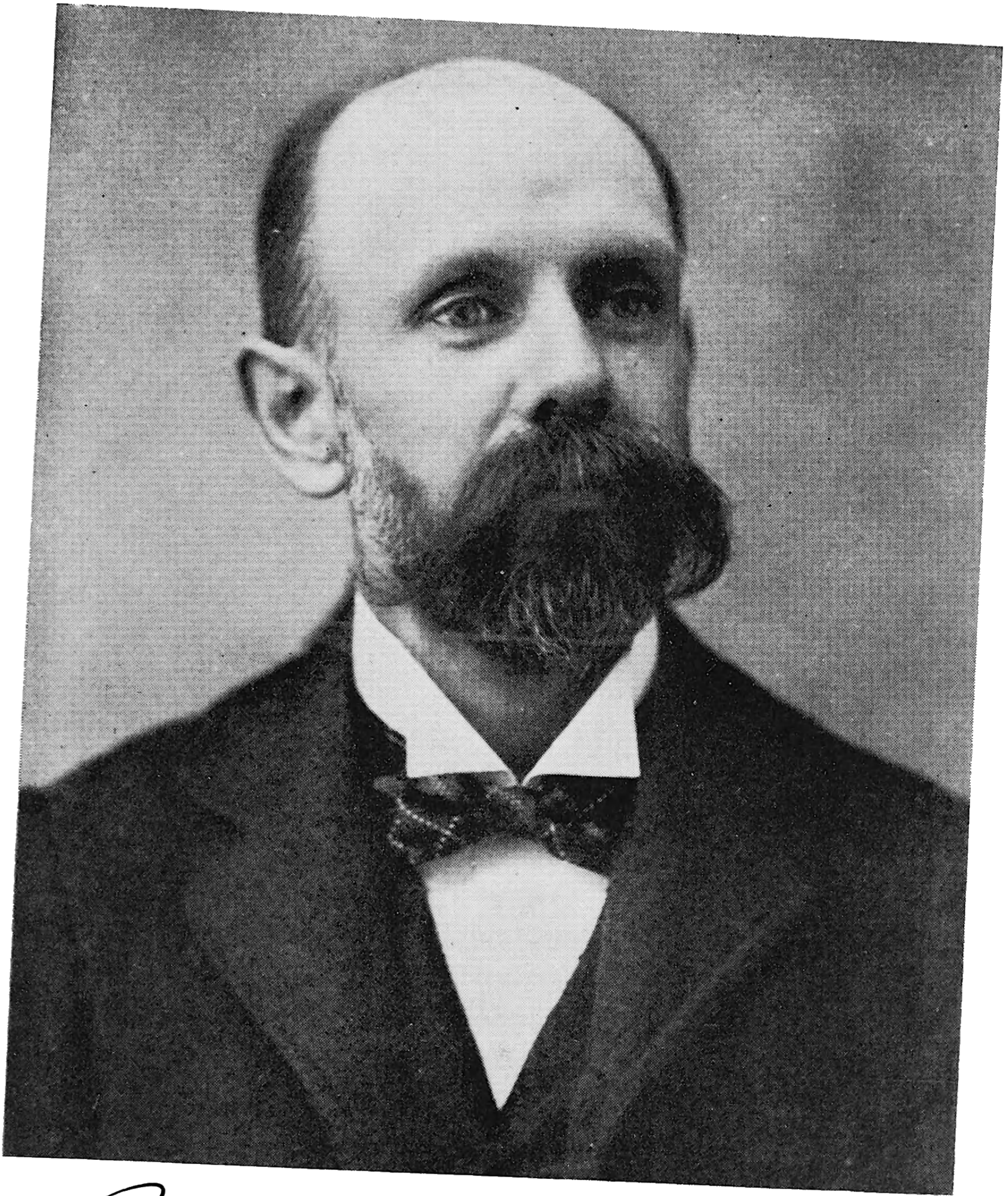
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Fortunately, Agassiz accepted the collection for which Call wanted only a complete set of the Museum's publications to date. While he would accept any monies that the authorities might care to send him from \$50.00 up, this was not required, since his chief interest was that the collection be placed where it would be studied and be of use to others.

Walter Faxon, Assistant in charge of Crustacea and Mollusks, duely acknowledged receipt of the collection as a gift in the Annual Report of the Museum for 1897-98 (p. 31) noting that the collection amounted to some 40,000 [*sic*] specimens.

R. Ellsworth Call, as he preferred to be known, was born in Brooklyn, New York on May 13, 1856. He wrote his first paper on mollusks in 1878, when he was 22, and continued to contribute to the literature until 1902. He received an A.B. from Indiana University, Bloomington in 1890, and an A.M. in 1891, and somehow managed to also earn an M.S. from Iowa State College in 1890 as well. In 1893 he became an M.D. graduating from the Hospital of the College of Medicine, University of Louisville, Kentucky. Finally Call became a Ph.D. from Ohio University, Athens, the oldest university in the Northwest Territory, in 1895.

At the age of 28 Call was an aid with the U. S. Geological survey, and during 1884-85 explored Utah and Nevada for mollusks, as well as carrying out his geological responsibilities. He remained in the West for many years. From 1885-86 he was principal of the high school in Moline, Illinois, then between 1887-88 he was an assistant professor of zoology at the University of Missouri, Columbia. During 1889-92 he taught science at the West Des Moines, [Iowa], high school. In 1892 he moved to Louisville, Kentucky, where he remained until 1895, teaching chemistry and physics at the Manual Training High School. From 1895-98 Call was superintendent of schools at Lawrenceburg, Indiana. It was at the end of this appointment that Call offered his collection to Agassiz. Afterward, he returned to Brooklyn, where he taught at Erasmus Hall, then the city's most prestigious high school, from 1898-99.



R. Ellsworth Call

1856-1917

From an original photograph in the A. F. Gray collection of portraits in the Mollusk Department in the Museum of Comparative Zoology, taken between 1895-1898 while Call was a resident of Lawrenceburg, Indiana. There is also a photograph in the collection of Call at the age of 22, taken in Mohawk, New York, as well as one made in Des Moines, Iowa, presumably between 1888-1892.

Plate 15

During 1899 he became curator of the Children's Museum of the Brooklyn Institute of Arts and Sciences. He left this post to become an instructor in biology and physiology at DeWitt Clinton High School, New York City in 1905. He died in 1917.

In reviewing Call's career, one is bound to speculate as to why he occupied so many positions in so many places; perhaps he was a wanderer by nature, peradventure he had an irascible nature. I prefer to think that he was more interested in pursuing his studies in mollusks than in promoting his academic career.

In 1884, Call was appointed by Francis W. Craigin of Washburn College, Topeka, Kansas, to conduct a survey of the fresh water mollusks of the state. The resulting publication, based largely on his own collecting, was the first one dealing with the geographical distribution of this fauna in Kansas.

During the summer of 1888 Call volunteered his services to the Geological survey of Arkansas. The result was an impressive geological tome (1891), and a study of the Unionidae of the state (1895). Until Call's latter paper appeared, almost nothing was known about the geographic distribution of the Unionidae of Arkansas. While a resident of Louisville, Kentucky, Call wrote an excellent biography of C. S. Rafinesque (1895) which includes the first bibliography of this prolific naturalist. Later (1899) he reprinted Rafinesque's early work on the fishes of the Ohio River. Call also collaborated with H. C. Hovey (1897) to produce an illustrated guide to Mammoth Cave, Kentucky. Call's most important work was his Descriptive Illustrated Catalogue of the Mollusca of Indiana (1901).

Call had a very modern view of the synonymy of the North American Unionidae both as to the number of valid species, and to the problems of priority caused by the adoption of the often earlier, sometimes ill defined descriptions of Lamarck and Rafinesque.

Concerning the number of species, he wrote to A. J. Jukes Browne in 1900: "I do not think that there are more than 250 good species of *Unio* in North America, though



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BIBLIOGRAPHY OF R. ELLSWORTH CALL'S WORK ON MOLLUSCA

1878. Mode of distribution of freshwater mussels. *American Naturalist* 12: 472-473.
1880. Reversed Melanthonies. *American Naturalist* 14: 207-208.
1880. Polymorphous *Anodonta*—variability of the American forms. *American Naturalist* 14: 529-530.
1880. Geology and natural history of Fremont County, Iowa. [in] *History of Fremont County, Iowa*. Des Moines, Iowa. [Mollusks are treated on pp. 34-36. Thirty-three species of freshwater mollusks are listed on p. 35].
1881. New Texan *Unio* (*Unio bollii*). *American Naturalist* 15: 390-391. [Reprints were distributed as pp. 391-392.]
1881. Note on *Succinea campestris* and *S. aurea*. *American Naturalist* 15: 391-392.
1881. [Obituary of] Dr. James Lewis. *American Naturalist* 15: 506-508.
1881. Recent land and freshwater shells in the Iowa Loess. *American Naturalist* 15: 585-586.
1882. Note on the geographical distribution of certain mollusks. *American Naturalist* 16: 400-402. [Reprints were distributed as pp. 401-402.]
1883. Notes on the genus *Campeloma* of Rafinesque. *American Naturalist* 17: 603-608.
1884. On the Quaternary and Recent Mollusca of the Great Basin, with descriptions of new forms. *Bull. U. S. Geological Survey*, no. 11: 367-420 (13-66), pls. 2-6.
1884. Notes on a Nevada shell (*Pyrgula nevadensis*). By R. Ellsworth Call and C. E. Beecher. *American Naturalist* 18: 851-855, text figs. and table.
1885. A geographic catalogue of the Unionidae of the Mississippi Valley. *Bull. Des Moines [Iowa] Acad. Sci.* 1 (1): 5-57.
1885. Description of a new species of *Unio* from Kansas (*Unio popenoi*). *Bull. Washburn College [Topeka, Kansas] Lab. Nat. Hist.* 1 (2): 48-49, pls. 2, figs. 1-4.
- 1885-1887. Contributions to a knowledge of the fresh water Mollusca of Kansas. Pts. 1-6. *Bull. Washburn College Lab. Nat. Hist.* 1 (2): 49-51, pt. 1; 1 (2): 49-54, pt. 2; 1 (3): 93-97, pt. 3; 1 (4): 115-124, pt. 4; 1886, 1 (6): 177-184, pt. 5; 1887, 2 (8): 11-25, pt. 6.
1886. On the genus *Campeloma* Rafinesque, with a revision of the species recent and fossil. *Bull. Washburn College Lab. Nat. Hist.* 1 (5): 149-165, pls. 3-6, text figs.

1886. Description of a new streptomatid mollusk of the genus *Gonio-basis* (*G. ozarkensis*). Bull. Washburn College Lab. Nat. Hist. 1 (7): 189-190, pl. 7, figs. 1-10.
1886. Description of a new rissoid mollusk (*Bythinella aldrichi*). By R. Ellsworth Call and C. E. Beecher. Bull. Washburn College Lab. Nat. Hist. 1 (7): 190-192, text fig., pl. 7, figs. 11-14.
1886. Notes on the land Mollusca of the Washburn College Biological survey of Kansas. Bull. Washburn College Lab. Nat. Hist. 1 (7): 201-206, text. fig.
1886. On certain Recent, Quaternary and new fresh water Mollusca. Proc. Davenport [Iowa] Acad. Nat. Sci 5: 1-8, pl. 1, text figs. 1-4.
1886. On *Pyrgulopsis*, a new genus of rissoid mollusk, with descriptions of two new forms. By R. Ellsworth Call and H. A. Pilsbry. Proc. Davenport Acad. Nat. Sci. 5: 9-14, pl. 2.
1887. Note on the ctenidium of *Unio aberti* Conrad. American Naturalist 21: 857-860, figs. 1-2.
1887. Descriptions of two new species of the genus *Unio* from the Ozark Region of Missouri. Proc. United States Natl. Mus. 10: 498-500, pls. 28-29.
1888. On a new Post-Pleiocene limnaeid. American Geologist 1: 146-148, figs. 1-6.
1888. On the gross anatomy of *Campeloma*. American Naturalist 22: 491-497, pl. 7, figs. 1-3.
1890. On a new fossil limnaeid from the Post-Pleiocene of California (Abstract). Proc. [Des Moines] Iowa Acad. Sci. for 1887-9, 1: 17.
1890. Notes on the gross anatomy of *Campeloma* (Abstract). Proc. [Des Moines] Iowa Acad. Sci. for 1887-9, 1: 16-17.
1890. The *parvus* group of Unionidae (Abstract). Proc. [Des Moines] Iowa Acad. Sci. for 1887-9, 1: 45-51.
1890. The geology of Crowley's Ridge, Arkansas. Proc. [Des Moines] Iowa Acad. Sci. for 1887-9, 1: 52-53. [Mentions fossil Ostreidae].
The 4 papers above and 3 others not dealing with mollusks were reprinted under the title, Papers published in abstract in the Proc. Iowa Acad. Sci. for 1887-9 by R. Ellsworth Call.]
1891. Description of a new Pelecypod mollusk of the genus *Mytilus*, from the Tertiary of Eastern Arkansas. [In] Ann. Rept. Geol. Survey of Arkansas for 1889, 2, The geology of Crowley's Ridge, pp. 202-203.

1894. A contribution to the knowledge of Indiana Mollusca. Proc. [Indianapolis] Indiana Acad. Sci. for 1893, 3: 140-156.
1894. On the geographic and hypsometric distribution of North American Viviparidae. American Jour. Sci. 48: 132-141, 1 map.
1895. The Unionidae of the Ohio River. (Abstract). Proc. Indiana Acad. Sci. for 1894, 4: 139-140.
1895. The Streptomatidae of the Falls of the Ohio. (Abstract). Proc. Indiana Acad. Sci. for 1894, 4: 140-143.
1895. A study of the Unionidae of Arkansas, with incidental reference to their distribution in the Mississippi Valley. Trans. Acad. Sci. St. Louis [Missouri] 7 (1): 1-65, 21 pls.
1896. Illustrations of little known Unionidae. Jour. Cincinnati [Ohio] Soc. Nat. Hist. 18: 157-160, pl. 6.
1896. Second contribution to a knowledge of Indiana Mollusca. Proc. Indiana Acad. Sci. for 1895, 5: 135-146.
1896. A revision and synonymy of the *parvus* group of Unionidae. Proc. Indiana Acad. Sci. for 1895. 5: 109-119, pls. 1-6.
1896. On a small collection of Mollusks from Northern Indiana (as Indiana University Biological Station Report on Mollusca on cover of reprint). Proc. Indiana Acad. Sci. for 1895, 5: 246-250.
1896. Fishes and shells of the Falls of the Ohio. [In] Memorial History of Louisville, Kentucky, 1, Chapter 2, 9-20 [Mollusks], pp. 17-20.
1897. Some notes on the flora and fauna of Mammoth Cave, Kentucky. American Naturalist 31 [Mollusks]: 387-388, pl. 10, figs. 6-7.
1897. The hydrographic basins of Indiana and their Molluscan fauna. Proc. Indiana Acad. Sci. for 1896, 6: 247-258, 1 map.
1900. A descriptive illustrated catalogue of the Mollusca of Indiana. 24th Annual Rept. Dept. of Geol. and Nat. Resources Indianapolis, Indiana for 1899, pp. 337-535, pls. 1-78, Index, pp. 1013-1017.
1902. The European pond-snail. Science, (n.s.) 16: 65.

Complete sets of the above papers are to be found in the Library of the Department of Mollusks as well as in the library of the Museum of Comparative Zoology, and that of the author.



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cragini, *Triodopsis*: 1886, Bull. Washburn College Lab. Nat. Hist. 1: 202, fig. 5 (Banks of Chetopa Creek, Neosho Co., Kansas). Figured holotype MCZ 3123; paratypes MCZ 3124.

dalli, *Amnicola*: 1884, Bull. U. S. Geol. Survey, no. 11: 21 (375), 45 (399), pl. 6, figs. 4–6 (Foot of Pyramid Lake, Semons stage station [not located, Washoe Co.], Nevada). Figured holotype MCZ 2087; paratypes MCZ 2088.

floridense, *Campeloma*: 1886, Bull. Washburn College Lab. Nat. Hist. 1: 159, pl. 6, fig. 7 (Florida). [ms. name in the synonymy of *C. limum* Anthony]. Lectotype MCZ 189529, Wekiva River, Orange Co., Florida, selected by Clench and Turner, 1956, Bull. Florida State Mus. [Gainesville] 1: 117, pl. 1, fig. 9.

hamatoides, *Mytilus*: 1891, [in] Ann. Rept. Geol. Survey of Arkansas for 1889, 2: 202, text fig. (Claiborne beds, Eocene Tertiary; Little Crow Creek, St. Francis County, Arkansas). [Location of the type not known.]

hockingensis 'Moore's' Call, *Anodonta*: 1880, Amer. Nat. 14: 530 [*nomen nudum*].

mississippiensis Call and Pilsbry, *Pyrgulopsis*: 1886, Proc. Davenport Acad. Nat. Sci. 5: 13, pl. 2, figs. 14–16 (Mississippi River, near the mouth of Rock River, Rock Island Co., Illinois). Lectotype ANSP 61609a selected by Baker, 1964, Proc. Acad. Nat. Sci. Phila. 116: 174 specimen portrayed in fig. 15; types also mentioned as in the Call colln. but not in the MCZ [lost].

ozarkensis, *Goniobasis*: 1886, Bull. Washburn College Lab. Nat. Hist. 1: 189, pl. 7, figs. 1–10 (Blue Springs, Eminence, Shannon Co., Missouri). Lectotype, here selected, MCZ 175785, specimen portrayed in fig. 2; figured paralectotypes MCZ 1601.

ozarkensis, *Unio*: 1887, Proc. U. S. Natl. Mus. 10: 498, pl. 27 (Currant River, Shannon Co., Missouri, and in Jacks Fork and Big Creek, tributaries to it). Lectotype, here selected, MCZ 5707, male specimen portrayed in figs. 1-3, original R. E. Call no. 5307; figured allotype MCZ 5705 portrayed in fig. 4 original R. E. Call no. 5306; *both* from Jacks Fork [Shannon Co.].

Pompholopsis, Subgenus. 1888, Amer. Geologist 1: 148. Type species, *Pomoholox whitei* Call, by monotypy.

popenoi, *Unio*: 1885, Bull. Washburn College Lab. Nat. Hist. 1: 49, pl. 2 (Fall River, Wilson Co., Verdigris River; *both* Kansas). Figured holotype MCZ 4934 from Fall River. Is *Unio aberti* Conrad, *teste* Call, 1887, Amer. Nat. 21: 860.

Pyrgulopsis Call and Pilsbry, Genus: 1886, Proc. Davenport Acad. Nat. Sci. 5: 9. Type species, *Pyrgula nevadensis* Stearns, original designation.

somersii 'Moore's' Call, *Anodonta*: 1880, Amer. Nat. 14: 529 [*nomen nudum*].

spinosus Call and Pilsbry, *Pyrgulopsis*: 1886, Proc. Davenport Acad. Nat. Sci. 5: 14, pl. 2, figs. 17-19 (Comal Creek, New Braunfels [Comal Co.], Texas). Types mentioned as in collns. of Call and Pilsbry. [Not found in either the MCZ or ANSP.]

stearnsiana, *Goniobasis*: 1886, Proc. Davenport Acad. Nat. Sci. 5: 1, fig. 3 (Dykes Creek, tributary to the Etowah River, Floyd Co., Georgia). Figured holotype MCZ 1660; paratype MCZ 1661.

stygium, *Carychium*: 1897, Amer. Nat. 31: 387, pl. 10, figs. 6, 7 (Mammoth Dome, Mammoth Cave [Edmonson Co.], Kentucky). Figured type in Call colln. at Indiana University, Bloomington, *teste* Call. [The collection was transferred to the Museum of Zoology, University of Michigan, Ann Arbor, but the type is lost.] Specimens from Call ANSP 68147 figured by Pilsbry, 1948, Acad. Nat. Sci. Phila. Monographs, no. 3, 1 (2): 1055, fig. 563. a, b.

- uintaense*, *Sphaerium*: 1886, Proc. Davenport Acad. Nat. Sci. 5: 8, text fig. 4 (Lake in the Uinta Mountains, Utah; elevation of 10,500 feet). Figured holotype MCZ 4859; paratypes MCZ 4848.
- utahensis*, *Radix ampla*: 1884, Bull. U. S. Geol. Survey, no. 11: 19 (373), 47 (401), pl. 6, figs. 7-9 (Lake Utah, near Lehi, [Utah Co.], Utah). Figured holotype MCZ 4036; paratypes MCZ 4037.
- utahensis*, *Valvata sincera*: 1884, Bull. U. S. Geol. Survey, no. 11: 22 (376); 44 (398), pl. 6, figs. 1-3 (Lake Utah, near Lehi, [Utah Co.], Utah, not far from the head of the River Jordan). Figured holotype MCZ 2522.
- whitei*, *Pompholys (Pompholopsis)*: 1888, Amer. Geologist 1: 148, figs. 1-3 (Tassajara Hills, California; post-Pleiocene). Types in the cabinet of the State University, Berkeley, California, *teste* Call. [Not located in 1975, *teste*, J. H. Peck.]



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1891. Description of two new species of *Unio* from Arkansas. *Nautilus* 5: 1–2.
1891. Description of two new species of *Unio* from Florida. *Nautilus* 5: 29–30.
1896. New American Unionidae. Aledo [Mercer Co., Illinois] Republican, Nov. 18, 1896 [newspaper].
1896. New American *Unio*. *Nautilus* 10: 91–92, pl. 1, figs. 3, 4.
1897. New American Unionidae. *Nautilus* 10: 103–104, pl. 1, figs. 1, 25.
1901. Description of a new *Unio* from Missouri. *Nautilus* 15: 74–75, pl. 5, figs. 1–2.
1902. Description of a new *Unio* from Tennessee. *Nautilus* 15: 115–116; 16: 8, pl. 1, upper two figs.
1902. Description of a new *Unio* from Tennessee. *Nautilus* 16: 7–8, pl. 1, lower two figs.

Species of Unionidae described by William A. Marsh.

Locality data in brackets are additions from original labels or modern atlases.

The following abbreviations have been used:

ANSP — Academy of Natural Sciences of Philadelphia, Pennsylvania

MCZ — Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts

MZUM — Museum of Zoology, University of Michigan, Ann Arbor, Michigan

USNM — National Museum of Natural History, Washington, D. C.

andrewsii, *Quadrula*: 1902, *Nautilus* 15: 115 (Holston River, Tennessee); 1902, *Nautilus* 16: 8, pl. 1, upper two figs. as *andrewsae*. Figured holotype ANSP 83170; paratype MCZ 134060.

askewi, *Unio*: 1896, *Nautilus* 10: 91, pl. 1, figs. 3, 4 (Village Creek, Hardin Co.; Sabine River; both Texas). Figured holotype ANSP 70448a; paratype MCZ 30555, both from the latter locality.

beauchampii, *Quadrula*: 1902, *Nautilus* 16: 7, pl. 1, lower two figs. (Little Tennessee River; Holston River; both Tennessee). Figured holotype ANSP 83169 from the former locality.

- ferrissii*, *Unio*: 1891, *Nautilus* 5: 30 (a small creek near Pilatka [Palatka, Putnam Co.], Florida). Type figured by Simpson, 1892, *Proc. U. S. Natl. Mus.* 15: 423, pl. 66, figs. 1-2, probably returned to Marsh [lost].
- missouriensis*, *Pleurobema*: 1901, *Nautilus* 15: 74 (Black River, near Poplar Bluff, Butler Co., Missouri). Holotype MZUM 38855 figured by Walker 1915, *Nautilus* 28: 140, pl. 5, figs. 1-2; also a smaller paratype.
- pilsbryi*, *Unio*: 1891, *Nautilus* 5: 1 (Little Red River, Arkansas). Holotype ANSP 41589a figured by Pilsbry, 1892, *Proc. Acad. Nat. Sci. Phila.* 44: 131, pl. 8, figs. 7-8 and in 1892, *Nautilus* 6, pl. 1, figs. 7-8; paratypes MZUM 42931.
- pleasii*, *Unio*: 1891, *Nautilus* 5: (Little Red River, Arkansas). Lectotype ANSP 56480a selected by Johnson and Baker, 1973, *Proc. Acad. Nat. Sci. Phila.* 125: 166, pl. 9, fig. 5; allotype ANSP 56480; paralectotypes MZUM 237354; MCZ 231258 and USNM 124641.
- singleyanus*, *Unio*: 1891, *Nautilus* 5: 29 (small creek near Pilatka [Palatka, Putnam Co.], Florida). Holotype MZUM 17628 figured by Simpson, 1892, *Proc. U. S. Natl. Mus.* 15: 426, pl. 68, figs. 4, 5, from the Frierson colln.
- superiorensis*, *Unio*: 1897, *Nautilus* 10: 103, pl. 1, figs. 1, 2, 5 (Michipicoton River, upper shore of Lake Superior [Canada]). Figured holotype ANSP 70449a; paratype ANSP 70449, fig. 5; paratypes MZUM 209139, MCZ 20169 and USNM 133386.
- upsoni*, *Unio*: 1880, "Read before the Mercer County, Illinois, Scientific and Historical Society March 2, 1880. Mr. Marsh had copies of the description published and thinks that the species was described on the records. It was not figured," Simpson, 1900, *Proc. U. S. Natl. Mus.* 22: 539; Marsh 1887, *Conch. Exchange [Nautilus]* 1: 51 (Kishaeaukee River, Winnebago County, Illinois). Not found in the MZUM; syntype MCZ 5551 in the R. E. Call colln.

CYPRAEA LEUCODON BRODERIP,
RAREST SHELL?

By RICHARD I. JOHNSON

For many years, through many editions, Guinness' *Book of World Records*, has listed *Cypraea leucodon* Broderip as the rarest shell. Burgess (1970: 252) pointed out that in addition to the holotype in the British Museum (Nat. Hist.) and the specimen in the Museum of Comparative Zoology (38370) a third specimen was taken in 1965 from the stomach of a fish caught in the Sulu Sea off the Philippine Islands. He further noted that both *Cypraea katsuae* Kuroda and *barclayi* Reeve are each known from single specimens. Thus in the single genus *Cypraea*, there are at least two species more rare than *leucodon*.

The 1974 edition of the Record Book no longer figures the holotype of *leucodon*, and duly notes that there are three specimens of it, but continues to regard it as the rarest shell. Obviously, there is no single rarest shell, but if one is needed to settle heated altercations in pubs, bars, and elsewhere, it might just as well be *Cypraea leucodon* that contributes to tranquility.

REFERENCES

- BRODERIP, W. J. 1828. *Zoological Journal* 4: 163. pl. 5. [Original description].
- BURGESS, C. M. 1970. *The Living Cowries*. A. S. Barnes & Co. Cranbury, New Jersey, pp. 252-253. pl. 28, figs. A, A1, [Holotype refigured].
- GUINNESS. 1974. *Book of World Records*, by N. and R. McWhirter. Bantam Books, Inc. New York, p. 100.

Note: The specimen of *C. leucodon* in the Museum of Comparative Zoology is now portrayed in color on a postcard, and is available at this writing from the Museum Shop, Museum of Comparative Zoology, Harvard University, Cambridge, MA. 02138, at 10¢ each, postage extra.



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provided additional distributional records for two of the species.

Specimens were examined from collections of the Museum of Comparative Zoology (MCZ), Harvard University, Cambridge, Massachusetts, the National Museum of Natural History (USNM), Washington, D.C., the Academy of Natural Sciences of Philadelphia (ANSP), Pennsylvania, the Florida Department of Natural Resources (FDNR) Marine Research Laboratory (catalogue prefix FSBC I), St. Petersburg, Florida, and the Steger collection, now at the Delaware Museum of Natural History (DMNH), Greenville, Delaware.

Eulima conica C. B. Adams, 1850

Adams named *Eulima conica* with the following description: "shell conic turritid: white: smooth and shining: apex acute: spire with the axis moderately curved throughout with the outlines rectilinear in the plane perpendicular to that of the curvature: whorls about eleven, planulate, with an indistinct suture: last whorl subangular, quite oblique anteriorly: aperture small, ovate. Mean divergence [spire angle] about 22°; length .1 inch; breadth .042 inch."

In their introduction, Clench and Turner stated (p. 234) that all Adams' western Atlantic *Eulima* (= *Melanella*) were missing, but they assigned types for *Eulima conica* and *E. jamaicensis* C. B. Adams, 1845 in the text. Their illustrated lectotype (MCZ 186183; Figure 1) and a conspecific paralectotype (MCZ 186184; Figure 2) of *Eulima conica* are not melanellids. Relatively large, obtusely conical protoconchs of about two whorls, glassy teleoconchs dulled by many microscopic axial striae, and two tooth-like swellings within outer lips indicate the shells to be specimens of *Zebina browniana* (d'Orbigny, 1842), a species somewhat resembling some melanellids but belonging to the family Rissoinidae.

Adams sold duplicate specimens to finance a monograph of his species, a task he never completed. Some National Museum melanellids are of certain Adams origin, and others may be duplicates acquired from other collections. Dall (1889) mentioned that "specimens [of *Eulima jamaicensis*] in the National Museum were received from Prof. Adams

and have lately been compared with his original type"; he also mentioned comparing other specimens with the type of *E. arcuata* C. B. Adams, 1850. This suggests that Adams' melanellid types may have been loaned to Dall prior to completion of the *Blake* Gastropoda report, and at least some may have later been catalogued into the National Museum collection. Apparent types of two such species are presently housed there; both conform well with Adams' descriptions and are marked "Jamaica. . .C. B. Ad.," evidently in Dall's handwriting. One lot (USNM 83270) containing a single specimen so marked is labeled "*Eulima conica* C. B. Ad." The shell (Figure 3) is a melanellid agreeing closely with Adams' description and measurements (Table 1). It is not now possible to demonstrate conclusively that this is the specimen upon which Adams based his description, but it seems certain the shell embodies Adams' concept of *E. conica*.

TABLE 1. Measurements of discussed *Eulima conica* specimens and those from Adams' description.

	Original Description	USNM 83270	MCZ 186183	MCZ 186184
Length	.1 in (2.54 mm)	2.6 mm	3.1 mm	3.2* mm
Breadth	.042 in (1.00 mm)	1.0 mm	1.4 mm	1.4 mm
Spire angle	22°	21°	33°	26°
whorls	ca. 11	10	6-3/4	7*

*First embryonic whorl damaged

The previously selected lectotype and paralectotype do not agree with Adams' measurements and whorl counts (Table 1). Numbers of whorls are especially variant, being considerably fewer on shells larger than that originally described. Although the shells are of Adams origin, they do not satisfy the criteria of his description. I therefore propose that the previous designation of MCZ 186183 as lectotype be set aside, and that USNM 83270 be considered the proper lectotype of *Eulima conica* C. B. Adams, 1850. Accordingly, the slender outline and moderate curvature of the spire indicate that *E. conica* should be assigned to *Vitreolina* Monterosato, 1884.

To date I have seen this species only from Jamaica, but it probably occurs elsewhere in the northern Caribbean.

Eulima fulvocincta C. B. Adams, 1850

Clench and Turner were unable to locate the type of *E. fulvocincta* but, as with *E. conica*, an apparent C. B. Adams syntype from Jamaica is in the National Museum collection (USNM 83268; Figure 4) and may serve as lectotype. Measurements of the worn shell (length 4.9 mm; breadth 1.6 mm) are similar to those reported by Adams (.2 in = 5.1 mm; .065 in = 1.65 mm). Early whorls are missing, leaving about 6 whorls on the teleoconch and perhaps explaining Adams' reference to a "rather obtuse apex". The shell possesses the two distinctive interrupted spiral bands and scattered, thin, brown stained varices described by Adams, markings which separate this species from all other western Atlantic melanellids. A freshly dead shell from off the Florida west coast (*Hourglass* station B, 27° 37' N, 83° 07' W; 18 m; Figure 5) is illustrated for comparison.

Adams' species is assigned to *Eulima* Risso, 1826, *sensu* Winckworth (1934). It is closely related to the eastern Pacific *E. schwengela* (Bartsch, 1938), formerly known as *Strombiformis hemphilli* Bartsch, 1917. Both Keen (1971) and Abbott (1974) were unaware of Bartsch's subsequent name, changed to avoid homonymy with the western Atlantic *Eulima hemphilli* Dall, 1884.

Mörch (1875) reported *Leiostraca* (= *Eulima*) *fulvocincta* from St. Thomas (Virgin Islands) and Porto Plata (Hispaniola). Soon thereafter, Dall (1889) erroneously designated *fulvocincta* a synonym of *Eulima bilineata* Alder, 1848; the latter species occurs off western Europe, not in the Americas, but its name has been applied to the western Atlantic *S. bifasciatus* (d'Orbigny, 1842) and several apparently unnamed species. Dall's synonymy was evidently convincing, for I find no subsequent use of *fulvocincta*. Illustrations of the shell are also scarce. The battered shell, probably from Puerto Rico, of Warmke and Abbott's (1961) figure 26-o appears to be *E. fulvocincta*. Although their



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Rissoa eulimoides C. B. Adams, 1850

Dr. D. R. Moore first called to my attention that the type of *R. eulimoides* is a melanellid. Subsequent inspection revealed the holotype (MCZ 156416; Figure 6) to be a worn, juvenile specimen with rather dull surface and lacking embryonic whorls. It is, however, identical with an excellent specimen of similar size from Goat Cay, Andros, Bahamas (FSBC I 11749; Figure 7); and others from Cayman Brac (ANSP 296068; Figures 8, 9); and Gulfport, Tampa Bay, Florida (MCZ 104323). The species is redescribed from these specimens.

Shell small, to about 16.0 mm total length, glossy, white, nearly straight. Protoconch of 4 small, slender whorls; postembryonic whorls about 15, considerably broader than long posteriorly, less so anteriorly, slightly rounded, forming shallow, narrow sutures; penultimate whorl merging smoothly with base. Sculpture lacking except for one deep axial incision at completion of each whorl, creating a single, nearly straight, incised line from posterior terminus of outer lip to base of final embryonic whorl. Umbilicus absent. Aperture small, broadly ovate, constricted posteriorly, rounded anteriorly; columella short, simple, slightly elevated, merging with base on juveniles, separated on adults. Outer lip thick, broadly rounded, resembling that of various Rissoinidae.

Poor condition of the type probably misled Adams to place the species in *Rissoa*; the embryonic whorls are missing and early postembryonic whorls are worn to resemble early whorls of some Rissoinidae. The comparatively dull surface and shape of the outer lip further suggest that family. Fresh shells, however, are clearly melanellid as indicated by the shape of embryonic whorls and by the highly glossy, oily texture of the shell surface. The strong labial scars and solid shell dictate that the species be placed in *Melanella* Bowdich, 1822. Linear arrangement of deeply incised varices also occurs on *Melanella dufresnei* Bowdich, 1822, from Japan.

Dr. Waren allowed examination of the MCZ and ANSP specimens on loan to him. He also (pers. comm.) reported examining specimens from the Caribbean coast of Panama

(USNM 620567). The Gulfport specimen is especially curious; I have not otherwise seen the species among many Tampa Bay melanellids. Except for that record, the species seems restricted to shallow areas of the Caribbean, where it is evidently uncommon.

The shell of *M. eulimoides* somewhat resembles that of Abbott's (1974) figure 1344, which he ascribes to *Melanella gibba* (De Folin, 1867). However, that species was described from Margarita Island, Panama (Bartsch, 1917), and the original illustration is of a shell quite different from that illustrated by Abbott, seeming more closely related to the group containing *M. arcuata* (C. B. Adams, 1850).

ACKNOWLEDGMENTS

I thank Dr. Anders Waren, University of Gothenburg, Göteborg, Sweden, for providing information and reviewing the manuscript. Dr. Joseph Rosewater provided study facilities at the U.S. National Museum and loaned USNM specimens. Dr. Ruth Turner (MCZ) graciously provided information concerning the Clench and Turner report and loaned necessary specimens. Dr. D. R. Moore, Rosenstiel School of Marine and Atmospheric Sciences (RSMAS), Miami, Florida, and Mrs. Barbara Steger, Tampa, Florida, are thanked for providing information. The Bahamian specimen of *M. eulimoides* was collected during cruise G-7124 of the M/V Gerda, RSMAS research vessel. Mrs. Sally Kaicher provided photographic assistance.

LITERATURE CITED

- ABBOTT, R. T. 1974. American Seashells, 2nd ed. 663 p., 24 pls. Van Nostrand Reinhold Co., New York.
- ADAMS, C. B. 1850. Descriptions of supposed new species of marine shells which inhabit Jamaica. *Contrib. Conch.* 7: 109-123.
- BARTSCH, P. 1917. A monograph of west American melanellid mollusks. *Proc. U.S. Nat. Mus* 53 (2207): 295-356, 16 pls.
- BARTSCH, P. 1938. *Leiostraca schwengela*, a new name. *Nautilus* 52(1): 34.
- CLENCH, W. J. and R. D. TURNER. 1950. The western Atlantic marine mollusks described by C. B. Adams. *Occ. Papers Moll., Harvard Univ.* 1(15): 233-403.
- DALL, W. H. 1889. Reports on the results of dredging, under the supervision of Alexander Agassiz, in the Gulf of Mexico (1877-78) and in the Caribbean Sea (1879-80), by the U.S. Coast Survey steamer *Blake*, Lieut. Commander

- C. D. Sigsbee, U.S.N., and Commander J. R. Bartlett, U.S.N., commanding. XXIX. Report on the Mollusca. Part 2. Gastropoda and Scaphopoda. Bull. Mus. Comp. Zool. 18. 1-492, pls. 10-40.
- KEEN, A. M. 1971. Sea shells of tropical west America, 2nd ed. 1064 pp., 22 pls. Stanford Univ. Press, Stanford, Calif.
- MORCH, O. A. 1875. Synopsis Molluscorum marinorum Indiarum occidentalium. Malak. Blatt. 22. 142-184.
- WARMKE, G. L. and R. T. ABBOTT. 1961. Caribbean Seashells. x + 348 pp. Livingston Publishing Co., Narberth, Pennsylvania.
- WINCKWORTH, R. 1934 Names of British Mollusca. II. Jour. Conch. 20(1): 9-15.

Plate 16

- Fig. 1. *Eulima conica*; Jamaica; MCZ 186183, lectotype of Clench and Turner (1950) (= *Rissoinidae*); length 3.1 mm (10 x).
- Fig. 2. *Eulima conica*; Jamaica; MCZ 186184; paralectotype; (= *Rissoinidae*) length 3.2 mm (10 x).
- Fig. 3. *Eulima* (= *Vitreolina*) *conica*; Jamaica; USNM 83270; new lectotype; length 2.6 mm (10 x).
- Fig. 4. *Eulima fulvocincta*; Jamaica; USNM 83268; lectotype; length 4.9 mm (10 x).
- Fig. 5. *Eulima fulvocincta*; Hourglass station B, 18 m; FSBC I 11750; length 4.8 mm (10 x).
- Fig. 6. *Rissoa* (= *Melanella*) *eulimoides*; Jamaica; MCZ 156416; holotype of Clench and Turner; length 5.2 mm (10 x)
- Fig. 7. *Melanella eulimoides*; Goat Cay, Andros, Bahamas, FSBC I 11749; length 5.6 mm (10 x).
- Fig. 8. *Melanella eulimoides*; Cayman Brac; ANSP 296068; length 13.0 mm (tip broken) (5 x).
- Fig. 9. Same; lateral view (5 x).



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Alcide d'Orbigny's South American Expedition (1826-1833)

By HARRIET HORNBLOWER

By 1834, much of the fauna and flora of Brazil and Peru had been collected and described by such eminent naturalists as Alexander von Humboldt and Augustin Saint-Hilaire. The rest of the South American continent to the south remained mostly uninvestigated. The Muséum National d'Histoire Naturelle conceived an ambitious project to fill this lacuna which, at the request of Geoffroy Saint-Hilaire, was undertaken by Alcide Charles Victor Dessalines d'Orbigny (1802-57). Orbigny readily assented, as such an expedition would be an invaluable opportunity for a young and aspiring naturalist.

Saint-Hilaire chose Orbigny because his research had already revealed an ability to clarify and impose new order on hopelessly inadequate systematics. He had separated the Foraminifera from the Cephalopoda which Lamarck had failed to do.

A foundation in zoology had been provided to him by his father, Charles-Marie Dessalines d'Orbigny (1770-1856), a naval surgeon with a passionate interest in natural history. He took his sons, Alcide and Charles, on numerous collecting trips. The Orbignys worked on the marine animals of the coast of Aunis and Vendée, and with Fleuriau de Bellevue, founded the first French regional museum at La Rochelle.

From youth, Alcide had been in contact with other naturalists: Savigny, Cuvier, Audouin, and Milne-Edwards.

On July 26, 1826 Orbigny sailed from Brest, and on September 24 arrived at Rio de Janeiro. Two weeks later he sailed to Montevideo, arriving on October 30 and for several months explored Uruguay. On February 14 he left Buenos Aires, journeying up the Paraná to Rosario and then on to Corrientes. For more than a year, he remained in the Corrientes region making excursions into Chaco and Guaraní territory. In December, he reached the frontiers of Paraguay, which he would have investigated had its dictator, Dr. Francia, not previously taken Bonpland, Humboldt's botanist, captive.

Leaving Corrientes at the end of May, he sailed down the Paraná to Buenos Aires. On January 2, 1829, Orbigny departed for the Río Negro, and for nine months he explored Patagonia.

Warring factions made an overland expedition from Buenos

Aires to Valparaiso impossible; so he went by sea around the Horn to Valparaiso, Chile arriving on February 16, 1830.

After a visit to Santiago, Orbigny learned upon returning to Valparaiso that President Santa Cruz, "a friend of the sciences", had requested his services in evaluating the riches of Bolivia. The offer was providential, for it not only gave Orbigny access to new zoogeographic zones, but afforded him badly needed financial assistance. Orbigny made an ascent of the Cordillera as he journeyed into Bolivia. Once in Bolivia he spent two years investigating the *Yungas*.

In Santa Cruz Province, while exploring the tributaries of the Madeira by *piroque*, he made extensive zoological, geographical and ethnological observations in almost unknown areas.

In Callao, Peru, Orbigny met M. Fontaine, a French physician for *The Griffon*. They collected marine mollusks in the vicinity. Fontaine continued to collect coastal, marine species as far north as Piura and later sent them to Orbigny in Paris.

On returning to Paris, Orbigny published the results of his expedition in nine folio volumes (1835-47). Elie de Beaumont described the work as presenting "in an almost encyclopedic framework, one of the most extensive monographs ever given on any region of the earth." Volume 5, part 3, is devoted to mollusks; many new species are described. [Some had been briefly described previously (Orbigny 1835).]

Orbigny's expedition served as a model for the scientific investigations of other unexplored regions. His contributions to South American geology, paleontology and malacology were monumental and became foundations in these fields.

Orbigny made one of the most extensive collections of the land and freshwater mollusks ever made in South America. The previous collection of shells made by Humboldt and Bonpland, described by Valenciennes, is of nugatory importance. Other naturalists such as Spix and Wagner, and Moricand described only the mollusks of Brazil.

Besides figuring over a hundred new mollusks, Orbigny made general observations on their habitats and a new synthesis of their distribution. Latitudinally he divided the continent into three zones, using gastropods and birds as examples. He noted a sharp diminution in species density from the tropical to the cold zone. He also recognized faunal zones in the distribution of the marine mollusks, concepts which were later augmented by Edward Forbes.

Many of Orbigny's speculations have been since discarded; yet he did much to organize and clarify South America's faunal, geological, and paleontological record, an immense accomplishment for a single man who generally travelled alone under perilous conditions.

Orbigny sold his shells, for pecuniary reasons, to the British Museum (Nat. Hist.), all of them glued to cards, with an x on the figured specimens. The over 800 lots were described by Gray (1854). The freshwater bivalves were critically examined by Johnson (1971).

REFERENCES CITED

- Dance, S. P. 1966 Shell collecting, an illustrated history. Univ. Cal. Press, Berkeley. pp. 172-173.
- Germain, L. 1933. Les Mollusques Terrestres et Fluviales. . . . [in] Commémoration du voyage d'Alcide D'Orbigny, etc Pub. du Mus. Nat. d'Hist. Nat. no. 3, pp 43-58.
- Goodman, E. J. 1972. The explorers of South America MacMillan Co., New York pp. 301-303.
- Gray, J. E. 1854. List of the shells of South America in the collection of the British Museum. Collected and described by M. Alcide D'Orbigny, in the "Voyage dans l'Amérique Méridionale." London, pp [1], 1-89.
- Johnson, R. I. 1971. The types and figured specimens of Unionacea (Mollusca. Bivalvia) in the British Museum (Nat. Hist.). Bull. British Mus. (Nat. Hist.) 20 (3): 73-108, 2 pls.
- La Rocque, A. 1966. A. C. V. D. D'Orbigny, 1802-57. Sterkiana no. 24, pp. 1-5.
- Orbigny, A. D. d'. 1835. Synopsis terrestrium et fluviatilium molluscorum, in suo per Americam meridionalem itinere. Mag. de Zool Classe 5, nos. 61, 62, pp. 44.
- 1835-47. Voyage dans l'Amérique méridionale (le Brésil . . . l'Uruguay, . . . l'Argentine, la Patagonie . . . Chili . . . Bolivia . . . Pérou) exécuté pendant . . . 1826-33. 7 vols. of text and 2 of plates 4to. Paris. Mollusques. 5 (3): xlii, 758. pp. 1-48, 1835; 49-184, 1836; 185-376, 1837; 377-408, 1840; 409-499, 1841; 489-758, 1846 Atlas 9, pls. 1-85, 41 bis. All the plates are hand colored save 83-85 which are plain. The publication dates of the plates have not been established
- Roule, M. L. 1933 Notice Biographique . . . [in] Commémoration, etc. [See reference under Germain, L.].



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cus or *mcglameriae*, which are not sculptured on the posterior slope, *M. penicillatus* (Lea) (Pl. 17, black squares) found in the Yellow, Econfina and Apalachicola River systems; *M. simpsonianus* Walker (Pl. 17 open squares) endemic to the Ochlockonee River system; and *M. walkeri* (B. H. Wright) (Pl. 17, black triangles) similarly restricted to the Suwannee River system, like *acutissimus*, are all sculptured on the posterior slope. These Apalachicolan species appear to be independently derived from *M. acutissimus*.

HISTORICAL CONSIDERATIONS

The genus *Medionidus* was proposed by Simpson (1900a: 77), who also published a synonymy of the species (1900b: 588-591). He later (1914: 246-253) modified the synonymy and added descriptions of the species. Simpson (1914: 248, 251) recognized *M. parvulus* (Lea) and *acutissimus* (Lea), both from the Mobile-Alabama-Coosa River system, as valid, as did Ortmann (1923: 59; 1924: 99). Van der Schalie (1938: 14), with more extensive collections at his disposal, noted that they intergraded. Later, van der Schalie (1940: 199) followed Simpson (1914: 248, 250) and recognized both *M. penicillatus* (Lea) and *kingi* (B. H. Wright) as valid species occurring in the Apalachicola River system. Clench and Turner (1956: 189) correctly synonymized these forms, but also included in their synonymy, *M. simpsonianus* Walker endemic to the Ochlockonee River system, and *walkeri* (B. H. Wright) endemic to the Suwannee River system. Johnson (1970: 270), in a compilation of the Unionacea of the Apalachicolan Region, followed van der Schalie and recognized both *penicillatus* and *kingi*. Actually, Frierson (1927: 92) had previously published the correct synonymy of the then known species of *Medionidus*. Haas (1969: 413-415) in his compilation of the Unionacea, followed Frierson, merely adding *M. mcglameriae* van der Schalie (1939) which had been subsequently described. Burch (1973: 21) in his identification manual of the North American Unionacea recognized only four of the six species

of *Medionidus: conradicus* (Lea), *acutissimus*, *mcglameriae*, and *penicillatus*. Hurd (1974: 98-99) recognized *conradicus* as occurring in both the Tennessee and the Mobile-Alabama-Coosa River systems, as well as *acutissimus* and *parvulus* in the latter. Burch (1975: 20) in a revised edition of his manual, also recognized *parvulus*. Stansbery (1976: 48) listed *conradicus* as "endangered" in both the "Tennessee and Mobile basins."

ACKNOWLEDGEMENTS

Special thanks are extended to Dr. Joseph Rosewater, National Museum of Natural History, who in addition to permitting me access to the collection, had photographs made of the relevant types. Dr. Juan Parodiz, Carnegie Museum, Pittsburgh, kindly made the collection in his charge available. Drs. Henry van der Schalie and John B. Burch, Museum of Zoology, University of Michigan also afforded me access to the collection in their charge, as well as allowing me to borrow type material. Dr. Fred G. Thompson, Florida State Museum, Gainesville, helped clarify a spurious record. Thanks are also extended to Dr. Kenneth J. Boss for reading the manuscript and making helpful suggestions.

SYSTEMATIC SECTION

The following abbreviations have been used in the text and on the plate captions.

CM — Carnegie Museum, Pittsburgh, Pennsylvania

MCZ — Museum of Comparative Zoology, Cambridge, Massachusetts

MZUM — Museum of Zoology, University of Michigan, Ann Arbor, Michigan

USNM — National Museum of Natural History, Washington, D.C.

Synonymy. For ease of reference, full citations are included for each taxon, including the type locality and the location

of the type when known. No plate or figure references are included with Lea's Obs. Unio, since they are always the same as in the preceding entry. Elsewhere in the text references are abbreviated.

Descriptions. The measurements are only intended to convey the general size of specimens from a given station, and to indicate sexual differences.

Anatomy. The available data are cited.

Remarks. These are designed to elucidate the differences between the species, and include comments on distribution and taxonomy.

Range. The distribution is summarized.

Abundance. These data are based on the literature and on the number and size of the lots found in the several collections studied.

Habitat. Included when known.

Specimens examined. The majority of the records are based on the collections in the museums mentioned above. Unless otherwise noted, the records are based on specimens in the Museum of Comparative Zoology. The few records which could not be seen are credited to the responsible author.

Aside from the Tennessee and Cumberland river systems, all the other relevant river systems flow into the Gulf of Mexico and are listed from west to east, the assumed direction of major dispersal. The records from each river system are arranged from headwaters to the mouth.

The cumbersome term, Mobile-Alabama-Coosa River system, is used because it reflects the main channel of the river, which was given a different name at each important confluence.

Figures. When available, the holotype, or lectotype, is used to illustrate each species and nominal taxon. When required several illustrations are included to show ecophenotypic variation. Some of the data on the plate captions, such as the measurements, are sometimes not repeated elsewhere.

It is suggested that anyone not familiar with the genera of North American Unionidae consult the key in one of the editions of Burch (1973, 1975).



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descending posterior margin. Hinge ligament rather long. Posterior ridge broadly rounded. Posterior slope more or less wrinkled. Sometimes somewhat depressed at the center of the disk. Umbos slightly inflated and little elevated, sculptured with fine, irregular corrugations, which tend to be double looped, located at the anterior quarter of the shell. Surface of the shell rather smooth, except for growth ridges. Periostracum scarcely shining, tawny to yellowish green, with feeble, wavy, dark green rays of uneven width which occasionally break into blotches, especially on the posterior slope.

Left valve with two low, stumpy, pseudocardinal teeth and two curved lateral ones. Right valve with one pseudocardinal and one lateral. Anterior adductor muscle scars deep, posterior ones shallow. Pallial line impressed anteriorly, where the shell is thicker. Umbonal cavities slightly excavated, Nacre bluish to dirty white, sometimes iridescent posteriorly.

The male shell is generally arcuate and wider behind. The female shell is generally a little produced along the middle of the base, and this area is sometimes faintly radially groved.

Length	Height	Width	
mm	mm	mm	
55	25	14	Clinch River, 5.5 mi. below Fort Blackmore. Scott Co., Virginia. Male.
48	25	15	Stones River, Murfreesboro, Rutherford Co., Tennessee. Female.
47	23	18	Caney Fork of the Cumberland River, Tennessee. Holotype. Female.

Anatomy. The anatomy was discussed and figured by Ortmann (1912, 335, fig. 22; 1915: 142; 1921:90). Lea (1863: 410 [46]), under *conradicus*, previously discussed the anatomy, but his specimen was from the Etowah River, a tributary of the Mobile-Alabama-Coosa River system, where this species does not occur. Glochidia rather large, subovate, or almost subspatulate. Length 0.22; height 0.28 mm (Ortmann, 1912, pl. 20, fig. 3).

Remarks. *Medionidus conradicus* (Lea) may be distin-

guished from the other members of the genus by its lack of a posterior ridge, the fineness or virtual absence of corrugations on the posterior slope, the generally arcuate ventral margin, and by the fine rays, which are not reticulated or spotted, but are generally continuous and straight, though the finer ones are sometimes wavy.

The restricted distribution of this species and its abundance led Ortmann (1925:354) to regard it as most characteristic of the Cumberlandian fauna which consists mostly of those species not found beyond the Tennessee and Cumberland River systems.

Hurd (1974: 98) included *conradicus* in the unionid fauna of the Coosa River drainage, based on his identification of lots 605.2-5, and on the former identification of alcoholic lots nos. 14, 24, 66 [the latter were not located] in the Alabama Museum of Natural History; as well as lots 51034, 51055, 69044, 98410, and 98457 in the Museum of Zoology, University of Michigan. Only two of these lots are *conradicus*, one is actually from the Tennessee River system, and the other, merely labeled, "Coosa River, Alabama, Showalter coll'n" is regarded as spurious. It was impossible to personally examine the several lots of specimens in the Alabama Museum where the Showalter collection is located, but it is assumed they are not authentic records from the Mobile-Alabama-Coosa River system.

Range: Restricted to the Tennessee River system in Virginia, Tennessee and Alabama, and the Cumberland River system in Kentucky and Tennessee, including the intervening Duck River drainage of the former.

Abundance. *M. conradicus* was a common species in the upper and lower Tennessee and Cumberland River systems before impoundments. It distinctly preferred small streams and headwaters, where it is still found (Stansbery and Clench, 1974). Known in the Tennessee River proper from a single specimen in the Carnegie Museum from Muscle Shoals, Alabama, collected by H. H. Smith.

Neel and Allen (1964: 444) reported that *conradicus* was abundant just below the Falls of the Cumberland River in September 1948. They did not find it elsewhere in the

main river, but it was abundant in Beaver Creek and the Rockcastle River, where it extended far up into Laurel Fork.

Habitat: Lives mostly in small streams.

SPECIMENS EXAMINED

TENNESSEE RIVER SYSTEM

Powell River Drainage. *Virginia:* South Fork Powell River, 2 mi. above Big Stone Gap, Wise Co. Powell River above Dryden; 2.5 mi. S. Jonesville; Flannery Ford, 7 mi. SW Jonesville; Walden Creek; Indian Creek, 4 mi. SW Ewing; *all* Lee Co.

Clinch River Drainage. *Virginia:* Clinch River, Cedar Bluff, Tazewell Co. Clinch River, Honaker; Cleveland; Boody; *all* Russell Co. Clinch River, St. Paul, Wise Co. Clinch River, Dungannon; Fort Blackmore; Clinchport; Wayland; Speers Ferry bridge; Moccasin Creek, Weber City; *all* Scott Co. Clinch River, 1.5 mi. S Dona; West Black Water Creek, Black Water; *both* Lee Co. *Tennessee:* Clinch River, Kyles Ford; Sneedsville; "The Rounds"; *all* Hancock Co. Clinch River, 4 mi. NW Thorn Hill, Grainger Co.

Holston River Drainage. *Virginia:* North Fork Holston River, 1.7 mi. SW Ceres, Bland Co. (Stansbery and Clench). Lick Creek, 3 mi. E Chatham Hill; North Fork Holston River, 9 mi. ENE Saltville; 8.5 mi. N Marion; *all* Smyth Co. Wolf Creek, 2 mi. NW Lindell; North Fork Holston River, [town of] Holston; Mendota (MZUM); *all* Washington Co. North Fork Holston River, nr. Gate City (MZUM); Big Moccasin Creek, 2.75 mi. SE Gate City; *both* Scott Co. Middle Fork, Holston River, 3.75 mi. S Glade Spring; South Fork Holston River, 1.25 mi. SE Lodi; *both* Washington Co. *Tennessee:* South Fork Holston River, Bluff City; Kingsport; (*both* MZUM) *both* Sullivan Co. Big Creek, Rogersville, Hawkins Co.

French Broad River Drainage. *North Carolina:* French Broad River, Ashville, Buncombe Co. (CM). Little Pigeon River, Sevierville, Sevier Co.

Little River Drainage. *Tennessee:* Little River, 1.5 mi. below Walland, Blount Co. (MZUM).



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son and Overton Cos.] (Wilson and Clark).

Caney Fork Drainage. *Tennessee*: Collins River, Shells Ford, Warren Co. Caney Fork.

Stones River Drainage. *Tennessee*: West Fork Stones River, 8.3 mi NW Murfreesboro; Stones River, Murfreesboro; *both* Rutherford Co. Stones River 1.25 mi. W Couchville, Davidson Co.

Red River Drainage. *Kentucky*: Red River [town of] Red River, Logan Co. (MZUM).

Medionidus acutissimus (Lea)

Plate 18, figs. 3-8

Unio acutissimus Lea 1831, Trans. Amer. Philos. Soc. 4: 89, pl. 10, fig. 18 (Alabama River, type lost, 3 specimens subsequently identified by Lea, MCZ 178887); Lea, 1834, Obs. Unio 1: 99

Unio rubellinus Lea 1857, Proc. Acad. Nat. Sci. Phila. 9: 32 (Oothcalooga [Oothkalooga] Creek, Gordon Co., Georgia). Lea, 1858, Jour. Acad. Nat. Sci. Phila. (2) 4: 70, pl. 13, fig. 51; figured holotype USNM 84136. Lea, 1858, Obs. Unio 6:70.

Unio parvulus Lea 1860, Proc. Acad. Nat. Sci. Phila. 12: 307 (Coosa River, Alabama; Chattanooga [Chattooga River] Georgia). Lea, 1866, Jour. Acad. Nat. Sci. Phila. (2) 6: 45, pl. 16, fig. 43, figured holotype USNM 84139 from the latter locality. Lea, 1867, Obs. Unio 11: 49.

Unio semiplicatus Küster 1862, Conchylien-Cabinet (2) 9, pt. 2 *Unio*, p. 279, pl. 94, fig. 4 (Neu-Holland [Australia, error], location of type not known).

Description: Shell small, seldom exceeding 55 mm in length. Outline elongated rhomboidal. Valves inequilateral, inflated, subsolid. Anterior end regularly rounded, posterior end somewhat to acutely pointed. Ventral margin slightly curved or incurved, dorsal margin rather long and slightly curved, forming an indistinct angle with the obliquely descending posterior margin. Hinge ligament rather long. Posterior ridge low and rounded to rather high and sharp, sometimes slightly double. Posterior slope, and sometimes the greater part of the shell, corrugatedly plicate. Umbos slightly inflated and little elevated, their sculpture not observed, located at the anterior quarter of the shell. Surface of the shell quite smooth except where plicated. Periostracum generally shining, yellowish or greenish, marked with fine green rays which are generally broken or zigzag.

Left valve with two low, stumpy, pseudocardinal teeth

and two curved lateral ones. Right valve with one pseudo-cardinal and one lateral. Anterior adductor muscle scars deep, posterior ones shallow. Pallial line impressed anteriorly, where the shell is thicker. Umbonal cavities slightly excavated. Nacre bluish-green, salmon, flesh color or white.

The male shell is generally arcuate, with the posterior end drawn to a rather sharp point at the posterior base. The female shell is somewhat swollen in the middle of the base, and the posterior point is a little above the base.

Length	Height	Width	
mm	mm	mm	
34	18	11	Chattooga River, Chattooga Co., Georgia. Male.
47	20	16	As above. Female.

Anatomy. The anatomy was discussed by Lea (see under the synonymy of: *rubellinus* 1858; *acutissimus* 1863: 411 [47]; and *parvulus* 1866). Ortmann (under *parvulus*, 1923: 59) said that the anatomy of the females he studied was practically identical with that of *M. conradicus* (Lea). He further noted that the glochidia were subspatulate like those of *conradicus* and that they corresponded to the minimum measurements known in the latter. Length 0.19; height 0.25.

Remarks. *Medionidus acutissimus* (Lea) is closest to *conradicus* (Lea), but differs from the latter in that it usually has a much more pointed posterior end, a sharper posterior ridge, and a posterior slope with coarse corrugations. The color rays are reticulated, interrupted or spotted, whereas those of *conradicus* are continuous.

M. acutissimus (Lea) of the Mobile-Alabama-Coosa River system is obviously derived from *conradicus* (Lea) of the Tennessee and Cumberland river systems. The presence of *Medionidus* in the Mobile-Alabama-Coosa river system affords evidence of a former connection between it and the Tennessee River system (van der Schalie, 1938: 27).

Ortmann (1923: 59, 60) distinguished between *acutissimus* and *parvulus* primarily on the basis that the former had a pointed posterior end and a sharp posterior ridge, whereas the latter was not pointed, and had a rounded posterior ridge, with a less plicate posterior slope. Van der

Schalie (1938: 14), with superior collections of the forms at his disposal, noted that they integrated. The most sharply pointed and plicated specimens are usually immature, which strongly suggests that these adaptations are useful in preventing dislocation from the substrate.

Three of the lots listed by Hurd (1974:98) under *conradicus* from the Mobile-Alabama-Coosa River system are actually *acutissimus* and are included here, under: Specimens Examined, with their catalogue numbers, the only data given by Hurd.

Range. Restricted to the Mobile-Alabama-Coosa River system in Tennessee, Georgia, Alabama, and Mississippi.

Abundance. *M. acutissimus* is a common species in the headwater streams in Tennessee and Georgia, where it is sometimes locally abundant; elsewhere it appears scarce. Formerly it was abundant in the Cahaba River, Lily Shoals, Bibb County, Alabama. Hurd (1974: 170–180), during an extensive survey of the Coosa River for Unionidae, collected at 194 stations, but he (1974: 42, 99) found a total of only 22 specimens of *acutissimus* from 4 localities.

Habitat. Lives mostly in small streams.

SPECIMENS EXAMINED

MOBILE-ALABAMA-COOSA RIVER SYSTEM

Conasauga River Drainage. *Tennessee:* Conasauga River. [town of] Conasauga, Polk Co. (MCZ and MZUM 51055). Coahulla Creek, 7.2 mi. SSE Cleveland, Bradley Co. *Georgia:* Conasauga River, Beaverdale; Swamp Creek; *both* Whitfield Co. Conasauga River, Gregorys Mill, 10 mi. N Eton; Upper Kings Bridge; Lower Kings Bridge; Campbells Mill; *all* Murray Co. Conasauga River, Fikes Ford, 1.4 mi. N Resaca, Gordon Co.

Oothkalooga Creek Drainage. *Georgia:* Oothkalooga Creek, 3.7 mi. SE Calhoun, Gordon Co.

Etowah River Drainage. *Georgia:* Etowah River [Bartow Co.] (Lea).

Chattooga River Drainage. *Georgia:* Duck Creek; Chattooga River, Martindale, (MZUM); *both* Walker Co. Arum-



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Description. Shell small, seldom exceeding 55 mm in length. Outline elongated rhomboidal to long elliptical. Valves inequilateral, subinflated, subsolid. Anterior end regularly rounded, posterior end with a rounded point near the base. Ventral margin straight or gently curved, sometimes slightly arcuate near the posterior end, dorsal margin slightly curved, merging imperceptibly with the obliquely descending posterior margin. Hinge ligament rather long. Posterior ridge rounded to bluntly angled. Posterior slope usually strongly corrugated. Umbos slightly inflated and little elevated, their sculpture consisting of double looped ridges, located at the anterior quarter of the shell. Surface of the shell quite smooth except where plicated. Periostracum generally shining, yellowish or greenish, marked with fine green rays which are often broken, giving a mottled appearance.

Left valve with two low, stumpy pseudocardinal teeth and two curved lateral ones. Right valve with one pseudocardinal and one lateral. Anterior adductor muscle scars deep, posterior ones very shallow. Pallial line impressed anteriorly. Umbonal cavities slightly elevated. Nacre purplish or greenish, often lurid and spotted, posteriorly iridescent.

The male shell generally has a straight ventral margin which may be slightly arcuate posteriorly. The female shell is generally smaller than that of the male, is more fully developed ventrally, and the posterior point is more elevated above the base than is that of the male.

Length	Height	Width	
mm	mm	mm	
52	27	20	Flint River, Bainbridge, Decatur Co., Georgia. Male.
44	23	17	As above. Female.

Anatomy. The anatomy was discussed by Lea (see under the synonymy of: *penicillatus* 1859) and the glochidium figured (1858: 47, pl. 5, fig. 5). The glochidia are subspatulate.

Remarks. *Medionidus penicillatus* (Lea) most closely resembles *acutissimus* (Lea) of the Mobile-Alabama-Coosa River system, from which it is undoubtedly derived. It differs

from the latter, in that the shell is higher, less arcuate, and has a lower posterior ridge with a posterior slope that is generally more finely and strongly corrugated.

Van der Schalie (1940: 199, pl. 3, figs. 5, 6) figured a female shell as *penicillatus* and a male as *kingi*, recognizing both taxa as valid, however there is much integration of the forms, the acuteness of the posterior ridge and the amount of sculpture on the posterior ridge being variable.

Range. Yellow River System in Alabama; Econfina Creek system in Florida; and the Apalachicola River system in Florida, Georgia, and Alabama.

Abundance. The number of specimens in the collections studied indicate that this species is relatively abundant in the Apalachicola River system, especially the Flint River drainage, and is scarce elsewhere.

Habitat: Lives in sand and gravel in streams where there is moderate current. (Clench and Turner 1956: 191).

SPECIMENS EXAMINED

YELLOW RIVER SYSTEM

Yellow River Drainage. *Alabama:* Yellow River, 7 mi. NW Lockhart, Covington Co. (MZUM, collected by W. H. Heard, Oct. 1963).

ECONFINA CREEK SYSTEM

Econfina Creek Drainage. *Florida:* Econfina Creek 7 mi. W Youngstown, Bay Co.

APALACHICOLA RIVER SYSTEM

Chipola River Drainage. *Alabama:* Big Creek, nr. Taylor, Houston Co. (MZUM). *Florida:* Big Creek, 8 mi. W Malone; Spring Creek, nr. Alabama state line (MZUM); *both* Jackson Co. *Alabama:* Cowarts Creek, nr. Cowarts; Reedy Creek, nr. Madrid (MZUM); *both* Houston Co. *Florida:* Reedy Creek, 6 mi. W Malone; Chipola River, 1 mi. N Mariana; Spring Creek, 2.5 mi. SE Mariana (MZUM); Rocky Creek, 2.4 mi. NNW Sink Creek; *all* Jackson Co. Chipola River, 2.5 mi. SE Chason; 2 mi. E Clarksville; Dead Lake of Chipola River, 20 mi. S. Blountstown; *all* Cahoun Co.

Chattahoochee River Drainage. *Georgia* [Chattahoochee River], near Atlanta, [De Kalb Co.] (Lea). Mulberry Creek, 3 mi. SSE Mountain Hill, Harris Co. (Clench and Turner). Chattahoochee River, Columbus, Muscogee Co. Sawhatchee Creek, 14 mi NW Donalsonville, Seminole Co.

Apalachicola River Drainage. *Florida*: Apalachicola River, Chattahoochee, Gadsden Co.

Flint River Drainage. *Georgia*: Sandy Mount Creek, 6 mi, N Vienna, Dooly Co. Gum Creek, 2 mi. N Cordele; Cedar Creek, 6 mi. SW Cordele; *both* Crisp Co. Jones Creek, 2 mi. S Oakfield; Abrams Creek, 5 mi. S Oakfield (MZUM); Mill Creek, 8 mi. S Oakfield; *all* Worth Co. Branch of Flint River; Flint River; *both* Baker Co. Flint River, Albany, Dougherty Co. Ichawaynochaway Creek, Calhoun Co. (MZUM). Flint River, Bainbridge; Recovery; *both* Decatur Co.

Medionidus walkeri (B. H. Wright)

Plate 19, figs. 3, 4

Unio walkeri B. H. Wright 1897, *Nautilus* 11: 91 (Suwannee River, [Ellaville], Madison Co., Florida. Lectotype USNM 150506 selected by Johnson, 1969, *Occ. Pap. on Moll.* 3: 9, pl. 8, fig. 1).

Description. Shell rather small, seldom exceeding 50 mm in length. Outline subrhomboid to ovate, but short. Valves inequilateral, rather inflated and solid. Anterior end regularly rounded, posterior end with a rounded point near the base. Ventral margin straight, dorsal margin forming a perceptible angle with the obliquely descending posterior margin. Hinge ligament short. Posterior ridge high and angled. Posterior slope with strong, curved, radiating corrugations. Occasional corrugations on the disk. Umbos full and high, their sculpture not observed, located at the anterior third of the shell. Surface of the shell often with strong irregular growth lines. Periostracum usually black or yellowish green; usually without rays, though sometimes with broad, very faint, greenish ones.

Left valve with two somewhat compressed pseudocardinal teeth, and two short lateral ones. Right valve with one pseudocardinal and one lateral. Anterior adductor muscle



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Medionidus simpsonianus Walker

Plate 19, figs. 5-8

Medionidus simpsonianus Walker 1905, Nautilus 18: 136, pl. 9, figs. 4, 5 ([Ochlockonee River], Calvary [Grady Co.], Georgia; holotype MZUM 98501)

Description. Shell small, seldom exceeding 55 mm in length. Outline elliptical. Valves inequilateral, rather inflated, subsolid. Anterior end regularly rounded and compressed, posterior end obtusely rounded, the tip being nearly on the medial line of the shell. Ventral margin distinctly and regularly curved. Dorsal margin slightly curved, merging imperceptibly with the posterior margin. Hinge ligament short. Posterior ridge somewhat angled. Posterior slope covered with strong, sub-concentric, somewhat irregular ridges, extending from the posterior ridge to the posterior margin. Sometimes with faint sculpture below the posterior ridge. Umbos rather low, their sculpture not observed, located at the anterior third of the shell. Surface of the shell smooth and usually polished. Periostracum dark yellow, yellowish green, or brownish, covered with dark green pencilled rays which tend to break into a distinctive network of angular lines covering the entire surface.

Left valve with two crenulate, compressed, pseudocardinal teeth, which are nearly in line and two delicate, straight, lateral ones. Right valve with one pseudocardinal and one lateral. Anterior adductor muscle scars deep, posterior ones very shallow. Pallial line usually visible. Umbonal cavities but slightly excavated with dorsal muscle scars under the hinge plate behind the pseudocardinal teeth. Nacre bluish-white.

Sexual differences slight, the female shell is less elongate than that of the male.

Length	Height	Width	
mm	mm	mm	
44	21	15	Ochlockonee River, 7 mi. S Cairo, Grady Co. Georgia. Male.
42	24	15	As above. Female.

Remarks. *Medionidus simpsonianus* Walker differs from all other *Medionidus* in that the anterior end tends to be

more compressed, the anterior margin more elevated, and the ventral margin is consistently and regularly rounded. The shell is equally curved above and below, the point being nearly on the medial line and not near the basal margin, as it is in all other *Medionidus*, giving *simpsonianus* a unique outline. When the rays are broken they break into angles which form patterns unlike those of any other of the species.

Range. Endemic to the Ochlockonee River system in Georgia and Florida.

Abundance. Long known only from the holotype and two paratypes, it was collected in some numbers from a single locality in 1934 and again from several localities in 1954.

Habitat. Lives in sand and gravel in streams where there is moderate current.

SPECIMENS EXAMINED

OCHLOCKONEE RIVER SYSTEM

Ochlockonee River Drainage. *Georgia:* Ochlockonee River, 7 mi. S Cairo; between Reno and Beachton; Calvary (MZUM): *all* Grady Co. *Florida:* Ochlockonee River, 11 mi. NW Tallahassee; 8 mi. W Tallahassee; *both* Leon Co. Ochlockonee River, Wakulla Co. Little River, 3.5 mi. E Quincy, Gadsen Co.

Medionidus mcglameriae van der Schalie

Plate 19, fig. 9

Medionidus mcglameriae van der Schalie 1939, Occ. Pap., Mus. Zool., Univ. Michigan, no. 407: 1-2, pl. 1, figs. 1-3 (Tombigbee River, Epes, Sumter Co., Alabama; holotype MZUM 130460).

Description. Shell very small not known to exceed 2.35 mm in length, "thin, oval in outline, somewhat swollen posteriorly. Posterior ridge low and well rounded, with a more or less prominent wing above the ridge. Beaks placed within anterior third of shell, but slightly raised above the hinge line. Beak sculpture not apparent because of erosion of the umbonal region. Anterior end of shell well rounded and somewhat cut away basally, giving the alate

shell a wedge-shaped appearance laterally; posterior end broadly biangulate. Viewed from above the shell has a characteristic wedge shape with the greatest diameter at about the center of the posterior ridge. The outline of the shell when viewed thus tends to be somewhat twisted. The epidermis has a yellow-green background crossed by numerous fine, undulating often blotched, green rays, which are somewhat concentrated along the posterior half of the shell. Outer surface uneven, slightly reticulate, and crossed by prominent growth rests. Left valve with two inconspicuous, stumpy pseudocardinal teeth (the one just anterior to the umbone most prominent), and two rather remote, lamellar, curved laterals. Right valve with one blunt, prominent pseudocardinal and one prominent lateral, occasionally with a small spurious one above it. Nacre bluish white, thin, with relatively deep anterior muscle scars and the posterior scars evident but shallow." (van der Schalie)

Length	Height	Width	
mm	mm	mm	
2.35	1.2	0.75	Tombigbee River, Epes, Sumter Co., Alabama Holotype.
2.10	1.0	0.50	As above Paratype.

Remarks. *Medionidus mcglameriae* van der Schalie differs from all other *Medionidus* in that the shell is distinctly alate, and is wedge shaped both laterally and dorsally. It is also distinguishable by its small size, the thinness of the shell, and the delicacy of the teeth.

It is assumed that this species evolved from *M. conradicus* or *acutissimus*, though it resembles neither very much.

Range. Endemic to the Tombigbee River drainage of the Mobile-Alabama-Coosa River system in Alabama.

Abundance. Known only from the holotype and a paratype in the Alabama Museum of Natural History.

Habitat. Found on a small sand bar in shallow water.

SPECIMEN EXAMINED

MOBILE-ALABAMA-COOSA RIVER SYSTEM

Tombigbee River Drainage. Alabama: Tombigbee River, Epes, Sumter Co. (MZUM).



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- 1925. The naiad-fauna of the Tennessee River below Walden Gorge. Amer. Mid. Nat. 9 (8): 321-373.
- SIMPSON, C. T. 1900a. New and unfigured Unionidae Proc. Acad. Nat. Sci. Phila. 52: 74-86, pls. 1-5.
- 1900b. Synopsis of the naiades, or pearly fresh-water mussels. Proc. U.S. Natl. Mus. 22: 501-1044.
- 1914. A descriptive catalogue of the naiades or pearly fresh-water mussels. Detroit, Michigan. Parts 1-3, pp. i-xi, 1-1540.
- STANSBERRY, D. H. 1976. Naiad Mollusks [in] Endangered and threatened plants and animals in Alabama. Bull. Alabama Mus. Nat. Hist. no. 2: 42-52.
- and W. J. CLENCH. 1974. The Pleuroceridae and Unionidae of the North Fork Holston River above Saltville, Virginia. Bull. Amer. Mal. Union, pp. 33-36.
- VAN DER SCHALIE, H. 1938. The naiades (freshwater mussels) of the Cahaba river in northern Alabama. Occ. Papers Mus. Zool., Univ. Michigan, no. 392, pp. 1-29.
- 1939. *Medionidus mcglameriae*, a new naiad from the Tombigbee River, with notes on other naiades of that drainage. Occ. Papers Mus. Zool., Univ. Michigan, no. 407, pp. 1-6, 1 pl.
- 1940. The naiad fauna of the Chipola River, in northwestern Florida. Lloydia 3: 191-208, pls. 1-4. Published by the Lloyd Library, Cincinnati, Ohio.
- 1973. The mollusks of the Duck River drainage in central Tennessee. Sterkiana, no. 52, pp. 45-55.
- WILSON, C. B. and H. W. CLARK. 1914. The mussels of the Cumberland River and its tributaries. U.S. Bur. Fisheries Doc. no. 781, pp. 1-67, 1 pl.

Plate 17

Distribution of the Genus *Medionidus*

- Black dots. Distribution of *Medionidus conradicus* (Lea). Tennessee and Cumberland River systems, including the intervening Duck River drainage of the former.
- Open circles. Distribution of *Medionidus acutissimus* (Lea) Mobile-Alabama-Coosa River system.
- Black star. Distribution of *Medionidus mcglameriae* van der Schalie. Known only from the Tombigbee River drainage of the Mobile-Alabama-Coosa River system at Epes, Sumter Co. Alabama.
- Black squares. Distribution of *Medionidus penicillatus* (Lea). Yellow River system, Econfina Creek system, and the Apalachicola River system.
- Open squares. Distribution of *Medionidus simpsonianus* Walker. Ochlockonee River system.
- Black Triangles. Distribution of *Medionidus walkeri* (B. H. Wright). Suwannee River system.

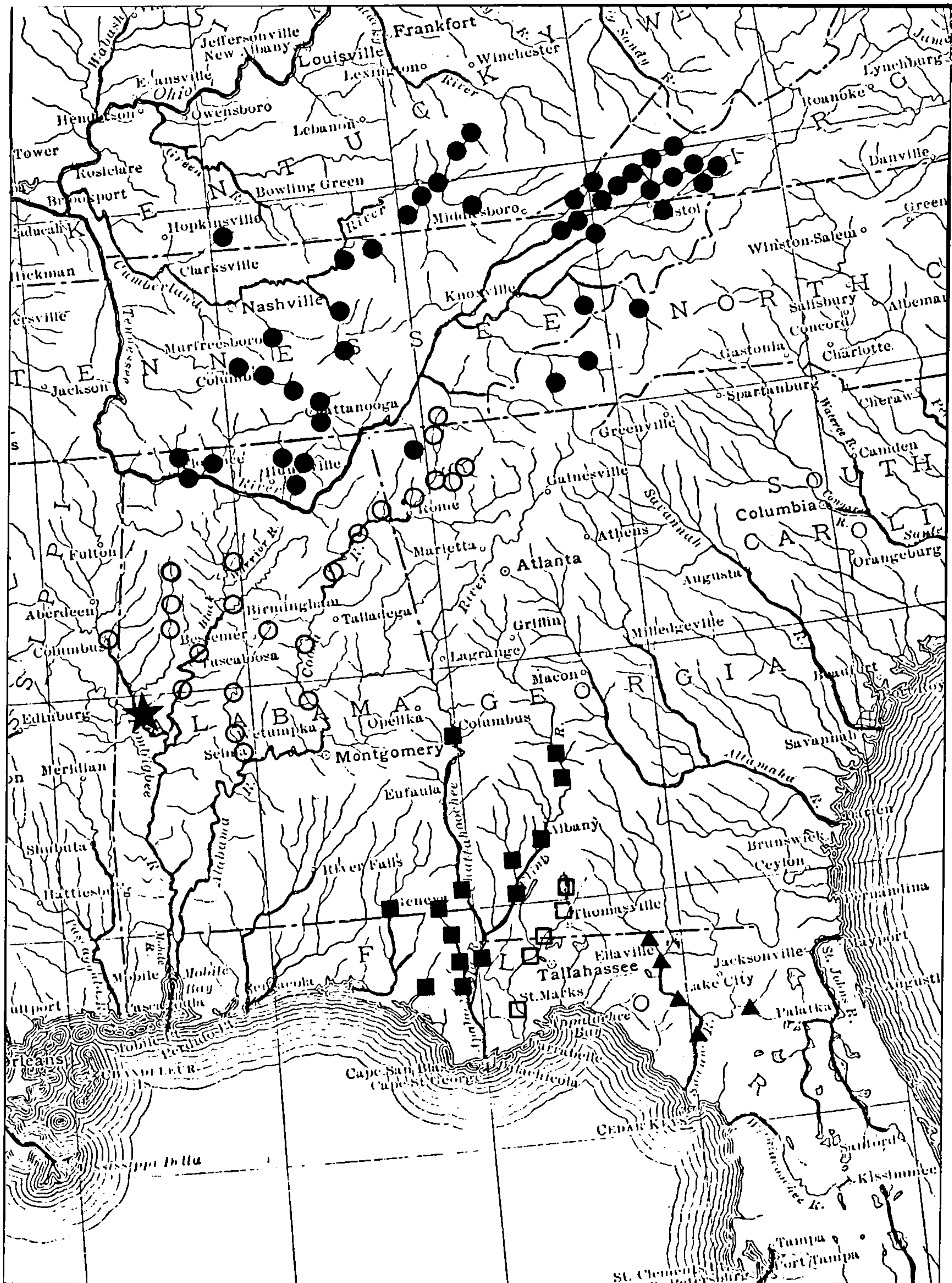


Plate 17

Plate 18

Medionidus conradicus (Lea)

- Fig. 1. Virginia. Specimen identified by Lea, MCZ 178931. Length 45 mm, height 20 mm, width 12 mm. Male.
- Fig. 2. *Unio conradicus* Lea. [Caney Fork of the Cumberland River, Tennessee]. Holotype USNM 84134. Length 47 mm, height 23 mm, width 18 mm. Female.

Medionidus acutissimus (Lea)

- Fig. 3. *Unio acutissimus* Lea. Alabama River. Type lost. Figure from Lea. Length 28 mm, height 12 mm, width 9 mm. Male
- Fig. 4. Alabama. Specimen identified by Lea, MCZ 178887. Length 22 mm, height 10 mm, width 7 mm. Female.
- Fig. 5. *Unio rubellinus* Lea Oothkalooga Creek, Gordon Co. Georgia. Holotype USNM 84136 Length 38 mm, height 19 mm, width 15 mm. Male.
- Fig. 6. Conasauga River, Campbells Mill, Murray Co. Georgia. MCZ 64057. Length 47 mm, height 21 mm, width 14 mm. Female.
- Fig. 7. *Unio parvulus* Lea. Chattooga River, Gordon Co. Georgia. Holotype USNM 84139. Length 41.5 mm, height 18 mm, width 11 mm. Male.
- Fig. 8. *Unio semiplicatus* Küster. [Alabama River system]. Location of type know known. Figure from Küster. Length 24 mm, height 11 mm, width 9 mm. Female.

Medionidus penicillatus (Lea)

- Fig. 9. *Unio penicillatus* Lea Flint River, near Albany, Dougherty Co., Georgia. Holotype USNM 84142. Length 33.5 mm, height 18, width 12.5 mm. Male.
- Fig. 10. *Unio kingii* B. H. Wright. A branch of the Flint River, Baker Co., Georgia. Holotype USNM 159965. Length 37, height 20, width 15 mm. Female.



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Plate 19

Medionidus penicillatus (Lea)

- Fig. 1. *Unio kingii* B. H. Wright. A branch of the Flint River, Baker Co., Georgia. Paratype MCZ 30045. Length 41, height 21, width 15 mm. Male.
- Fig. 2. *Unio kingii* B. H. Wright. A branch of the Flint River, Baker Co., Georgia. Paratype MCZ 20156. Length 34 mm, height 20 mm, width 14 mm. Female.

Medionidus walkeri (B. H. Wright)

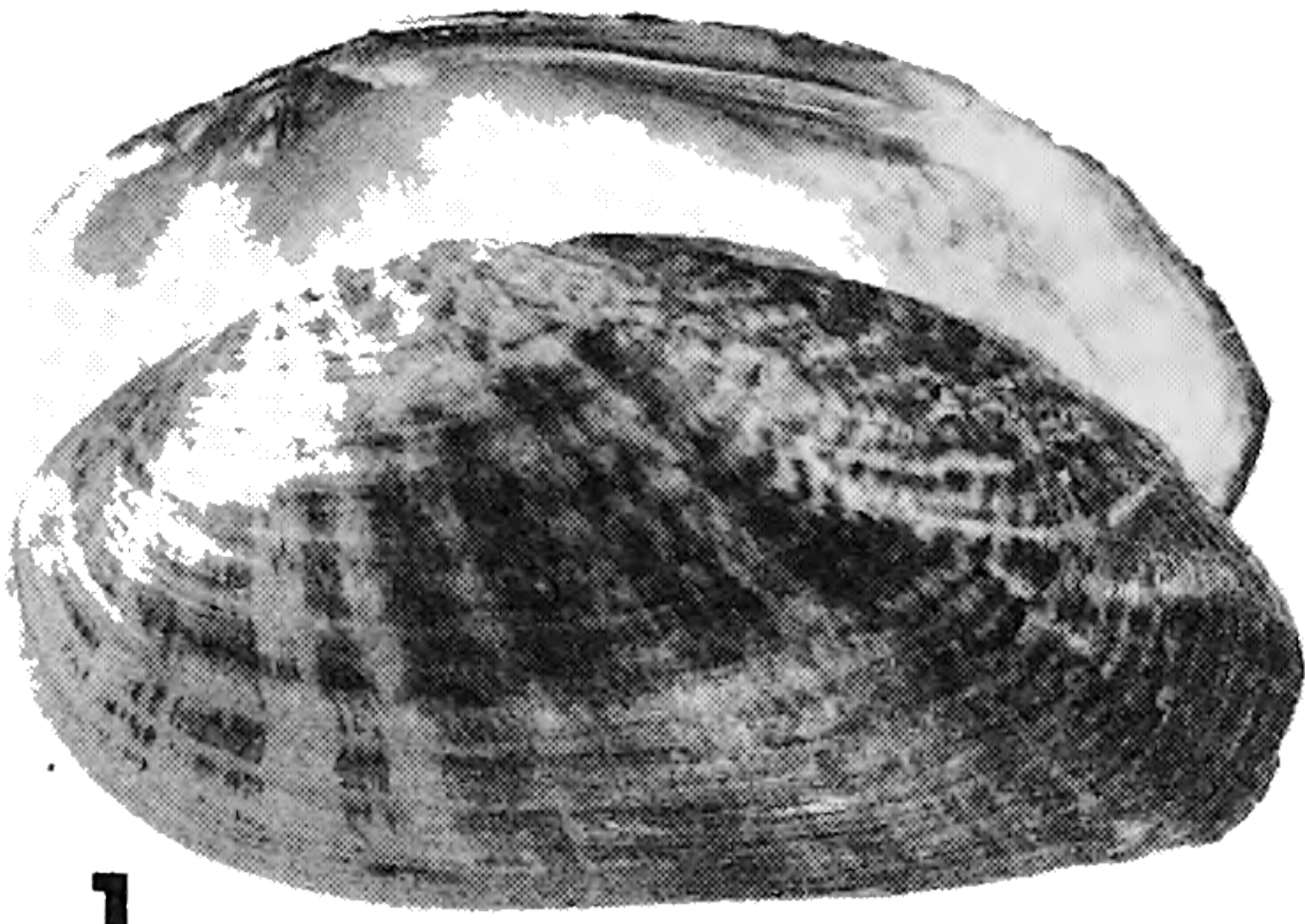
- Fig. 3. *Unio walkeri* B. H. Wright. Suwannee River [Ellaville], Madison Co., Florida. Lectotype USNM 150506. Length 47, height 25 mm, width 17 mm. Male.
- Fig. 4. Suwannee River, Ellaville, Madison Co., Florida. MCZ 30049. Length 45 mm, height 22 mm, width 16 mm. Female.

Medionidus simpsonianus Walker

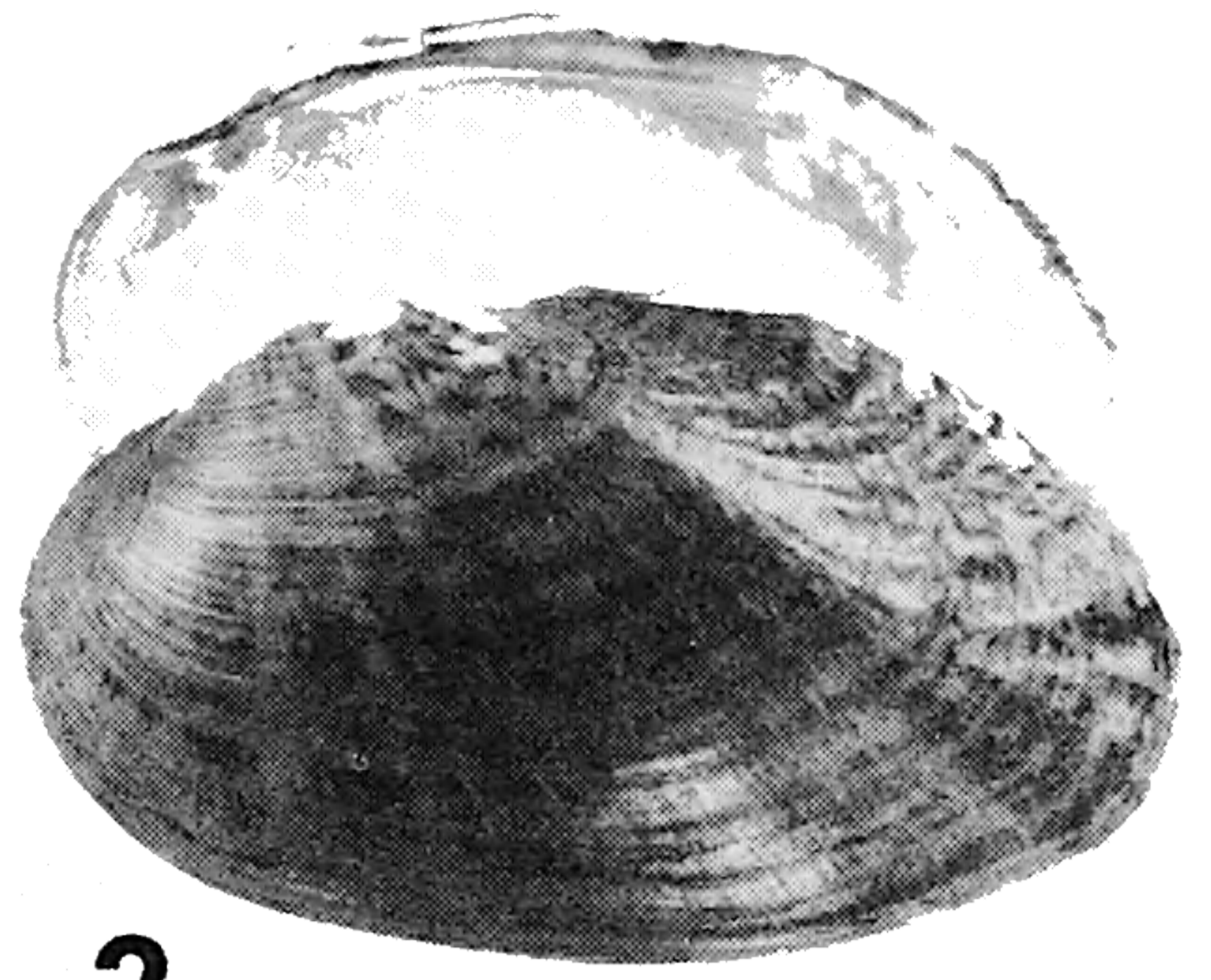
- Fig. 5. *Medionidus simpsonianus* Walker. [Ochlockonee River], Calvary, [Grady Co.], Georgia. Holotype MZUM 98501. Length 36 mm, height 19 mm, width 13 mm. Male.
- Fig. 6. Ochlockonee River, 7 mi. S Cairo, Grady Co., Georgia. MCZ 190298. Length 42 mm, height 24 mm, width 16. Female.
- Fig. 7. Ochlockonee River, 7 mi. S Cairo, Grady Co., Georgia. MCZ 190298. Length 45 mm, height 23 mm, width 17 mm. Male.
- Fig. 8. Little River, 3.5 mi. E Quincy, Gadsden Co., Florida. MCZ 190301. Length 33.5 mm, height 19 mm, width 13 mm. Female.

Medionidus mcglameriae van der Schalie

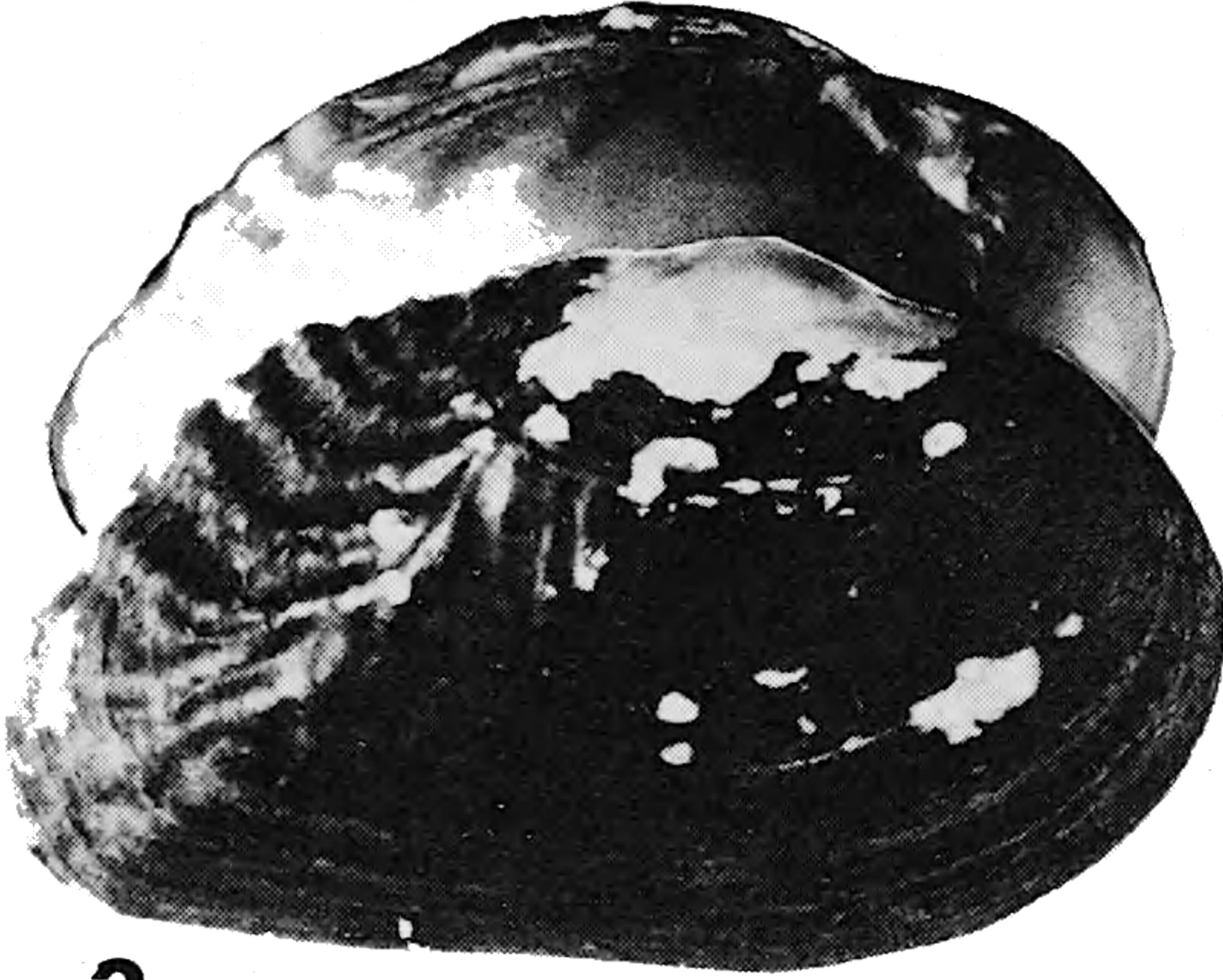
- Fig. 9. *Medionidus mcglameriae* van der Schalie. Tombigbee River, Epes, Sumter Co., Alabama. Holotype MZUM 130460. Length 2.35 mm, height 1.2 mm, width 0.75 mm.



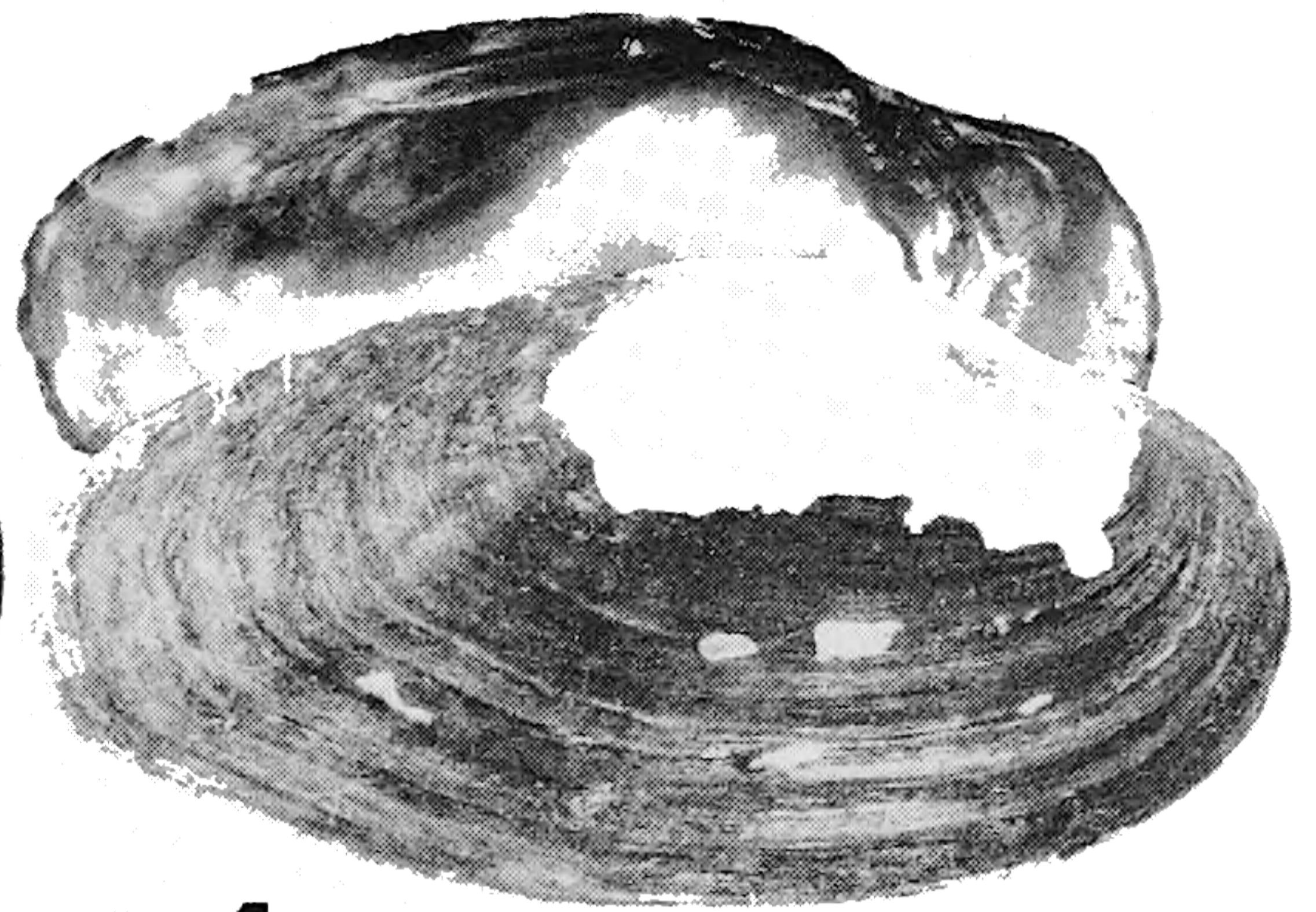
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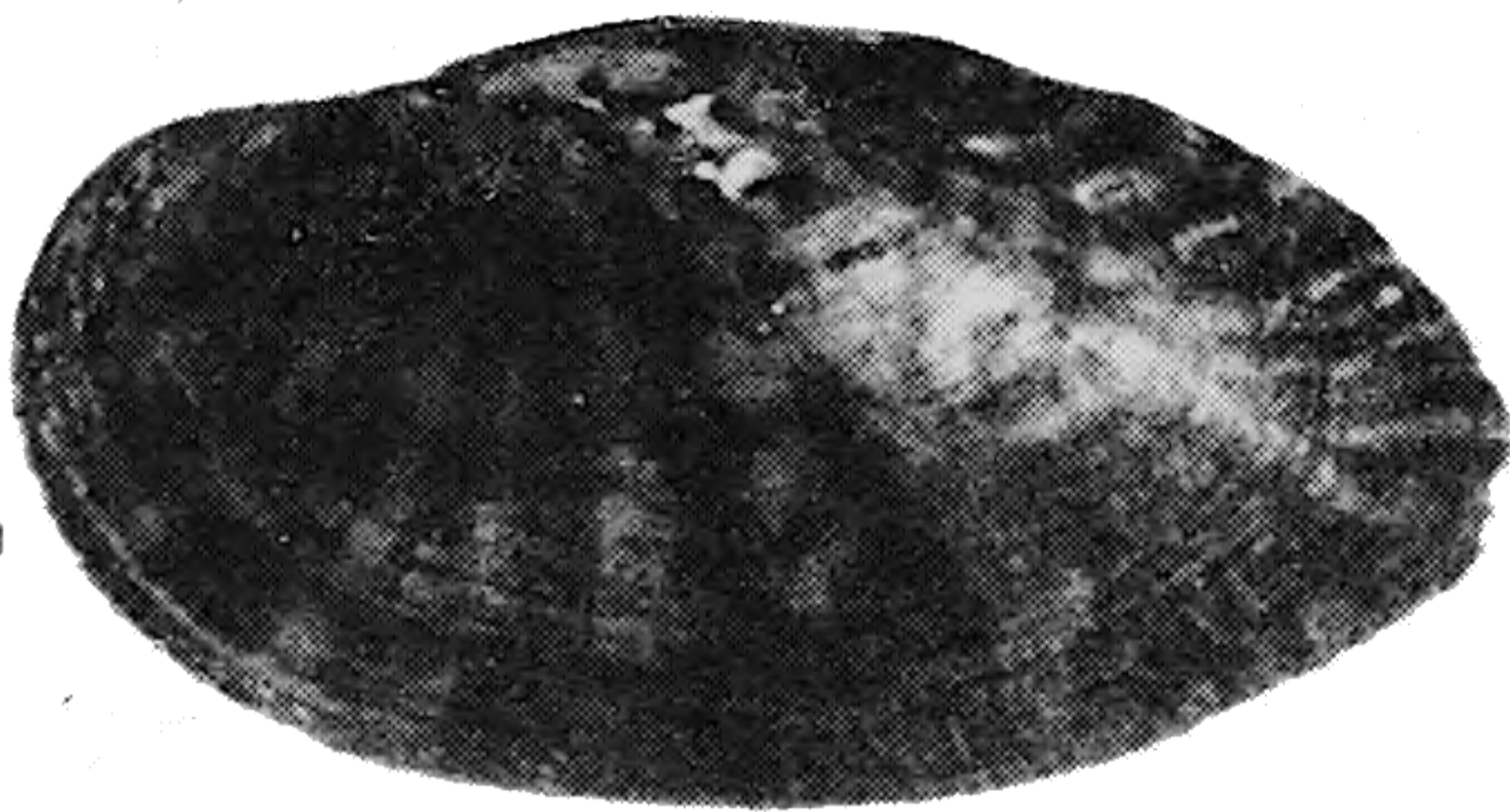
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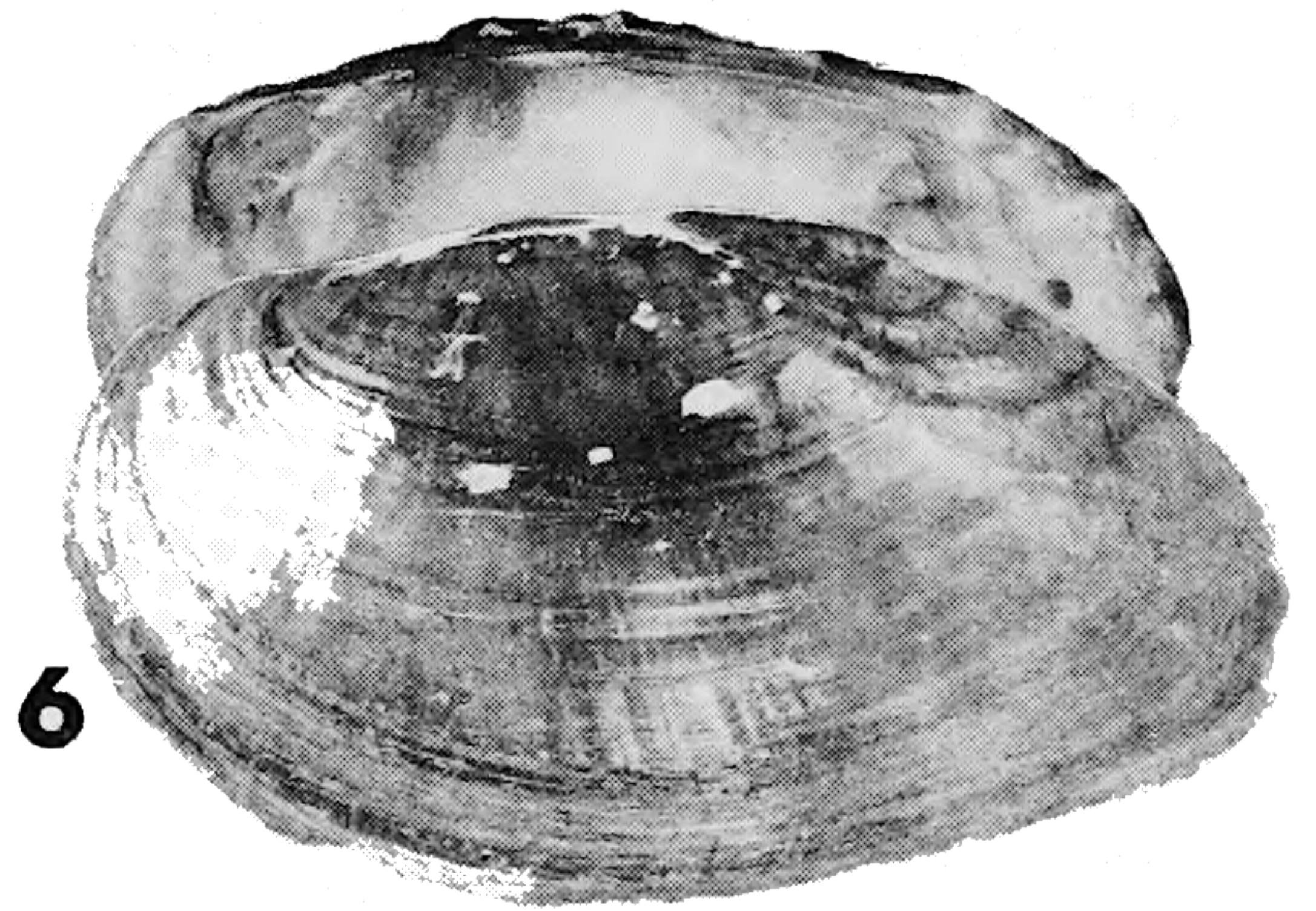
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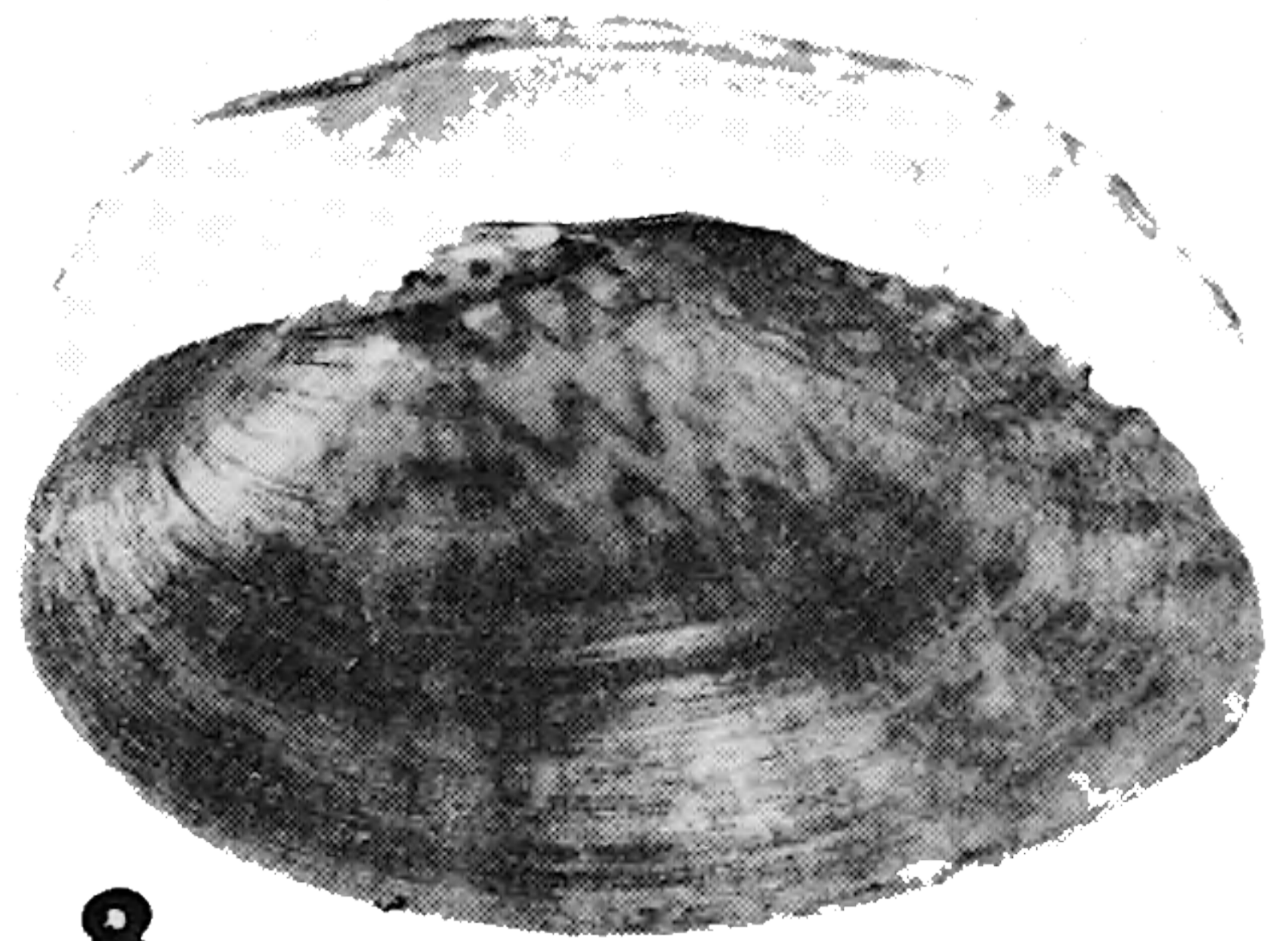
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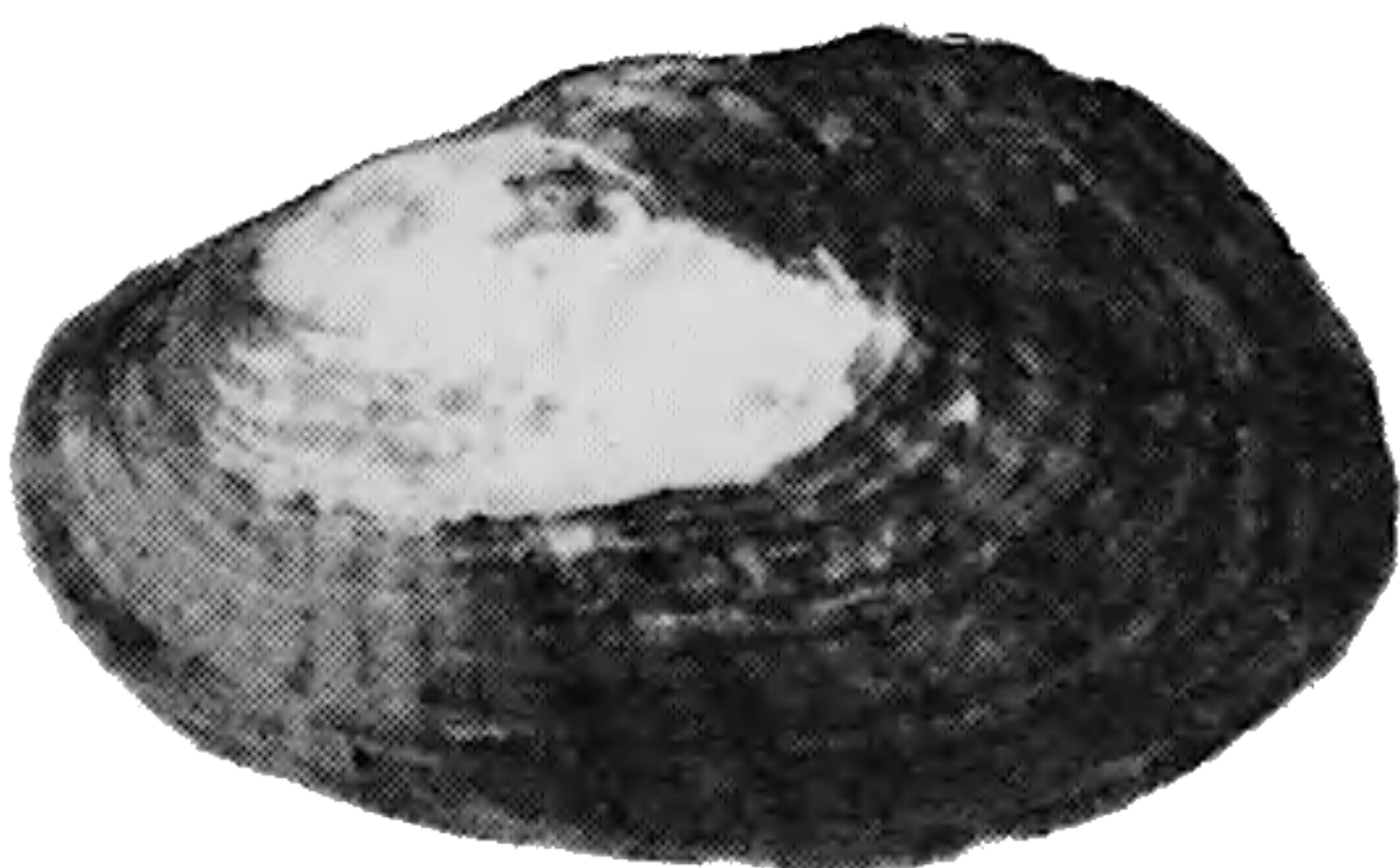
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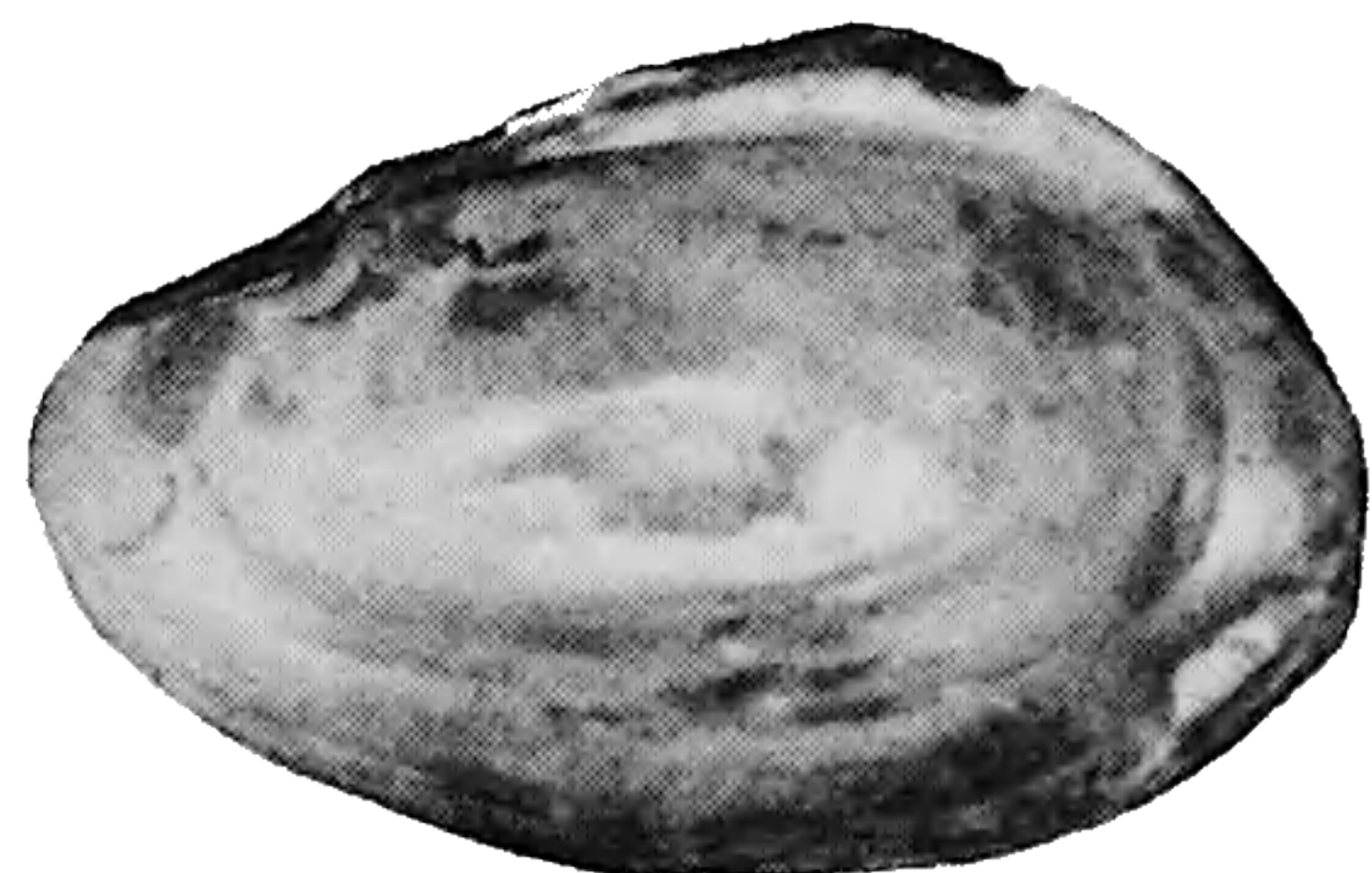
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Book Review

Hurlburt, Sarah. 1977. *The Mussel Cookbook*. Harvard University Press, Cambridge, 169 pp., text illustrations. 8 vo. \$8.95.

Years ago, after our first feast of steamed mussels, with white wine and butter, my family swore an oath to dine forevermore on *Mytilus edulis* in lieu of our old favorite, the Cape Cod steamer, *Mya arenaria*. Some of the family may have made this choice because of Yankee frugality. Blue mussels were, and still are, abundant, accessible, and only costly in the labor of harvesting.

Now, Sarah Hurlburt gives the blue mussel its culinary due. Whether it be a traditional *Éclade* from Provence or a novel variation on the Hawaiian *Pupus*, she runs the gamut of international mussel cuisine. *Mytilus* readily adapts to soy sauce, wine, beer, or cream bases; to cloves, capers, basil, horseradish, saffron, or dijon spices; to potato, eggplant, tomato, or even to the piquant cranberry complements.

The author offers more than a mere cookbook. She provides a reasoned argument for our cultivation of mussels. This shellfish grows plump on phytoplankton; cattle grow fat on grain. Beef cattle consume 21 pounds of protein to produce one pound of meat protein. Granted our Western palate can afford steak, but as prices rise, Hurlburt suggests that we acquire a preference for this protein of the sea.

She suggests we seriously consider the mariculture of *Mytilus*. This has been successful in Europe, where yields are impressive. Spain, the world's largest producer, cultivates mussels on rafts and produces upwards of 220,000 tons a year. France's pole culture and Holland's bottom culture also have high yields. Hurlburt proposes that a site such as Cape Cod Bay, an area of less than 300 square miles, could be a blue mussel fishery. Ideally, she envisions the Bay as yielding 43 billion pounds of meat a year!

The mussel is a filter feeder, reaping a mixed harvest of nutrients and whatever contaminants, natural or otherwise, flow with the tide. The problem is to keep the mariculture free from pollution and invasions of such dinoflagellates as *Gonyaulax*, which cause paralysis.

Purchase this succulent shellfish in the market, or have fun and gather *Mytilus* from our rocky shores. Then prepare this delicacy, following one of the author's recipes that accords with your mood.

—HARRIET HORNBLOWER



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more or less allopatric: *Strigilla* is represented by a couple of poorly known species in the Australian and West African regions and has its central radiation in Western Tethys, embracing the Caribbean and Eastern Pacific regions. *Iacra* is found mainly along the coast of East Africa, around Madagascar and in the Red Sea.

Sculpture in the bivalves is usually formed concentrically as the shell grows periodically around its entire mantle edge or radially as structural differentiations in the shell form at discrete positions along the edge of the mantle. In the case of acentric sculpture, the peripheral mantle secretory areas shift positions during growth and form the sculpture discordantly. Such unusual sculpture has arisen several times among lineages in the superfamily Tellinacea (Boss, 1966) and occurs in several other families of bivalves as well (Seilacher, 1972). Among tellinids, the suborbicular shape and bilaterally acentric sculpture is typical of *Strigilla* (Boss, 1969) while within the confines of the family Semelidae, it is limited to *Iacra*. As illustrated in Plate 20, figs. 1-3, the acentric incised scissulations cover the surface of the disc of the shell and descend ventrally at an angle of about 45°. Along the posterior dorsal slope the sculpture is angled upward and the lirations are compressed closer together while along the anterior dorsal slope, simple concentric sculpture is evident as is the marked zone where discordance commences (Plate 20, fig. 4). In *Iacra* as well as in *Strigilla*, the exact nature of these differential sculptures combine with features of the pallial sinus, dentition and size of the shell to form taxobases which distinguish species.

The functional and adaptive significance of discordant sculpture in *Strigilla* has been discussed by Stanley (1969: 1970). By inference, this unusual sculpture probably serves the same functional role in *Iacra*. *Strigilla carnaria* and *S. mirabilis* from Puerto Rico are very rapid burrowers. They position themselves vertically with an active and extensible foot and commence penetration of the substrate with a rocking movement during which the scissulations dig into and displace the sand. The acentric sculpture, thus, acts as an important mechanical aid in the penetration

of, and slipping through, the substrate. *Strigilla* normally lives in clear sandy substrates where current or wave action frequently necessitates reburial or at least downward movement for maintenance of normal burrow depths (Stanley, 1969). The animals are rather deep burrowers and live in depths of the sediment several times their own shell lengths. The position taken up in the sediment is various but always with the posterior end uppermost and at least the incurrent siphon extending toward the substrate interface. Presumably *Strigilla* is a suspension or interstitial feeder since deposit feeding was not observed in either *S. carnaria* or *S. mirabilis* (Stanley, 1970). It is also probable that the grain of the acentric sculpture serves to maintain position in the substrate as well as to anchor the shell when the siphons are retracted (Boss, 1966). Although little information is available on the ecological preferences of the three species of *Iacra*, most of the data point to their preferring sandy substrates in subtidal depths, and utilizing their sculptural peculiarities in much the same way as *Strigilla*.

ACKNOWLEDGMENTS

The following are acknowledged for the loan of specimens and exchange of correspondence: R. T. Abbott (DMNH), P. H. Boshoff, Port Alfred, and B. C. Fabian, University of Witwatersrand, Johannesburg, Republic of South Africa, J. van Goethem (IRSNB), T. Habe (NSMT), B. F. Kensley (SAM), R. Kiliyas (ZMB), R. Oleröd (NR), O. Paget (NMW), J. P. Pointier (MNHNP), R. Robertson (ANSP), J. Rosewater (USNM) and K. M. Way (BMNH). Critical readings of the MS were made by R. I. Johnson and R. D. Turner.

ABBREVIATIONS

ANSP — Academy of Natural Science, Philadelphia
BMNH — British Museum (Natural History), London
DMNH — Delaware Museum of Natural History, Greenville
IRSNB — Institut Royal des Sciences Naturelle de Belgique
MCZ — Museum of Comparative Zoology
MNHNP — Muséum National d'Histoire Naturelle, Paris

NMW — Naturhistorisches Museum, Wien

NR — Naturhistoriska Riksmuseet, Stockholm

NSMT — National Science Museum, Tokyo

SAM — South African Museum, Cape Town

USNM — National Museum of Natural History, Washington

ZMB — Zoologisches Museum der Humboldt-Universität, Berlin

SYSTEMATIC SECTION

SUBGENERIC SYNONYMY

Iacra H. and A. Adams 1856, Gen. Rec. Moll. 2: 409 (type-species, by monotypy, *Scrobicularia seychellarum* A. Adams, 1856).

Strigillina Dunker 1861, Malak. Blätt. 8: 43 (type-species, by monotypy, *Strigillina lactea* Dunker, 1861).

Jacra Dunker 1882, Nov. Conch. Suppl. 7: 194, error pro *Iacra* H. and A. Adams 1856.

Remarks. *Iacra* is differentiated from all other semelids by its elaboration of acentric scissulate sculpture very similar to that found in the tellinid *Strigilla*. The presence of an internal ligamental element which is supported by a variously shaped chondrophore allocates *Iacra* to the Semelidae (Boss, 1972). As Keen (1969) has pointed out, *Iacra* is placed in the genus *Abra* which consists of species whose shells tend to be thinner and smaller than *Semele*. More importantly, the pallial sinus of *Abra* and its constituent *Iacra* are confluent with the pallial line while in *Semele* the pallial sinus ascends obliquely from the pallial line at its most posteriad.

Iacra consists of three species: *seychellarum* with strongly developed internal chondrophore, narrowly set, incised scissulations, whitish coloration and wide tropical western Pacific and Indian Ocean distribution; *petiti* also with strongly developed internal chondrophore, rather widely set, incised scissulations, mostly yellowish-purplish coloration and a distribution restricted to Madagascar and the



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crowded along anterior dorsal slope; scissulate lirations over the postero-central portions of disc (2-6/mm) and extremely closely-spaced, finely incised lirations along posterior dorsal slope (8-16/mm). Posterior ridge weakly developed, especially in left valve. Putative growth annulae from 1 to 7, indicated by differential translucence of shell substance.

Ligament opisthodontic, consisting of very short, external, mostly periostracal element in elongate-lanceolate, weakly distinct escutcheon, an internal variously developed, but usually rather strong, elastic, calcareous portion, resting in spatulate chondrophore.

Hinge line consisting of both cardinal and lateral dentition. Dentition stronger in right valve, cardinal complex consisting of short, protuberant, narrowly subdeltoid anterior and posterior teeth; right anterior lateral tooth subproximal to cardinal complex, shelf-like, bluntly pointed and socketed above; right posterior lateral tooth distal, posterior to external ligament and chondrophore, elongate, narrowly shelf-like, bluntly pointed and socketed above. In left valve, cardinal complex consisting of narrowly to strongly subtrigonal anterior cardinal tooth and thin, obsolete, frequently absent posterior cardinal tooth, often consisting of nothing more than a wrinkle along the ventral edge of the internal ligament. Anterior lateral tooth subproximal to cardinal complex, very weak, consisting of irregularly pointed or knob-like protuberance; posterior lateral tooth even weaker, distal, behind the posterior to ligamental plate, and consisting of pointed, shelf-like protuberance.

Muscle scars not strongly impressed. Anterior adductor muscle narrowed and more elongate than rather rounded posterior adductor. Pallial sinus unequal in opposite valves. In right valve, pallial sinus not contiguous with anterior adductor muscle, gently descending anteriorly from posterior adductor muscle to form confluence with pallial line along ventral margin. In left valve, pallial sinus arising slightly from posterior anterior muscle to form gentle arch and subsinuately descending anteriorly to confluence with pallial line at or very near anterior adductor muscle.

Shell white, opalescent, very rarely with whitish-gray, vague, mostly central suffusions; internally frequently highly polished.

Measurements:

Length	Height	Width	H/L	W/L	Remarks
21.5 mm	17.2 mm	mm	.80		lectotype of <i>seychellarum</i> left valve
16.0	13.0	6.0	.81	.37	holotype of <i>strigilloides</i>
14.2	12.0	6.3	.84	.44	neotype of <i>lactea</i>
18.4	15.7	8.4	.85	.46	Red Sea
17.6	14.3	5.9	.81	.34	Mahé, Seychelle Is.
17.0	14.1	7.8	.83	.45	Ceylon
16.9	14.9	8.3	.88	.49	Red Sea
15.3	12.4	5.2	.81	.34	Aden
13.5	10.8	5.7	.80	.42	Mahé, Seychelle Is.
12.3	11.3		.91		Thursday Is.
10.5	9.2	4.9	.88	.46	Mahé, Seychelle Is.
9.4	8.4	5.0	.90	.53	Ugui, Shingu City, Japan
8.9	6.5	3.5	.73	.39	Luzon
8.8	6.2	3.4	.70	.38	Ceylon
6.8	5.4	3.1	.79	.45	Madras, India
6.5	4.8	2.5	.74	.38	NW Bay, Mahé, Seychelle Is.
5.5	4.8		.87		Bien Son, Vietnam

Types. Adams (1856) described *Scrobicularia seychellarum* on specimens obtained by a Mr. Ricketts and, at that time, belonging to the Cuming Museum. I have chosen a lectotype from a placque in the BMNH which is marked "M.C." but which does not bear the name of Ricketts. The lectotype (Plate 20, fig. 3; Plate 22, fig. 3) consists of one broken right valve and one complete left valve measuring 21.5 mm in length and 17.2 mm in height and bears the catalog number 78.1.28.197. This is the first illustration of the type-specimen, the only previous figure of a specimen referred to as '*seychellarum*' being that of Boshoff (1965, p. 183, pl. 9, fig. 2) from Punta Torres, Inhaca, Mozambique. The back of the placque in the BMNH bears the contradictory notation: "smallest from the Colln of H. Adams 78.1.28.197". The other two remaining specimens on the placque are also *seychellarum*, one consisting of one complete pair, probably that of Preston from Ceylon, the other of an imperfect set comprized, like the type, of a broken

right valve and a complete left valve; this latter specimen is probably the one cited by McAndrew (1870) from Suez in the Red Sea.

Since Dunker (1861: 44) specifically states that the specimens upon which he based his description were in the collection of H. Dohrn in Stettin and since that collection was destroyed in World War II (Dance, 1966: 285), I have selected a neotype (MCZ 288004) (Plate 21, figs. 1 and 2) which was originally in the Dohrn collection and which bears an old hand-written label stating "*Strigillina* [Dkr.] n. genus near *Semele* [*lactea* Dkr.] Red Sea". The neotype measures 14.2 mm in length and 12.0 mm in height; the original holotype was 16 mm long. Type-material of this specific nomen has never been illustrated and the first and only illustration of specimens referred to *lactea* was by Odhner (1919, p. 28, pl. 2, figs. 20 and 21), a sample dredged from Tamatave, Madagascar and preserved in the Kaudern Collection of the Rijksmuseum in Stockholm.

Type-material of *Iacra japonica* A. Adams could not be located in the BMNH (Ms. K. Way, *pers. comm.*); an illustration bearing this specific epithet has only been published once (Habe, 1952: 209, figs. 503-4). The original type-locality, Kino-O-Sima is surely problematic and can not be pin-pointed. Consultation with a gazetteer of Japan (U.S. Board on Geographic Names) shows that there are at least 12 islands of the name Okino-Shima, including one in the Oki Guntō (Oki Archipelago) on the west coast of Japan in the Japan Sea at 36°N; 133°E. The original specimens of *I. japonica* probably came from somewhere along the Pacific Coast of Japan as the known Oriental population of *seychellarum* (= *japonica*) extends along that coast and the southern islands from 23° to 34°N (Kuroda and Habe, 1952: 12).

The holotype of *strigilloides* (Plate 20, figs. 1 and 2; Plate 22, figs. 1 and 4) in the MNHNP measures 16 x 13 x 6 mm and was figured in the original description (Vaillant 1865: pl. 6, fig. 1; the type locality was given as 'sur la plage du désert de l'Attaka'; the label with the holotype specimen does not bear this specific locality but reads 'Baie de Suez'. After a thorough search of several gazetteers,



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incised scissulations which number about 2-6 per mm. The species is apparently rather rare in the eastern portion of its range and smaller in size than in the western Indian Ocean (see measurements and compare Plate 23, figs. 1 and 2). The few samples from Japan, Vietnam, the Philippines, the East Indies, the Torres Straits and the subcontinent of India indicate its rarity and consist of smallish individuals with noticeable subtrigonal and rather pointed posterior outlines. Very occasionally specimens will lack the union of the pallial sinus and the anterior adductor muscle scar in the left valve; in these few individuals the sinus becomes confluent with the pallial line just ventral to the anterior adductor.

Evidently the species prefers relatively shallow water and a sandy substrate (Taylor, 1968), and though there are no real data to substantiate the generalization, it appears that *seychellarum* lives in large populations where the ecological conditions are optimal—namely the warm tropical waters of the outlying islands of east Africa.

In immature specimens, at size ranges below 5 mm in length, the outline of the valves is distinctly tellinoid being more subquadrate-elongate than in adults. Shells at 2-3 mm in length are extremely fragile, have a distinct and strong internal resilium resting in a pendant chondrophore. Acentric scissulate sculpture is already apparent, especially in the right valve, in very young individuals even only 3 mm long, it consists at this stage of 4 or 5 angled, incised lines along the posterior portion of the disc. Such sculpture begins just after the smooth tiny prodissoconch, at shell lengths of 1.5-2 mm.

In a very few individuals, especially smaller ones, the pallial sinus of the left valve is not wholly contiguous with the anterior adductor muscle but is confluent with the pallial line just ventral to the adductor scar. The shells, however, are recognizable as *seychellarum* by their lateral compression, fine sculpture, and subtrigonally pointed posterior outline.

From collection data it is apparent that the species prefers clean, white sand as its substrate; living animals have been procured in from 1-8 fathoms of water although McAndrew

(1870) and Cooke (1886) cited a range from 10–20 fathoms.

The record of *Strigilla carnaria* Linnaeus from Mauritius provided by Viader (1937) may well refer to *I. seychellarum*.

Published records for the distribution and occurrence of *I. seychellarum* (and its synonyms) include: entrance to Suez Canal, Egypt ("sur la plage de Moya Soukhn", Moazzo, 1939); Hammam Faraoun, Egypt (Lamy, 1938); Bay of Suez (Vaillant, 1865; Semper, 1866; Issel, 1869; McAndrew, 1870; Cooke, 1886); Red Sea (Dunker, 1861; Paetel, 1892; Sturany, 1901); Aden (Smith, 1891; Anthony, 1905); Seychelle Islands (Adams, 1856; Adams and Adams, 1856); Madagascar (Odhner, 1919; Dautzenberg, 1929; 1932); South East Asia [Annam=Vietnam] (Dautzenberg and Fischer, 1906); Taiwan (Kuroda, 1941; Skarlato, 1965); Japan from 23°–34°N (Adams, 1864; Dunker, 1882; Habe, 1952; Kuroda and Habe, 1952).

Specimens examined (Map 1). MOZAMBIQUE: Delagoa Bay (SAM). MADAGASCAR: plage de Tuléar; baie de Ranofotsy, SW of Fort Dauphin; baie de Galions, W of Fort Dauphin; plage de Vatomandry; plage d'Andevoranto, N of Vatomandry (all IRSNB); Tamatave (NR); Nosy Bé (SAM); 2 mi SE of Nosy Iranja, 32 mi SW of Nosy Bé, 8 fms sand (DMNH; ANSP); Nosy Iranja, 10–12 m (MCZ); 6–20 ft, clear white sand, between Ambatoloaka and Madirokely, SW of Nosy Bé (ANSP); 0–8 ft, sand, grass, coral, rock between Ambatoloaka and Madirokely, SW Nosy Bé (ANSP). TANZANIA: Mbos Mogi, 9 mi S of Dar-es Salaam (USNM). SEYCHELLE ISLANDS: Seychelles (USNM; IRSNB); Mahé (BMNH); NW Bay, Mahé (BMNH); Port Ternay, NW Mahé (MCZ); 15–40 ft, sand and grass, Port Ternay, NW Mahé (ANSP). ADEN: (BMNH; IRSNB; MNHNP; NMW; USNM; ZMB); Khor Maksar Beach, Aden (BMNH). EGYPT: *Pola* Station 5, Rás Mallap, 29°12'N; 32°55'E, off Sinai Peninsula, Gulf of Suez (NMW); Suez; Baie de Suez (both MNHNP); Red Sea (IRSNB; MCZ; MNHNP; ZMB). INDIA: Sindi, presidency of Bombay, between Cutch and Beloochistan; Madras (both BMNH). CEYLON: Ceylon (BMNH). INDONESIA: Pelaboen Ratoe, [=Palabuhan Ratu], 7°05'S; 106°27'E, Java (USNM). VIETNAM: Bien Son, N of Vinh, Gulf of Tonkin (IRSNB).

PHILIPPINE ISLANDS: Luzon (IRSNB). AUSTRALIA: Thursday Island, 10°35'S; 142°13'E, 30 mi N of Cape York, Torres Strait, N. Queensland (BMNH). JAPAN: Ugui, Shingu-City (33°39'N; 135°58'E), Wakayama Pref., Honshu (NSMT).

Abra (Iacra) petiti (Dautzenberg)

Plate 24, figs. 1-4; Map 2

Iacra petiti Dautzenberg 1923, Jour. de Conch. 68: 72-74, 3 figs (lectotype, here selected, IRSNB, type-locality, here selected, plage d'Ankilibé (23°25' S; 43°45' E), Madagascar).

Description. Shell extending to 14 mm in length and to 13 mm in height, subvoid, slightly inequilateral, subequivalve with left valve slightly larger, more inflated and convex, solid, rather plump and inflated with barely detectable posterior flexure to right. Umbos slightly anterior to the middle, pointed, nearly orthogyrous, flattened, and left umbo a little lower than right. Anterior margin broadly rounded and gently convex; ventral margin broadly convex; anterior dorsal margin short, gently inclined, more or less straight and tending to abrupt confluence with anterior margin; posterior dorsal margin longer, steeply inclined and more or less straight; posterior margin short and weakly convex.

Sculpture consisting of three moieties: anterior slightly acentric, incised, rather widely spaced lirations (2-4/mm) more crowded along dorsal slope; acentric, posteriorly descending scissulations on central disc (2-4/mm); and, very closely spaced, finely incised lirations along the posterior dorsal slope (7-10/mm). Posterior ridge not strongly developed especially reduced in left valve. Possible growth annulae (up to 7) noted by differential intensity of coloration in shell substance.

Ligament opisthodetic, consisting of extremely short, external yellowish periostracal element in indistinct lanceolate escutcheon; internal ligamental element or resilium, rather strong and placed in moderately elongate chondrophore.

Hinge teeth consisting of both cardinal and lateral ele-



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In the original material at the Brussels Museum, no type-specimen was designated. Nor, for that matter, was a type-locality assigned since the original description listed Tamatave, Foulpointe, Tuléar, and plage d'Ankilibé, Madagascar. In 1929 Dautzenberg provided several further localities from the island. I herein select a lectotype measuring $13.5 \times 12.5 \times 7.2$ mm, from the beach at Ankilibé, which is therefore restricted and designated as the type-locality.

Remarks. Dautzenberg (1923) described this species based on a series of specimens from Madagascar; most of the material listed in the section of *Specimens examined* is in the Brussels Museum, was available to him, and consists mostly of beach worn specimens. However, one lot from Ankilibé, near Tuléar on the southwestern portion of Madagascar included specimens which were obviously living when collected. From them, as noted previously, a lectotype has been selected.

In contrast to *trotteriana*, *petiti* can be recognized by its relatively strongly developed resilium while in comparison to *seychellarum* to which *petiti* is more closely allied, it may be distinguished by its plump, rounded shape (the mean W/L ratio is 50), rather heavier shell and thicker dental elements, tendency to yellowish-purplish central suffusions, and left pallial sinus which is well separated from the anterior adductor muscle scar. Additionally, the acentric scissulate sculpture on the central disc as well as the concentric, incised lirations along the anterior slope are more widely spaced in *petiti* (about 2–4/mm).

The shells of *petiti* show certain ontogenetic changes. Small individuals from Ranofotsy (4.5×3.7 mm) were thin and translucent, especially centrally; umbos were, as might be expected, more easily discernable, slightly opisthogyrous and sharply pointed. The internal surface of younger specimens also had more noticeable shining, highly polished internal surfaces. Many individuals had fallen prey to muricids which had bored holes through the shells, especially in the umbonal region.

In establishing *petiti*, Dautzenberg (1923) discussed the status of *Iacra*, according it generic rank, and noting that

Strigillina Dunker was synonymous; he pointed out its similarity to the tellinid *Strigilla* but noted that its familial affinities were, because of the internal ligamental resilium, with the Scrobiculariidae (= Semelidae). According to his locality data, several of the samples were taken as living specimens (exemplaires vivants) - namely at Tamatave, Foulpointe and Ankilibé. The preferred bottom type was muddy sand. He subsequently added (1929; 1932) several localities where specimens were obtained by his correspondents on the island; these data are incorporated herein. The species has not been cited subsequently, at least by its own name! The material listed by Barnard (1964: 535) as *Iacra trotteriana* from the Tongaat River and from Durban, Natal proved upon examination to be *petiti* while the sample from Ilha dos Portuguesos, Inhaca [island], Mozambique listed as *trotteriana* and figured by Boshoff (1965: 157, pl. IX, fig. 1) is also *petiti*—though the original material could not be obtained from Mozambique for study.

Zoogeographically, *petiti* has a rather limited distribution along the eastern and southwestern shores of Madagascar and the relatively adjacent peripherally subtropical areas of Natal, South Africa and Mozambique (Map 2). Although a few dead, beach worn specimens of *seychellarum* have been taken in samples with *petiti*, it is more probable that the species are allopatric; the ranges may overlap in Mozambique along that portion of the African coast but the known sample from that area, Inhaca by Boshoff (1965), is based on a dead specimen. With their stronger right lateral dentition, the rather robust shells of *petiti* contrast markedly with the more fragile, probably sympatric *trotteriana*.

Specimens examined (Map 2). REPUBLIC OF SOUTH AFRICA: Tongaat River (29°34' S; 31°11' E); Durban, Natal (both SAM). MADAGASCAR: plage de Tuléar; plage de Ankilibé (23°25' S; 43°45' E); Andrahomana, S of Fort Dauphin; baie du Ranofotsy, SW of Fort Dauphin; baie du Galions, W of Fort Dauphin; Anse Dauphine, Fort Dauphin; plage de Vatomandry (19°20' S; 48°59' E); plage d'Andevoranto, N of Vatomandry (18°40' S; 48°35' E); Ambila, S of Tamatave; plage de Soanierana, N of Tamatave

(18°56' S; 47°31' S; 47°31' E; Pointe à Larrée, opposite Ile. Ste. Marie (16°50' S; 49°50' E) (all IRSNB).

Abra (Iacra) trotteriana (Sowerby)

Plate 22, figs. 5–8; Plate 25, figs. 1–3; Map 2

Strigillia (sic) *trotteriana* Sowerby 1894. Jour. of Conch 7: 376 (holotype, BMNH, type-locality, Durban, South Africa); 1897. Appendix to Marine Shells of South Africa, p 23, pl. 6, fig. 32 (Incorrectly refers to Jour. of Conch, vol vii, p. 12, April, 1896).

Iacra trotteriana (Sowerby). Barnard 1964, Ann. South African Mus 47 (3). 535.

Description. Shell extending to about 20 mm in length and to about 18 mm in height, ovate-subtrigonal, inequilateral subequivalve, with left valve slightly more inflated and convex, subfragile to solid, not too strongly compressed with very weak posterior flexure to right. Umbos somewhat anterior to middle, pointed, almost orthogyrous, not greatly inflated, rather flattened, with left umbo a little lower than the right. Anterior margin convex (more broadly rounded in larger specimens); ventral margin gently convex; anterior dorsal margin short, rather gently inclined, making rather abrupt confluence with anterior (especially in younger individuals); posterior dorsal margin longer, rather steeply inclined, and more or less straight; posterior margin short, irregularly convex and rounded, forming a rather blunt weakly subtrigonal outline posteriorly.

Ligament opisthodetic, short, consisting of yellowish-brown periostracal element set in indistinct escutcheon and of a rather strong elongate subtrigonal calcareous portion subtended by flattened nymphs. Internal ligamental element or resilium markedly reduced, very small, and set in a tiny, very shallow, slit-like obsolete chondrophore.

Hinge teeth consisting of both cardinal and lateral elements. In right valve, dentition stronger with cardinal complex consisting of angular, narrow shelf-like anterior tooth and perpendicular, narrowly subdeltoid posterior tooth; anterior lateral tooth subproximal to cardinal complex, rather well developed, weakly upcurled, blunt, shelf-like and socketed above; posterior lateral tooth distal to



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yellowish or purplish coloration. Internally not highly polished.

Measurements:

Length	Height	Width	Remarks
12.0 mm	10.0 mm	mm	holotype of <i>trotteriana</i>
19.9	18.1	9.6	Koseir, Red Sea
18.5	16.2	9.2	El Tor, Bay of Suez
16.9	14.6	7.8	Djibouti, Gulf of Tadjura, Gulf of Aden
14.6	13.2		Natal, South Africa, right valve
13.2	11.7	6.5	Massawa, Eritrea, Ethiopia
12.3	11.2		Ambila, Madagascar, left valve
11.7	10.5	6.2	Massawa, Eritrea, Ethiopia
8.5	7.5		Ambila, Madagascar, right valve

Remarks. The most variable of the species of *Iacra*, *trotteriana* is especially characterized by its very reduced chondrophore. The internal resilial element of the ligament is very much atrophied and consists of an extremely small, slit-like element sandwiched between the posterior cardinal tooth and the rather flattened nymphal plate supporting the external opisthodetic ligament (Plate 22, figs. 5–8). Such a reduced internal ligament is paralleled in the Indo-Pacific-Australian semelid *Semelangulus* and, in the case of *trotteriana*, brings the species even closer in appearance to the true tellinid genus *Strigilla*, which totally lacks even a very small chondrophore and its concomitant resilium. The reduction in the size of the resilium and chondrophore serves to distinguish *trotteriana* from both *seychellarum* and *petiti*.

Morphologically, *trotteriana* has a variable sculpture which in its most simple form is dominated by the acentric scissulations across the central disc. However, in several samples from the Red Sea and Gulf of Suez, including some which were identified as *seychellarum* by Sturany (1901) in his report on the results of the *Pola* expedition, the shells attain their maximum size and have a much stronger sculpture. The left valve (Plate 25, fig. 1) may appear somewhat reticulate on the disc where the concentric sculpture intersects with the acentric scissulations. The right valve may have strongly raised, coarse concentric ridges (Plate 25, fig. 2) similar in their form to those found

in *Semele modesta* (Reeve) of the South Atlantic (Boss, 1972),

Subsequent to the original description and remarks of Sowerby (1894: 376; 1897: 23), this species was not cited again until Barnard (1964: 535) listed it in *Iacra*, a citation which I think might well have been for another species (see *Remarks* under *petiti*) though *trotteriana* does occur, at least as partial specimens, in South Africa. Boshoff (1965: 183, pl. IX, fig. 2), following Barnard, also confused these species, figuring a specimen, which is no longer available for study since the revolution in Portuguese East Africa, of *trotteriana* as "*seychellarum*" from Punta Torres, Inhaca Island, Mozambique.

In shape, *trotteriana* tends to be somewhat subquadrate in smaller individuals and more ovate-subtrigonal in adults. In the right valve, the posterior dorsal slope and its conjoining with the umbonal region evince a "hunched" or arched contour, which is sometimes helpful in recognizing beach worn valves.

The distribution of living *trotteriana* is really poorly known since most of the samples listed in the section on *Specimens examined* are based on miscellaneous beach worn valves. The species occurs in the Red Sea, probably along the coast of east Africa to Natal, South Africa, and possibly in such offshore islands as Madagascar. The marked concentric sculpture in the right valve and noticeable reticulations in the left valve seem to occur in populations in the Gulf of Suez and Red Sea areas, and since only poorly preserved material has been obtained from South Africa, Mozambique and Madagascar and no samples whatsoever along the intervening African coast, it is possible that the northern population may be subspecifically or even specifically distinct. However, since so few data are available, it is deemed unwise to establish yet another poorly known "new species" of bivalve.

Specimens examined (Map 2). REPUBLIC OF SOUTH AFRICA: Natal; Tongaat River, Natal; Durban, Natal (all SAM). MADAGASCAR: baie de Ranofotsy, SW of Fort Dauphin; baie de Galions, W of Fort Dauphin; Anse Dauphine, Fort Dauphin; Ambila, S of Tamatave; Tamatave

Veno (all IRSNB); Tamatave (NR); plage de Soanierana, 18°56' S; 47°31' E, N of Tamatave (IRSNB). FRENCH SOMALILAND: Djibouti, Gulf of Tadjura, Gulf of Aden (MNHNP). ETHIOPIA: Massawa, Eritrea, Red Sea (NMW; ZMB). EGYPT: *Pola* Station 21, Koseir, 26°06' N; 34°17' E; *Pola* Station 8, El Tor, 28°14' N; 33°37' E, Sinai Peninsula, Gulf of Suez (both NMW).

BIBLIOGRAPHY

- ADAMS, A. 1856. Descriptions of thirty-four new species of bivalve mollusca (*Leda*, *Nucula*, and *Pythina*) from the Cumingian Collection. Proc. Zool. Soc. London 24: 47-53.
- ADAMS, A. 1864. On some new genera and species of Mollusca from the seas of China and Japan. Ann. Mag. Nat. Hist., (3), 13: 307-315.
- ADAMS, H. AND A. 1856. The Genera of Recent Mollusca; arranged according to their organization. John van Voorst, London, Vol. II (1854-1858): 1-1661, 138 pls.
- ANTHONY, M. R. 1905. Liste des mollusques acéphales du Golfe de Tadjourah. Bull. Mus. Hist. Nat. Paris 11: 490-500.
- BARNARD, K. H. 1964. Contributions to the knowledge of South African marine Mollusca. Part V. Lamellibranchiata. Ann. South African Mus. 47 (3): 361-593, 39 figs.
- BOSHOFF, P. H. 1965. Pelecypoda of Inhaca Island, Moçambique. Mem. Inst. Invest. Cien. Moçambique (A), 7: 65-206, 14 pls.
- BOSS, K. J. 1966. Convergence of an acentric sculptural trait in the Tellinacea. Ann. Rept. for 1965 Amer. Malac. Union, pp. 5-6.
- BOSS, K. J. 1969. The subfamily Tellininae in the Western Atlantic. The genus *Strigilla*. Johnsonia, 4 (47): 345-366.
- BOSS, K. J. 1972. The genus *Semele* in the Western Atlantic. Johnsonia, 5 (49): 1-32.
- COOKE, A. H. 1886. Report on the Testaceous Mollusca obtained during a dredging-excursion in the Gulf of Suez in the months of February and March 1869. By Robert MacAndrew.- Republished, with additions and corrections. Ann. Mag. Nat. Hist. (5) 18: 92-109.
- DALL, W. H. 1900. Contributions to the Tertiary fauna of Florida, with especial reference to the silex-beds of Tampa and the Pliocene beds of the Caloosahatchie River, including in many cases a complete revision of the generic groups treated of and their American Tertiary species. Part V. Teleodermacea: *Solen* to *Diplodonta*. Trans. Wagner Free Inst. Sci. Philadelphia, 3 (5): 949-1218, pls. 36-47.
- DANCE, S. P. 1966. Shell collecting, an illustrated history. Univ. California Press, Berkeley and Los Angeles, 344 pp. 35 pls.
- DAUTZENBERG, PH. 1923. Liste préliminaire des mollusques marins de Madagascar et description de deux espèces nouvelles. Jour. de Conch. 68: 21-74, 2 figs.



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- SOWERBY, G. B. 1892. Marine shells of South Africa. A catalogue of all the marine species with references to figures in various works, descriptions of new species, and figures of such as are new, little known, or hitherto unfigured.
- SOWERBY, G. B. 1894. Marine Shells of South Africa. *Jour. of Conch.* 7: 368–378.
- SOWERBY, G. B. 1897. Appendix to Marine Shells of South Africa. A catalogue of all the marine species with references to figures in various works, etc. London, Sowerby, 42 pp., pls. 6–8.
- SOWERBY, G. B. AND H. C. FULTON. 1903. *Recet Mollusca* A catalogue of Pelecypoda and Brachiopoda. For sale by Sowerby & Fulton. Dryden Press, London, 24 pp. + index.
- STANLEY, S. M. 1969. Bivalve mollusk burrowing aided by discordant shell ornamentation. *Science* 166: 634–635.
- STANLEY, S. M. 1970. Relation of shell form to life habits of the Bivalvia (Mollusca). *Geol. Soc. Amer. Mem.* 125, 296 pp.
- STURANY, R. 1901. Lamellibranchiaten des Rothen Meeres. *Denkschr. Akad Wiss. Wien*, 69: 255–295.
- TAYLOR, J. D. 1968. Coral reef and associated invertebrate communities (mainly Mollusca) around Mahé, Seychelles. *Phil Trans. Royal Soc. London (b)*, No. 793, 254: 129–206.
- THIELE, J. 1935. *Handbuch der systematischen Weichtierkunde*. Gustav Fischer, Jena, 2: 779–1022, 110 figs.
- VAILLANT, L. 1865. Recherches sur la faune malacologique de la baie de Suez. *Jour. de Conch.* 13: 97–127, pl 6.
- VIADER, R. 1937. Revised catalogue of the testaceous Mollusca of Mauritius and its dependencies. *Bull. Mauritius Institute* 1 (2): xiii, 111 pp., 1 map.

Maps 1 and 2

Plates 20–25



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Plate 20

Abra (Iacra) seychellarum (A. Adams)

- Fig. 1. Holotype of *Syndosmya strigilloides* Vaillant 1865. External view of the left valve (sur la plage du désert de l'Attaka, Baie de Suez, 16.0 × 13.0 × 6.0 mm, MNHNP).
- Fig. 2. External view of the right valve of same.
- Fig. 3. Lectotype of *Scrobicularia seychellarum* A. Adams 1856. External view of the left valve (Seychelles, 21.5 × 17.2 mm, BMNH 78.1.28.197).
- Fig. 4. Enlargement of an external view of the right valve of the neotype of *Strigillina lactea* Dunker 1861, (aus dem Rothen Meere, 14.2 × 12.0 × 6.3 mm, MCZ 288004).

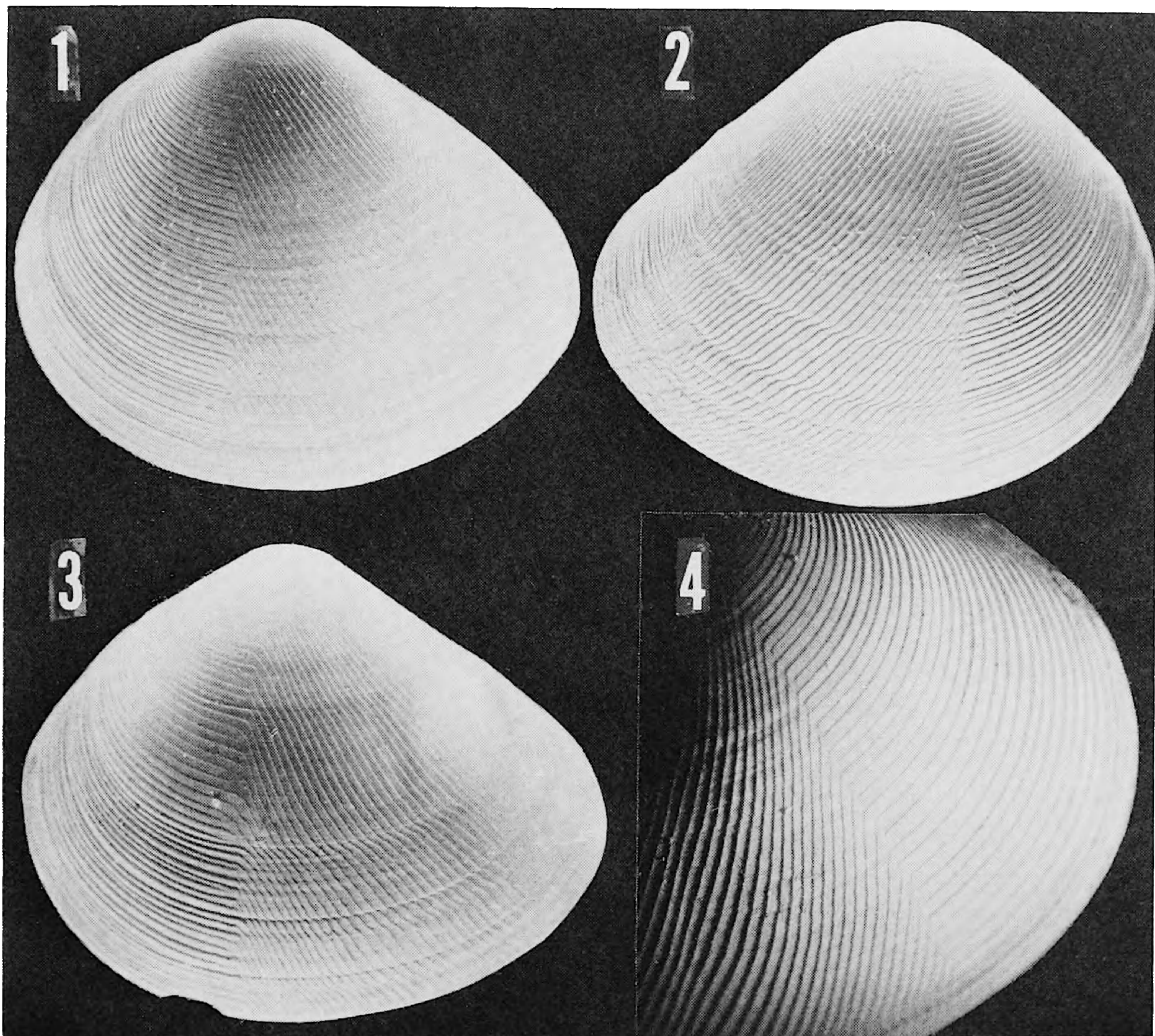


Plate 20

Plate 21

Abra (Iacra) seychellarum (A. Adams)

- Fig. 1. Neotype of *Strigillina lactea* Dunker 1861 External view of the left valve (aus dem Rothen Meere, 14.2 × 12.0 × 6.3 mm, MCZ 288004)
- Fig. 2 External view of the right valve of same.
- Fig. 3 External view of the right valve of *A. seychellarum* (from Nosy Iranja, about 30 miles SW of Nosy Bé, Madagascar, 12.1 × 9.2 × 4.9 mm, MCZ 288378)



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Plate 22

Hinge lines, dentition, and position of the resilium in *Iacra*Figs 1-4 *Abra (Iacra) seychellarum* (A. Adams)

- Fig. 1. View of the right valve of holotype of *Syndosmya strigilloides* Vaillant 1865 (sur la plage du désert de l'Attaka, Baie de Suez, 16.0 × 13.0 × 6.0 mm, MNHNP).
- Fig. 2. View of a right valve from Nosy Iranja, about 30 miles SW of Nosy Bé, Madagascar, 12.1 × 9.2 × 4.9 mm, MCZ 288378
- Fig. 3. View of the left valve of the lectotype of *Scrobicularia seychellarum* A. Adams 1856. (Seychelles, 21.5 × 17.2 mm, BMNH 78.1.28.197).
- Fig. 4. View of the left valve of the holotype of *Syndosmya strigilloides* Vaillant 1865 (sur la plage du désert de l'Attaka, Baie de Suez, 16.0 × 13.0 × 6.0 mm, MNHNP).

Figs 5-8. *A. (I.) trotteriana* (Sowerby)

- Figs 5 and 6. View of a right valve from Massawa, Eritrea, Ethiopia [Red Sea], 11.7 × 10.5 × 6.2 mm, ZMB 27365
- Fig. 6. View of a right valve from Koseir, Red Sea, 19.9 × 18.1 × 9.6 mm, NMW.
- Fig. 7. View of a left valve from Massawa, Eritrea, Ethiopia [Red Sea], 11.7 × 10.5 × 6.2 mm, ZMB 27365
- Fig. 8. View of a left valve from Durban, South Africa, BMNH.

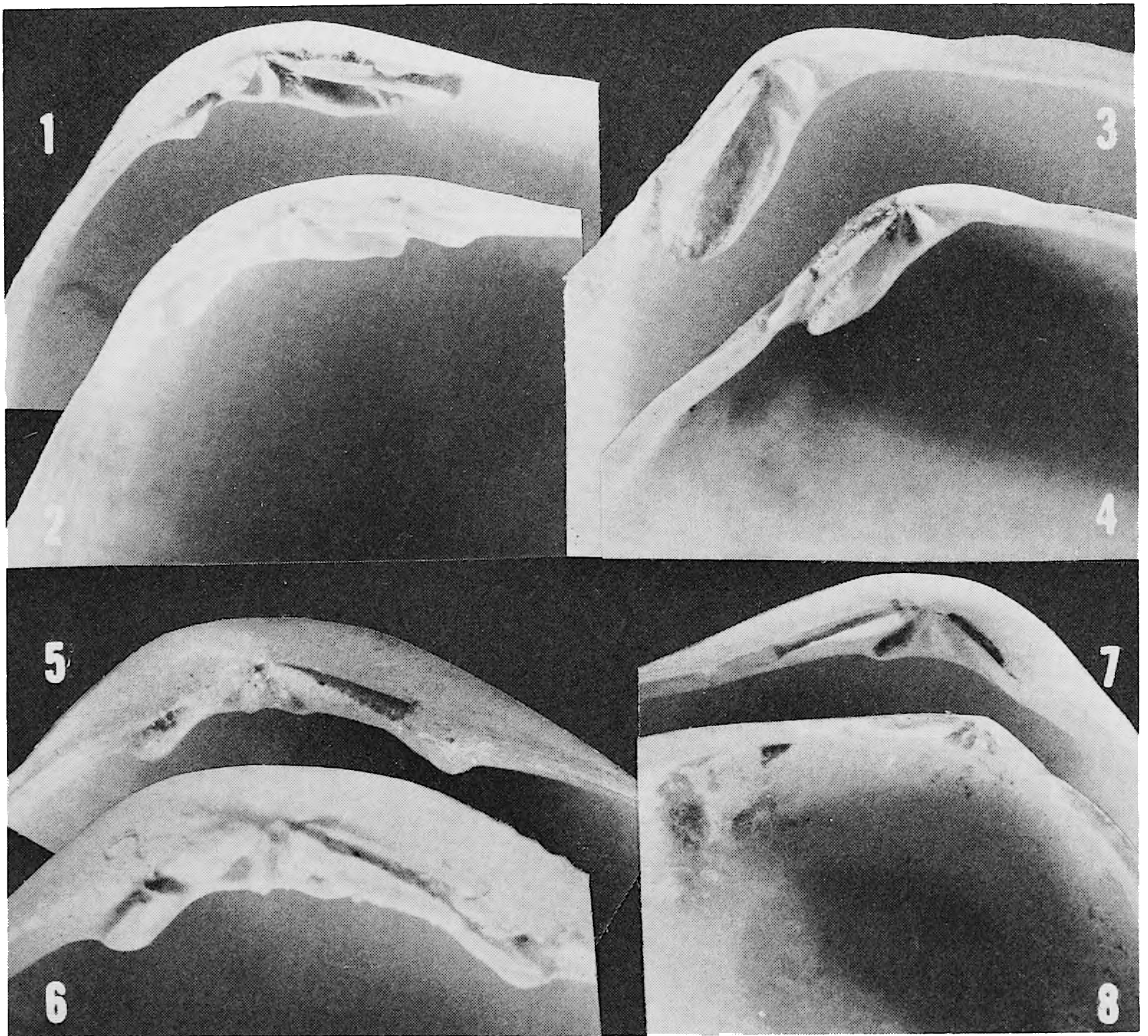


Plate 22

Plate 23

Abra (Iacra) seychellarum (A. Adams). External views of the left valves of specimens from two widely separated localities to show the variation in sculpture, outline of the valves, and comparative strength and configuration of the chondrophore as well as cardinal and lateral dentitions.

Fig 1 Specimen from Nosy Iranja, about 30 miles SW of Nosy Bé, Madagascar, measuring $12.1 \times 9.2 \times 4.9$ mm, MCZ 288378

Fig 2. Specimen from Pelaboean Ratoe ($7^{\circ}05'S$, $106^{\circ}27'E$), Java, Indonesia, measuring 6.2×5.2 mm, USNM 261458



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Plate 24

Abra (Iacra) petiti (Dautzenberg)

The lectotype of *Iacra petiti* Dautzenberg 1923, 13.5 × 12.5 × 7.2 mm from plage d'Ankilibé (23°25'S, 43°45'E), Madagascar, IRSNB.

- Fig 1. External view of the left valve.
- Fig 2. External view of the right valve.
- Fig. 3 Hinge of the right valve.
- Fig 4 Hinge of the left valve

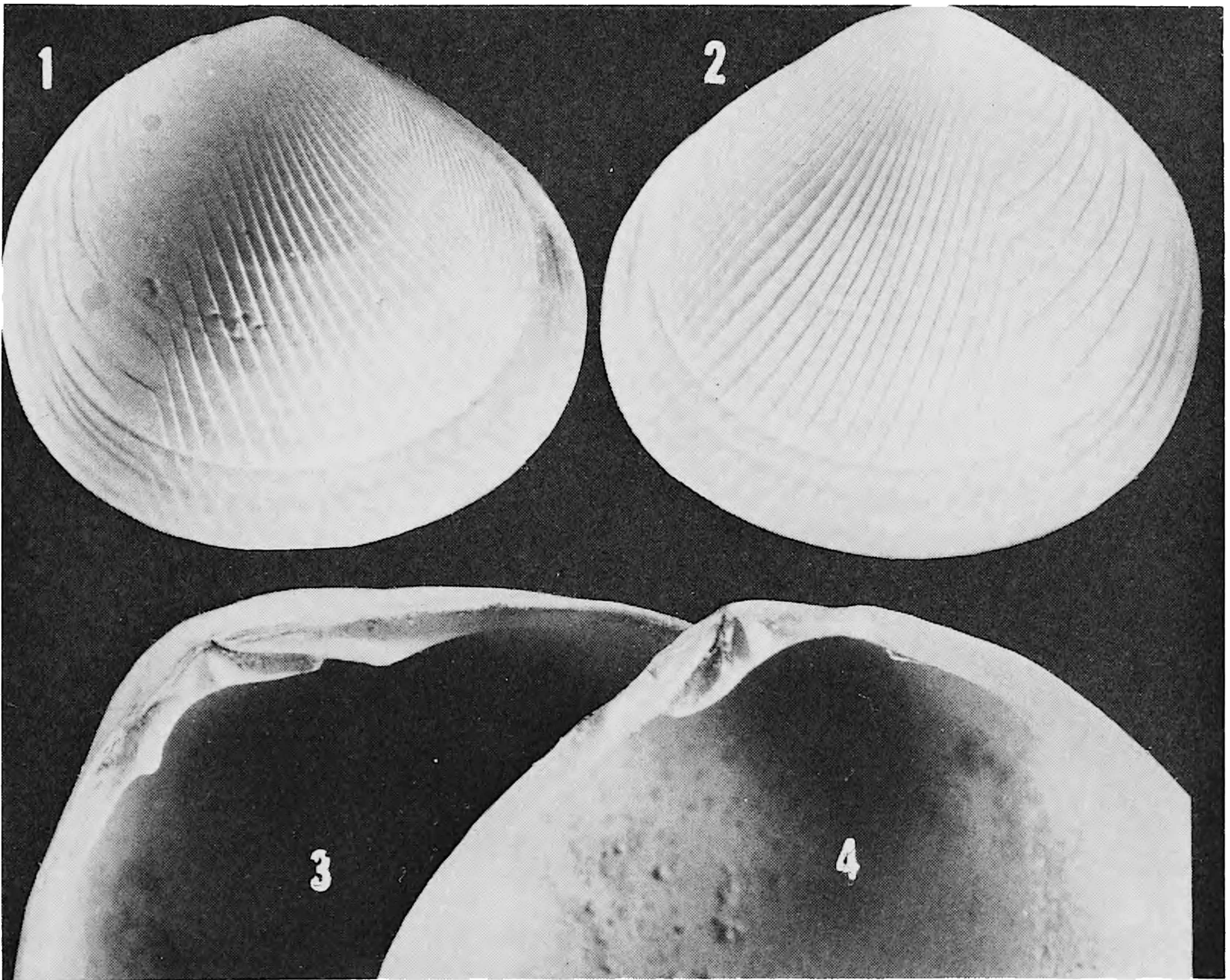


Plate 24

Plate 25

Abra (Iacra) trotteriana (Sowerby)

Specimen measuring 11.7 × 10.5 × 6.2 mm from Massawa, Eritrea, Ethiopia on the Red Sea (in ZMB 27365, collected by Jickeli)

- Fig 1 External view of the left valve indicating the finely reticulate sculpture occurring in some populations
- Fig 2 External view of the right valve illustrating the heavy concentric sculpture of some populations
- Fig 3 The holotype of *Strigillia* [*sic*] *trotteriana* Sowerby 1894 (12.0 × 10 mm, right valve only, from Durban, South Africa [BMNH]).



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**Norman Macdowell Grier, A Bibliography of His
Work on Mollusks, with a Catalogue of His Unionid
Taxa**

By RICHARD I. JOHNSON

Grier was born on June 13, 1890 in Pittsburgh, Pennsylvania. He attended the University of Pittsburgh where he received a B. S. in 1911, an A. M. in 1912, and a Ph.D. in 1919. During 1914–1916, he was an assistant at the Carnegie Museum where he was Arnold E. Ortmann's most prolific student. He contributed numerous papers on the biometrics of the Unionidae. After Ortmann's death in 1927, Grier made no more contributions to the literature of mollusks, though he continued to write on education. From 1937 he was employed by the State Social Security Board. He died on December 26, 1951.

REFERENCE

Based on: Abbott, R. T. 1973. American Malacologists. First edit Falls Church, Va

BIBLIOGRAPHY OF NORMAN MACDOWELL GRIER'S WORK ON MOLLUSCA

1916. List of the naiades of the Meramec River, Missouri. *American Midland Naturalist* 4: 517–518
1918. New varieties of naiades from Lake Erie. *Nautilus* 32: 9–12
1920. The fresh water pearl makers. *Nature-Study Review* 16: 338–344.
1920. Morphological features of certain mussel-shells found in Lake Erie, compared with those of the corresponding species found in the drainage of the Upper Ohio *Ann. Carnegie Mus., Pittsburgh, Pa.* 13: 145–182, pls. 2–3
1920. On the erosion and thickness of shells of the fresh-water mussels. *Nautilus* 34: 15–22.
1920. Sexual dimorphism and some of its correlations in the shells of certain species of Najades. *American Midland Naturalist* 6: 165–172.
1920. Variations in nacreous color of certain species of naiades inhabiting the upper Ohio Drainage and their corresponding ones in Lake Erie. *American Midland Naturalist* 6: 211–243, pls. 1–3 [pl 3 is a folio chart]
1920. Variation in epidermal color of certain species of najades inhabiting the upper Ohio Drainage and their corresponding ones in Lake Erie. *American Midland Naturalist* 6: 247–285, pls. 1–3 [pl. 3 is a folio chart].

1921. Notes on the naiad fauna of the Upper Mississippi River. *Nautilus* 34: 80-81.
1922. Final report on the study and appraisal of mussel resources in selected areas of the upper Mississippi River. *American Midland Naturalist* 8: 1-33, 1 map.
1922. Observation on the rate of growth of the shell of lake dwelling fresh water mussels. *American Midland Naturalist* 8: 129-148.
- 1922-1923. Notes on the naiad fauna of the Upper Mississippi River. II. The naiades of the Upper Mississippi drainage. By N. M. Grier and J. F. Mueller. *Nautilus* 36: 46-49; 1923, 36: 96-103.
1923. On the naiades of Long Island, New York. *American Midland Naturalist* 8: 281-282.
1923. On the naiades of Long Island. *Anat. Rec. Philadelphia* 26: 379-380.
1924. Further studies in correlation of shape and station in freshwater mussels. *Anat. Rec. Philadelphia* 29: 27.
1924. On the naiades of Long Island, N. Y. *Nautilus* 37: 95-96.
1926. Notes on the naiades of the Upper Mississippi drainage. III. On the relation of temperature to the rhythmical contractions of the "mantle flaps" in *Lampsilis ventricosa* (Barnes). *Nautilus* 39: 111-114.
1926. Report on the study and appraisal of mussel resources in selected areas of the upper Mississippi River, 1920-1925. *American Midland Naturalist* 10: 89-110, 113-134.
1926. Further studies in correlation of shape and station in fresh water Mussels. By N. M. Grier and J. F. Mueller. *Bull. Wagner Free Instit. Sci. Philadelphia* 1: 11-28.
1927. Notes on the naiades of Long Island: II. *Anodonta cataracta* on Long Island. *Nautilus* 40: 91-93.
1927. The fauna of the sandbars of the Upper Mississippi River. By N. M. Grier and R. B. Tweedy. *Bull. Wagner Free Instit. Sci. Philadelphia* 2: 97-105.

THE UNIONID VARIETIES INTRODUCED BY N. M. GRIER

eriganensis, *Lasmigona costata*

1918, *Nautilus* 32: 10 (Lake Erie, Presque Isle Bay, Big Bend [W of waterworks, Erie Co., Pennsylvania]). Syntypes CM 61.4720. Syntype figured by Ortmann, 1919, *Mem. Carnegie Mus.* 8: 131, pl. 9, fig. 6 (emend. *eriganensis*). Lectotype, Grier's first measured specimen (presumed the one figured by Ortmann, selected by Parodiz, 1967, *Sterkiana* no. 28, p. 26).

parvula, *Fusconaia flava*

1918, *Nautilus* 32: 11 (Lake Erie, Presque Isle Bay, Big Bend [Erie Co., Pennsylvania]). Syntypes CM 61 4513. The type figured by Ortmann, 1919, *Mem. Carnegie Mus.* 8: 21, pl. 2, fig. 2 was selected as lectotype by Parodiz, 1967, *Sterkiana* no. 28, p. 23 [not renumbered].

sterkii, *Elliptio dilatatus*

1918, *Nautilus* 32: 8 (Lake Erie, Presque Isle Bay, Big Bend [W of waterworks, Erie Co., Pennsylvania]). Holotype CM 61.4268 no. 4 figured by Ortmann, 1919, *Mem. Carnegie Mus.* 8: 101, pl. 8, fig. 3, CM 61.4628 [sic], selected as lectotype by Parodiz, 1967, *Sterkiana* no. 28, p. 25 CM 61.4648, no. 4 [sic].

BOOK REVIEW

Habe, Tadashige 1977 *Systematics of Mollusca in Japan. Bivalvia and Scaphopoda*. Tokyo, 372 pp., 72 pls. No price listed. In Japanese.

Dr. Tadashige Habe, long time curator at the National Science Museum in Tokyo and acknowledged authority on the taxonomy of the mollusca of Japan, presents here in bound form, an updating of his several papers on the genera of Japanese bivalves and scaphopods (*Genera of Japanese Shells. Pelecypoda*, nos 1-4 [1951-1953], and, with S. Kosuge, *A List of the Indo-Pacific Molluscs, Concerning to the Japanese Molluscan Fauna. Class Scaphopoda Nat. Sci. Mus.*, Tokyo [1964]). The compilation is listed according to the outlines provided in the *Treatise on Invertebrate Paleontology*. Thus, for the Bivalvia, which constitutes the bulk of the text, 6 subclasses and 89 families within 42 superfamilies are delineated. Even taxa which are not part of the Japanese fauna are listed for convenience and designated by an asterisk.

Within each family, the general treatment includes the citation of each genus along with a notation of the type-species and currently accepted synonyms. After a short generic diagnosis, there follows a listing of Japanese species with a citation of the original author and date and the common Japanese name accompanied by the Japanese authority for such, mainly Hirase, Kuroda, and Habe, himself. Geographic localities are listed to indicate the range of each species. Depth records are provided as well as an indication of the preferred bottom type or substrate. The line-drawings in the plates illustrate several hundred of the most common Japanese species.

The Scaphopod portion of the volume occupies fewer than twenty pages.

Glossaries of the specialized descriptive terms utilized in the taxonomy of these organisms, as well as a short dictionary of nomenclatorial definitions, are provided. Indices to Latin and Japanese generic nomina complete the volume.

The work is, of course, indispensable for anyone working on the taxonomy and distribution of bivalves or scaphopods; it will certainly be useful for the student of sea shells of the Western Pacific, and it will have to be consulted by various other specialists since new taxa are introduced. Although comprehensive, the treatment is regional and parochial; critical revisions of most oriental taxa continue to go begging.

—K. J. Boss



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curator of invertebrate paleontology at Princeton University where he remained until 1903 when he then became curator of invertebrate zoology in the Carnegie Museum where he remained until his death on January 3, 1927.

His extensive report on the Tertiary Invertebrates of the Princeton-Patagonia Expeditions (1896–1899) appeared in 1902 and contained the descriptions of numerous fossil marine mollusks.

Ortmann did not confine his zoogeographical studies just to the Unionacea. He was also interested in Crustacea and published, "The Geographical Distribution of Freshwater Decapods, and its Bearing on Ancient Geography" (1902). His work on the crayfishes of Pennsylvania (1906) also contains an important discussion on their zoogeography.

Ortmann's two most elegant works on the Unionacea are on those of Pennsylvania (1911, 1919) and of South America (1921). These volumes were grandly printed in quarto with excellent illustrations, as Memoirs of the Carnegie Museum. Among Ortmann's other faunal studies of the naiades were those of the Tennessee River (1918, 1925), the Duck River (1924) and the Green River (1926).

Pilsbry (1927: 111) says of Ortmann that he was,

"cordial and prepossessing in manner. His enthusiasm for natural history was contagious, and contributed to his success as a teacher. (He held various teaching positions at the University of Pittsburgh, which in 1911 conferred on him the degree of Sc.D.). In the field he was indefatigable never sparing himself, deterred by neither exposure nor fatigue, in the quest of specimens for his researches."

One can best understand Ortmann's attitude toward his work by quoting from a letter of his to Calvin Goodrich (December 15, 1910) quoted by van der Schalie (1951: 135):

Do not feel alarmed about having used any information received from me in any way you see fit. I am not jealous, and anybody is welcome to use and to *criticise* whatever I may say in private correspondence. I also do not object if anybody *publishes* anything for I am not working for my personal benefit but for the good of science, and I know myself best that I cannot work out everything myself. I wish I could induce many more conchologists to work along the same lines I am working.

Ortmann was survived by his wife, one son and two married daughters.

REFERENCES

- HOLLAND, W. J. 1927. Arnold Edward Ortmann. *Science* 65 (1972): 29
- ORTMANN, A. E. 1902. The geographical distribution of freshwater decapods and its bearing upon ancient geography. *Proc. Amer. Philos. Soc.* 41 (171): 267–400.
- 1906. The crawfishes of the state of Pennsylvania. *Mem. Carnegie Mus.* 2 (10): 343–524, pls. A, B, 41–43.
- PILSBRY, H. A. 1927. Arnold Edward Ortmann. *Nautilus* 40: 109–111.
- SIMPSON, C. T. 1900. Synopsis of the naiades, or pearly fresh-water mussels. *Proc. U.S. Natl. Mus.* 22: 501–1044, pl. 18.
- 1914. A descriptive catalogue of the naiades, or pearly fresh-water mussels. Detroit, Michigan, Pts. 1–3, pp. xi, 1–1540.
- VAN DER SCHALIE, H. 1951. Arnold Edward Ortmann as revealed by his letters. *Nautilus* 64: 134–141, 65: 23–26.

ACKNOWLEDGEMENTS

Special thanks are extended to Dr. J. José Parodiz, Carnegie Museum, Pittsburgh, who, at my request, chose many of the lectotypes selected in this paper. He also kindly gave me access to Ortmann's types, afforded me his synonymies of some of the taxa, and made available the hitherto unpublished photograph of Ortmann used here. Thanks are also extended to Dr. Kenneth J. Boss for reading the manuscript.

BIBLIOGRAPHY OF ARNOLD EDWARD ORTMANN'S WORK ON MOLLUSCA

1888. Japanische Cephalopoden. *Zool. Jahrb. für Systematik* 3: 639–670, pls. 20–25.
1891. Cephalopoden von Ceylon gesammelt von den Herren Dres. Sarasin. *Zool. Jahrb. für Systematik* 5: 669–678, pl. 46.
1897. On some of the large oysters of Patagonia. *Amer. Jour. Sci.* 4: 355–356, pl. 11.
1898. Preliminary report on some new Miocene Tertiary horizons discovered by Mr. J. B. Hatcher near Punta Arenas, Magellanes, Chile. *Amer. Jour. Sci.* 6: 478–482.
1900. Synopsis of the collections of invertebrate fossils made by the Princeton Expedition to Southern Patagonia. *Amer. Jour. Sci.* 10: 368–381.
1902. Tertiary Invertebrates. Reports of the Princeton Univ. Expeditions to Patagonia 1896–1899, 4: 45–332, pls. 1–38, pl. 39, folding map. Mollusks, pp. 80–247.
- 1903 *Illex illecebrosus* (Lesueur), the squid from Onondaga Lake, N.Y. *Science* 17: 30–31.



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- 1913-1916 Studies in najades. 1913, *Nautilus* 27: 88-91; 1914, 28: 20-22, 28-34, 41-47, 65-69; 1915, 28: 106-108, 129-131, 141-143; 1915, 29: 63-67; 1916, 30: 54-57.
1913. The Alleghenian divide, and its influence upon the freshwater fauna. *Proc. Amer. Philos. Soc.* 52: 287-390, pls. 12-14.
1916. The anatomy of *Lemiox rimosus* (Raf). *Nautilus* 30: 39-41.
1916. The anatomical structure of *Gonidea angulata* (Lea). *Nautilus* 30: 50-53.
1916. The anatomy of the nayad *Hyriopsis myersiana* (Lea). *Nautilus* 30: 85-87.
1917. The anatomy of *Contradens cambojensis* (Sowerby). *Nautilus* 30: 106-108, pl. 4, fig. 10.
1917. A new type of the nayad-genus *Fusconaia* group of *F. barnesiana* Lea. *Nautilus* 31: 58-64
1918. The anatomy of two African nayades, *Unio caffer* and *Spatha wahlbergi*. *Nautilus* 31: 75-78.
- 1918 The identity of the nayad-genus *Nodularia* Conrad with *Unio* Retzius. *Nautilus* 31: 128-131.
- 1918 The systematic position of two species of mussels from the Ozarks. *Nautilus* 32: 13-15.
- 1918 The nayades (fresh-water mussels) of the Upper Tennessee Drainage, with notes on synonymy and distribution. *Proc. Amer. Philos. Soc.* 57: 521-626.
1920. Über die australische Muschelgattung *Hyridella*. *Archiv für Molluskenkunde* 52: 119-121.
1920. Correlation of shape and station in fresh water mussels. *Proc. Amer. Philos. Soc.* 59: 269-312.
1921. The anatomy of certain mussels from the Upper Tennessee. *Nautilus* 34: 81-91
1921. A new locality for *Arkansia wheeleri* Ortmann and Walker. *Nautilus* 34: 141.
1921. Some central American species of naides [sic] belonging or allied to the genus *Elliptio*. *Nautilus* 35: 24-27.
1921. South American naiades; a contribution to the knowledge of the freshwater mussels of South America. *Mem. Carnegie Mus. Pittsburgh, Pa* 8: 451-670, pls. 34-48.
1921. Marsupium und Glochidium der Sudamerikanischen Muscheln aus der Unterfamilie der Hyriinae. *Archiv für Molluskenkunde* 53: 103-111.
1922. A new genus and species of American naiades. By A. E. Ortmann and B. Walker. *Nautilus* 36: 1-6, pl. 1.
- 1922 On the nomenclature of certain North American naiades. By A. E.

Ortmann and B. Walker. Occ. Pap. Mus. Zool. Univ. Michigan, no. 112, pp. 1-75.

- 1923 The anatomy and taxonomy of certain Unionidae and Anodontinae from the Gulf Drainage. *Nautilus* 36: 73-84, 129-132
- 1923-1924. Notes on the anatomy and taxonomy of certain Lampsilinae from the Gulf Drainage. 1923, *Nautilus* 37: 56-60; 1924, 37: 99-105, 137-144
- 1924 The naiad-fauna of Duck River in Tennessee *American Midland Naturalist* 9: 18-62.
1924. Distributional features of naiades in tributaries of Lake Erie. *American Midland Naturalist* 9: 101-117.
1924. Mussel Shoals. *Science* 60: 565-566.
1925. Mussel Shoals. *Bull. New York Zool. Soc.* 35: 10-11.
1925. The naiad-fauna of the Tennessee River system below Walden Gorge. *American Midland Naturalist* 9: 321-372.
1926. *Helix nemoralis* L. in Lynchburg, Virginia. *Nautilus* 39. 73-74.
1926. Unionidae from the Reelfoot Lake region in West Tennessee. *Nautilus* 39. 87-94.
- 1926 The naiades of the Green River Drainage in Kentucky. *Ann. Carnegie Mus., Pittsburgh, Pa.* 17 (1): 167-188, pl.8.

RECENT GENERIC AND SPECIFIC MOLLUSCAN TAXA INTRODUCED BY ARNOLD EDWARD ORTMANN.

For convenience of reference, the following list is arranged alphabetically by species, with the original references, type localities (locality data in brackets were found on original labels or are additions from recent maps), and the location of the extant types.

Higher categories, and the fossil marine mollusks described in the report on the Princeton-Patagonia Expedition (1902), are *not* included.

ABBREVIATIONS

CM—Carnegie Museum, Pittsburgh, Pennsylvania
MCZ—Museum of Comparative Zoology, Cambridge, Massachusetts

Alasminota, Subgenus: 1914, *Nautilus* 28: 41. Type species, *Margaritana holstonia* Lea, original designation.

- analoga*, *Fusconaia cor* Plate 27, fig. 1
1918, Proc. Amer. Philos. Soc. 57: 533. Ortmann refers to Reeve, Conch. Iconica 16, *Unio*, pl. 15, species 65 (Tennessee River). This indicated specimen is the holotype, British Museum (Nat. Hist.) 1964117. The type locality is restricted to the Clinch River, Speers Ferry, Scott Co., Virginia from whence came Ortmann's specimens, CM 61.6326. Discussed by Parodiz, 1967, Sterkiana, no. 28: 23.
- Arkansia* Ortmann and Walker, Genus: 1912, Nautilus 25: 97. Type species, *Arkansia wheeleri* Ortmann and Walker, original designation.
- aspersa*, *Loligo*: 1888, Zool. Jahr. 3: 661, pl. 25, fig. 3 (Kochi [Japan]). Type in Strasbourg Museum.
- berthae*, *Diplodon*: 1921, Mem. Carnegie Mus. 8: 528, pl. 38, figs. 1-4 (Rio Jacuhy, Cachoeira, Rio Grande do Sul, Brazil). Lectotype, here selected, CM 61.5865 specimen no. 24, pl. 38, fig. 1 a-d; paralectotype MCZ 100974. Is *Diplodon picens* (Lea) teste Parodiz.
- brocki*, *Octopus*: 1888, Zool. Jahr. 3: 645, pl. 21, fig. 4, pl. 22, fig. 1 (Tokiobai and Kagoshima [Japan]). Types in Strasbourg Museum.
- cohongoronta*, *Lampsilis ventricosa*: 1912, Nautilus 26: 53 (Potomac River, Hancock, Washington Co., Maryland). Lectotype selected by Parodiz, 1967, Sterkiana, no. 28: 28, CM 61.3999. Figured by Johnson, 1970, Bull. Mus. Comp. Zool. 140: 386, pl. 21, fig. 1; allotype CM 61.4000, pl. 21, fig. 2; 2 paralectotypes MCZ 273128.
- Cumberlandia*, Genus: 1912, Nautilus 26: 13. Type species, *Unio monodonta* Say, original designation.
- decipiens*, *Diplodon*: 1921, Mem. Carnegie Mus. 8: 499, pl. 36, figs. 3-6 (Creek, tributary to the Rio Iguassú. Serrinha, Paraná, Brazil). Lectotype, here selected, CM 61.9253, specimen no. 4, pl. 36, fig. 3 a-d. Is *Diplodon martensi* Ihering teste Parodiz.
- döderleini*, *Tremoctopus*: 1888, Zool. Jahr. 3: 642, pl. 20 (Tokiobai [Japan]). Type in Strasbourg Museum.



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- imitator*, *Diplodon*: 1921, Mem. Carnegie Mus. 8: 491, pl. 34, figs. 5–7, pl. 35, figs. 1, 2 (Rio Vaccahy-mirim, Santa Maria, Rio Grande do Sul, Brazil). Lectotype, here selected, CM 61.9248, specimen no. 29, pl. 34, fig. 5 a–d. Is *Diplodon martensi* Ihering teste Parodiz.
- kagoshimensis*, *Octopus*: 1888, Zool. Jahr. 3: 644, pl. 21, fig. 2 (Kagoshima [Japan]). Type in Strasbourg Museum.
- leucogona*, *Fusconaja* [sic] *subrotunda* Plate 27, fig. 2 1913, Nautilus 27: 89 (Elk River, Gassaway Braxton Co., West Virginia). Lectotype, here selected, CM 61.5239 specimen A (not 61.5399 as indicated in the description. teste: Parodiz, 1967, Sterkiana, no. 28: 23). Paralectotype MCZ 293011; paralectotype Ohio State Museum 18117.
- Lexingtonia*, Genus: 1914, Nautilus 28: 28. Type species, *Unio subplanus* Conrad, original designation.
- microcotyledon*, *Sepia*: 1891, Zool. Jahr. 5: 673, pl. 46, fig. 1 (Ceylon). Type in Strasbourg Museum.
- Microteuthis*, Genus: 1888, Zool. Jahr. 3: 648. Type species, *Microteuthis paradoxa* Ortmann, monotypic.
- mogymirim*, *Diplodon*: 1921, Mem. Carnegie Mus. 8: 520, pl. 37, figs. 4–7 (Creek near Mogy Mirim, São Paulo, Brazil, tributary to Rio Mogy Guassú and Rio Grande, upper Paraná drainage). Lectotype, here selected, CM 61.9260 specimen no. 22, pl. 37, fig. 4 a–c. Is *Diplodon expansus* (Küster) teste Parodiz.
- obesa*, *Monocondylaea*: 1921, Mem. Carnegie Mus. 8: 583, pl. 40, figs. 4–6 (Rio Tapajos, Santarem, Pará, Brazil). Lectotype, here selected, CM 61.5850 specimen no. 10, pl. 40, fig. 4 a–c.
- paradoxa*, *Microteuthis*: 1888, Zool. Jahr. 3: 649, pl. 22, fig. 4 (Kadsiyama [Japan]). Type in Strasbourg Museum.
- Prolasmidonta*, Subgenus: 1914, Nautilus 28: 44. Type species, *Unio heterodon* Lea, original designation.
- Quincuncina*, Genus: 1922, Nautilus 36: 1. Type species, *Quincuncina burkei* Walker, original designation.

Scalenilla Ortmann and Walker, Subgenus: 1922, Occ. Papers Mus. Zool. Univ. Michigan, no. 112, p. 68. Type species, *Unio sulcatus* Lea, original designation.

simillimus, *Diplodon*: 1921, Mem. Carnegie Mus. 8: 495, pl. 35, figs. 3–6 (Rio Nhundiaquara, Morretes, Paraná, Brazil). Lectotype, here selected, CM 61.9250 specimen no. 22, pl. 35, fig. 5 a–d; 2 paralectotypes MCZ 47050. Is *Diplodon martensi* Ihering teste Parodiz.

singhalensis, *Loligo*: 1891, Zool. Jahr. 5: 676, pl. 46, fig. 3 (Ceylon). Type in Strasbourg Museum.

susquehannae, *Alasmidonta* (*Decurambis*) *marginata*: 1919, Mem. Carnegie Mus. 8: 187, pl. 12, fig. 4 (Susquehanna River, Selinsgrove, Snyder Co., Pennsylvania). Figured holotype CM 61.4679, selected as lectotype by Parodiz 1967, Sterkiana, no. 28: 26; paratype Ohio State Museum 18118.

tetradynamia, *Loligo*: 1888, Zool. Jahr. 3: 659, pl. 23, fig. 4, pl. 25, fig. 1 (Tokiobai [Japan]). Types in Strasbourg Museum.

tokioensis, *Sepia*: 1888, Zool. Jahr. 3: 653, pl. 23, fig. 3 (Tokiobai [Japan]). Types in Strasbourg Museum.

torosa, *Sepia*: 1888, Zool. Jahr. 3: 652, pl. 23, fig. 2 (Tokiobai [Japan]). Type in Strasbourg Museum.

tritogonia, *Quadrula*: 1909, Nautilus 22: 101. New name for *Unio tuberculatus* Barnes 1823 when *Obliquaria tuberculata* Rafinesque 1820 and it were both considered as in the genus *Quadrula*.

Truncillopsis Ortmann and Walker, Subgenus: 1922, Occ. Papers Mus. Zool. Univ. Michigan, no. 112, p. 65. Type species, *Truncilla triqueter* Rafinesque, original designation.

vicarius *Diplodon*: 1921, Mem. Carnegie Mus. 8: 497, pl. 35, figs. 7, 8, pl. 36, figs. 1, 2 (in creeks, Aqua Quente, 8 miles from Iporanga, São Paulo, Brazil). Lectotype, here selected, CM 61.9251 specimen no. 15, pl. 35, fig. 8. Is *Diplodon martensi* Ihering teste Parodiz.

wheeleri Ortmann and Walker, *Arkansia*: 1912, *Nautilus* 25: 98, pl. 8 (Old River, a bayou of the Ouachita River) Arkadelphia, Clark Co., Arkansas. Figured holotype Museum of Zoology, University of Michigan 105514; paratypes MCZ 135712, 23319, and 45759; 2 paratypes CM 61.6162. Discussed by Parodiz, 1967, *Sterkiana*, no. 28:25.

LITERATURE CITED

- BROOKS, S. T. and B. W. 1931. List of types of Pelecypoda in the Carnegie Museum on January 1, 1931. *Ann. Carnegie Mus.* 20 (6): 171-177.
- PARODIZ, J. J. 1967. Types of North American Unionidae in the collection of the Carnegie Museum. *Sterkiana*, no. 28: 21-29.
- 1977. [Present synonymys of certain South American species], in letter.

Plate 27

- Fig. 1. *Fusconaia cor analoga* Ortmann. [Clinch River, Speers Ferry, Scott Co., Virginia]. Holotype British Museum (Nat. Hist.) 1964117. Length 47 mm, height 36 mm, width 20 mm.
- Fig. 2. *Fusconaja* [*sic*] *subrotunda leucogona* Ortmann. Elk River, Gassaway, Braxton Co., West Virginia. Lectotype Carnegie Museum 61.5239, specimen A. Length 91 mm, height 68 mm, width 35 mm. Male.



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The Carnegie Museum, its Collections and Curators of Mollusks

By RICHARD I. JOHNSON

The Carnegie Museum opened in November of 1895 with Herbert Huntington Smith in charge of Invertebrate Zoology. At first the mollusk collection consisted only of Smith's, a general one, representing some 3,000 species. To this was soon added the collection of F. R. Holland, containing some 6,000, which included specimens identified by C. B. Adams, T. Bland, J. G. Anthony, and Isaac Lea. In 1899 Smith left to collect specimens in South America. During 1890 George Hubbard Clapp (1859–1949) was appointed Honorary Curator of the Department. He was a wealthy man, a trustee of the museum, with a special interest in the land and freshwater mollusks of North America. Between 1893 and 1927 he contributed 64 articles on mollusks to the *Nautilus*. In 1902, the important collection of *Partula* made by William Dell Hartmann (1817–1899) was purchased, along with his general collection of 9,000 species. His collection of the Hawaiian terrestrial family Achatinellidae had been previously sold to the Natural History Museum in Bremen, Germany. Smith, having returned to the museum, prepared an annotated catalogue of the Hartman *Partula* (1902). In 1903 Smith retired to become Curator of the Alabama State Museum of Natural History. There, through exchange and by extensive collecting, he built an important collection of freshwater mollusks.

In July 1903, Arnold E. Ortmann was appointed Curator of Invertebrate Zoology (exclusive of Insects), and the Carnegie Museum soon became a major center for the study of Unionidae. Not only did Ortmann enrich the collection with the specimens he gathered himself, but his reputation was such that he received unionids from almost all of his interested contemporaries. In 1904, the museum purchased marine shells collected by the *Porcupine* and *Valorous* expeditions from the London shell dealer, of dubious reputation, H. B. Preston.

In 1909 Victor Sterki (1846–1933) was appointed an Honorary Assistant in the department of Invertebrate

Zoology. His extensive collection of Pupillidae and Sphaeriidae, consisting of some 12,000 identified and catalogued lots had been purchased in 1906. Sterki worked mainly, in absentia, from his home in New Philadelphia, Ohio, though he and Ortmann were in the field collecting together during 1911.

Ortmann worked with graduate students from the University of Pittsburgh (which is just across the street from the Museum). During 1913 the collection of shells was moved to its present location and here Ortmann supervised the Doctoral thesis of Miss M. A. Moldenhauer on the Glochidea of Najades. Ortmann's most prolific student was Norman MacDowell Grier (1890–1951) who arrived in 1915 and "was assigned a table in the laboratory of invertebrate zoology, where he took up biometric work on the Najades of Lake Erie." Also present at other tables were Miss Moldenhauer and Miss. E. C. Carter, who were also working for advanced degrees. Grier received his Ph.D. from the University of Pittsburgh in 1919 and went on to make a significant contribution to the study of Unionidae. In 1922, G. H. Ball, another Doctoral candidate from the University, published his thesis on variation in freshwater mussels. This paper was done under Ortmann's direction. The latter suggested the project and the species used.

Ortmann died suddenly in 1927. Interestingly, after Ortmann's death neither Clapp, who was then 76, nor Grier, who went into other work, published anything significant on mollusks. In 1927, Stanley Truman Brooks (1902–ca. 1960), Ortmann's last student, was appointed assistant in charge of the department, and upon the receipt of his Ph.D. in 1929 was made Acting Curator. He and his wife (1931) made studies of the types in the collection. On January 25, 1933, Sterki died and his collection and library were removed to Pittsburgh. Ortmann's extensive library had been purchased by the Museum several years previously.

In 1933, Gordon M. Kutchke (subsequently changed to G. K. MacMillan) (1906–) became associate Curator. He held this post, with a few months off in 1944 for military service, until 1951, when he went into wastewater chemistry. He made contributions to the knowledge of land mollusks. In 1936 he revamped the type collection and found

67 overlooked by the Brooks'. Brooks left the Museum in 1946 on a year's leave of absence to work for the U.S. Military Government as a scientific specialist, and subsequently went into private business.

A new era in molluscan studies began at the Museum in 1951 when Dr. Juan José Parodiz (1911-) became Assistant Curator of Recent Invertebrates. He was not long in becoming full curator. Parodiz had spent 20 years with the Museo Argentino de Ciencias Naturales, and was *the* expert on the land mollusca of South America. Parodiz began his tenure with a 10 year survey of the freshwater gastropods of Pennsylvania. He has followed Ortmann in his interest in the naiades of South America. He has published a list of the North American unionid types (1967), and has made numerous contributions to our knowledge of the land and freshwater mollusks of the Americas, the area which has always been the museum's greatest strength.

REFERENCES

The above notes are mostly gleanings from a perusal of the complete Annual Reports of the Carnegie Museum (1897-1975) and from: Abbott, R. T. 1973. *American Malacologists*. First edit. Falls Church, Va.

LITERATURE CITED

- Ball, G. H. 1922. Variation in fresh-water mussels. *Ecology* 3: 93-121.
- Brooks, S. T. and B. W. 1931. List of types of Pelecypoda in the Carnegie Museum on Jan. 1, 1931. *Ann. Carnegie Mus.* 20: 171-177.
- 1931. List of types of Amphineura and Gastropoda in the collection of the Carnegie Museum on Jan. 1, 1931. *Ann. Carnegie Mus.* 20: 179-253.
- Johnson, R. I. 1977. Norman MacDowell Grier, a bibliography of his work on mollusks, with a catalogue of his unionid taxa. *Occ. Papers on Moll.* 4 (57): 226-227.
- Parodiz, J. J. 1967. Types of North American Unionidae in the collection of the Carnegie Museum. *Sterkiana* no. 28: 21-30.
- Smith, H. H. 1902. An annotated catalogue of shells of the genus *Partula* in the Hartman collection belonging to the Carnegie Museum. *Ann. Carnegie Mus.* 1: 422-485.



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national Project for the Investigation of the Macaronesian Area, relying on Riedel (1964) when dealing with the Zonitidae.

Collections are still not sufficient for a complete understanding of the distribution and relationships of Azorean mollusks either within or outside the archipelago. The purposes of this paper are to describe a new species of *Oxychilus* and to discuss the relationships and evolution of the endemic subgenus *Drouetia* Gude, particularly its affinities with the subgenus *Ortizius* Forcart. The results support the hypothesis of Riedel (1964) that both groups arose in the Azores from a pre-*Ortizius* type snail which had arrived from Europe, probably during the Tertiary.

The nine islands comprising the Azorean archipelago (Plate 28, fig. 1) lie on the mid-Atlantic ridge, 1450 km west of Portugal and 1776 km east-south-east of Newfoundland. Santa Maria Island (Plate 28, fig. 2) has an area of 97 km² and its highest point is only 580 m above sea level. It has ten endemic species and subspecies of land snails, the largest number of any of the islands. São Miguel Island, 80 km north and eight times larger, has only five endemic

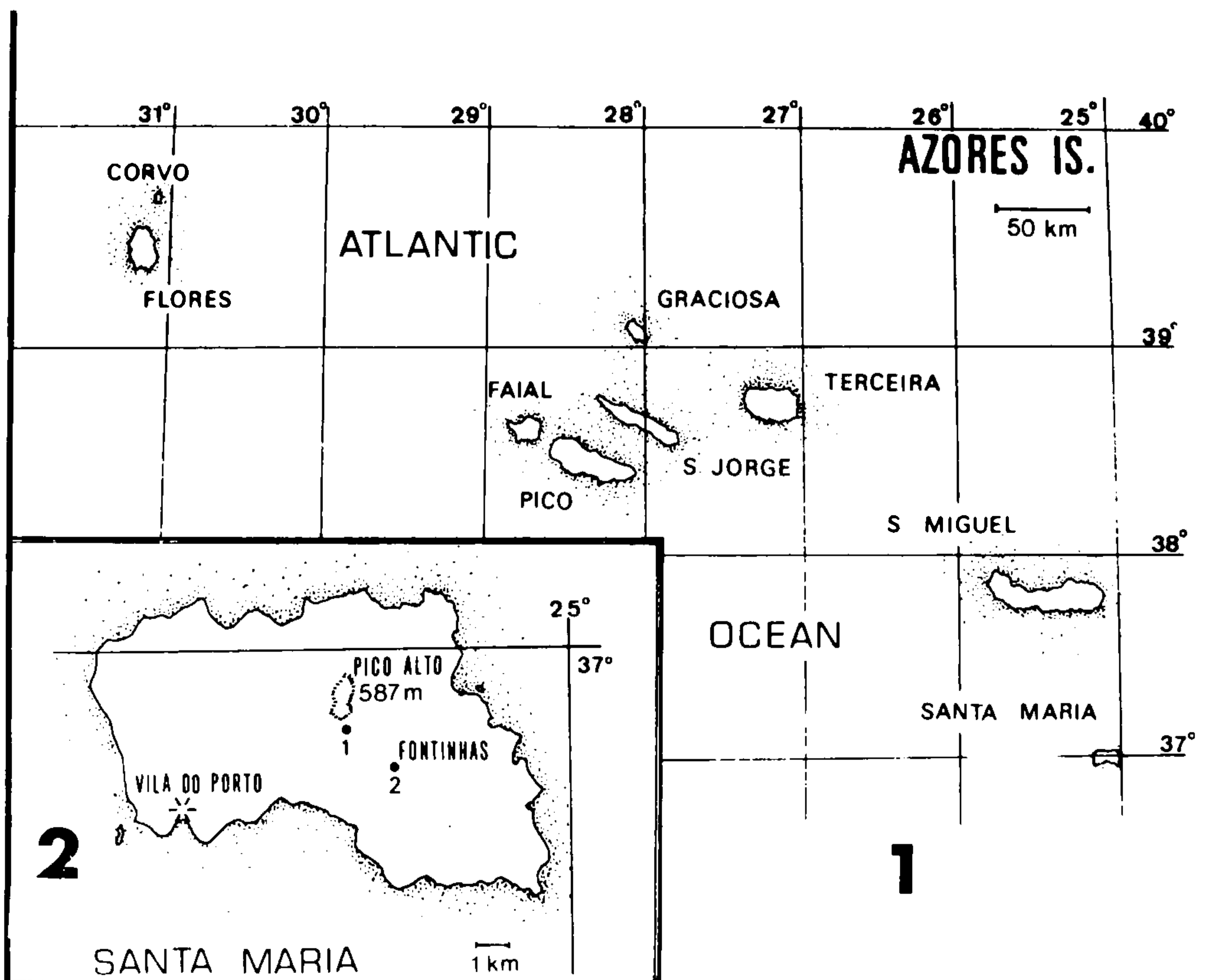


Plate 28

Fig. 1. Map of the Azores Islands.

Fig. 2. Map of Santa Maria Island, showing the collecting stations.

species. It is possible that, after a thorough study of the geological and biological history of the Azores, Santa Maria Island will prove to occupy a key position in the colonization of the archipelago.

ACKNOWLEDGMENTS

I wish to express my gratitude to Drs. Ruth D. Turner and Kenneth J. Boss of Harvard University and Dr. Robert C. Bullock of the University of Rhode Island for their continued assistance and comments on the manuscript.

MATERIALS AND METHODS

Specimens for anatomical work were killed by drowning in freshwater overnight and then preserved in 70% ethanol. No histological preparations or studies were made.

Specimens for examination with the Scanning Electron Microscope (SEM) were first cleaned in distilled water and then in 70% and 90% ethanol, using an ultrasonic cleaner for 10 seconds at each step. They were then mounted on a stub using double coated tape. Radulae were first cleaned in KOH, washed in distilled water and then carried to absolute ethanol to harden the teeth. To avoid destruction of the teeth, ultrasonic cleaning was reduced to two seconds per step. The radula ribbon was mounted on a circular cover glass to which it adhered when dry and the cover slip was attached to the stub with double coated tape. All specimens were covered with carbon and gold-palladium in a Denton DV-502 vacuum evaporator and examined using a ISI Mini-SEM, located in the Department of Zoology, University of Rhode Island.

Systematic work was based on the studies of Wollaston (1878), Gude (1911), Forcart (1957), Zilch (1959) and Riedel (1957, 1964, 1966). Terminology generally follows that of Fretter and Graham (1962) for the description of the soft parts, Rigby (1963) for the digestive and reproductive systems and Simroth (1908), Bargmann (1930) and Franc (1968) for the nervous system.

STATION DATA

Santa Maria Island, Azores Islands: *Station 1*, Pico Alto, south slope, at 500 m. In primitive forest of *Pittosporum undulatum* Vent, *Erica azorica* Hochst, *Laurus azoricus* (Seub) and the introduced *Hedychium gardnerianum* Roscoe. The animals had a special preference for fallen leaves of *Hedychium*. a. 1-XI-1974, 1 dead specimen; b. 9-X-1975, 1 dead and 7 live specimens.

Station 2. Fontinhas, Perímetro Florestal, at 300–400 m of altitude in forest of *Cryptomeria japonica* Don and *Myrica faya* Ait with an undergrowth of *Hedychium*. a. 1-XI-1974, 1 live and 1 dead specimen; b. 10-X-1975, 10 live and 8 dead specimens.

SYSTEMATICS

Family ZONITIDAE Mörch 1864

Subfamily ZONITINAE Mörch 1864

Genus *Oxychilus* Fitzinger 1833

Oxychilus Fitzinger 1833, Beiträge Landesk. Oesterreich's unter der Enns [in] Verein fuer Vaterlaendische Geschichte . . . , [Vienna] 3 (3): 100. Type species, *Helix cellaria* Müller, subsequent designation Herrmannsen 1847.

Shell thin, translucent, smooth, somewhat glossy, disc-shaped, moderately umbilicate to non-umbilicate; whorls about 6; sutures not impressed; axial striae indistinct; last whorl elliptical in profile; aperture oblique, lip simple, sharp.

Subgenus *Drouetia* Gude 1911

Drouetia Gude 1911, Proc. Malacological Soc. London 9:272. Type species, *Helix atlantica* Morelet and Drouet, original designation.

Foot tripartite, right posterior tentacle retractor crossing the reproductive organs. Shell imperforate, hyaline, shiny, smooth, sculpture (at 400×) of extremely fine spiral lines crossed by axial threads.

Oxychilus (Drouetia) agostinhoi, new species¹

Plates 29–35

Type Locality. Fontinhas, Perímetro Florestal, 300–400 m, Santa Maria Island, Azores Islands.

Type Repositories. Holotype and two paratypes, Museum of Comparative Zoology, nos. 288926, 288927, 288928. Additional paratypes at the American Museum of Natural History (1 sp.) Academy of Natural Sciences, Philadelphia (1 sp.), National Museum of Natural History, Washington, D.C. (1 sp.), British Museum (Natural History), London (2 sp.), Musée d'Histoire

¹By naming this species after the late Ten.-Cor. José Agostinho, I express my deepest homage to an eminent Azorean scientist and a very dear friend.



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shell; mantle border black; genital opening marked by a whitish hue behind posterior right tentacle, about midway on neck.

Table 1. Measurements of the shells of the holotype (#315) and adult or nearly adult paratypes of *Oxychilus (Drouetia) agostinhoi*. Measurements in mm. The specimen number refers to my own collection. The mean is given as $\bar{X} \pm$ one standard deviation. For locality see text. For measurements see Plate 29, figs. 1-3.

Specimen number	Locality	Maximum diameter	Oblique height	Vertical height	Aperture height	Aperture width	Number of whorls
315	2b	5.1	2.0	2.2	1.8	3.0	4 $\frac{1}{4}$
506	2b	5.0	2.0	2.2	1.8	3.0	4
504	2b	5.0	1.9	2.2	1.8	3.0	4
505	2b	4.9	1.9	2.1	1.7	2.9	4 $\frac{1}{4}$
174	2a	4.9	2.1	2.4	1.9	3.0	4
377	1b	4.9	2.1	2.3	1.9	2.9	4
514	2b	4.9	2.0	2.4	1.8	2.6	4
507	2b	4.8	2.0	2.2	1.7	2.8	4 $\frac{1}{4}$
503	1b	4.8	1.9	2.1	1.7	2.8	4 $\frac{1}{4}$
508	2b	4.7	1.9	2.0	1.6	2.9	4
511	1b	4.6	1.9	2.3	1.8	2.9	4
313	2b	4.6	1.9	2.1	1.8	2.7	4
509	1b	4.6	1.9	2.1	1.8	2.6	4
515	2b	4.6	2.0	2.2	1.7	2.5	4
314	1b	4.5	1.7	1.9	1.5	2.7	4
510	1b	4.3	1.8	2.0	1.7	2.6	4
312	2b	4.2	1.9	2.1	1.8	2.4	4

Mean $4.7 \pm .2$ $1.8 \pm .1$ $2.2 \pm .1$ $1.8 \pm .1$ $2.6 \pm .5$

Radula. (Plate 31, figs. 1-3. Plate 32). Radula formula:

$$\left[\frac{(12-13)}{1-(2)} + \frac{2}{3} + \frac{1}{3} + \frac{2}{3} + \frac{(12-13)}{(2)-1} \right] \times 42 - 55$$

Central tooth shorter and narrower than laterals, tricuspid; cusps about same size, small; central cusp always thinner than laterals. First lateral higher than central, tricuspid; inner cusp small, broad; median cusp long; outer cusp smaller than inner cusp, somewhat narrower. Second lateral similar to the first lateral, larger. Marginals falciform; first marginal bicuspid, with inner cusp rudimentary and outer cusp strong, curved; other marginals unicuspid, similar to the first marginal, becoming smaller.

Anatomy (Plate 33): *Organs of the neck region*. Anterior tentacles with grayish to dark gray internal wall; a thin contractor

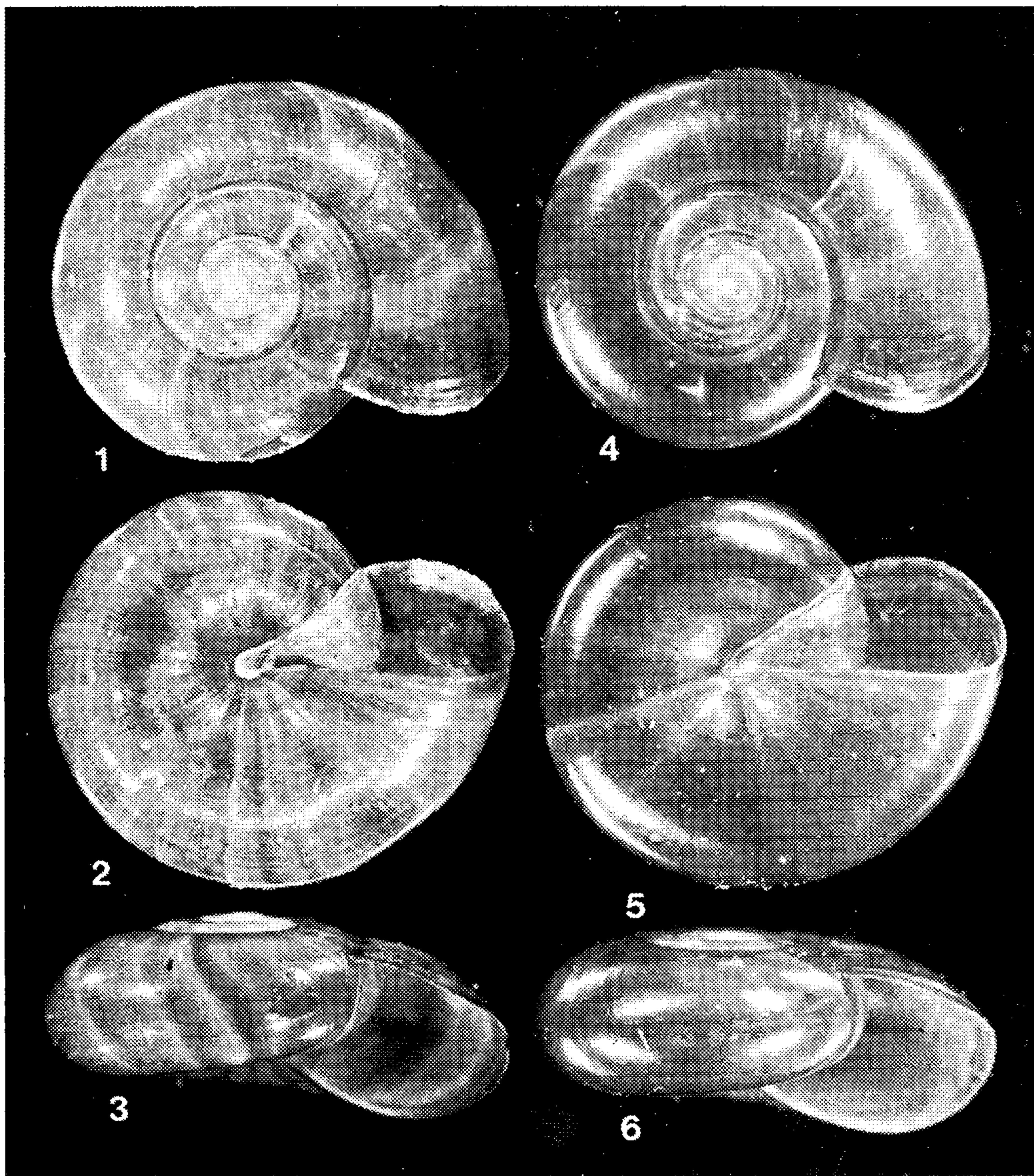


Plate 30

Figs. 1-6. *Oxychilus (Drouetia) agostinhoi* Shell. Figs 1-3, holotype (MCZ 288926) (5.1 mm max. diameter); Figs 4-6, paratype (MCZ 288928) (4.5 max. diameter).

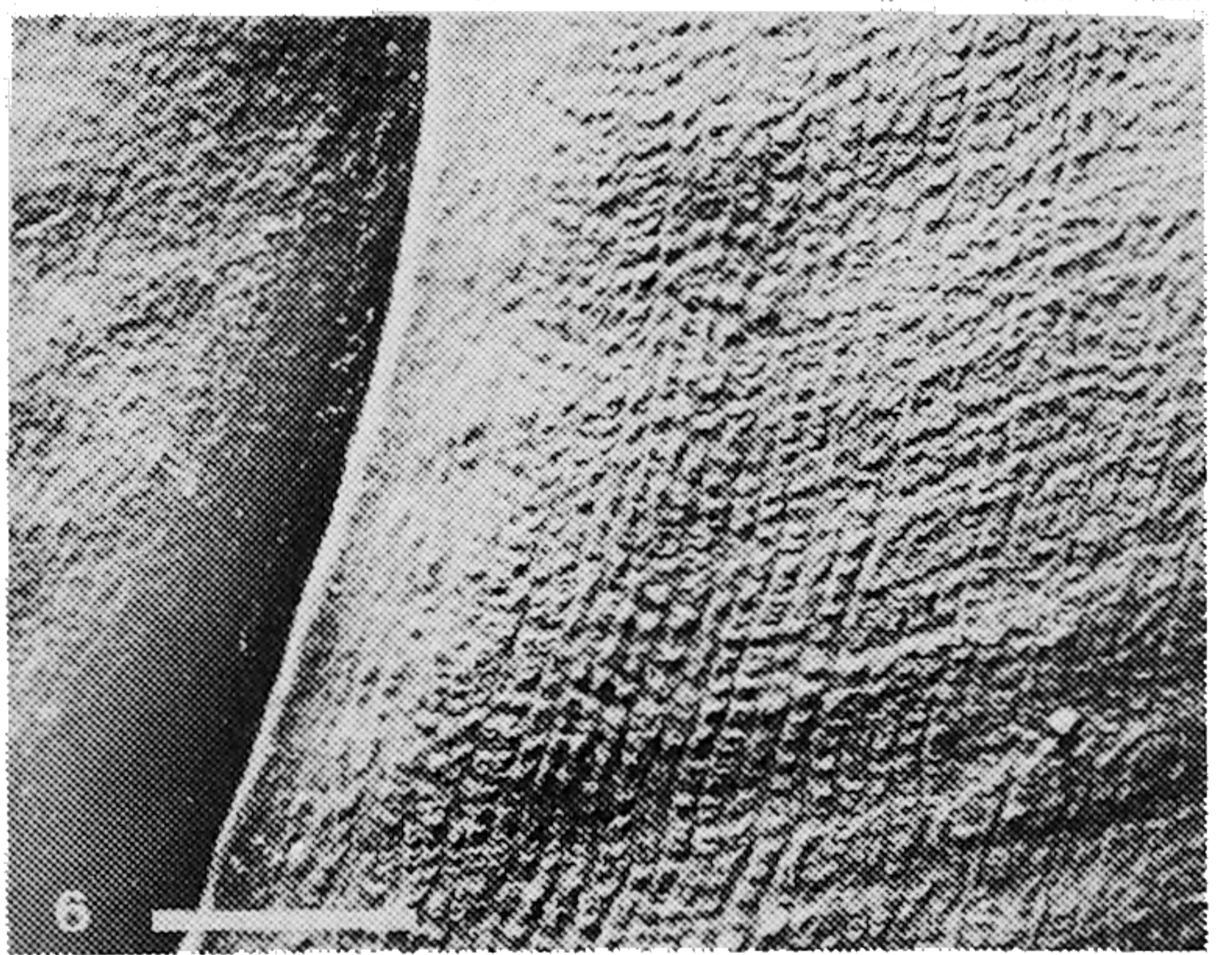
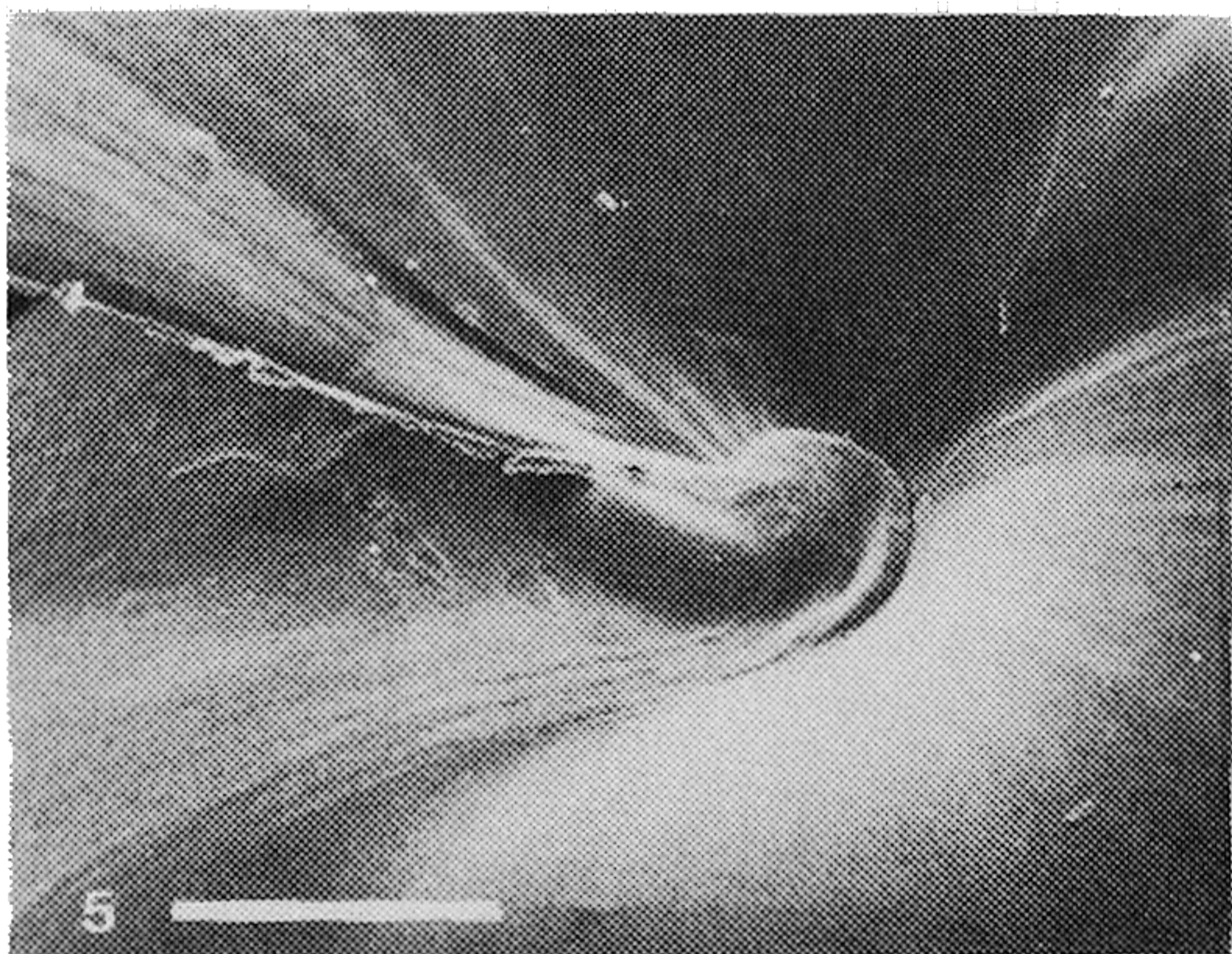
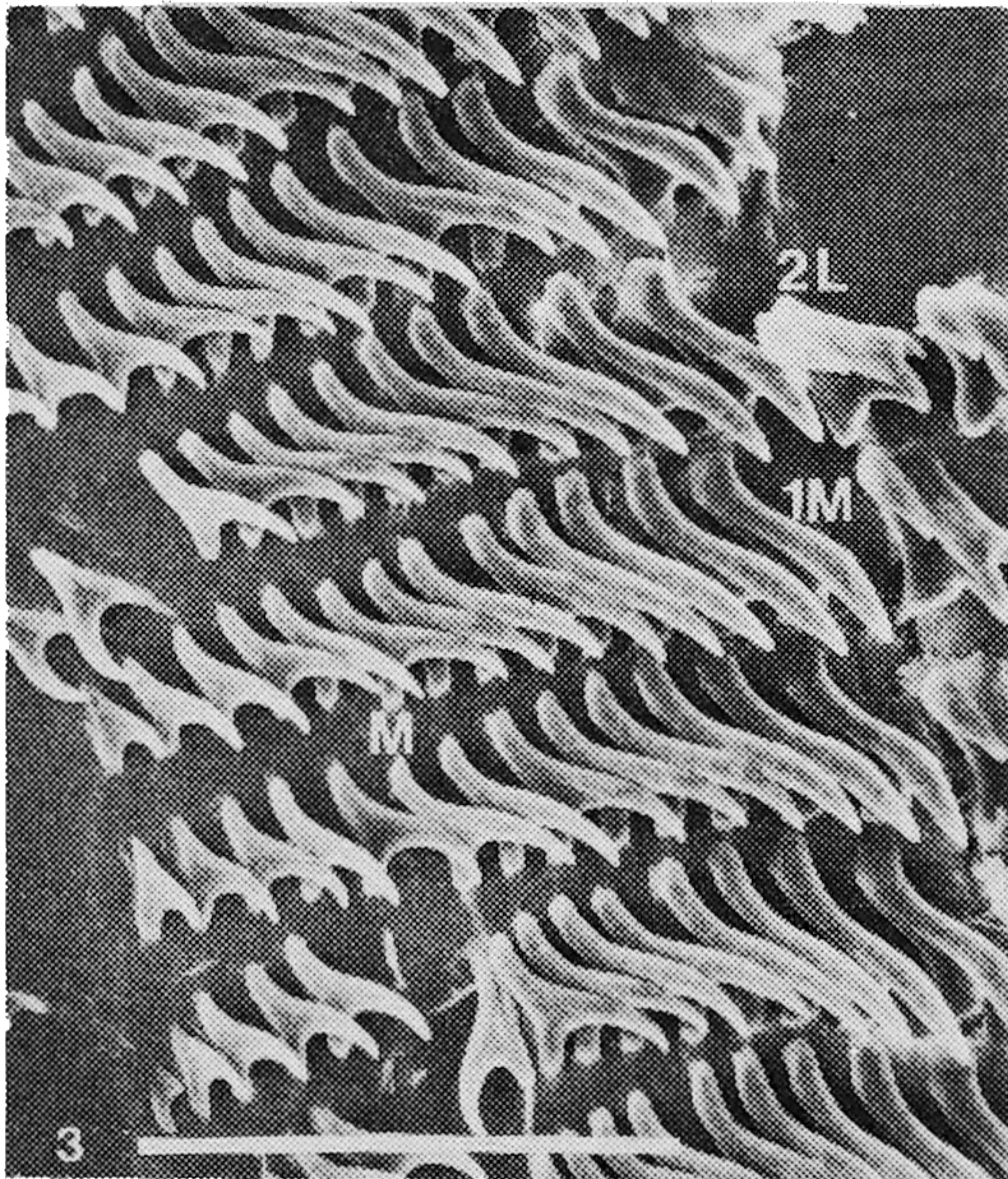
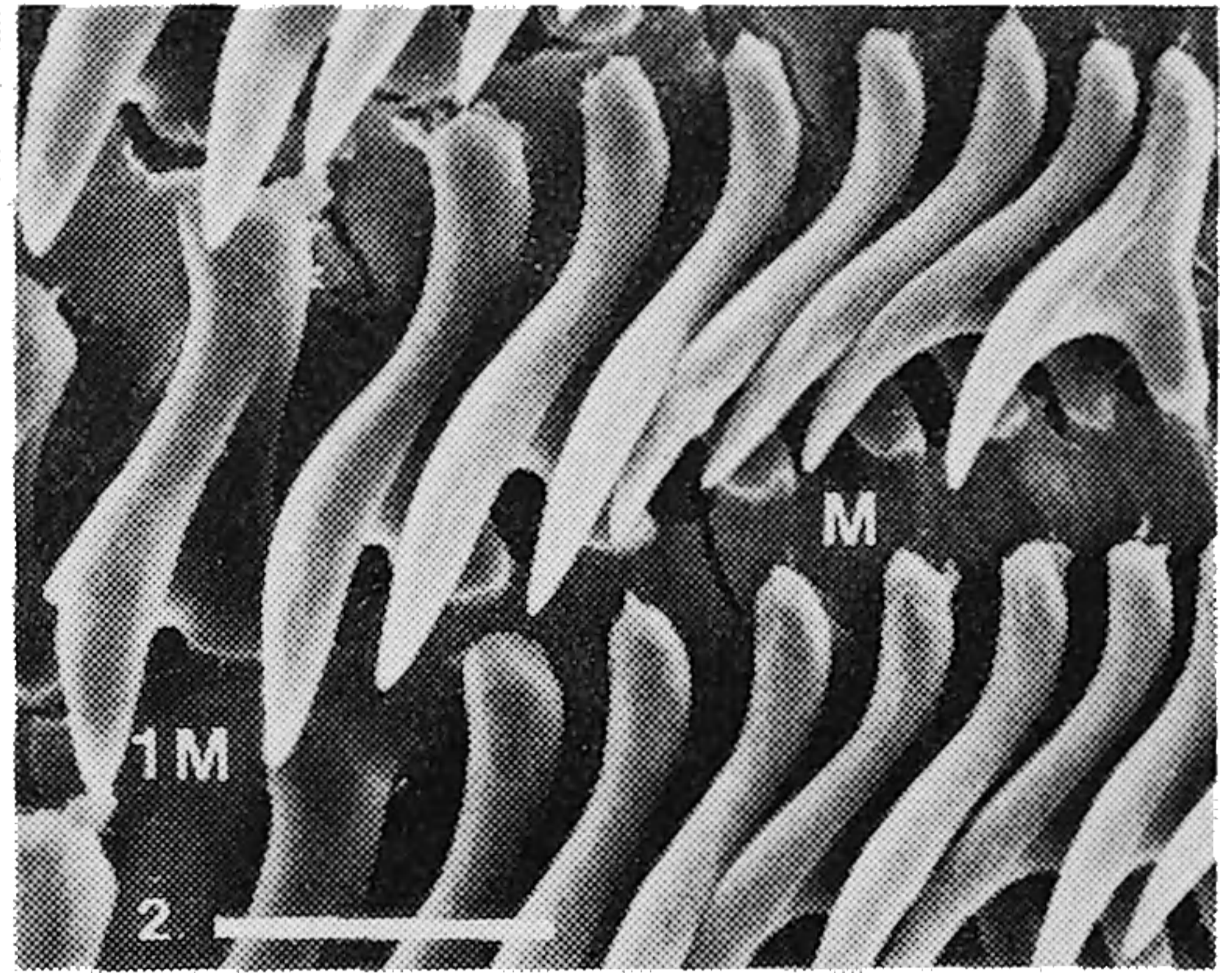
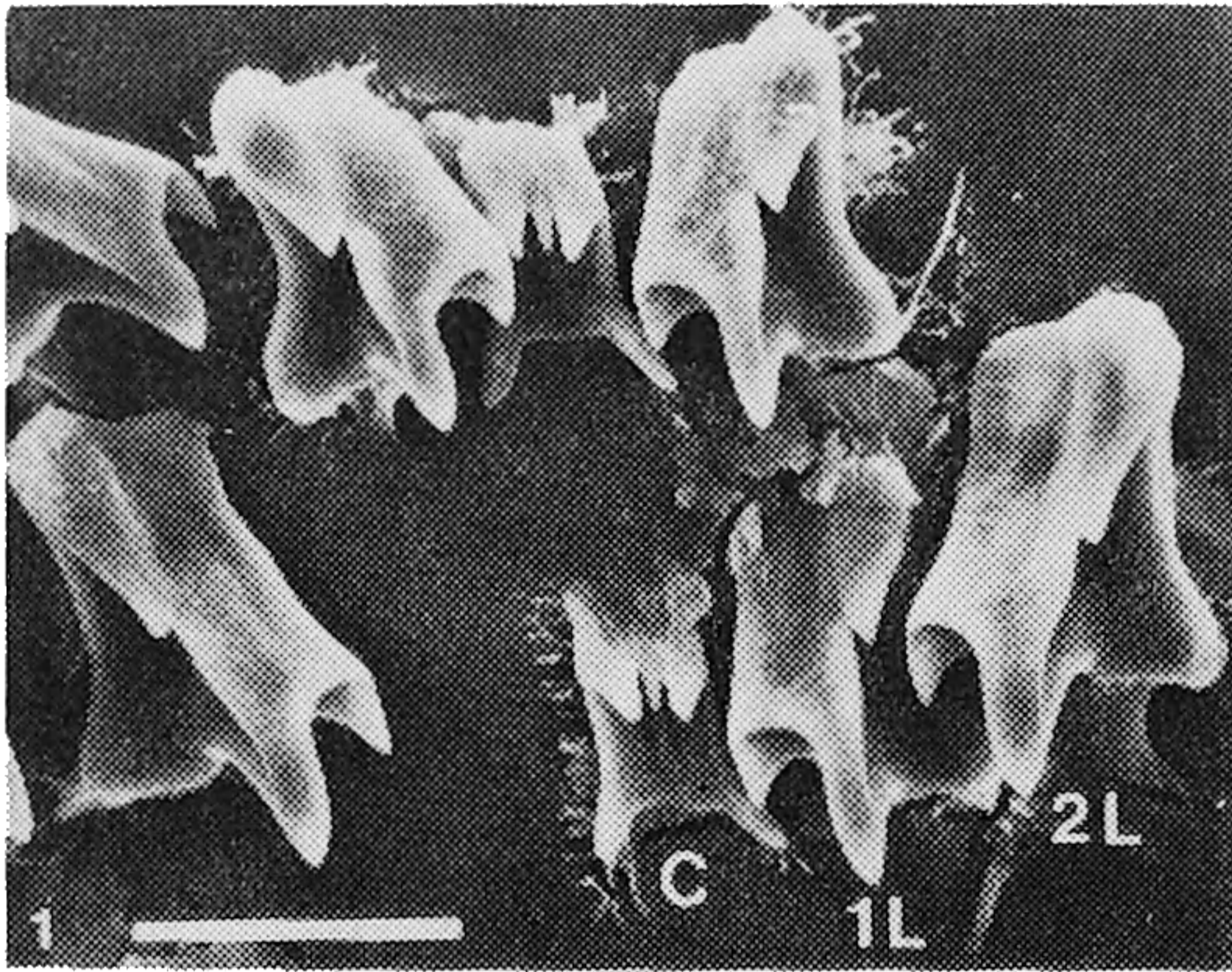


Plate 31



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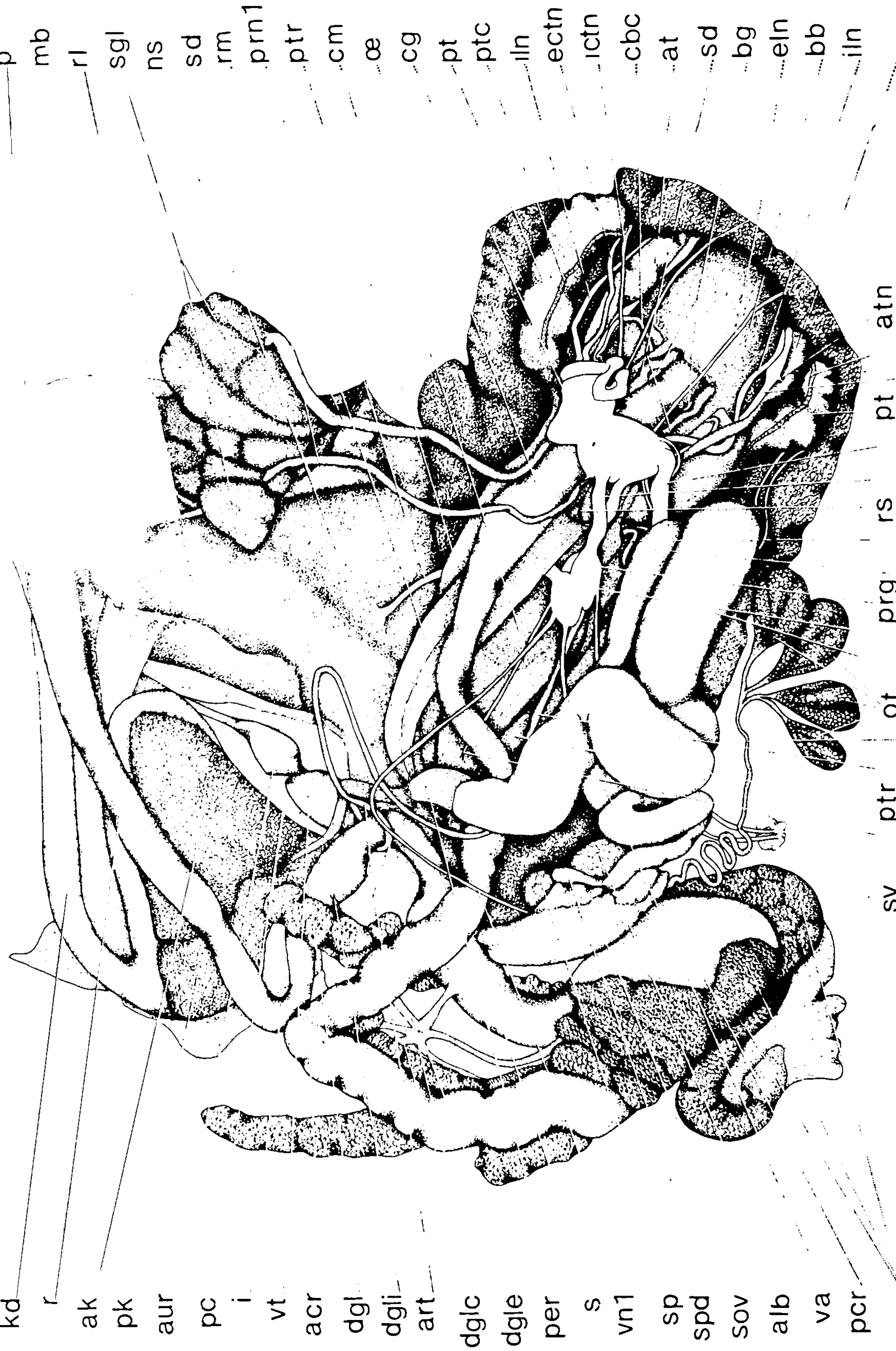
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length; penis thick, twisted posteriorly and with a medial constriction; proximal portion wrapped in a membranous sheath, the external reflection of a strong muscular sheath (fig. 2) which does not cover the constriction; flagellum thick, short; epiphallus thinner than flagellum, shorter than total length of penis and expanding rapidly from the vas deferens; internal wall of penis and epiphallus (fig. 2) with 4 to 5 longitudinal folds, stronger in penis; penis retrac-

Plate 33

Dorsal view of dissected *Oxychilus agostinhoi*; the top of the neck was cut longitudinally and the skin reflected; a lateral cut was made on the body whorl from below the pneumostome to the top of the visceral mass, and the rectum, kidney and all the roof of mantle cavity reflected to the left; the floor of the mantle cavity was removed and most of the organs loosely separated; ovotestis and salivary glands are displaced.

- | | |
|-----------------------------------------------|-----------------------------------------------------------------------------------------|
| <i>acr</i> , anterior crop | <i>ot</i> , ovotestis |
| <i>ak</i> , anterior lobe of kidney | <i>pc</i> , pericardium |
| <i>alb</i> , albumen gland | <i>pcr</i> , posterior crop |
| <i>art</i> , artery | <i>pe</i> , penis |
| <i>at</i> , anterior tentacle | <i>per</i> , penis retractor |
| <i>atn</i> , anterior tentacle nerve | <i>pk</i> , posterior lobe of kidney |
| <i>aur</i> , auricle | <i>pn</i> , pneumostome |
| <i>bb</i> , buccal bulb | <i>pns</i> , skin close to the pneumostome
where <i>prn 1</i> and <i>vn 1</i> attach |
| <i>bg</i> , buccal ganglia | <i>prg</i> , parietal ganglion |
| <i>cbc</i> , cerebro-buccal connective | <i>prn 1</i> , first parietal ganglion |
| <i>cg</i> , cerebral ganglia | <i>pt</i> , posterior tentacle |
| <i>cm</i> , columellar muscle | <i>ptc</i> , posterior tentacle contractor |
| <i>cmn</i> , columellar muscle nerve | <i>ptr</i> , posterior tentacle retractor |
| <i>dgl</i> , digestive gland | <i>r</i> , rectum |
| <i>dglc</i> , digestive gland collector ducts | <i>rl</i> , roof of the lung |
| <i>dgle</i> , digestive gland excretor ducts | <i>rm</i> , radular muscle |
| <i>dgli</i> , digestive gland intestinal duct | <i>rs</i> , radular sac |
| <i>ectn</i> , external circumtentacular nerve | <i>s</i> , stomach |
| <i>eln</i> , external lip nerves | <i>sd</i> , salivary ducts |
| <i>ep</i> , epiphallus | <i>sgl</i> , salivary glands |
| <i>hd</i> , hermaphroditic duct | <i>sov</i> , spermoviduct |
| <i>i</i> , intestine | <i>sp</i> , spermatheca |
| <i>ictn</i> , internal circumtentacular nerve | <i>spd</i> , spermathecal duct |
| <i>iln</i> , internal lip nerve | <i>sv</i> , seminal vesicle |
| <i>kd</i> , kidney duct | <i>va</i> , vagina |
| <i>mb</i> , mantle border | <i>vd</i> , vas deferens |
| <i>mln</i> , median lip nerve | <i>vg</i> , visceral ganglion |
| <i>ns</i> , neck skin | <i>vn 1</i> , first visceral nerve |
| <i>oe</i> , oesophagus | <i>vt</i> , ventricle |
| <i>on</i> , ocular nerve | |

tor thick, usually short, arising from the floor of the lung posteriorly and inserting on the flagellum subapically. Genital atrium very reduced. Vagina almost as thick as penis and, together with oviduct, usually half total length of penis. Perivaginal gland thick, slightly pigmented, enveloping distal portion of vagina and proximal portion of oviduct, as well as proximal end of spermathecal duct. Spermathecal duct as thick as oviduct and as long as vagina; spermatheca pinkish, slightly elongated, twice the diameter of the spermathecal duct. Oviduct short. Internal wall of vagina and oviduct, as well as that portion of spermathecal duct covered by perivaginal gland, and with numerous longitudinal folds (Plate 34, fig. 3). Spermooviduct divided into two parts: 1. distal portion, enveloped by mucous gland, as thick as vagina; 2. proximal portion, thin walled and convoluted; the internal wall of anterior half with numerous folds, posterior half smooth (fig. 3); floor of spermooviduct covered by a thick, whitish sperm groove tract, which tapers and disappears when entering oviduct (Plate 34, figs. 3-4). Prostate gland adhering to floor and right side of proximal spermooviduct, pinkish, large, somewhat quadrangular. Albumen gland about same size as proximal spermooviduct. Ovotestis yellowish, composed of four oval lobes, the narrower ends of the lobes connecting with the hermaphroditic duct through moderately short and thin ducts, fused halfway in the first two lobes.

Digestive system (Plate 33). Buccal bulb well developed, cylindrical. Mandible (Plate 31, fig. 4) oxygnathe, semilunar in shape, strong, smooth, with a slightly curved median prominence on its free edge. Salivary glands white, well developed, fused together, forming a somewhat cylindrical mass, lying on top of the crop fitting up against the penis, spermooviduct and albumen gland. Oesophagus imperceptibly merging with the crop, which ends as a thin

Plate 34

Figs. 1-4. Reproductive system of *Oxychilus agostinhoi*. Fig. 1, external morphology; Fig. 2, internal morphology of male ducts; Fig. 3, internal morphology of female ducts; Fig. 4, diagrammatic cross section of proximal spermooviduct, based on dissections and the literature.

a, atrium

fsou, folded portion of spermooviduct

pems, penial muscular sheath

pes, penial sheath

pr, prostrate gland

psou, proximal spermooviduct

spg, sperm groove

spgt, sperm groove tract

vd, vas deferens



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walled sac. Stomach small, muscular, tapering abruptly posteriorly. Intestine short, convoluted, imperceptibly merging into the non-convoluted and slightly enlarged rectum. Digestive gland dark, its two main collector ducts merge before reaching the stomach, then subdivide into four excretory ducts, two of which empty into the anterior portion of the crop, one into the posterior portion of the crop and the other one into the stomach; an independent smaller duct empties into the anterior portion of the intestine.

Kidney (Plate 33). Bilobed, yellowish, strongly folded internally; the anterior lobe largest, on the roof of the mantle cavity, posterior to the heart; posterior lobe in visceral mass; nephridial duct S-shaped, large, arising from the tip of the anterior lobe close to the auricle, contouring its right edge and then turning forward to follow the left of the rectum, to open at the pneumostome.

Nervous system (Plate 35). Typical of the family (zonitoid type). Cerebral ganglia well developed, separated by very short cerebral commissure, with 21 nerves emerging from the ganglia, six of them connectives. The single unpaired penial nerve emerges posterior to the right external circumtentacular nerve and enters the penis where the penial sheath adheres to the epiphallus. There are seven sets of paired nerves emerging from the cerebral ganglia:

1. Internal circumtentacular nerves emerge from the front portion of the ganglia, close to the cerebral commissure, and attach to the basal wall of the posterior tentacle.

2. External circumtentacular nerves arise at the latero-posterior side of the ganglia and insert on the external basal wall of the posterior tentacle.

3. Ocular nerves are very thick, arise lateral to the internal circumtentacular nerves, insert on the proximal portion of the posterior tentacle, and continue inside it up to the eye, where they enlarge.

4. External lip nerves arise anterior to the external circumtentacular nerves on the lower surface of the ganglia and insert on the sides of the upper lip.

5. Internal lip nerves originate internal to the median lip nerves and insert internally below the base of the anterior tentacles.

6. Median lip nerves are thick, originate anterior to the previous ones, and extend to the anterior tentacle muscles. At the proximal end of the anterior tentacle muscle the median

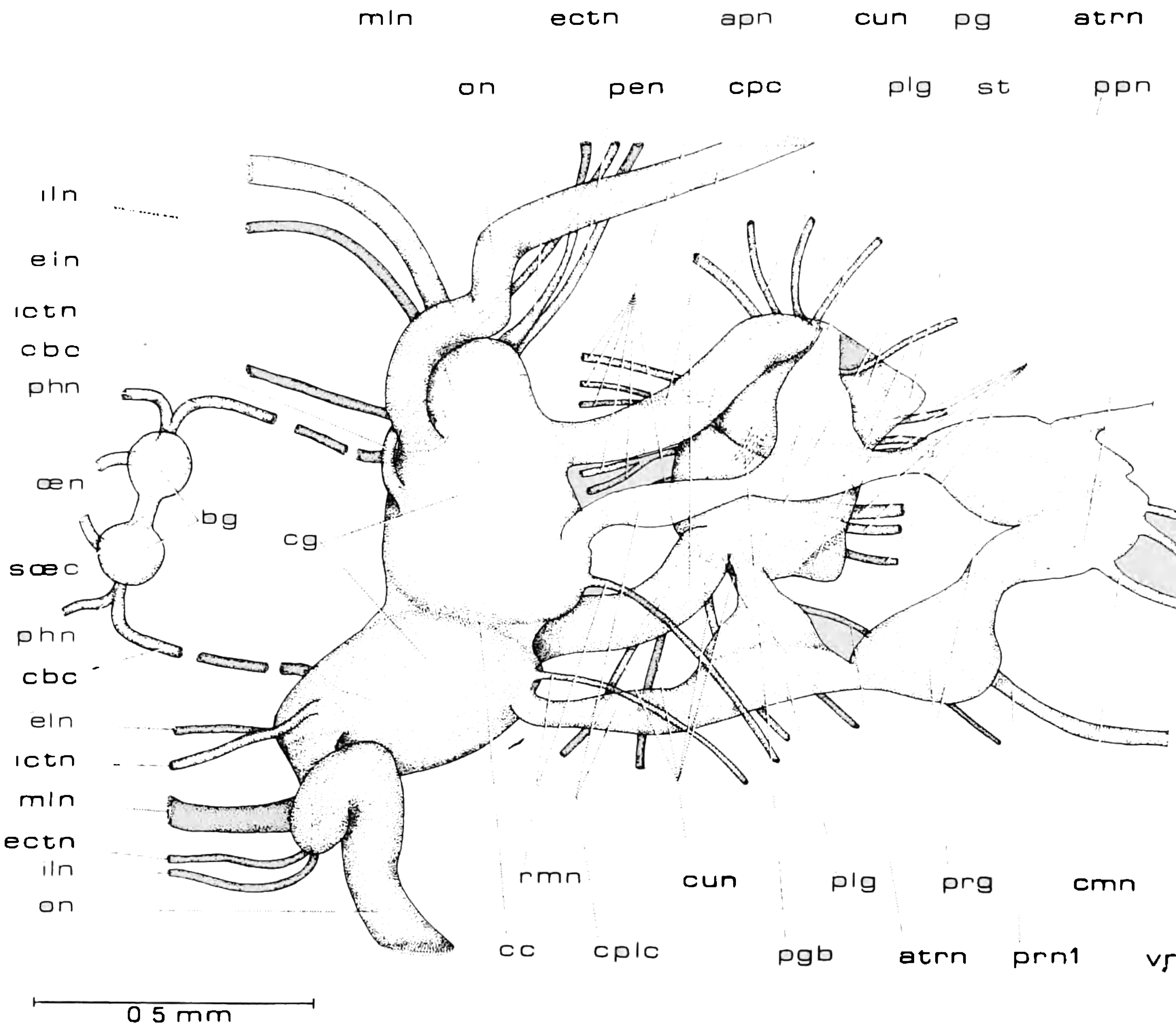


Plate 35

Dorsal view of central nervous system of *Oxychilus agostinhoi*.

apn, anterior pedal nerves
atrn, anterior tentacle retractor nerve
bg, buccal ganglia
cbc, cerebro-buccal connectives
cc, cerebral commissure
cg, cerebral ganglia
cmn, columellar muscle nerve
cpc, cerebro-pedal connectives
cplc, cerebro-pleural connectives
cun, cutaneous nerves
ectn, external circumtentacular nerve
eln, external lip nerve
ictn, internal circumtentacular nerve
iln, internal lip nerve
mln, median lip nerve

oen, oesophageal nerves
on, ocular nerve
pen, penial nerve
pg, pedal ganglia
pgb, pedal ganglia bridge
phn, pharyngeal nerves
plg, pleural ganglia
ppn, posterior pedal nerves
prg, parietal ganglia
prn 1 - prn 2, parietal nerves
rmn, radular muscle nerves
soec, suboesophagian commissure
st, statocyst
vg, visceral ganglion
vn 1 - vn 2, visceral nerves

lip nerve gives rise to a short anterior tentacle nerve, then divides: one branch has three fusiform thickenings and the other one two; they insert on the base of the anterior tentacles.

7. Radular muscle nerves emerge from the posterior end of the ganglia; the left one loops above and around the left salivary duct; the right nerve curves below the oesophagus.

The right internal circumtentacular, the right ocular and the right external circumtentacular cross the reproductive organs in between the penis and the vagina.

Connectives leaving the cerebral ganglia:

1. Cerebro-buccal connectives, very long, emerge from below the front side of the ganglia and extend to the buccal ganglia, which are located below the proximal end of the oesophagus between the proximal ends of the salivary ducts. The oesophageal nerves emerge from the buccal ganglia, and the pharyngeal nerves from the point of insertion of the cerebro-buccal connectives.

2. Cerebro-pedal connectives, short and thick, emerge from the posterior end of the cerebral ganglia and connect laterally with the pedal ganglia.

3. Cerebro-pleural connectives, short and thick, emerge internal to the previous ones.

Pleural ganglia elongate, twice the diameter of the connectives; bridges to the parietal ganglia very short, tapering downward to the pedal ganglia, and assuming the shape of a triangle; they are about the same size as the other connectives at the point of insertion with the pedal ganglia; at the point of the insertion of the pleuro-pedal connectives emerge the anterior tentacle retractor nerves. The parietal ganglia are asymmetrical; left parietal about the same size as the pleural ganglia, connects to the visceral ganglion through a broad and short connective; from the latero-posterior portion of the left parietal ganglion emerges a parietal nerve, which inserts on the neck, close to the floor of the lung; right parietal larger than the left one, fused with the visceral ganglion, but distinguishable from this one by its outline; it bears also one nerve, which emerges latero-posteriorly and attaches near the pneumostome region. Visceral ganglion about the same size as the right parietal, bears three nerves: the one on the left emerges latero-



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Table 2. Comparative table of the characteristics of the Azorean species of the subgenera *Ortizius* Forcart, *Drouetia* Gude and *Atlantoxychilus* Riedel, and of *Oxychilus* (*Drouetia*) *agnostinhoi* n. sp. Partly based on data from Riedel (1964).

TAXONOMIC UNIT	SHELL							RADULA			REPRODUCTIVE ORGANS		
	MD	W	SP	AP	U	COL	MIC	T/R	R	CC	PE (ext.)	PE (int.)	PVG
<i>ORTIZIUS</i>	5.5 to 15.0	4 ¹ / ₄ to 5 ³ / ₄	somewhat raised	depressed and oblique	yes	transparent to translucent; dark-light radial bands moderately compact	fine to marked	31 to 39	34 to 46	longer than laterals	constriction always covered by penial sheath	weak longitudinal folds; sometimes transverse furrows also present	well developed; darkly pigmented
<i>DROUETIA</i>	7.0 to 9.0	5 to 6	raised to somewhat raised	raised and somewhat oblique	no	fairly transparent uniform	very fine	41 to 46	54 to 58	longer than laterals	no constriction	strong longitudinal folds	weakly to well developed; slightly pigmented
<i>ATLANTOXYCHILUS</i>	5.5	5	raised	raised and somewhat oblique	no	fairly transparent; dark-light radial bands somewhat compact	very fine and very weak; deep spiral furrow	41	46	longer than laterals	no constriction	strong longitudinal folds and papillae	weakly developed; slightly pigmented
<i>OXYCHILUS</i> (<i>D.</i>) <i>AGOSTINHOI</i>	5.1	4 ¹ / ₄	very flat	depressed and oblique	no	transparent to translucent; unevenly spaced dark-light radial bands	weak and very fine	29 to 31	42 to 55	same size as laterals	constriction always above penial sheath	strong longitudinal folds	well developed; slightly pigmented

AP – aperture

CC – central cusp of central tooth

COL – external appearance and coloration

MD – maximum diameter in mm

MIC – microsculpture

PE (ext) – external morphology of penis

PE (int) – internal morphology of penis

PVG – perivaginal gland

R – number of rows of teeth

SP – spire

T/R – number of teeth per row

U – umbilicus

W – number of whorls

Despite a thorough search of Santa Maria, I failed to collect the first two species. *Oxychilus* (*D.*) *atlanticus brincki* is considered endemic to Santa Maria; however, some specimens I collected on Terceira Island are very similar to this subspecies although they possess a much longer epiphallus. Anatomical studies are needed in both groups to determine whether or not they are consubspecific.

Oxychilus (*D.*) *agostinhoi* shares characteristics with species of the subgenus *Ortizius* as well as of the subgenera *Drouetia* and *Atlantoxychilus*. This can be easily seen in Table 2. Other characteristics of the new species, not included in Table 2 due to lack of comparative data are:

1. The fine spiral lines on the shell are crossed by finer more compact axial lines, more easily visible in less transparent specimens. This pattern is stronger in *O.* (*D.*) *atlanticus brincki*, and weaker in *O.* (*A.*) *spectabilis*.

2. The absence of large light-dark patches in the mantle which are visible through the shell of *O.* (*A.*) *spectabilis* and all subspecies of *O.* (*D.*) *atlanticus*.

3. The grayish to white foot of *O.* (*D.*) *agostinhoi* relates it to species of *Ortizius*; the foot of *Drouetia* group is usually deeply colored, yellow to brilliant orange.

4. The mandible is identical to that of *O.* (*D.*) *atlanticus brincki*, but very different from the narrow, fragile mandible of *O.* (*A.*) *spectabilis*. Lack of material does not permit a comparison with other subspecies of *O.* (*D.*) *atlanticus* or with the endemic species of *Ortizius*.

In spite of these differences, I feel that the establishment of a new subgenus is unwarranted and that, based on the shell and internal structure of the penis, this species belongs in the subgenus *Drouetia*. However, its relationship to other species of *Oxychilus* endemic to the Azores elucidates the phylogenetic position of the up-to-now monotypic, endemic subgenus *Drouetia*. Its resemblance to the recent Azorean species of the subgenus *Ortizius* supports the hypothesis of Riedel (1964). Based only on these resemblances, for there is no fossil record, I think that *Oxychilus* (*Drouetia*) *agostinhoi* probably arose from the branch leading to the *O.* (*D.*) *atlanticus* s. l. before the origin of the subgenus *Atlantoxychilus* (Plate 36).

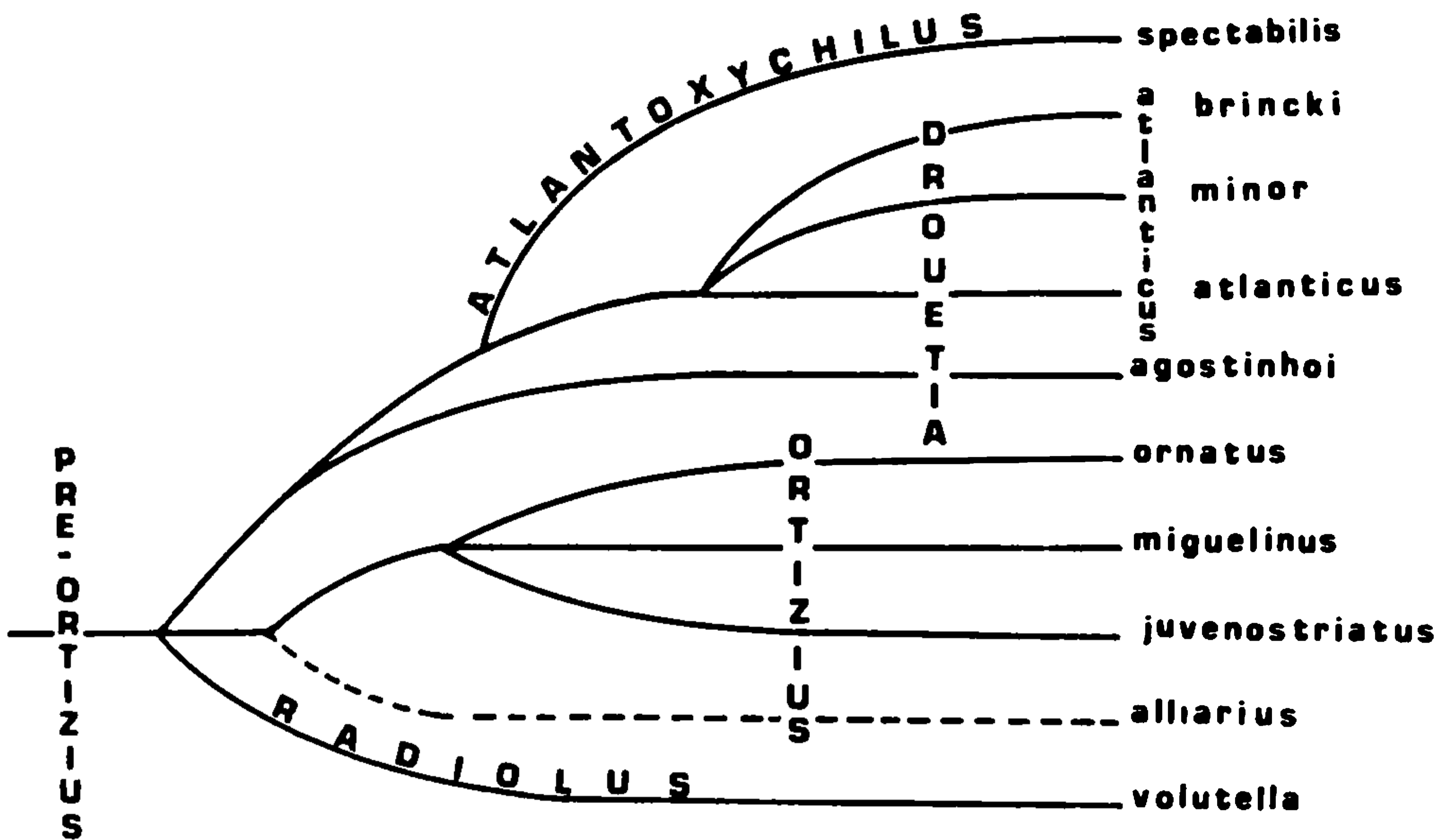


Plate 36

Diagrammatic representation of the relationship of the Azorean species of *Oxychilus* Fitzinger, except for *Oxychilus s. s.* (Adapted from Riedel, 1964).

- _____ species and groups endemic to the Azores
 - - - - - species living also in Europe



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BIBLIOGRAPHY OF STANLEY TRUMAN BROOKS' WORK ON MOLLUSCA.

- 1929 Directions for collecting land snails. Carnegie Mus., Invert. Zool Leaflet no. 1, pp. [6]
1931. List of types of Pelecypoda in the Carnegie Museum on January 1, 1931. By S. T. Brooks and B. W. Brooks. Ann. Carnegie Mus. 20 169-177.
1931. List of types of Amphineura and Gastropoda in the collection of the Carnegie Museum on January 1, 1931. By S. T. Brooks and B. W. Brooks. Ann. Carnegie Mus. 20. 179-253.
- 1931 A list of the land snails of Pennsylvania with a summary of their distribution. Ann. Carnegie Mus. 20. 313-331, map
- 1931 The gastropod family Pleuroceridae in Pennsylvania. Nautilus 45. 58-64.
1932. *Polygyra platysayoides* nov. spec. Nautilus 46. 54-55, 3 text figs.
1933. *Natica sanctivincenti* sp. nov. Ann. Carnegie Mus 21: 413, fig
- 1933 Dr. Victor Sterki (1846-1933). Nautilus 46. 134-136.
- 1934 Obituary [of] Dr. Victor Sterki. Ann. Carnegie Mus. 22. i-xii, portrait. [Includes a list of Sterki's scientific papers.]
1934. William Elliot Burnett 1872-1933. Nautilus 47: 143-144.
1934. A new colony of *Helix nemoralis*, with some observations on their color. By S. T. Brooks and B. W. Brooks. Nautilus 47. 96-100.
1935. Molluscs from the Harmonsburg (Pennsylvania) Marl Ann Carnegie Mus 24. 59-60.
1935. The shelled molluscs of West Virginia in the collection of the Carnegie Museum Ann. Carnegie Mus 24: 61-68.
1935. *Aplexa hypnorum pilsbryi*. n. subsp. Nautilus 48 100.
1935. New species and races of Lymnaeidae from Newfoundland By F. C. Baker and S. T. Brooks. Nautilus 49. 10-13.
1935. Exploration of Southampton Island, Hudson Bay Zoology. I Echinodermata and Mollusca. Mem. Carnegie Mus. 12, Part II, Sect. 5, pp. 1, 2.
1936. The land and freshwater mollusca of Newfoundland. Ann. Carnegie Mus. 25: 83-108, pls. 12-13.
1936. *Vertigo clappi*, a new land snail from West Virginia. By S. T. Brooks and G. R. Hunt. Ann. Carnegie Mus. 25. 121, text fig.
1936. The land snails collected during the 1936 voyage of the "Vagabondia" with descriptions of new species of *Plectostylus*. Ann. Carnegie Mus. 25 123-126, 3 text figs.
1936. West Virginian Carychiidae in the Carnegie museum collection. Nautilus 49. 115.
1936. Some molluscs from Utah. Nautilus 50. 13-14, text fig.
1937. The West Virginia Pupillidae in the Carnegie Museum. Nautilus 50. 97-98.
1937. Occurrence of the family Carychiidae in West Virginia. By S. T. Brooks and G. M. Kutchka. Ann. Carnegie Mus. 25: 155-161, text figs.
- 1938 Occurrence of the family Pupillidae in West Virginia. By S. T. Brooks and G. M. Kutchka. Ann. Carnegie Mus. 27: 63-85, text figs.
1939. *Oreohelix eurekensis uinta* [new subspecies]. Nautilus 52: 105-106.
1940. Geographical distribution of the recent mollusca of Newfoundland. By S. T. Brooks and B. W. Brooks. Ann. Carnegie Mus. 28. 53-75.
1940. New Gastropoda from West Virginia. By S. T. Brooks and G. K. MacMillan. Nautilus 53. 95-97, pl. 12, figs 2, 3.
1944. The Sphaeridae, a preliminary survey. By S. T. Brooks and H. B. Herrington. Nautilus 57. 93-97.

MISCELLANY

STANLEY TRUMAN BROOKS, A BIBLIOGRAPHY OF HIS
WORK ON MOLLUSKS WITH A CATALOGUE OF HIS
MOLLUSCAN TAXA.

RICHARD I. JOHNSON

Stanley Truman Brooks was born on October 4, 1902 in Mound City, Kansas. He attended the University of Kansas where he received an A.B. degree in 1926. He did graduate work at the University of Pittsburgh, receiving a M. S. in 1927 and a Ph. D. in 1929. Between 1926 and 1928 he was an assistant in the Department of Invertebrate Zoology, then under the direction of Arnold E. Ortmann (Johnson, 1977). Most of his work was on North American land and fresh water mollusks. After Ortmann's death in 1927, Brooks was appointed curator of the department, a post he held until 1946. He then took a year's leave of absence to act as a scientific specialist for the United States Military Government in Germany. He never returned to the Museum, but for the rest of his life worked for a tobacco company. Brooks died of emphysema in 1960 (pers. comm., J. J. Parodiz).

REFERENCES

- ABBOTT, R. T. 1973. American Malacologists, First edit. Falls Church, Va., p. 74.
 JOHNSON, R. I. 1977. Arnold Edward Ortmann, a bibliography of his work on mollusks, with a catalogue of his recent molluscan taxa. Occasional Papers on Mollusks 4 (58), pp. 229-244.

MOLLUSCAN TAXA INTRODUCED BY S. T. BROOKS

ABBREVIATIONS

CM – Carnegie Museum, Pittsburgh, Pennsylvania

MCZ – Museum of Comparative Zoology, Cambridge, Massachusetts

clappi Brooks and Hunt, *Vertigo*

1936, Ann. Carnegie Mus. 26: 121, fig. 1 (Renick, Greenbrier Co., West Virginia).
 Holotype CM 62.28186.

mariae Brooks, *Plectostylus*

1936. Ann. Carnegie Mus. 25: 124 and figure (San Esteban, Chile). Holotype CM
 62.28184.

newfoundlandensis Baker and Brooks, *Stagnicola*

- 1935, *Nautilus* 49: 12 (Camp 31, 8 mi. from Lomond, Bonne Bay, Newfoundland). Measured holotype CM 62.26763; paratype MCZ 108814.
- papyracea* Baker and Brooks, *Stagnicola palustris*
1935, *Nautilus* 49: 10 (Rocky Pond near Whitbourne, Newfoundland). Measured holotype CM 62.26761; paratype MCZ 108813.
- perpalustris* Baker and Brooks, *Stagnicola palustris*
1935, *Nautilus* 49: 11 (Pools along Exploits River, Grand Falls, Newfoundland). Measured holotype CM 62.26762; paratype MCZ 108812.
- pilsbryi* Brooks, *Aplexa hypnorum*
1935, *Nautilus* 48: 100 (Pond near White Rocks River, at Paradise Creek, White Rocks Canyon, Uinta Co., Utah, Twp. 2 S, Range 18 E, Salt Lake Meridian). Holotype CM 62.26773. Figured by Brooks, 1936, *Nautilus* 50: 14, fig. 1.
- platysayoides* Brooks, *Polygyra*.
1932, *Nautilus* 46: 54-55, 3 text figs. (Cooper's Rock, Monongahela Co., West Virginia). Holotype CM 62.23750.
- praelonga* Brooks and MacMillan, *Pomatiopsis*
1940, *Nautilus* 53: 96, pl. 12, fig. 2 (Hillside along Elk River, 1.5 mi. S Clay Co., West Virginia). Holotype CM 62.32897.
- rugosa* Brooks and MacMillan, *Triodopsis tridentata*
1940, *Nautilus* 53: 96, pl. 12, fig. 3 (Damp Ravine, Blair Mountain, 1 mi. SW Blair, Logan Co., West Virginia). Holotype CM 62.32899.
- sanctivincentii* Brooks, *Natica*
1933, *Ann. Carnegie Mus.* 21: 413, fig. 1 (West Coast of St. Vincent, British West Indies). Syntypes CM 62.3369.
- vagabondiae* Brooks, *Plectostylus*
1936, *Ann. Carnegie Mus.* 25: 125 and figure (San Esteban, Chile). Holotype CM 62.28185.
- uinta* Brooks, *Oreohelix eurekensis*
1939, *Nautilus* 52: 105 (Hominy Creek, R. 1 W., T. 3., 3 mi N Uinta Special Meridian, near Whiterocks, Uinta Co., Utah). Measured holotype CM no. [not given, and now apparently lost (pers. comm., J. J. Tripp)]. Paratype Acad. Nat. Sci. Philadelphia, fig. by Pilsbry, 1939, *Acad. Nat. Sci. Philadelphia, Monograph* 3, 1 (1): 534, fig. 348, lower figs.



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Mycetopoda siliquosa (Spix) occur both in Trinidad and Venezuela. *Mycetopoda siliquosa*, which is widely distributed from Guatemala to northern Argentina, is reported from Trinidad for the first time.

Classification above genus is that of Parodiz and Bonetto (1963); genera are according to Haas (1969) except the concept of *Villosa*, which is based on Burch (1975).

ACKNOWLEDGMENTS

Special thanks are extended to Dr. Peter R. Bacon of the University of the West Indies, Trinidad, for specimens of *A. leotaudi* and *M. siliquosa*. Dr. Joseph Rosewater, National Museum of Natural History, and Dr. Juan J. Parodiz, Carnegie Museum, Pittsburgh, kindly made the collections in their charge available. Dr. Barry Roth, California Academy of Sciences, San Francisco, lent specimens, and Dr. Rosina Fechter, Zoologische Staatssammlung, Munich, kindly informed me that the types of *M. siliquosa* (Spix) are still extant. Thanks are also extended to Drs. Kenneth J. Boss and Juan J. Parodiz for reading the manuscript and especially to Drs. Ruth D. Turner and Arthur S. Merrill who made critical suggestions and revisions.

ABBREVIATIONS

AMNH—American Museum Natural History, New York
 ANSP—Academy of Natural Sciences, Philadelphia, Pennsylvania
 BMNH—British Museum (Natural History), London, England
 CAS—California Academy of Sciences, San Francisco, California
 CM—Carnegie Museum, Pittsburgh, Pennsylvania
 MCZ—Museum of Comparative Zoology, Cambridge, Mass.
 USNM—National Museum of Natural History, Washington, D.C.

Superfamily UNIONACEA Fleming 1828

Family UNIONIDAE Fleming 1828

Subfamily UNIONINAE Fleming 1828

Genus *Nephronaias* Fischer and Crosse

Nephronaias Fischer and Crosse 1893, Mission Sci. au Mexique, pt. 7, 2: 556 (Type-species, *Unio plicatulus* Charpentier 1856, by monotypy).

Description. "Shell elliptical, biangulate behind, that of the male showing a tendency to become arcuate with age, the female usually having a posterior inflation and never arcuate; surface concentrically sculptured; [umbos] low, with faint, broken ridges, which show a tendency to fall into two rounded loops; pseudocardinals generally rather compressed, ragged; laterals obliquely ridged; [umbonal cavity] rather deep, dorsal muscle scars distinct, running in a line from the [umbonal] cavity downward and forward." (Simpson, 1914: 253).

Remarks. In this paper we are dealing only with the subgenus *Nephronaias* in which Haas (1969: 192-204) included 24 Central American and Cuban species.

Nephronaias (*Nephronaias*) *scamnata* (Morelet)

Plate 37, figs. 1-4; Plate 38, fig. 1

Unio scamnatus Morelet 1849. Testacea Novissima 1: 30 ([Rio Las Pozas] Cacajáicara, [Pinar del Rio] Cuba; lectotype BMNH 1893.2.4.1976 labeled, "Rio Taco Taco [Pinar del Rio], Cuba," selected by Johnson 1971: 92, pl. 2, fig. 3); Martens 1900, Biologia Centrali Americana, Moll., p. 507.

Unio proclinatus Martens 1900. Biologia Centrali Americana, Moll., p. 508 (Rio Taco [Taco]; Gibara [Oriente Prov.], Cuba [erroneous]); and Pinar del Rio; Gundlach, in Museum Berolini [syntypes presumed to be in the Zoological Museum, Humbolt University (Berlin)].

Unio calamitarum Morelet 1849. Testacea Novissima 1: 30 (rivulum Baluntìè, propre Palenqueanum vicum [Chiapas Prov.], Mexico [presumed erroneous]; lectotype BMNH 1893.2.4.2010 selected by Johnson 1971: 80, pl. 2, fig. 5).

Unio calamitarum prolongata Fischer and Crosse 1894. Mission Sci. au Mexique, pt. 7, 2: 612, pl. 63, fig. 5, 5a (type locality as preceding entry [presumed erroneous], Morelet colln.; type not located in the BMNH [presumed lost]).

Unio bitumen Cooke. Vaughn 1919 [in] Carnegie Inst. Washington, pub. no. 219, p. 130, pl. 9, fig. 3 a-c, (Angela Elmira asphalt mine, near Bejucal [Habana Prov.], Cuba, Oligocene "?"; holotype USNM 167063).

Nephronaias scamnata (Morelet). Simpson 1900. Proc. U.S. Natl. Mus. 22; 595; Simpson 1914, Cat. Naiades 1: 272; Aguayo

and Jaume 1947, *Catalogo Moluscos de Cuba*, no. 134; Haas 1969, *Das Tierreich*, pt. 88, p. 193.

Elliptio (Nephronaias) scamnatus (Morelet). Frierson 1927, *Check List of North American Naiades*, p. 34; Haas 1929, *Senckenbergiana* 11: 328, figs. 4, 5.

Description. Shell usually of medium size, not often reaching over 80 mm in length. Outline long elliptical, valves rather solid, compressed, and inequilateral. Anterior end broadly and regularly rounded, posterior end less so. Ventral margin almost straight or slightly arcuate. Dorsal margin straight, ending in an indistinct angle with the gradually descending posterior margin. Hinge ligament long. Posterior ridge low, faint, generally double, often ending in a faint biangulation. Umbos low and sharp, located very anteriorly, and sculptured with fine, doubly-looped ridges.

Shell with concentric sculpture covering the entire surface. Periostracum blackish, brownish, or olive, sometimes with a few faint green rays, and occasionally with concentric tawny or light brown bands.

Left valve with two subtriangular, ragged pseudocardinal teeth and two slender, nearly straight, lateral teeth. Right valve having a strong pseudocardinal tooth and a vestigial one anterior to it and a single lateral tooth. Umbonal cavities shallow. Anterior adductor muscle scars deep, posterior ones very faint. Pallial line distinct anteriorly, where the shell is thickened. Nacre usually bluish-white, creamy or yellowish and slightly iridescent posteriorly.

Sexual differences slight, but when apparent, male shells have a straight or slightly arcuate ventral margin, while females may be slightly produced at the posterior ventral margin.

Plate 37

Fig. 1. *Nephronaias (Nephronaias) scamnata* (Morelet). *Unio scamnatus* Morelet. Rio Taco Taco [Pinar del Rio Province] Cuba. Lectotype BMNH 1893.2.4.1976. Length 52, height 34, width 17 mm. Fig. 2. *Unio calamitarum* Morelet. Rio Baluntìè, near Palenque, [Chiapas State], Mexico, erroneous. [Pinar del Rio Province, Cuba]. Lectotype BMNH 1893.2.4.2010. Length 54, height 32, width 20 mm. Fig. 3. *Unio calamitarum prolongata* Fischer and Crosse. No locality given, but presumed to be the same as that of *U. calamitarum*. Figured type in the Morelet collection, according to Fischer and Crosse, but is not in the BMNH and so presumed lost. Figure from Fischer and Crosse. Length 64, height 34, width 22 mm. Fig. 4. Pinar del Rio Province, Cuba. MCZ 6585. Length 63, height 32, width 25 mm. Fig. 5. Rio Caiguanabo, San Diego de los Baños, Pinar del Rio Province, Cuba. MCZ 126800. Length 69, height 36, width 18 mm.



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Length	Height	Width	
mm	mm	mm	
85	43	26	Rio Taco Taco, Pinar del Rio Prov. Cuba. Female
78	38	22	Rio Viñales, Pinar del Rio Prov. Cuba. Male

Remarks. *Nephronaias scamnata* (Morelet), judging by the size and number of lots found in the several collections studied, is not particularly abundant. Only a few lots have consisted of more than a half-dozen specimens. The species has sometimes been confused with male (but not female) *Villosa gundlachi* (Dunker), mostly because their ranges overlap. However, the shells of *N. scamnata* show little sexual dimorphism, are long elliptical, sometimes with a concave ventral margin, have the entire surface of the shell covered with concentric sculpture, and have ragged pseudocardinal teeth. The shells of male *V. gundlachi* are also elliptical but are proportionally much higher and have straight or slightly curved ventral margins, the concentric sculpture either restricted or absent, and the pseudocardinal teeth subcompressed.

This species has not been found in Central America; it bears no close resemblance to *Nephronaias hermannii* (Haas 1929: 30, figs. 12, 13) or *N. tabascoensis* (Charpentier) to which it has been compared. The sculpture of the former is not the same and the latter has a subtruncated posterior end. The lectotype of *Unio calamitarum* and the figure of *U. c. prolongata* are certainly *N. scamnata*, and as no other specimens have been seen from Central America, it is assumed that both taxa are based on Cuban shells from the Morelet collection. Recent *N. scamnata* and Oligocene (?) *U. bitumen* are separated by time, if not by locality but there is no significant morphological difference in their shells.

Aguayo and Jaume (1947) reported *N. scamnata* from Rio Zanjonal [near Viñales], but this river could not be located on the Cuban Military Maps of 1942; also it is impossible to tell which of the two Rio Hondos in Pinar del Rio Province they intended. They further reported this species from the Rio Santa Fé, Isla de Pinos, on the authority of Poey [reference not located], but they were unable to confirm this either by specimens in the Museo Poey or by collecting. Henderson (1916) did not find it when he made a survey of the land and freshwater mollusks of the island. Thus, the range is

restricted to Pinar del Rio Province, Cuba as far as can be ascertained.

Specimens examined or recorded. PINAR DEL RIO: *Gulf of Mexico Drainages*—Rio San Vicente, Viñales and Baños de San Vicente; Rio Rosario, Mina Constanca, Viñales; Rio Guacamayos, S of Concolacion del Norte (all MCZ); Rio Las Pozas, Cacarajícara (type locality of *U. scamnatus*); *Caribbean Drainages*—Rio Cuyaguaje, Sumidero and Guane; Rio Los Portales; Rio San Diego, Caiguanabo and San Diego de los Baños; Rio Taco Taco; Rio San Cristóbal, San Cristóbal (all MCZ). HABANA: Angela Elmira asphalt mine, near Bejucal, Oligocene (?) (type locality of *U. bitumen*); ISLA DE PINOS: Rio Santa Fe (Poey, teste Aguayo and Jaume, 1947) [doubtful].

Subfamily LAMPSILINAE Ortman 1910

Genus *Villosa* Frierson

Villosa Frierson 1927, Check List of North American Naiades, pp. 11, 80. (Type-species, *Unio villosus* Wright 1898, by original designation).

Description. "The shells are small to medium in size and subrhomboidal, subovate or subelliptical in shape, and mostly rather thin. The disc is without sculpture, the periostracum greenish-yellow to nearly black, usually with dark green color rays. The [umbonal] sculpture is double-looped." (Burch, 1975: 124).

Remarks. Burch (1975: 22) included 16 North American species in *Villosa*. Based solely on shell morphology, *Unio gundlachi* from Cuba is herein also placed in this genus.

Villosa gundlachi (Dunker)

Plate 38, figs. 2, 4

Unio gundlachi Dunker 1858, Malakozool. Blätter 5: 228 ([Rio] Taco Taco [Pinar del Rio], Cuba): measured holotype in the Berlin Museum, teste Haas 1929: 328, and figs. 8-11, showing two female paratypes.

Nephronaias gundlachi (Dunker). Simpson 1900, Proc. U. S. Natl. Mus. 22: 595; Simpson 1914, Cat. Naiades 1: 274; Aguayo and Jaume 1947, Catalogo Moluscos de Cuba, no. 134, p. [1]; Haas, 1969, Das Tierreich, pt. 88, p. 193.

Lampsilis (Actionaias) gundlachi (Dunker). Frierson 1927, Check List of North American Naiades, p. 84.

Elliptio (Nephronaias) gundlachi (Dunker). Haas 1929, Senckenbergiana 11: 328, figs. 6-11

Description. Shell usually of medium size, not often reaching over 70 mm in length. Outline elliptical or elliptical rhomboid. Valves rather solid, compressed, inequilateral. Anterior end regularly rounded, posterior end of the male slightly more broadly rounded, that of the female very much more broadly rounded. Ventral margin straight or slightly concave. Dorsal margin straight, ending in an indistinct angle with the posterior slope. Hinge ligament long. Posterior ridge low, faint, generally double, often ending in a faint biangulation. Umbos low, located very anteriorly, their sculpture consisting of doubly looped ridges.

Sculpture of faint, concentric ridges that are most distinct behind the posterior ridge. Periostracum smokey-olive to greenish yellow, occasionally with green rays on the disc.

Left valve with two subcompressed pseudocardinal teeth and two slender, nearly straight lateral teeth. Right valve with one subcompressed pseudocardinal, the vestige of a second one anteriorly, and one lateral tooth. Umbonal cavities shallow, with dorsal muscle scars in the cavities and under the pseudocardinal teeth. Anterior adductor muscle scars deep, posterior ones very faint. Pallial line distinct anteriorly, where the shell is thickened. Nacre whitish, or bluish-white, slightly iridescent posteriorly.

Plate 38

Fig. 1. *Nephronaias (Nephronaias) scamnata* (Morelet). *Unio bitumen* Cooke. Angela Elmira asphalt mine, near Bejucal [Habana Province], Cuba; Oligocene "?" Holotype USNM 167063. Figure from Cooke. Length 68, height 29.5 mm. Fig. 2. *Villosa gundlachi* (Dunker). *Unio gundlachi* Dunker. Rio Taco Taco [Pinar del Rio Province], Cuba. Paratype MCZ 94849, from W. Dunker ex J. G. Anthony collection. Length 53, height 32, width 12 mm. Male. Fig. 3. *Villosa lienosa* (Conrad). Bottom of lock 2, Black Warrior River, Tuscaloosa, Tuscaloosa Co., Alabama. Length 55, height 32, width 20 mm. Male. Fig. 4. *Villosa gundlachi* (Dunker). [Rio Guamá], near Pinar del Rio, Pinar del Rio Province, Cuba. MCZ 20862. Length 54, height 34, width 21 mm. Female. Fig. 5. *Villosa lienosa* (Conrad). Bottom of lock 2, Black Warrior River, Tuscaloosa, Tuscaloosa Co., Alabama, MCZ 28460. Length 48, height 32, width 18 mm. Female.



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Male shells quite evenly elliptical, length usually about one and one half times the height, the ventral margin straight, or slightly curved. Female shells much wider posteriorly than anteriorly, with a wide, rounded, marsupial swelling. The posterior point is high on the shell, and sharper than that of the male; below the point the posterior margin is subtruncate.

Length	Height	Width	
mm	mm	mm	
68	38	22	Rio Cuyaguaje, Cabezas, Pinar del Rio Prov., Cuba. Male.
62	36	20	Rio Taco Taco, Pinar del Rio Prov. Cuba. Holotype. Male.
62	42	24	Rio Guamá, near Pinar del Rio, Pinar del Rio Prov., Cuba. Female.
54	34	21	As above. Female.

Remarks. The male shell of *Villosa gundlachi* (Dunker) bears some superficial resemblance to *Nephronaias scamnata* (Morelet). However, the female of *V. gundlachi*, on the basis of shell morphology, is close to *V. lienosa* (Conrad), a common species in the Gulf Coastal and Appalachian regions of the United States. Simpson (1914: 273) noted the resemblance of the female *V. gundlachi* to *Lampsilis [=Ligumia] subrostrata* (Say). In each of these species, the female shell is much wider posteriorly than anteriorly, has a wide rounded marsupial swelling, a posterior point that is higher than on the male shell, and is subtruncate between the point and the post-basal swelling.

The range of *Villosa gundlachi* is limited to Pinar del Rio Province, Cuba. It is apparently rather rare as only a few of the lots examined have consisted of more than a half-dozen specimens.

Specimens examined or recorded. PINAR DEL RIO: *Gulf of Mexico Drainages*—Rio Las Pozas, near Rancho Lucas (MCZ) and Las Pozas (Aguayo and Jaume). *Caribbean Drainages*—Rio Cuyaguaje, Sumidero and Cabezas; and Rio Guamá, near Pinar del Rio (all MCZ). *Rio San Diego Drainage*—Rio San Diego, Caiguanabo and San Diego de los Baños (both MCZ); *Rio Los Palacios Drainage*—Rio Los Palacios, Pinar del Rio (MCZ). *Rio Taco Taco Drainage*—Rio Taco Taco, Taco Taco (MCZ, type locality of *U. gundlachi*). *Rio San Cristóbal Drainage*—Rio San Cristóbal, San Cristóbal (MCZ).

Family HYRIIDAE Swainson 1840

Subfamily HYRIINAE Ortmann 1911

Genus *Triplodon* Spix

Triplodon Spix 1827, [in] Spix and Wagner, *Testacea Fluviatilia ... Brasiliam, Monachii* [Munich], p. 53. (Type-species, *Triplodon rugosum* Spix 1827, by monotypy).

Description. Shell subrhomboidal, solid, slightly inflated, narrow and dorsally winged anteriorly, biangulate posteriorly. Umbos low with nearly radial sculpture. Periostracum greenish, to brownish or blackish. Two denticulate pseudocardinals in each valve, one lateral in the right and two in the left valve.

Remarks. The subgenus *Triplodon* s.s. has a well developed posterodorsal wing, while in the subgenus *Triquetrana* Simpson 1900 it is compressed and poorly developed. According to Haas (1969: 545), the former subgenus is represented by four recent species: *T. (T.) corrugatus* (Lamarck, 1819); *T. (T.) latialatus* (Sowerby 1869); *T. (T.) transversus* (Hupé 1857); and *T. (T.) rugosissimus* (Sowerby 1869). These species are found primarily in the Guayanas and Brasil. The fossil forms were discussed by Palmer (1945: 11); one of these, *T. (T.) trinitaria*, occurs in both Trinidad and Venezuela and is included here.

***Triplodon (Triplodon) trinitaria* (Maury)**

Plate 39, fig. 1

Hyria (Hyria) trinitaria Maury 1925, *Bull. American Paleontol.* 10 (42): 235, pl. 13, figs. 2 (Cedros Point, SW Trinidad, Lower Pliocene, figured holotype Paleontological Research Institution 854); Palmer 1945, *Bull. American Paleontol.* 31(118): 12, pl. 1, figs. 1-10.

Description. "Length of shell, without the anterior and posterior points, 65 mm. Shell subrhomboidal, rather solid, only slightly inflated, when perfect with a narrow, conspicuous, pointed, anterior process and a broad, high posterior dorsal wing terminating when entire in a prominent point. Posterior ridge strongly carinate, slightly biangulate. Beaks very low. Hinge line almost perfectly straight. One specimen shows distinctly a pseudocardinal tooth much split up into denticles. Surface marked with close, sharply defined, concentric threads, and on the disc, in front of the umbonal carina, are very beautiful V-shaped markings ..." (Maury, 1925).

Length	Height	Width	
mm	mm	mm	
70	40	21	E La Llanera, State of Monagas, Venezuela, Lower Pliocene.
65	50	32	Cedros Point, SW Trinidad, Lower Pliocene. Holotype.

Remarks. Maury (1925: 236) mentioned that *Triplodon trinitaria* Maury is ancestral to *T. corrugatus* (Lamarck 1819), in showing the "dawning" of the V-shaped corrugations which are so striking in *T. corrugatus*. The latter species is found in the rivers of the Guayanas, Brazil, and, based on a specimen so labeled in the Museum of Comparative Zoology, possibly also in the Orinoco River, Venezuela. Palmer (1945: 12) reported *T. trinitaria* from the lower Pliocene of Venezuela proper and noted that the assemblage of species from La Llanera suggests closer affinities with Amazonian and Recent forms than with Colombian species of the same genus.

Triplodon trinitaria is from the lower Pliocene of northeastern Venezuela and Trinidad. It is a rare species, known from about 40 specimens.

Specimens examined or recorded. VENEZUELA: a low hill along the east bank of the Quatatal River, east of La Llanera, and 17.1 kms N of Caicara, State of Monagas; Pliocene (Palmer, 1945: 7). TRINIDAD: Cedros Point, [SW part of island]; lower Pliocene (Maury, 1925: 236).

Superfamily MUTELACEA Parodiz and Bonetto 1963

Family MYCETOPODIDAE Parodiz and Bonetto 1963

Subfamily ANODONTITINAE Parodiz and Bonetto 1963

Genus *Anodontites* Bruguière

Anodontites Bruguière 1792, Jour. Hist. Nat., Paris 1: 131. (Type-species, *Anodontites crispata* Bruguière, by monotypy). Haas (1969: 557) listed a number of generic synonyms.

Description. "Shell rounded to elongated, inflated, subsolid; [umbos] full, [periostracum] smooth or cloth-like, rarely having faint rays; hinge line straight or slightly curved, edentulous, sometimes a little sinuous, the escutcheon distinct and large; nacre



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especially posteriorly. Periostracum yellowish brown, chestnut, or blackish.

Hinge plate and teeth lacking; umbonal cavities shallow; anterior muscle scars distinct, posterior scars and pallial line indistinct, nacre flesh colored, pinkish or whitish.

Length	Height	Width	
mm	mm	mm	
84	46	31	[Caroni River], Trinidad. Measured type of <i>Anodon leotaudi</i> Guppy.
70	39	22	Venezuela. Holotype of <i>Anodontites irisans</i> Marshall.
78	45	25	Trinidad. Lectotype of <i>Anodon leotaudi</i> Guppy.

Remarks. *Anodontites leotaudi* (Guppy) was placed near *A. patagonicus* (Lamarck) by Simpson (1914) and Haas (1969); however, it does not resemble it. The shell of *A. patagonicus* is obovate, more inflated, and heavier than that of *A. leotaudi* and its northern range is southern Brazil. *Anodontites leotaudi* appears close to some specimens of *A. trapesialis glaucus* (Valenciennes) which ranges from Central America south to the Magdalena River system, Colombia. However, the shell of *A. leotaudi* is heavier, the periostracum darker and without traces of green.

Anodontites leotaudi has been found in Venezuela and Trinidad. Guppy (1893: 230) gave an indication of its relative abundance: "I have never been able to procure more than two or three specimens."

Specimens examined or recorded. VENEZUELA: (Marshall; USNM: CAS; AMNH). TRINIDAD: (USNM); *Caroni River system*: "... some of the streams flowing into the Caroni." (Guppy 1866b: 27; ANSP; BMNH). *Nariva Swamp*: Cuche River (MCZ). *Lizard Springs*: 10 mi S E [town of] Rio Claro (MCZ).

Subfamily MYCETOPODINAE Modell 1942

Genus *Mycetopoda* Spix

Mycetopoda Orbigny 1835, *Magasin de Zoologie*, Paris 5 (5): 41 (type-species, *Anodontis siliquosi* [sic] Spix 1827, subsequent designation, Herrmannsen, 1847: 77).

Description. Shell thin, elongated, truncated posteriorly; posterior ridge low and flat; umbos smooth or slightly concen-

trically wrinkled; periostracum smooth, shining, pale greenish-yellow or brownish, rayless; hinge line straight and edentulous; nacre bluish white and iridescent; muscle scars shallow.

Remarks. Haas (1969: 574–576) included three species in this genus: *Mycetopoda siliquosa* (Spix), found from Guatemala to the La Plata River, Buenos Aires Province, Argentina; *M. soleniformis* Orbigny found from the headwaters of the Amazon River in Ecuador, Peru, Bolivia and Brazil to the Rio Paragua and Paraná drainages, Argentina (but not found in the Uruguay and La Plata Rivers, J. J. Parodiz, pers. comm.); and *M. legumen* (Martens) found from southern Brazil to the Rio de la Plata system, Uruguay and Argentina. The uniqueness of *M. legumen* is questioned here (see under Remarks for *M. siliquosa*).

Mycetopoda siliquosa (Spix)

Plate 39, fig. 4

Anodon siliquosus Spix 1827, [in] Spix and Wagner, Testacea Fluviatilia ... Brasiliam, Monachii [Munich], p. 30, pl. 23, fig. 2 (flumine Peruaguacú, ad molendinam sacchari Engenho da Ponte, in Provincia Bahiensi [Brazil]; figured type in the Bavarian State Museum, Munich, studied by Ihering (1890: 128), still extant, pers. comm. R. Fechter, 1980 [not seen]).

Mycetopus weddellii Hupé 1855, [in] Castelnau, Expedition ... L'Amérique de Sud ... Pt. 7, p. 93, pl. 20, fig. 2 (Santa-Anna de Chiquitos, Bresil, figured type, Paris Museum [not seen]).

Mycetopoda siliquosa (Spix). Simpson, 1900, Proc. U. S. Natl. Mus. 22: 934; 1914, Cat. Naiades, 3: 1459. Ortmann, 1921, Mem. Carnegie Mus. 8: 633. Haas (1969: 574), with the exception of *M. clessini* Ihering 1893, included the following taxa in the synonymy of *M. siliquosa* (Spix 1827): *Mycetopus ventricosus* Orbigny 1846; *M. subsinuatus* Sowerby 1868; *M. hupeanus* Clessin 1875; *M. occidentalis* Clessin 1879; *M. staudingeri* Ihering 1890; *M. punctatus* Preston 1909; *Mycetopoda krausei* Ihering 1910; *M. staudingeri aequatorialis* Ihering 1910; *M. bahia* Ihering 1910; *M. orbignyi* Ihering 1910; *M. pittieri* Marshall 1927.

Description. Shell usually of medium size, though sometimes exceeding 130 mm in length. Outline elongate subtrapezoid. Valves thin and inflated, gaping at the anterior base. Anterior end regularly rounded, posterior end more broadly and less regularly rounded. Ventral margin long and usually straight. Dorsal margin long,

straight and forming a sharp angle with the obliquely truncate posterior margin. Hinge ligament long. Posterior ridge well developed, and narrowly rounded, ending in a blunt point at the base of the shell. Umbos moderately full, but not much elevated above the hinge line, located very anteriorly, their sculpture not known.

Surface usually shining, smooth except for growth lines and inconspicuous radial sculpture; periostracum pale greenish-yellow or brownish, rayless.

Hinge edentulous, or showing faint traces of denticles beneath the nacre; umbonal cavities shallow; muscle scars and pallial line faint. Nacre bluish white and iridescent.

Length	Height	Width	
mm	mm	mm	
145	46	31	Peperpot Plantation near Paramaribo, Surinam
99	33	19	Nariva Swamp, Trinidad

Remarks. *Mycetopoda siliquosa* (Spix) is a variable and widely distributed species. It has been confused with *M. soleniformis* (Orbigny) which has a concave ventral margin and a swollen posterior ridge, but the posterior ridge of *M. siliquosa* is not swollen and its ventral margin is straight.

Bonetto (1962: 180) and Haas (1969: 576) recognized *M. legumen* (Martens) as a mycetopod, though the type had not been figured, and included *M. felipponei* Marshall as a synonym. Mansur and Veitenheimer-Mendes (1979) redescribed *M. legumen*, figured the holotype, and restricted the type locality to: Arroio da Manteiga [city of] São Leopoldo, Rio Grande do Sul [Province], Brazil. They also included *M. felipponei* as a synonym, since it falls within the range of *M. legumen* which is, roughly, the lower Rio de la Plata,

Plate 39

Fig. 1. *Triplodon (Triplodon) trinitaria* (Maury). *Hyria (Hyria) trinitaria* Maury. Cedros Point, SW Trinidad, Holotype Paleo. Res. Inst. 854. Length 65, height 50, width 32 mm. Fig. 2. *Anodontites (Anodontites) leotaudi* (Guppy). *Unio leotaudi* Guppy. Streams flowing into the Caroni [River], Trinidad. Lectotype ANSP 125443. Length 78, height 45, width 25 mm. Fig. 3. A. (A.) *leotaudi* Cuche River, Nariva Swamp, Trinidad. MCZ 288542. Length 62, height 38, width 22 mm. Fig. 4. *Mycetopoda siliquosa* (Spix) Canque River, Nariva Swamp, Trinidad. MCZ 88541. Length 87, height 32, width 18 mm.



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Rio Uruguay, and the rivers flowing into the Atlantic east of the Rio Uruguay. While the validity of *M. legumen* is not of essential concern here, both *M. legumen* and *M. felipponei*, each with a straight ventral margin, appear to be *M. siliquosa*. The morphological shell variation of *M. legumen*, illustrated by Mansur and Veitenheimer-Mendes (1979, fig. 5), is so similar to that of *M. siliquosa* over the rest of its range that I am at a loss to separate them conchologically, although the authors appear able to do so on the basis of the anatomy.

Mycetopoda siliquosa is a well established species ranging from Guatemala to northern Argentina, and Trinidad.

Specimens examined or recorded. GUATEMALA: Rio Conchins, Maya Farm, Quirigua, Izabel Prov. (CM); Paso Antonio [14°03'N; 90°43'W], Santa Rosa Prov. (Martens, 1900: 540). NICARAGUA: Lake Nicaragua (MCZ). COLOMBIA: Rio Chenche, Tulima Prov. (type locality of *M. punctatus*). [Rio Bogota], Bogota, Cundinamarca Prov. (type locality of *M. subsinuatus*). VENEZUELA: *Rio Portuguesa Drainage*—Rio Portuguesa, Mata Verde, near Guanare, Zamora Prov. (type locality of *M. pittieri*). TRINIDAD: Nariva Swamp, Canque River (P. R. Bacon, 1978, MCZ). SURINAM: [Surinam River] Peperpot Plantation, near Paramaribo (MCZ). ECUADOR: *Rio Putumayo Drainage*—[Rio] Putumayo (Martens 1900: 655). *Rio Marañon Drainage*—Rio Napo, near Coca (MCZ); Rio Pastaza (type locality of *M. occidentalis*) (both Napo, Pastaza Prov.). PERU: Rio Huayabamba (trib. of Rio Huallaga), San Martin Prov. (type locality of *M. staudingeri*); Rio Marañon, Loreto Prov. (CM). BOLIVIA: *Rio Madeira Drainage*—Rio Beni [near Rio Orton, Pando Prov.] (MCZ). BRAZIL: Rio Araguaia, Ilha do Bananal, Goiaz Prov. (type locality of *M. krausei*); Rio Gurguéia, Bom Jesus, Piau Prov. (MCZ); Rio São Francisco, Casa Nova, Bahia Prov. (type locality of *M. bahia*); Lagoa Salgado, Rio Salitre Drainage, Bahia Prov. (MCZ); Rio Peruaguacu [sic], Engenho Ponte, Bahia Prov. (type locality of *A. siliquosus*). *Rio Dos Sinos Drainage*: Rio Dos Sinos, 5 km W São Leopoldo (MCZ); Arroio da Mateiga, São Leopoldo (type locality of *M. legumen*) (both Rio Grande do Sul Prov.). URUGUAY: Canada Grande [Jaguarao], Dept. of Cerro Largo (type locality of *M. felipponei*). RIO DE LA PLATA SYSTEM: *Rio Paraguay Drainage*—*Bolivia*: Rio de Tucabaca, near Mission San Juan (type locality of *M. ventricosus*); [Rio Otuguis] Santa Ana de Chiquitos

(type locality of *M. weddellii*) (both Santa Cruz Prov.). *Rio Paraná Drainage—Argentina*: Laguna Guadalupe, Santa Fe; Rio San Javier, Isla la Dionisia (both MCZ; both Santa Fe Prov.). *Rio Santiago Drainage—Argentina*: Rio Santiago, [a small river, near La Plata], Buenos Aires Prov. (MCZ).

BIBLIOGRAPHY

- *AGUAYO, C. G. 1959. Los orígenes de la fauna Cubana. An. Acad. Cienc. Méd., Fís. y Nat., Habana 88: 1-23.
- AGUAYO, C. G. AND M. L. JAUME 1947. Cat. Moluscos Cuba, no. 134, p. [1].
- BONETTO, A. A. 1962. Especies del género *Mycetopoda* en el sistema hidrográfico del Rio de la Plata. Rev. Mus. Argentino Cienc. Nat. (Zool.) 8 (14): 173-182.
- BURCH, J. B. 1975. Freshwater Unionacean Clams (Mollusca: Pelecypoda) of North America. Malacological Publications, Hamburg, Michigan. xviii + 204 pp., text figs.
- *CROSSE, H. 1890. Faune malacologique terrestre et fluviatile de l'Île de la Trinité (Antilles). Jour. de Conch. 38: 35-65, pl. 2.
- *_____ 1890. Faune malacologique terrestre et fluviatile de l'Île de Cuba. Jour. de Conch. 38: 173-335.
- GUPPY, R. J. L. 1866a. On the terrestrial and fluviatile Mollusca of Trinidad. Ann. Mag. Nat. Hist. (3) 17: 42-56.
- *_____ 1866b. Catalogue of the land and fresh water Mollusca of Trinidad. Proc. Sci. Assoc. Trinidad, pp. 2-27.
- _____ 1893. The land and freshwater Mollusca of Trinidad. Jour. Conch. 7: 210-231.
- HAAS, F. 1929. Bemerkungen über mittelamerikanische Najaden. Senckenbergiana 11: 310-344, 21 figs.
- _____ 1969. Superfamilia Unionacea. [In] Das Tierreich, Berlin. Leif. 88: x + 663 pp.
- HENDERSON, J. B. 1916. A list of the land and fresh-water shells of the Isle of Pines. Ann. Carnegie. Mus. 10 (3 and 4): 315-324.
- IHERING, H. VON 1890. Revision der von Spix in Brasilien gesammelten Najaden. Arch. für Naturgesch., Berlin 1: 117-170, pl. 9.
- *_____ 1910. Über Brasilianische Najaden. Abh. Senckenb. Naturforsch. Ges. 32: 113-140, pl. 12.
- JOHNSON, R. I. 1971. The types and figured specimens of Unionacea (Mollusca: Bivalvia) in the British Museum (Natural History). Bull. British Mus. (Nat. Hist.), Zool. 20 (3): 75-108, pls. 1, 2.
- JOHNSON, R. I. AND H. B. BAKER 1973. The types of Unionacea (Mollusca: Bivalvia) in the Academy of Natural Sciences of Philadelphia. Proc. Acad. Nat. Sci. Philadelphia 125 (9): 145-186, 10 pls.
- LIDDLE, R. A. 1928. The geology of Venezuela and Trinidad. J. P. MacGowan, Fort Worth, Texas, xxxix + 552 pp.
- *MANSUR, M. C. D. 1970. Lista dos moluscos bivalves das Famílias Hyriidae e Mycetopodidae para o Estado do Rio Grande do Sul. Iheringia [Mus. Rio-Grandense Ciênc. Nat., Porto Alegre], Sér. Zool., no. 39: 33-95.

- MANSUR, M. C. D. AND I. L. VEITENHEIMER-MENDES 1979. Redescrição de *Mycetopoda legumen* (Martens, 1888) (Bivalvia, Mycetopodidae). Rev. Bras. de Biol. [Rio de Janeiro] 39 (3): 695-702, figs.
- MARTENS, E. VON 1900. Biologia Centrali-Americana. Land and freshwater mollusca. xxviii + 706 pp., 44 pls.
- MAURY, C. J. 1925. A further contribution to the paleontology of Trinidad. Bull. American Paleontol. 10 (42): 153-402, pls. 1-40.
- PALMER, K. VAN W. 1945. Fossil fresh-water Mollusca from the state of Monagas, Venezuela. Bull. American Paleontol. 31 (118): 1-34, 3 pls.
- PARODIZ, J. J. AND A. A. BONETTO 1963. Taxonomy and zoogeographic relationships of the South American naiades (Pelecypoda: Unionacea and Mutelacea). Malacologia 1 (2): 179-213.
- ROSEN, D. E. 1976. A vicariance model of Caribbean biogeography. Syst. Zool. 24: 431-464.
- SIMPSON, C. T. 1914. A descriptive catalogue of the naiades, or pearly fresh-water mussels, Detroit, Michigan, Parts 1-3: xi + 1540 pp.
- VAUGHN, T. W. 1919. Contributions to the geology and paleontology of the West Indies. IV. Tertiary mollusks from the Leeward Islands and Cuba. Carnegie Institute, Washington, Pub. no. 291: 103-156, pls. 1-16.
- VEITENHEIMER-MENDES, I. L. AND M. C. D. MANSUR 1978a. Morfologia, histologia e ecologia de *Mycetopoda legumen* (Martens, 1888) (Bivalvia, Mycetopodae). Iheringia [Mus. Rio-Grandense Ciênc. Nat., Porto Alegre], Sér. Zool. no. 52: 33-71.
- _____ 1978b. *Mycetopoda legumen* (Martens, 1888): Lasídio e Desenvolvimento Parasitário (Bivalvia, Mycetopodidae). Rev. Brasil Biol. [Rio de Janeiro]: 38 (3): 531-536.

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pointed out that, "*masoni* is tetragenous and thus belongs to *Fusconaia*. Except for the one character-state difference, one finds little difference between *F. masoni* and various species of *Elliptio* and *Pleurobema*." The two species from the James River system appear to be of similar lineage, Boss and Clench (1967) indicated that when *collina* does not have spines it could be confused with *masoni* except that the latter was slightly more rhomboid, often with a brownish clothlike periostracum, generally with at least a trace of green rays on the disk, whereas *collina* has a periostracum that is more yellowish and smooth, with only an occasional hint of brownish rays. Thus, Boss and Clench (1967) and Johnson (1970: 301,303) did not follow Frierson (1927: 46) who placed *U. collinus* and *U. spinosus* Lea 1836 in the genus *Canthyria* Swainson 1840 on the basis of the spines alone, or Morrison (1955) who regarded both as species of *Elliptio* in the subgenus *Canthyria*. Starobogatov (1970: 69) and Fuller (1977: 158) elevated *Canthyria* to generic status without discussion. Ortmann (1912: 269) suggested that the spines on *U. spinosus* were unique, and would possibly justify the erection of a separate genus, *Canthyria* for that species. Simpson (1914: 704) stated that the anatomy of *spinosa* was typical of *Unio* [=Elliptio]. Since *Canthyria* is distinguished from *Elliptio* Rafinesque only by the presence of spines we continue to retain it as a subgenus of *Elliptio*.

Morrison was correct in his assumption that a third spiny mussel existed in the Carolinas. It was discovered by Carol B. Stein, of the Ohio State Museum of Natural History, in 1964. The tiny specimens were misidentified by Johnson (1970:301) who regarded them as a range extension of *Pleurobema (Lexingtonia) collina* which occurs only in the James River system.

Since the discovery of the undescribed Tar River spiny mussel, a number of specimens have been collected by H. D. Athearn, R. G. Biggins, A. H. and J. M. Clarke, W. H. Harmon, D. H. Stansbery, and others. Those specimens subsequently seen by the authors have convinced them as to both

their uniqueness and close relationship to *Elliptio* (*Canthyria*) *spinosa* (plate 40, fig. 3) of the Altamaha River system. Johnson, as first revisor of the Atlantic Slope unionids (1970), had long planned to describe this species, but was prevented from doing so because few examples of it were at his disposal. Clarke has recently completed an extensive status survey of the Tar River spiny mussel for the U.S. Fish and Wildlife Service, (Contract no. 14-16-0004-82-014) to whom he is grateful for having been chosen for performing such a pleasant task, which added to the number of specimens available for study. The authors are pleased to name this species for Dr. Carol B. Stein who discovered it and her colleague, Dr. David H. Stansbery, one of whose specimens was figured by Shelley (1972). Thanks are extended to Dr. Kenneth J. Boss for suggesting the name and for preparing some of the photographs.

Abbreviations

MCZ—Museum of Comparative Zoology, Cambridge, Massachusetts

USNM—National Museum of Natural History, Smithsonian Institution, Washington, D.C.

Elliptio (*Canthyria*) *steinstansana* new species

Plate 40, figs. 4, 5

[spiny naiad] Shelley, 1972. Wildlife in North Carolina 36: 4, fig.

“*Canthyria*” sp. Fuller, 1977. Endangered and Threatened plants and animals of North Carolina, p. 158.

Holotype: MCZ 282677, from the Tar River, 1.5 mi. N of Tarboro, Edgecombe County, North Carolina.

Paratypes: All of the specimens listed under: Specimens Examined are paratypes.

Measurements

Length	Height	Width	(excluding spines)
mm	mm	mm	
62.0	38.6	27.3	(1) Paratype MCZ 282678
56.1	35.1	19.2	(2) Paratype USNM 758667
54.0	33.0	23.8	(3) Holotype MCZ 282677
32.7	20.8	13.6	(4) Paratype MCZ 282676

(1) no spines

(2) one spine on each valve

(3) one spine on right valve only

(4) one spine on left valve, 3 spines on right valve

Description. Shell medium, reaching about 60 mm. in length. Outline subrhomboidal, valves subinflated, inequilateral; shell solid. Anterior end regularly rounded; posterior end slightly broader, ending in a blunt point just below the medial line. Ventral margin slightly curved. Dorsal margin obliquely descending from the umbos, imperceptibly joining the descending posterior margin. Hinge ligament prominent, but short. Posterior ridge generally slightly angular, sometimes with a faint secondary ridge above it, posterior slope smooth. Umbos slightly elevated above the hinge line, located in the anterior third of the shell, their sculpture consisting of about three short, strong bars. The first one or two bars are oblique and extend diagonally across the growth lines (the posterior ends are closer to the hinge) and the later bars are slightly curved and nearly parallel with the growth lines. Surface of the shell generally smooth and shiny with fine concentric sculpture. Each valve usually ornamented with from one to several short spines. Specimens less than 35 mm. in length usually have two or three erect spines on each valve. They are about 2.6 mm. in length and 1.5 mm. wide at their bases. They project perpendicularly from the shell surface, the tips are slightly bent in a ventral direction, and are generally arranged in a radial row located slightly in front of the posterior ridge.



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fixed in 10% formalin and preserved (and perhaps bleached) in 70% ethyl alcohol. A living, immature paratype USNM 758545 had its branchial opening surrounded by about 30 large and small, gray, white-tipped papillae and its anal opening surrounded by about 12 small, gray, white-tipped papillae. The supra-anal opening was about as long as the branchial and anal openings combined. The foot and mantle edges were pale yellow. In another live specimen, returned to the river, the foot and mantle edges were pale orange (Clarke)."

Breeding season. Not known.

Habitat. "Has been collected on sand and mud bottoms in shallow water, but its presence in muskrat middens (M.J. Imlay, pers. comm.) suggests that it also occurs in deeper water (Fuller, 1977: 158)."

Plate 40

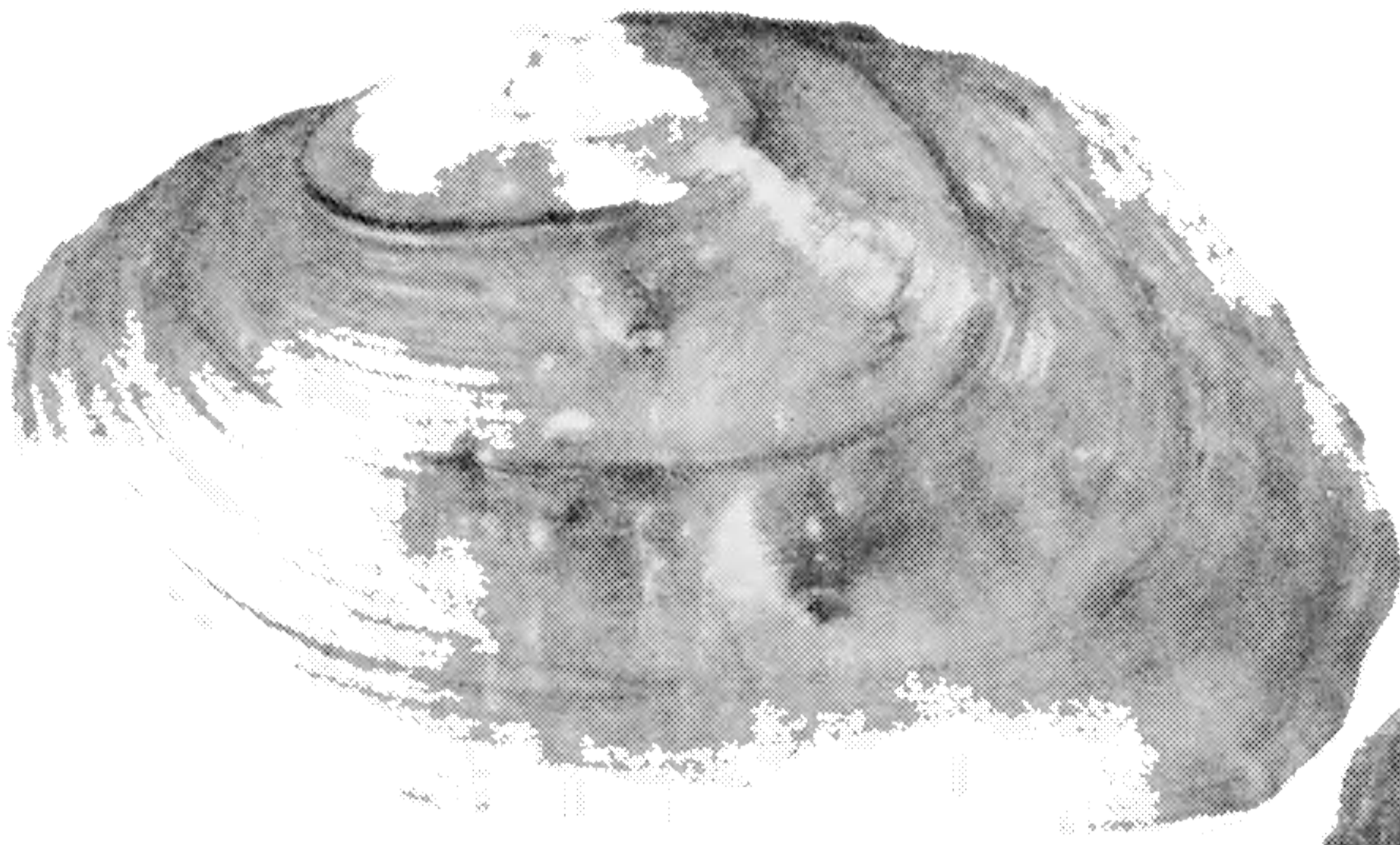
Fig. 1. *Fusconaia collina* (Conrad). James River, Virginia. MCZ 226656. Length 44, height 26, width 13 (less spines) mm. (slightly enlarged).

Fig. 2. *Fusconaia masoni* (Conrad). Tar River, 9 mi. NW of Greenville, Pitt Co., North Carolina. MCZ 250578. Length 38, height 26, width 17 mm. (slightly enlarged).

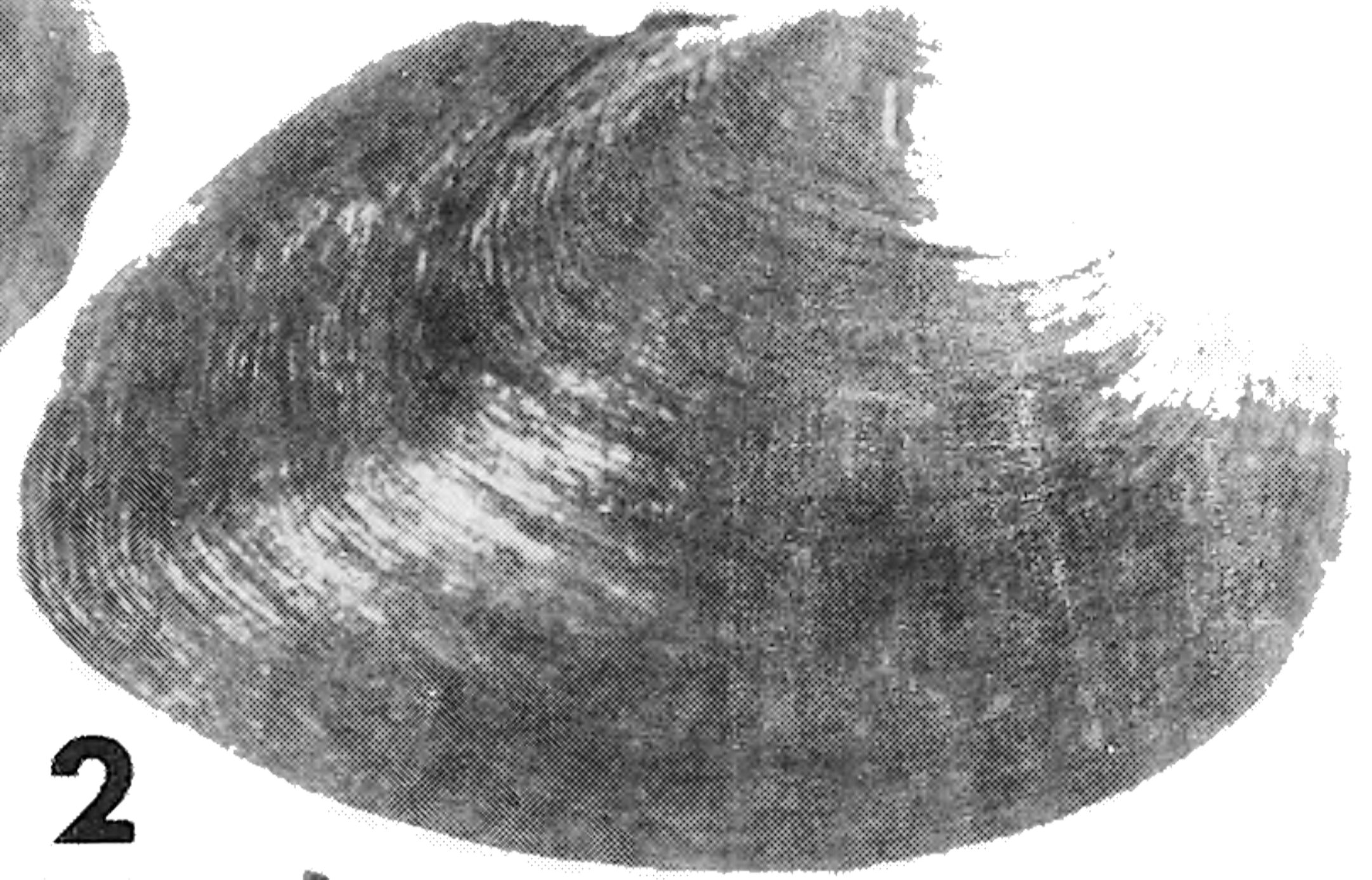
Fig. 3. *Elliptio (Canthyria) spinosa* (Lea). Altamaha River, 4 mi. NE of Jesup, Wayne Co., Georgia. MCZ 234055. Length 59, height 37, width 22 mm. (approximately 1.2×).

Fig. 4. *Elliptio (Canthyria) steinstansana* new species. Tar River, 1.5 mi N of Tarboro, Edgecombe Co., North Carolina. Holotype MCZ 282677. Length 54, height 33, width 23.8 mm. (nat. size).

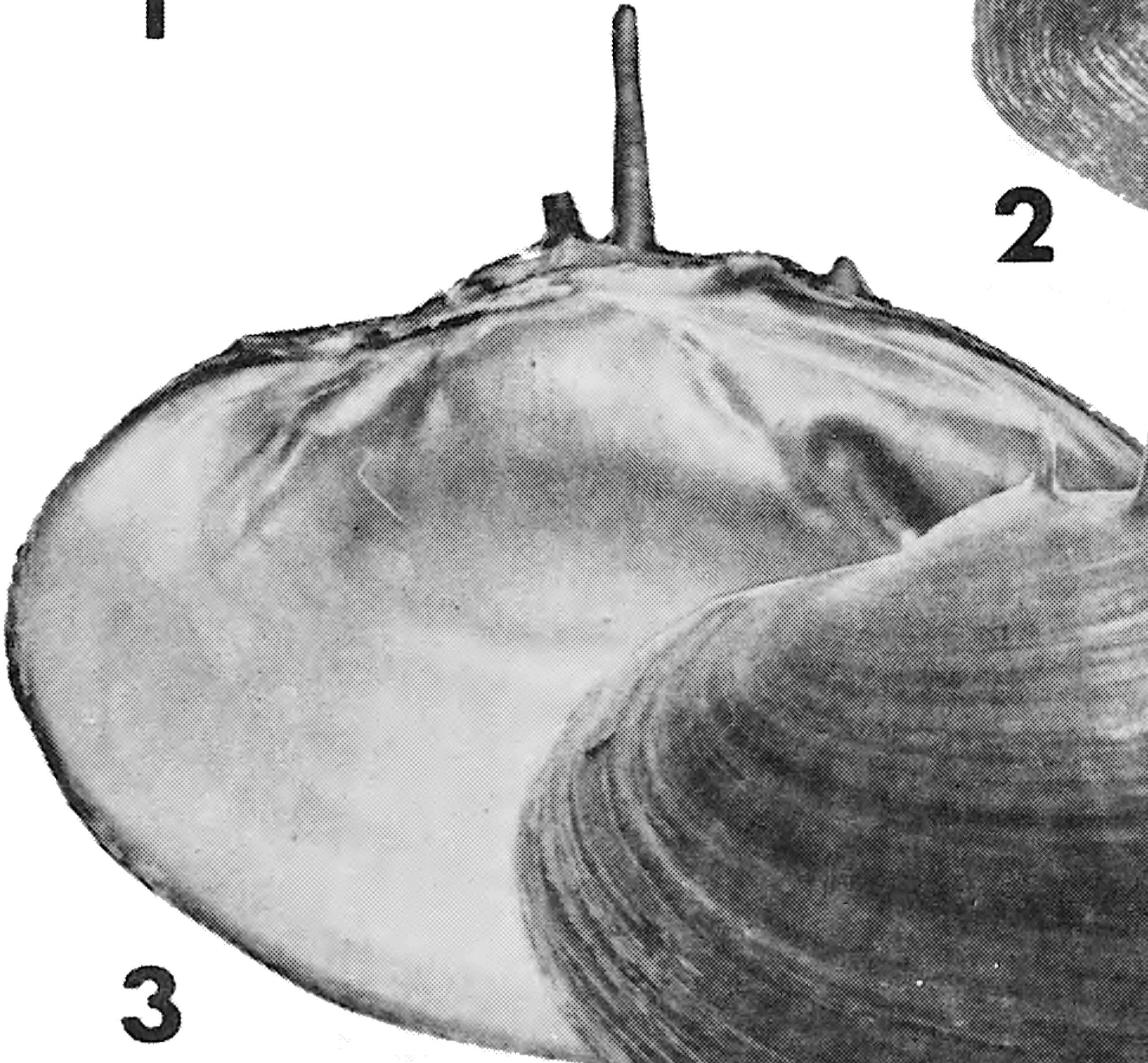
Fig. 5. *Elliptio (Canthyria) steinstansana* new species. Tar River, above River Front Park, Tarboro, Edgecombe Co., North Carolina. Paratype MCZ 282676. Length 32.7, height 20.8, width 13.6. (slightly enlarged).



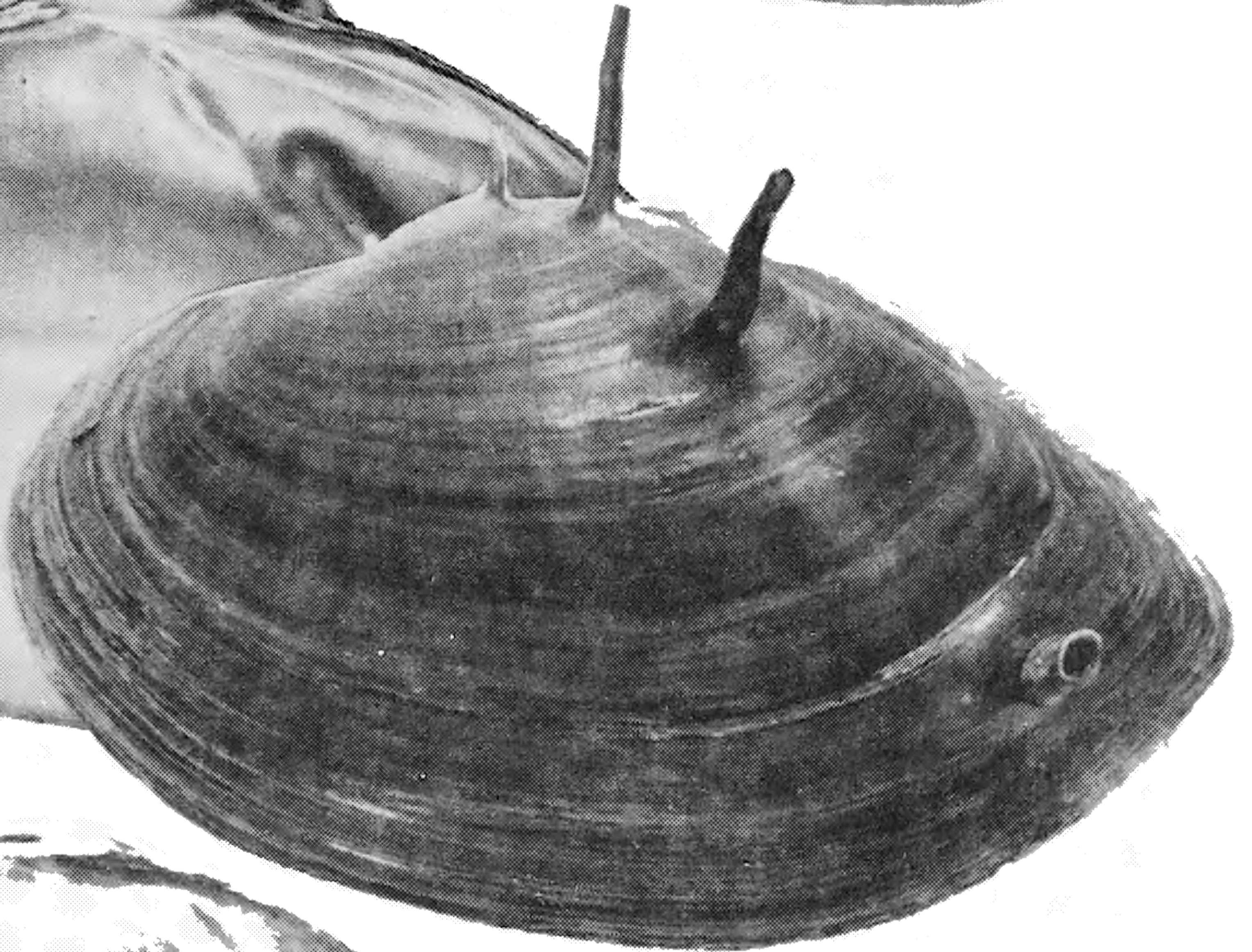
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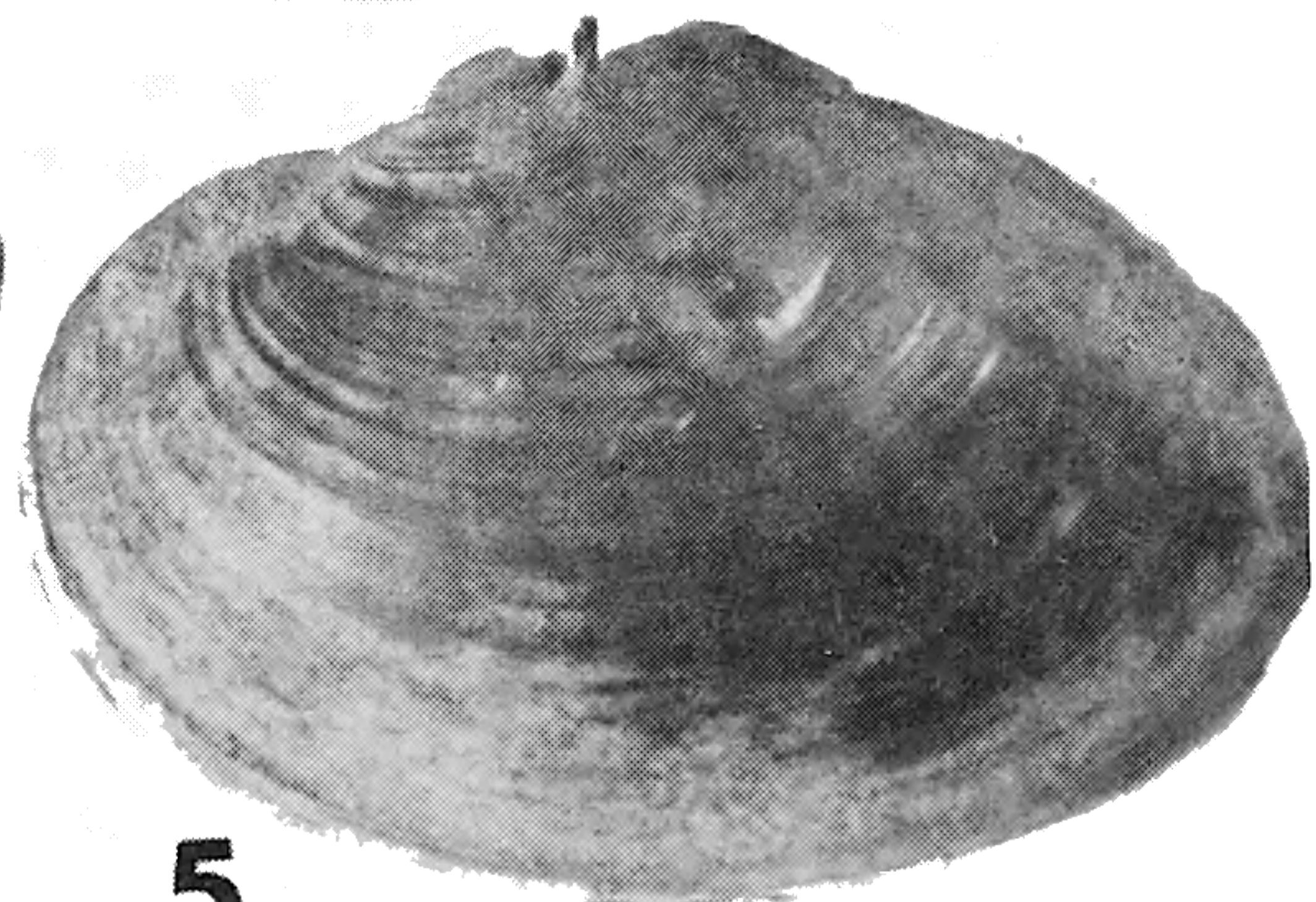
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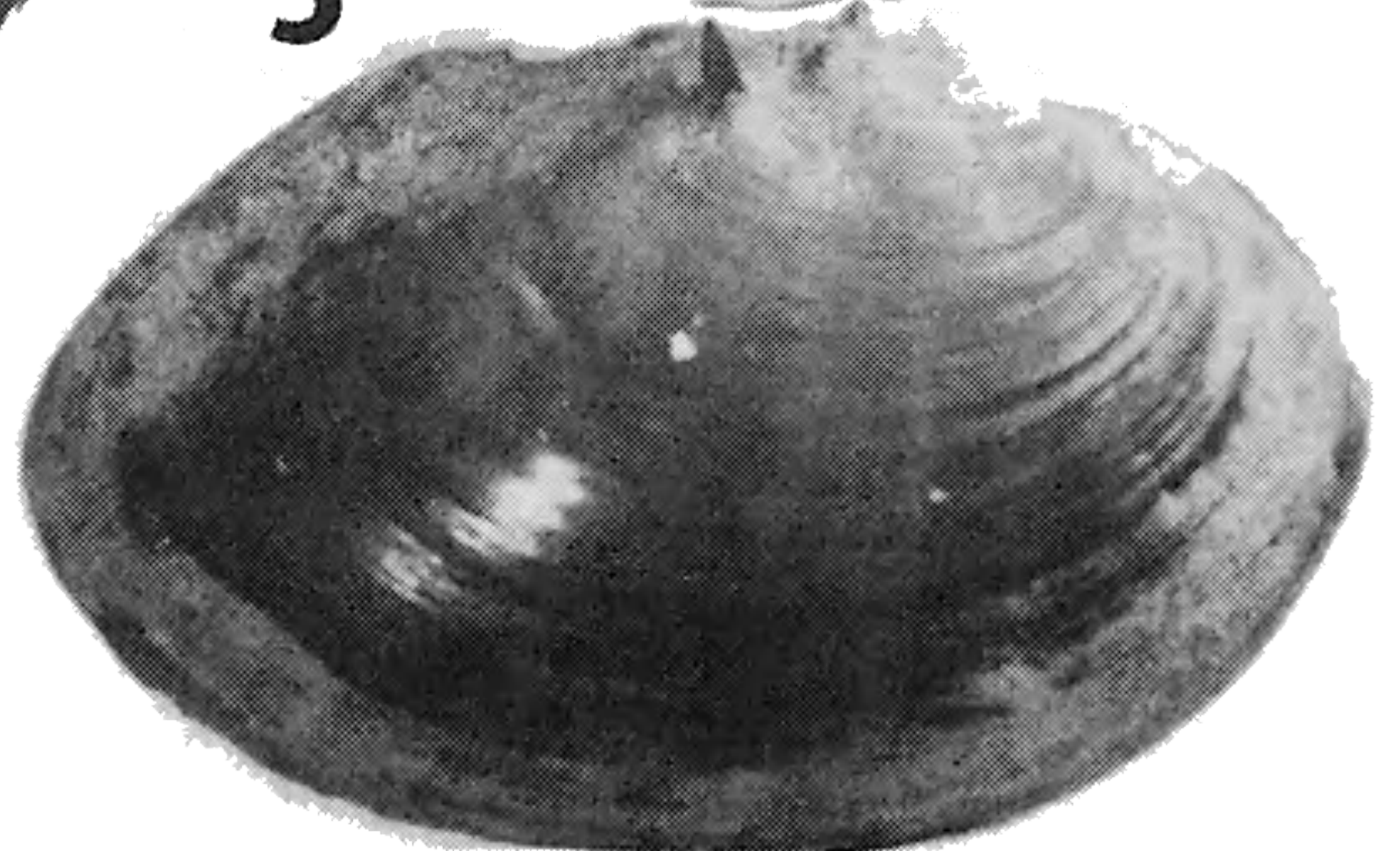
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4



5



Remarks. Only three species of unionids in the world have spines on their post-larval shells. All of them occur in the Southern Atlantic Slope region. The relationship between *Fusconaia (Lexingtonia) collina* Conrad and *F. (L.) masoni* Conrad of the James River system has been discussed. On the basis of shell morphology, *E. (C.) steinstansana* is more similar to *E. (C.) spinosa* (Lea 1834) (Johnson, 1970: 303, pl. 2, fig. 11) from the Altamaha River system, Georgia than any other species. Specimens of *spinosa* exceed 90 mm. in length whereas those of *steinstansana* are not known to exceed 90 mm. The shell of *spinosa* is proportionately higher, the posterior margin is more pointed, and the posterior ridge is much sharper than in *steinstansana*. The spines in *spinosa* are proportionately much longer and are curved dorsally rather than ventrally, and the umbonal sculpturing in *spinosa* is finer. The periostracum of *spinosa* is greenish yellow or brownish in old shells, usually with faint greenish and yellowish rays, whereas that of *steinstansana* is orange brown and covered with narrow and wide greenish rays when young becoming darker or blackish brown, with the rays inconspicuous when adult. An interdental projection is virtually wanting in *spinosa* but is well developed in *steinstansana*. The nacre in *spinosa* is predominantly purple whereas in *steinstansana* the nacre is yellowish or pinkish anteriorly, where the shell is thickened, but bluish white and iridescent posteriorly.

The anatomy of the two species is similar, but in *steinstansana* the water tubes in the female, not gravid, outer demi-branches extend completely to the ventral margin, but in *spinosa* they do not. The pigmentation of the mantle openings in the latter is more intense.

Range. Southern Atlantic Slope: Tar River, between Nash and Pitt Counties, of the Pamlico River system.



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- JOHNSON, R. I. 1970 The systematics and zoogeography of the Unionidae (Mollusca: Bivalvia) of the Southern Atlantic Slope Region. *Bulletin of the Museum of Comparative Zoology* 140 (6): 263-449, pls. 1-22.
- MORRISON, J. P. E. 1955. Notes on the spiny freshwater mussels (Canthyria). *Bulletin of the American Malacological Union*, pp 62-63.
- ORTMANN, A. E. 1912. Notes upon the families and genera of the naiades. *Annals of the Carnegie Museum* 8 (2): 222-365, pls. 86-89.
- SHELLEY, R. M. 1972. In defense of naiades. *Wildlife in North Carolina* 36: 4-8, 26-27.
- SIMPSON, C. T. 1914. A descriptive catalogue of the naiades or pearly freshwater mussels. Detroit, Michigan, Parts 1-3, pp. xi, 1-1540.
- STAROBOGATOV, YA. I. 1970. Mollusk fauna and the zoogeographic zoning of the continental waterbodies throughout the world. pp. 372. "Nauka" publishing house, Leningrad.

Occasional Papers On Mollusks

Published by

THE DEPARTMENT OF MOLLUSKS

Museum of Comparative Zoology, Harvard University
Cambridge, Massachusetts

VOLUME 4

22 July 1983

NUMBER 62

**MARGARITIFERA MARRIANAЕ, A NEW SPECIES OF
UNIONACEA (BIVALVIA: MARGARITIFERIDAE)
FROM THE MOBILE-ALABAMA-COOSA AND
ESCAMBIA RIVER SYSTEMS, ALABAMA**

RICHARD I. JOHNSON

The species from Alabama, described here as distinct, was included with *Margaritifera hembeli* (Conrad, 1838) from Louisiana, by Simpson (1914: 523) and Clench and Turner (1956: 148). *M. hembeli* was figured by Conrad (1838: 93, pl. 51, fig. 1) and the holotype is in the Academy of Natural Sciences of Philadelphia 56639. It has no locality data, but was sent from New Orleans, Louisiana. A specimen was figured by Hanley 1856: 383, pl. 24, fig. 3); by Sowerby (1866, pl. 33, species 172) from a specimen in the H. Cuming collection now in the British Museum (Natural History) 1964174; and here (plate 41, fig. 1). In 1972 Joseph P. E. Morrison collected *hembeli* in Brown and Loring Creeks, Rapides Parish, Louisiana and he realized that the Alabama *Margaritifera* was different from it (pers. comm.). I take pleasure in naming the undescribed species for my wife, Marrian Geer Gleason Johnson.

Davis and Fuller (1981) reduced the Margaritiferidae to the subfamily Margaritiferinae, but their classification is being challenged by Douglas Smith (ms.). Thanks are extended to Dr. George M. Davis of the Academy of Natural Sciences of Philadelphia who kindly lent me the figured type of *Unio hembeli* as well as the extensive series of voucher specimens of it, ANSP 334426, from Rapides Parish, Louisiana which were used in the Davis and Fuller (1981) paper.

Margaritifera marrianae new species

Margaritana hembeli (Conrad, 1838) *partim*. Simpson, 1914. Catalogue of the naiades 1: 523; Clench and Turner, 1956. Bull. Florida State Mus. 1: 148, pl. 5, fig. 1. [The figured specimen MCZ 148819 is a paratype of *M. marrianae*].

Margaritana hembeli Ortmann 1912, *non* Conrad. Ann. Carnegie Mus. 8: 235, fig. 3, 3a. [anatomy of *M. marrianae*].

Margaritana hembeli (Conrad, 1838) *ssp.* Stansbery, 1976. Bull. Alabama Mus. Nat. Hist., No. 2: 44.

Holotype. MCZ 28491 from Hunters Creek, 8 mi. SW of Evergreen, Conecuh Co., Alabama.

Paratypes: MCZ 62595 from the same locality; and figured paratype (Clench and Turner, 1956: pl. 5, fig. 1) MCZ 148819 from Horse Creek, near Luverne, Crenshaw Co., Alabama.

Measurements

Length	Height	Width	
mm	mm	mm	
95	50	29.5	Burnt Corn Creek, Conecuh Co., Alabama
83	41	24.5	Holotype MCZ 28491



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Specimens Examined

MOBILE-ALABAMA-COOSA RIVER SYSTEM

ALABAMA RIVER DRAINAGE—*Alabama*: Limestone Creek, near Monroeville, Monroe Co. (Museum of Zoology, University of Michigan).

ESCAMBIA RIVER SYSTEM

CONECUH RIVER DRAINAGE—*Alabama*: Burnt Corn Creek, near Burnt Corn, Monroe Co. Hunters Creek, 8 mi. SW Evergreen; Otter Creek, branch of Murder Creek, near Evergreen; *both* Conecuh Co. Horse Creek, near Luverne, Crenshaw Co. (*all*) Museum of Comparative Zoology.

Plate 41

Fig. 1. *Margaritana hembeli* (Conrad). [Bayou] Clear, 20 mi. S of Alexandria, Rapides Parish, Louisiana. MCZ 190124. Length 88, height 47, width 27 mm. (about nat. size).

Fig. 2. *Margaritana marrianae* new species. Hunters Creek, 8 mi. SW of Evergreen Conecuh Co., Alabama. Holotype MCZ 28491. Length 83, height 41, width 24.5 mm. (about nat. size).

Fig. 3. *Margaritana marrianae* new species. Horse Creek, near Luverne, Crenshaw Co., Alabama. Paratype MCZ 148819. Length 72, height 39, width 21 mm. (natural size). After Clench and Turner (1956, pl. 5, fig. 1).

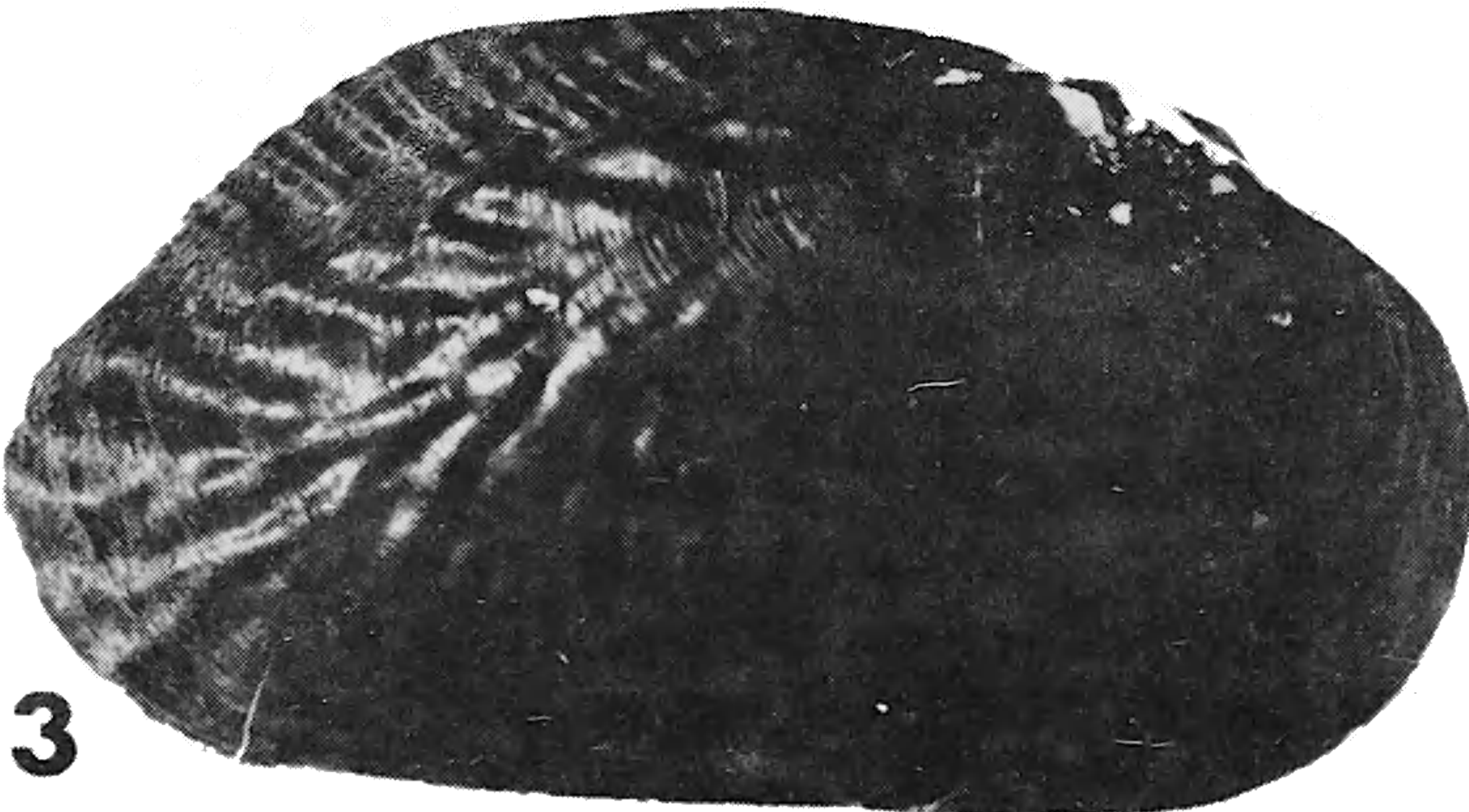
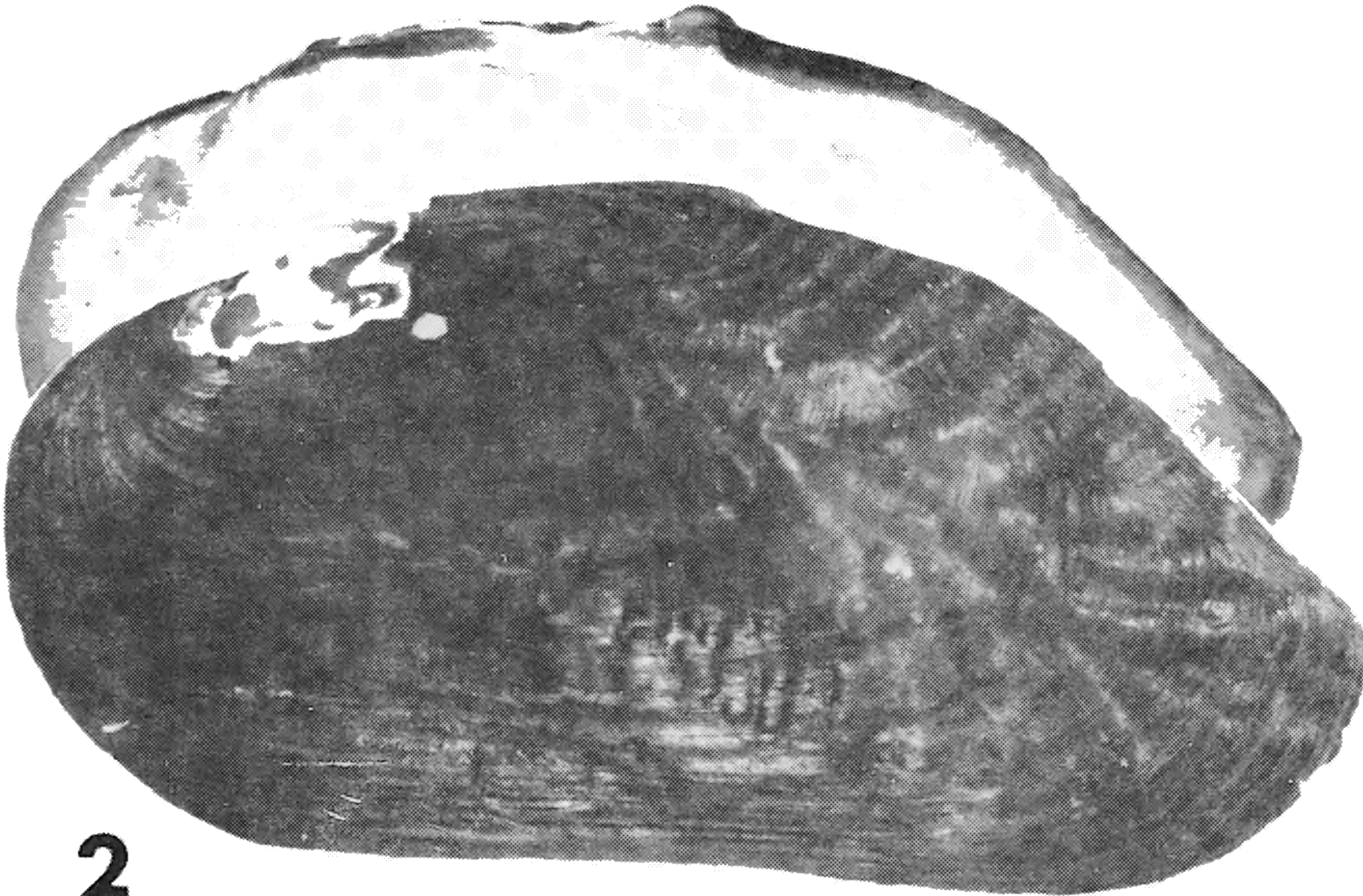
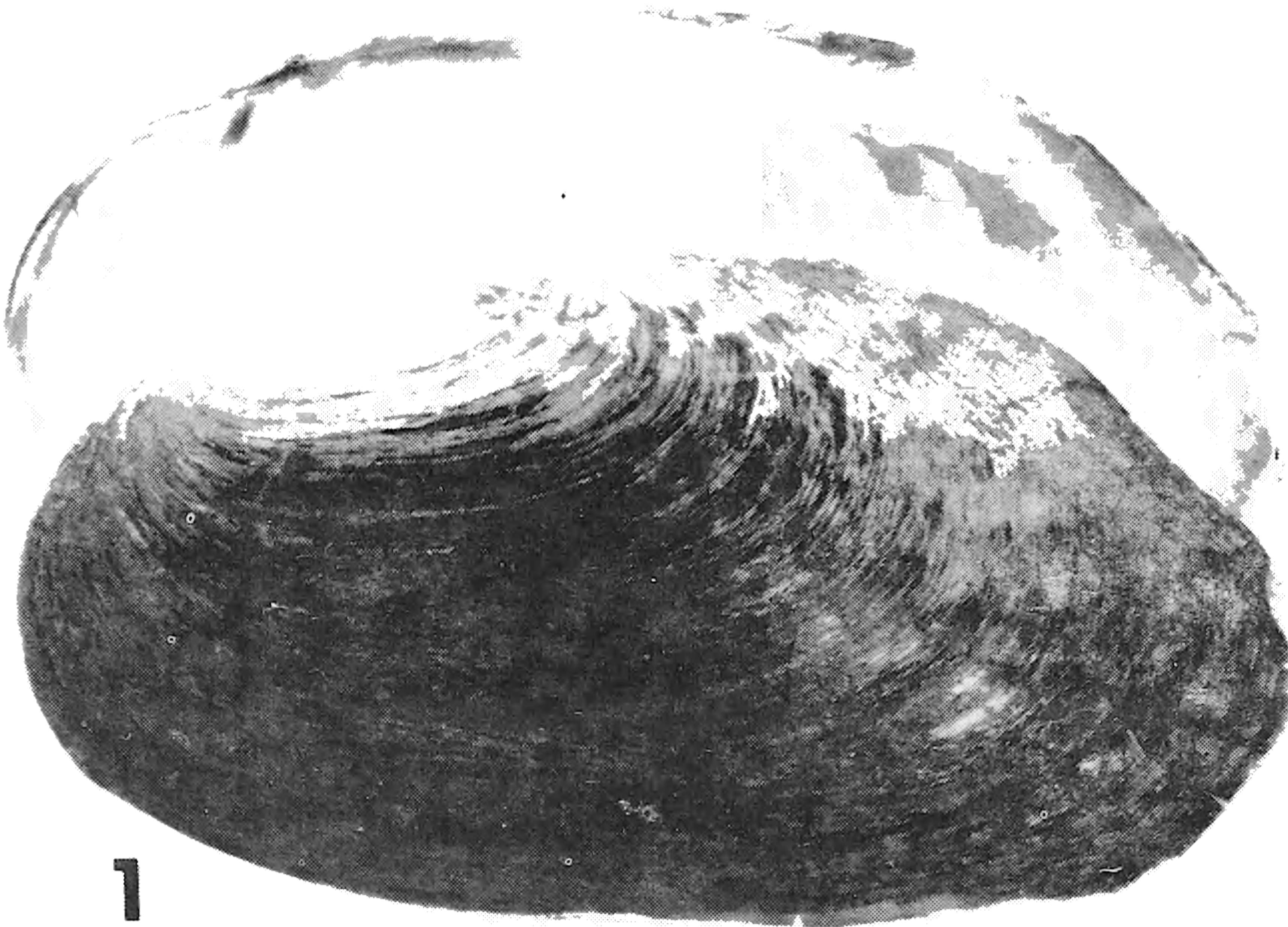


Plate 41

LITERATURE CITED

- CLENCH, W. J. AND R. D. TURNER. 1956. Fresh-water mollusks of Alabama, Georgia, and Florida from the Escambia to the Suwannee River. *Bulletin of the Florida State Museum* 1: 97-239.
- CONRAD, T. A. 1838. Monography of the family Unionidae, or naiades of Lamarck (Fresh water bivalve shells) of North America, Philadelphia, Penn., nos. 10, 11, pp. 81-102, pls. 46-56.
- DAVIS, G. M. AND S. L. H. FULLER. 1981. Genetic relationships among recent Unionacea (Bivalvia) of North America. *Malacologia* 20 (2) 217-253.
- HANLEY, S. 1856. An illustrated catalogue of British and Foreign shells... by W. Wood. Revised edition. London, pp. xx, 234, pls. 1-38, 1-8.
- SIMPSON, C. T. 1914. A descriptive catalogue of the naiades or pearly fresh-water mussels. Detroit, Michigan, Parts 1-3, pp. xi, 1-1540.
- SOWERBY, G. B. 1866, [in] L. Reeve, *Conchologia Iconica* 16: *Unio*, plate 33 (letter press).



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Waccamaw River system or exclusively shared with the Little Pee Dee drainage or Cape Fear River system (Shute, Shute, and Lindquist, 1981: 1). Among the mollusks are two species of endemic mussels, *Elliptio waccamawensis* and a *Lampsilis* described here, which are related to species found in both the Pee Dee (Kool *et al.* 1981; Coney *et al.* 1983a) and Cape Fear River (Coney *et al.* 1983b) systems. Kat (1983c: 143) in an elegant paper on divergence among *Lampsilis*, concluded that this, "is a species distinct from other Atlantic Slope lampsilines; it has recently diverged from *L. radiata*, with which it still exhibits considerable similarity with respect to allele frequencies and anatomical characteristics. Genetic differentiation has occurred mainly at variable-substrate loci such as *Lap*. Divergence time from *L. radiata*, is estimated at 1.3×10^5 years ago, a time consistent with the proposed age of Lake Waccamaw."

The Waccamaw River system originates from Council Mill Pond some nine miles northwest of Lake Waccamaw and it, with a number of small streams, form Friar Swamp which is the principal feeder of the lake. Three smaller streams also drain into the lake: Little, Second, and Third creeks. Acid water from these streams is neutralized by the calcareous Waccamaw limestone formation which underlies the lake and is exposed along the north shore.

Lake Waccamaw is about five miles long and three miles wide. The bottom is mainly sand and fibrous peat. Man-made canals surround much of the lake. It is drained by the Waccamaw River which flows southward for some 145 miles to its confluence with the Pee Dee River at Winyah Bay, South Carolina, an estuarine habitat, which is an effective barrier for faunal exchange between the two systems for most freshwater species. The river has a number of tributaries; the largest is Juniper Creek which is the first to enter the river from the east.

Johnson (1970) failed to recognize the species described here as distinct, since he did not separate his specimens from those of *Elliptio waccamawensis*, another endemic species. Fuller (1977: 164, fig. 3) figured both the male and female shells under "*Lampsilis radiata* (Gmelin) complex, and said

that the latter resembles no other species in Lake Waccamaw, while the male is almost indistinguishable from *E. waccamawensis* of either sex." Kat (1983c: 143, fig. 1) on the basis of electrophoretic and anatomical analyses showed that the species described here recently diverged from *Lampsilis radiata radiata* (Gmelin) and is distinct. He further compared and illustrated the other closely related *Lampsilis*.

The author is pleased to name this species for Mr. Samuel L. H. Fuller, who first figured this species, and for Dr. Pieter W. Kat who determined its relationship to other *Lampsilis*.

Lampsilis (Lampsilis) fullerkti new species

Plate 42, figs. 1-3

"*Lampsilis*" *radiata* (Gmelin) complex. Fuller 1977. Endangered and threatened plants and animals of North Carolina, p. 164, fig. 3.

Lampsilis sp. Porter and Horn 1980. Bulletin of the American Malacological Union for 1980, p. 16; Horn and Porter, 1981, Bulletin of the American Malacological Union for 1981, p. 3; Porter and Horn, 1983, American Malacological Bulletin 1: 63; Kat, 1983c, Journal of Molluscan Studies 49: 137, fig. 1B.

Holotype: MCZ 294576 from Lake Waccamaw, [town of] Lake Waccamaw, Columbus Co., North Carolina. Collected by W. J. Clench, K. J. Boss, and S. L. H. Fuller, October 1961.

Allotype: MCZ 294577 As above.

Paratypes: MCZ 294578 As above.

Measurements

Length	Height	Width	
mm	mm	mm	
62	32	22	Lake Waccamaw, [town of] Lake Waccamaw, Columbus Co., North Carolina. Male.
51	26	17	As above. Male. Holotype.
41	22	15	As above. Allotype.

Description. Shell small, seldom exceeding 60 mm in length. Outline elongated rhomboidal to long elliptical. Valves subinflated, thin, inequilateral. Anterior end regularly rounded; posterior end slightly biangulate and pointed toward the base in the male; female broadly rounded and somewhat expanded in the postbasal region. Ventral margin straight, slightly curved, or occasionally arcuate roughly parallel to the almost straight dorsal margin which forms an angle with, or merges imperceptibly with the obliquely descending margin. Posterior ridge high somewhat angular, usually with a faint second ridge above it ending behind in a broad point in the male. Umbos rather sharp but not full or high, located in the anterior quarter of the shell, their sculpture not observed. Periostracum rather smooth with delicate growth lines, generally yellowish or brownish green, with rather fine dark greenish rays of varying width often visible over the entire surface.

Left valve with two stumpy pseudocardinal teeth, one in front of the other, often of almost equal height. Hinge line short and narrow, two short almost straight lateral teeth. Right valve with one triangular pseudocardinal, and a vestigial one before it; one lateral tooth. Beak cavities very shallow, with a few dorsal muscle scars. Anterior and posterior adductor muscle scars and pallial line distinct. Nacre purplish often lurid and spotted, somewhat iridescent.

Anatomy. Discussed by Kat (1983c).

Breeding season. September, December, March, April and June; bradytidic (Porter and Horn 1983: 65).

Habitat. Lives in sand in sluggish water.

Remarks. *Lampsilis (L.) fullerhati* is a more diminutive species than *L. radiata radiata* with a more delicate shell, a consistently sharp posterior ridge, and purplish nacre. The latter has rounded posterior ridge and the nacre is white, bluish white, or sometimes tinted with pink or salmon. *L. (L.) fullerhati* exhibits conspicuous sexual dimorphism and the female resembles no other species in Lake Waccamaw. The male shell closely resembles that of *Elliptio waccamawensis* (Lea), but the latter is sculptured on the posterior slope, the periostracum is generally more brownish and less rayed, and the nacre is white rather than purplish.



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Lampsilis splendida (Lea) (Johnson 1970; 394) which ranges from Georgia to South Carolina does not overlap that of *L. r. radiata* or *fullerkati*, but according to Kat (1983c: 142) "is biochemically and anatomically closely related to both." *Lampsilis splendida* has a sharp posterior ridge like *fullerkati* but the umbos of the former are much higher, fuller and more centrally located.

Range. Southern Atlantic Slope: endemic to the Waccamaw River System; North Carolina.

Specimens Examined

WACCAMAW RIVER SYSTEM

WACCAMAW RIVER DRAINAGE—*North Carolina:* Lake Waccamaw, [town of] Lake Waccamaw, Columbus Co. (Museum of Comparative Zoology). Waccamaw River, below the Lake (Fuller, 1977: 164) [not seen].

The unionids of the Waccamaw River System

Since the publication of Johnson's (1970) work on the Unionacea of the Southern Atlantic Slope a number of papers have appeared which have taken exception to some of the classification, especially, as was predicted, among the members of *Elliptio*. Morrison (1972, 1973) correctly inferred that several valid species were included under Johnson's synonymy of *Elliptio lanceolata*, and though he did not refer to the latter's work, it was obvious that he had it in mind. Davis *et al.* (1981) in a paper on molecular genetics and speciation in *Elliptio* also take a number of names out of Johnson's synonymies, but they did not define, differentiate, or indicate the ranges of their species, nor did Coney *et al.* (1983a, b).

The following list of the unionids attempts to revise the nomenclature of the several species, based on observations and the literature since 1970. Stansbery and Clench (1978) mentioned that ten species of naiades occur in Lake Waccamaw, but did not list them. In a series of papers on the

naiades of Lake Waccamaw Porter and Horn (1980; 1983) and Horn and Porter (1981) made interesting contributions to the biological knowledge of the naiad fauna of the lake. The author is especially grateful to Dr. H. J. Porter, Curator of Invertebrate Collections, The University of North Carolina at Chapel Hill for the loan of the samples which formed the basis for these papers and for sharing his views on the nomenclature employed in them.

Several papers have appeared on the genetic relationships among recent genera of Unionacea since Johnson's (1970) revision of the species. The latest of these, by Davis and Fuller (1981) lists the more important previous classifications and presents a new one of their own. In the following list, the classification used in 1970 is retained, not because it is necessarily better, but because a discussion of higher categories is not the purpose of this paper.

All of the species listed here occur in Lake Waccamaw. Little is known about most of them in the rest of the river system, except as mentioned below.

ELLIPTIO (ELLIPTIO) WACCAMAWENSIS (Lea 1863)

Johnson 1970, p. 313, pl. 7, figs. 6, 7; Fuller 1977, p. 162, figs. 1, 2; Porter and Horn 1980, p. 15; Horn and Porter 1981, p. 15; Davis *et al.* 1981, fig 3, H; Porter and Horn 1983.

Johnson's figure 6, cited above, is typical of specimens found in the lake. They achieve greater size and are less eroded in the canals outside of the lake, figure 7.

ELLIPTIO (ELLIPTIO) COMPLANATA (Lightfoot 1786) Plate 43, fig 1

Johnson 1970, p. 322 (records for the Waccamaw River System) pl. 8, fig. 6; Davis *et al.* 1981, fig. 3, J, K, L; Kat 1982, 1983a.

Johnson's figure 6, cited above, is typical of specimens found in the lake. They achieve greater size and are less eroded in the Waccamaw River below the lake.

ELLIPTIO (ELLIPTIO) ICTERINA (Conrad 1834)

Johnson 1970, p. 325, pl. 9, figs. 3-10, pl. 10, figs. 1-3; Davis *et al.* 1981, fig. 3, G, I. Morrison (1972: 38) suggested that *E. icterina* is a synonym of *E. congaraea* (Lea 1831), Johnson 1970, p. 308, pl. 5, figs. 1-8.

Elliptio raveneli (Conrad [May 1834]). Porter and Horn 1980, p. 15.

ELLIPTIO (ELLIPTIO) ANGUSTATA (Lea 1831)

Johnson 1970, p. 333 (*partim*), pl. 11, fig. 3; Morrison 1972; p. 38; Morrison 1973, p. 14; Moore *et al.* 1983, p. 95.

Elliptio producta (Conrad 1836). Johnson 1970, pl. 10, fig. 10; Porter and Horn 1980, p. 14, footnote 1; Porter and Horn 1983, p. 61, footnote 2.

Elliptio fisheriana (Lea 1838). Porter and Horn 1980, p. 14 (*non* Lea).

Elliptio lanceolata (Lea 1828). Fuller 1972; Porter and Horn 1980, p. 16; Davis *et al.* 1981, p. 135, fig. 3B, specimen from Lake Waccamaw; Coney, Moore, and Kool, 1981, 1983 (*non* Lea).

Morrison (1973, p. 14) stated, "The dark species, *E. angustatus* is completely biologically separate from the golden, sand-dwelling *Elliptio lanceolatus* (Lea 1828). The true species *E. lanceolatus* is known only from five river systems in Maryland, Virginia, and North Carolina."

Coney, *et al.* (1983a) suggested that there is an undescribed member of the *Elliptio lanceolata* species group in the Pee Dee River system of which the shell morphology appears to be intermediate between that of *Unio emmonsii* Lea 1857 (Johnson 1970, pl. 11, fig. 4) from the Roanoke River system and *Unio perlatus* Lea 1863 (Johnson 1970, pl. 10, fig. 9) from the Cape Fear River system.

Morrison (1972: 38) stated, "In the Potomac River System, *Elliptio complanatus* Lightfoot, and *Elliptio angustata* Lea, 1831 (+*producta* Conrad, 1836) are living side by side" He (1973: 14) also stated that *E. angustatus* [sic] occurred in both South and North Carolina, northward as far as the Schuylkill River, near Philadelphia, Pennsylvania.



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Toxolasmus [sic] *pullus* (Conrad). Porter and Horn 1980, p. 16.

Johnson (1970: 369) discussed the fact that *Unio lividus* Rafinesque 1831 is a *nomen dubium* and that therefore *Toxolasma* should be disregarded.

VILLOSA DELUMBUS (Conrad 1834)

Johnson 1970, p. 375, pl. 18, figs. 4-8.

Villosa ogeecheensis (Conrad 1838). Porter and Horn 1980, p. 13.

V. delumbus is the male shell while *ogeecheensis*, figure 8 cited above, is that of the female.

Plate 43

Elliptio (*Elliptio*) *complanata* (Lightfoot 1786)

Fig. 1. Waccamaw River, Wachsaw Landing, 2 mi. E. of Murrells Inlet, Georgetown Co., South Carolina. MCZ 185714. Length 86, height 44, width 24 mm. (reduced).

Uniomerus obesus (Lea 1831)

Fig. 2. Waccamaw drainage canal, 1 mi. E Dupree, Columbus Co., North Carolina. MCZ 214258. Length 63, height 35, width 24 mm. (slightly enlarged).

Fig. 3. *Unio cistelliformis* Lea 1863, Proceedings of the Academy of Natural Sciences of Philadelphia 15: 193 (Neuse River near [6 mi. E] Raleigh [Wake Co.], North Carolina); 1866, Journal of the Academy of Natural Sciences of Philadelphia (2) 6: 19, pl. 6, fig. 17; 1867, Observations on the Genus *Unio* 11: 23, pl. 6, fig. 17. Figured holotype National Museum of Natural History 85533. Length 46; height 26; width 23 mm. (reduced).

Lampsilis (*Lampsilis*) *crocata* (Lea 1841)

Fig. 4. *Unio crocatus* Lea 1841, Proceedings of the American Philosophical Society 2: 31 (Savannah River, Georgia); 1842, Transactions of the American Philosophical Society 8: 238, pl. 22, fig. 52; 1842, Observations on the Genus *Unio* 3: 76, pl. 22, fig. 52. Allotype National Museum of Natural History 84908.2. Length 42, height 27, width 19 mm. Male. (slightly reduced).

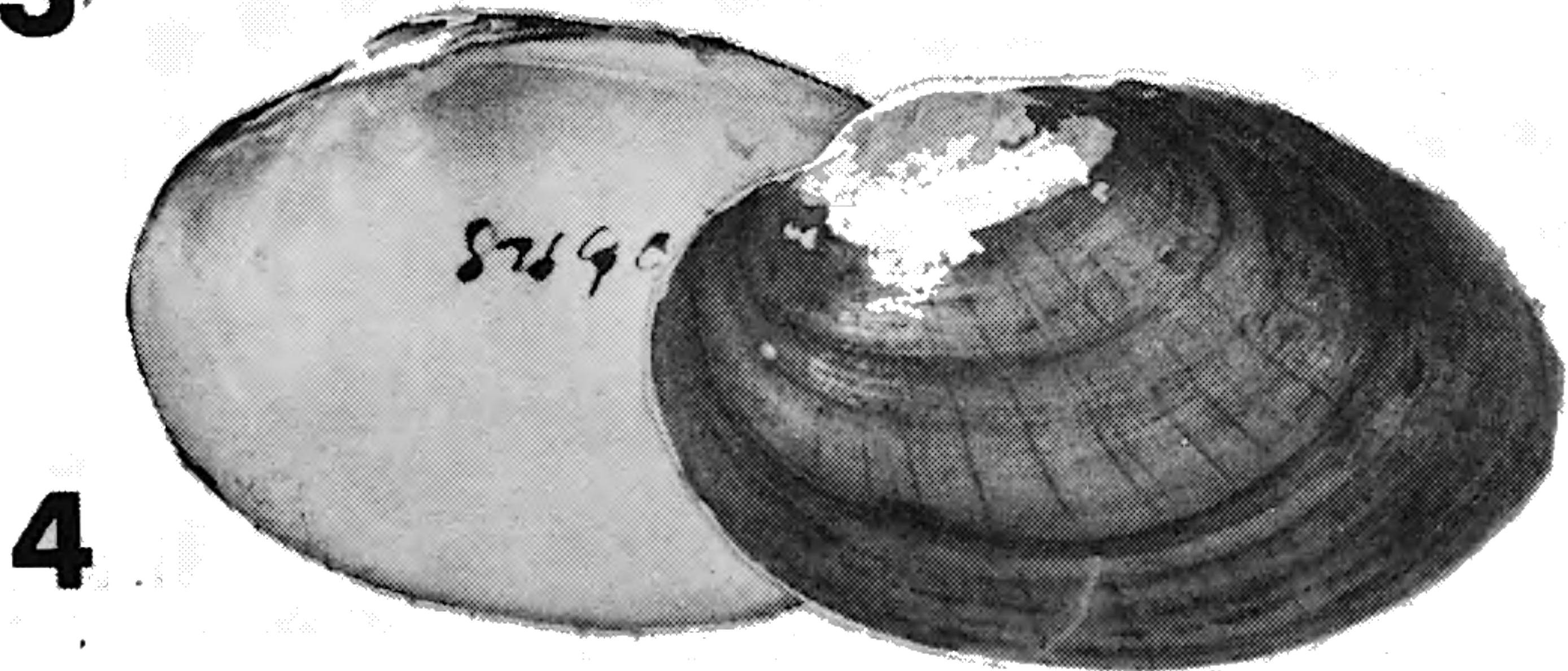
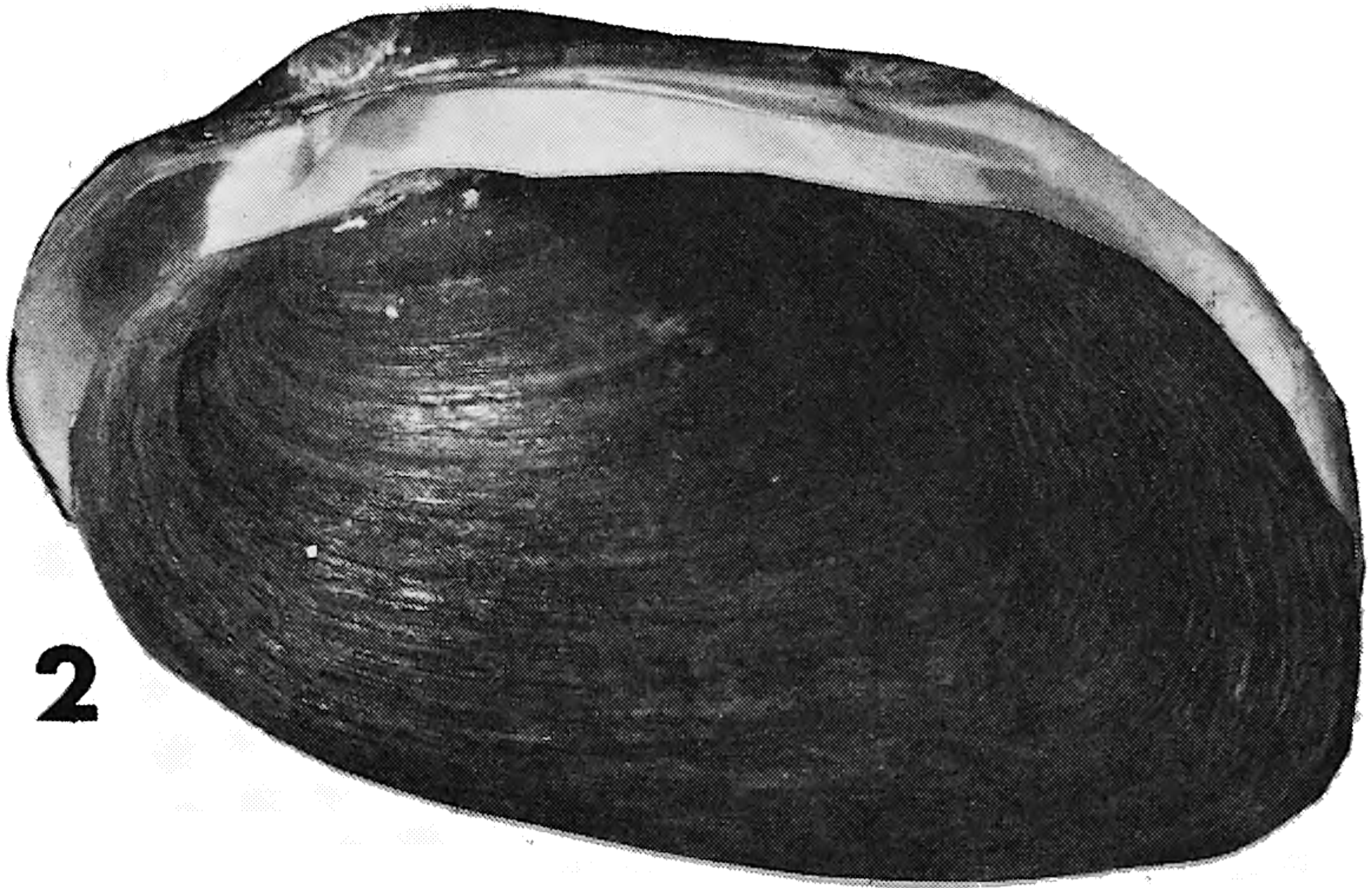
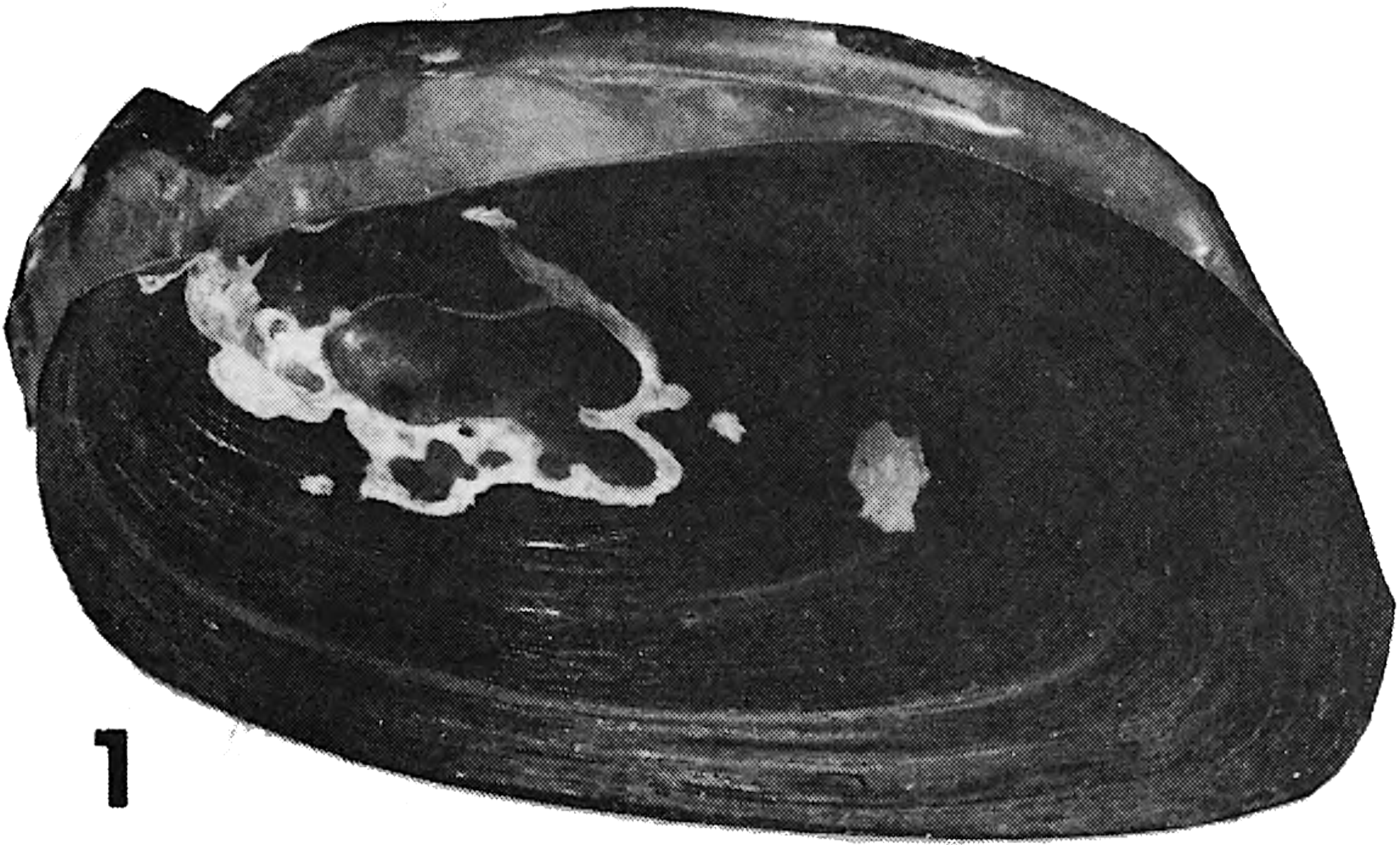


Plate 43

LAMPSILIS (LAMPSILIS) OCHRACEA (Say 1817)

Johnson 1970, p. 388, pl. 21, figs. 4, 5; Bereza and Fuller 1975 p. 42; Fuller 1977, p. 182, figs. 10-12; Johnson 1980, p. 99; Kat 1983c, fig. 1, C, D.

Leptodea fluviatilis (Gmelin 1791). Morrison 1975, p. 38.

Leptodea ochracea (Say 1817). Porter and Horn 1980, p. 15; Horn and Porter 1981; Porter and Horn 1983.

LAMPSILIS (LAMPSILIS) CROCATA (Lea 1841) Plate 43, fig. 4, Text fig. 1. Porter and Horn 1980 and 1983.

Johnson (1970: 382) placed *Unio crocatus* under the synonymy of *Lampsilis cariosa* (Say 1817) thinking that the type specimens were young specimens of the latter on the basis of their having rather heavy valves and pyramidal pseudocardinal teeth, even though they have fine, faint, greenish rays over the entire surface similar to those of *L. ochracea* and have slightly sharper posterior ridges than either *cariosa* or *ochracea*. Morrison (ms. note, 1971) regarded *crocata* as distinct. Porter and Horn (1980) noted differences in the glochidia between populations of *L. crocata* and *ochracea* in Lake Waccamaw where the two species are not easy to separate conchologically except that the latter species has lamellate rather than pyramidal pseudocardinal teeth. Two specimens MCZ 224049 and 294816 from the Waccamaw River, Wachasaw Landing, 2 miles East of Murrells Inlet, Georgetown County, South Carolina closely resemble the types figured here. *L. crocata* is not known to occur in the river systems between the Savannah and the Waccamaw.



***Lampsilis (Lampsilis) crocata* (Lea 1841)**

Text figure 1. *Unio crocatus* Lea 1841. Savannah River, Georgia. Figured holotype National Museum of Natural History 84901.1. Length 45; height 30, width 20.5 mm. Female (slightly reduced). The author is grateful to Dr. Joseph Rosewater for the loan of the type specimens and to Mr. David Backus for taking some of the photographs.



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- _____. 1970. The systematics and zoogeography of the Unionidae (Mollusca: Bivalvia) of the Southern Atlantic Slope Region. *Bulletin of the Museum of Comparative Zoology*, 140 (6): 263-449, pls. 1-22.
- _____. 1980. Zoogeography of North American Unionacea (Mollusca: Bivalvia) north of the maximum Pleistocene Glaciation. *Bulletin of the Museum of Comparative Zoology*, 149(2): 77-189, pls. 1-20.
- KAT, P. W. 1982. Effects of population density and substratum type on growth and migration of *Elliptio complanata* (Bivalvia: Unionidae). *Malacological Review*, 15: 119-127.
- _____. 1983a. Patterns of electrophoretic and morphologic variability in a widely distributed unionid: [*Elliptio complanata*] an initial survey. *Netherlands Journal of Zoology*, 33(1): 21-40.
- _____. 1983b. Genetic and morphological divergence among nominal species of North American *Anodonta* (Bivalvia: Unionidae). *Malacologia*, 23(2): 316-374.
- _____. 1983c. Morphologic divergence, genetics, and speciation among *Lampsilis* (Bivalvia: Unionidae). *Journal of Molluscan Studies*, 49(2): 133-145.
- KOOL, S. P., C. C. CONEY, D. H. STANSBERY, AND A. E. BOGAN. 1981. Fresh-water Mollusks of the Little Pee Dee River in South Carolina. *Bulletin of the South Carolina Academy of Science*, 43: 93.
Listed are: *Elliptio lanceolata*-complex form *E. fisheriana* (Lea 1838)
Elliptio icterina (Conrad 1834)—species complex
Elliptio raveneli (Conrad 1834)—species complex
Uniomerus obesus (Lea 1831)
- MOORE, R. H., C. C. CONEY, AND M. R. CREITZ. 1983. Comparisons of morphometric and soft anatomy characters between topotypic populations of *Elliptio lanceolata* (Lea 1828) and *E. angustata* (Lea 1831). *American Malacological Bulletin*, 1: 95.
- MORRISON, J. P. E. 1972. Sympatric species of *Elliptio* in North Carolina. *Bulletin of the American Malacological Union for 1971*, pp. 38-39.
- _____. 1973. Sympatric species of *Elliptio* living in the St. Johns River, Florida. *Bulletin of the American Malacological Union for 1972*, p. 14.
- _____. 1975. Maryland and Virginia mussels of Lister. *Bulletin of the American Malacological Union for 1974*, pp. 36-39.
- _____. 1976. Species of the genus *Uniomerus*. *Bulletin of the American Malacological Union for 1976*, pp. 10-11.
- PORTER, H. J. AND K. J. HORN. 1980. Freshwater mussel glochidia from Lake Waccamaw, Columbus County, North Carolina. *Bulletin of the American Malacological Union for 1980*, pp. 13-17.
- _____. 1983. Habitat distribution of sympatric populations of selected Lampsiline species (Bivalvia: Unionoida) in the Waccamaw drainage of eastern North and South Carolina. *American Malacological Bulletin*, 1: 61-66.
- SHUTE, J. R., AND P. W. SHUTE, AND D. G. LINDQUIST. 1981. Fishes of the Waccamaw River Drainage. *Brimleyana* no. 6: 1-24.
- STANSBERY, D. H. AND W. J. CLENCH. 1978. The mollusca of Lake Waccamaw in North Carolina. *Bulletin of the American Malacological Union for 1978*, p. 63. Abstract. "At least three species of gastropods and ten species of naiades."

ZULLO, V. A. AND W. B. HARRIS. 1979. Plio-Pleistocene crustal warping in the outer Coastal Plain of North Carolina, pp. 31-40. *In* G. R. Baum, W. B. Harris, and V. A. Zullo (Eds.). Structural and stratigraphic framework for the Coastal Plain of North Carolina. Carolina Geological Society, 1979 Field Trip Guidebook, 111 pp.

MISCELLANY

Fusconaia collina (Conrad),
from the James River, Virginia,
an additional note

by

Richard I. Johnson and Kenneth J. Boss

When Johnson and Clarke (1983) described a spiny mussel, *Elliptio* (*Canthyria*) *steinstansana*, from the Tar River, North Carolina, they assumed that the specimens figured by Boss and Clench (1967, pl. 15, figs. 2 and 3) as *Pleurobema* [= *Fusconaia*] *collina* (Conrad) were correctly identified and that the locality, North Carolina, was incorrect. However, the lot, National Museum of Natural History 84376, could not be studied since it was on loan to the Ohio State Museum. It was recently returned and through the kindness of Dr. Joseph Rosewater we have been able to examine it. The specimens numbered 84376.1-4, and 84376.6 (a single valve) are indeed *Fusconaia collina* (Conrad). Specimen 84376 has "N. Car. Emmons" pencilled in one of the valves. E. Emmons collected a number of shells from the Cape Fear, Neuse, and Roanoke River Systems in North Carolina for Isaac Lea, some of which the latter described as new. Unless *F. collina*, now known only from the James River System, Virginia, is eventually found in North Carolina, it is assumed that the locality data with these shells is incorrect. Boss and Clench (1967, pl. 15, fig. 2) gave a dorsal view of specimen 84376.2 which is illustrated here, ventrally, Text fig. 1. Unfortunately the specimen they illustrated ventrally 84376.5 (pl. 15, fig. 3) is a young specimen of *Elliptio* (*Canthyria*) *spinosa* (Lea), known only from the Altamaha River System, Georgia. Of the three known spined species of unionids this is the only one with long spines that are often hollow, that has a faintly greenish periostracum, and is less rhomboidal than the other two.



Text fig. 1. *Fusconaia collina* (Conrad). [James River, Virginia]. National Museum of Natural History 84376.2. Length 19, height 12, width 7 mm. (less spines). (2.25 ×).

The label on this lot from the Isaac Lea collection indicates that the specimens came from J. G. Anthony. In the Museum of Comparative Zoology there are small specimens from the Anthony collection of both *F. collina* and *E. (C.) spinosa* with correct localities, which offer no clues as to which of Lea's specimens came from Anthony or how they all became labeled as from North Carolina. Nevertheless, it appears that this mixed lot, with its incorrect data, led to Morrison's (1955) correct assumption that there was an undescribed spiny mussel in the Carolinas.

LITERATURE CITED

- BOSS, K. J. AND W. J. CLENCH. 1967. Notes on *Pleurobema collina* (Conrad) from the James River, Virginia. Occasional Papers on Mollusks 3(7): 45-52, pl. 15. Museum of Comparative Zoology, Harvard University.
- JOHNSON, R. I. AND A. H. CLARKE. 1983. A new spiny mussel, *Elliptio steinstansana* (Bivalvia: Unionidae), from the Tar River, North Carolina. Occasional Papers on Mollusks 4(61): 289-298, pl. 40. Museum of Comparative Zoology, Harvard University.
- MORRISON, J. P. E. 1955. Notes on the spiny freshwater mussels (*Canthyria*). Bulletin of the American Malacological Union, pp. 19-20.



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primitive features among the unionoid mussels. Although challenged at first (Lefevre and Curtis, 1912), Ortmann's views soon found wide acceptance among unionoid systematists (see Heard and Guckert, 1970; Davis and Fuller, 1981; Boss, 1982, for review of classifications). Recently the familial status of the Margaritiferidae has again been challenged (Davis and Fuller, 1981). Although conceding the connotation of primitiveness and morphological distinctiveness of margaritiferids, they concluded that the group represents a subfamily of equal phylogenetic status with other traditional subfamilial groups in the Unionidae.

Davis and Fuller (1981) used information acquired from two sources: an analysis of immunogenetic data gathered from a wide assortment of taxa and a reassessment of the morphological characters of the "Unionacea."

Nonetheless, they neglected to leave open the possibility for alternative interpretation of their results and ignored extant studies relevant, though contradictory, to their own conclusions and further failed to explain why their concept of the Margaritiferinae demonstrates unique derived features distinct from other "unionid" groups. We present another viewpoint supporting the validity of the Margaritiferidae and to show that the Margaritiferidae represents a derived group within the Unionacea.

Davis and Fuller's (1981) immunogenetic analysis clearly showed three distinct clusters of taxa. Two clusters followed traditional systematic interpretations indicating a separation of an "amblemid" group from a margaritiferid group. A third cluster comprising the "anodontids" also was identified. They surmised that the anodontids represented as unique an assemblage as did the margaritiferids or amblemids. Furthermore, they determined that the 47% genetic distance they found between the margaritiferids and amblemids (no analysis was presented for margaritiferids versus anodontids or anodontids and amblemids combined) was insufficient to substantiate recognition of the Margaritiferidae. This conclusion followed a theory in which, among mollusks, genetic distance, expressed as ranges of percent differences between taxa, increased in a similar fashion with

morphological (*i.e.* traditional phylogenetic) distance. The criteria for family level status in "most" cases was from 50 to 80% (Davis, 1978). However, in a similar study involving immunogenetic comparisons of five unionid species, a sphaeracean clam, *Sphaerium striatinum*, and a marine veneracean clam, *Saxidomus nuttalli*, Fisher (1969) found that genetic distance did not increase in a similar fashion with "phylogenetic" distance. *Saxidomus nuttalli* and *Sphaerium striatinum* showed equal or less genetic deviation from certain unionids as did *Anodonta grandis*, a unionid species. Davis (1978) remarked that biochemical systematic studies on mollusks were just beginning so it may be premature to categorize higher molluscan groups according to genetic distance.

Nevertheless, in an electrophoretic study on five Palearctic species of Unionidae (genera *Unio* and *Anodonta*) and the margaritiferid *M. margaritifera*, Logvinenko and Kodolova (1979) found that the level of similarity between the traditional unionid species and *M. margaritifera* was very low when compared to levels of similarity observed between each of the five unionid species. They concluded that the low level of similarity between the five unionid species and *M. margaritifera* was indicative of family level differences.

Davis and Fuller (1981) argued that morphological characters in "unionids" had undergone parallel evolution. Since parallel evolution prevented deviation from a basic unionid "groundplan" in margaritiferids, they contended that margaritiferids should not be accorded family rank. Unionoid bivalves (excluding etheriids) are infaunal filter feeders and show a morphological groundplan suited for such a role. In this respect most bivalve groups have undergone convergence or parallel evolution (Stanley, 1970). Davis and Fuller (1981) used certain marine bivalve families as examples to show the degree of difference between groundplans necessary for recognition of families. They consider the Cardiidae and Tridacnidae to have distinct enough groundplans to be considered as separate families within the Cardiacea. Similarly the Pectinidae, Malleidae, and Pteriidae (Pteriacea) are listed as showing family level groundplans. However, these families represent morphological adaptation

(groundplans) to vastly divergent niches and demonstrate such great morphological differences that some workers (Abbott, 1974; McCormick and Moore, 1969; Boss, 1982) consider most of them as distinct superfamilies (Tridacnidae in Tridacnacea, Cardiidae in Cardiacea, Pectinidae in Pectinacea, and Pteriidae and Malleidae in Pteriacea). A more accurate comparison among recognized marine families should have included the Lucinidae and Mactromyidae (Lucinacea) in which an infaunal groundplan is present but in which other morphological differences substantiate recognition of separate families. The same is true for the Cardiidae and Hemidonacidae (Cardiacea) and the Astartidae and Crassatellidae (Astartacea). The families above are distinguished by four or five major character states chiefly involving both the shell and anatomy (Boss, 1982).

In comparing margaritiferids with North American unionids Davis and Fuller (1981: Table 10, which see) listed morphological character states assignable to each taxonomic grouping. Characters one through four are of significant systematic importance as they represent substantive morphological differences in the adult morphologies of each group (see Boss, 1982, for accurate descriptions). Among the three subfamilies compared, the Anodontinae and Ambleminae share characters one through four, except that in character two a distinction is made between the Anodontinae and Ambleminae on the basis of the tripartite water tubes in the gills of the Anodontinae. The tripartite condition merely represents a specialization of the gill septa. Modifications of the female septate gill of lampsilines (within the Ambleminae of Davis and Fuller, 1981) occur as well. Modifications of the septate gill in both the Anodontinae and Ambleminae should therefore be included as part of the septate condition (character one). Characters five through nine can be considered of minor systematic importance because they are either highly variable among "unionid" genera or mutually inclusive (character five is inclusive with character two, and six with seven in the Ambleminae and Anodontinae).



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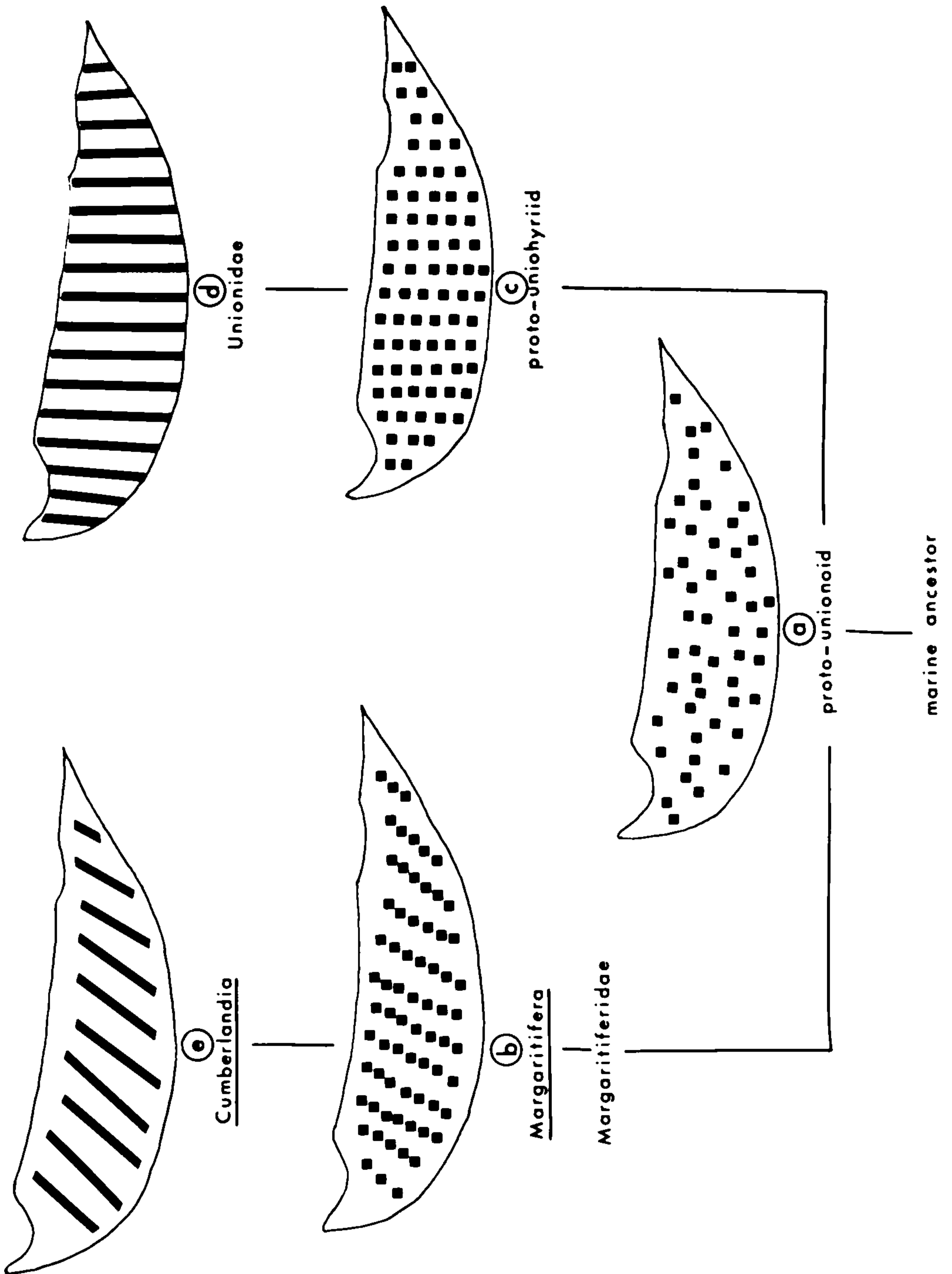
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The Margaritiferidae therefore differ from the anodontid-amblemid group by six character states (four anatomical, two conchological) which are equivalent to the number used to distinguish marine bivalve families with similar morphological groundplans. Had Davis and Fuller (1981) treated the Hyriidae they would have found that only three anatomical characters and no conchological characters (the morphology of conchiolin is unknown in hyriids) separate the Unionidae from the Hyriidae.

We believe that the margaritiferids diverged early from a stem unionoid group and followed a conservative evolutionary pathway independent of other unionoids. An ancestral eleutherorhabdic (=filibranch) group gave rise to freshwater inhabiting bivalves which acquired a synaptorhabdic (=eulamellibranch) gill condition in which solid interlamellar junctions replaced filamentous junctions to accommodate and brood shelled larvae. From a primitive eleutherorhabdic group a lineage evolved in which the randomly arranged interlamellar junctions (Text fig. 1a, the proto-unionoid stage) were arranged into diagonal rows (Text fig. 1b), a feature maintained in Recent margaritiferids. Another lineage evolved, the proto-uniohyriid, in which perforate (incomplete) vertical gill septa (Text fig. 1c), the alleged primitive state of septate unionoids (Heard, 1974), replaced randomly distributed interlamellar junctions. In later independent steps, perforate vertical septa became complete (Text fig. 1d). Both major branches aspired to accomplish a similar goal: to increase incubative efficiency. To this end the Margaritiferidae were largely unsuccessful as evidenced by the limited number of extant species and the lack of innovative marsupial morphologies otherwise present in unionoids. The culmination of marsupial design in margaritiferids exists in *C. monodonta* in which some of the scattered diagonally directed interlamellar junctions have coalesced to form diagonally elongated septa-like junctions (Text fig. 1e). A precursor to septa-like junctions (but not septa) is suggested by *M. margaritifera* in northeastern North America in which, during the incubative period, connective tissues are produced that line the inner gill lamellae walls and appear as diagonally arranged strands (Smith, 1979).



Text figure 1. Schematic diagram showing extant and assumed morphological states of the interlamellar junctions of gills of the Unionoida: a, the ancestral unionoid gill with randomized junctions (black squares); b, diagonally directed junctions in Recent *Margaritifera*; c, vertically directed junctions in proto-uniohyriids; d, vertical septa (fused junctions) in Recent unionids; e, fused diagonal junctions (non-septate) of Recent *Cumberlandia*.

A hypothetical freshwater ancestor common to both the Margaritiferidae and Unionidae and other unionoid groups, has been described herein containing a character state (randomized interlamellar junctions) not present in any living unionoid group nor found in any suggested hypothetical ancestral marine bivalve. Thus a character (anatomical) becomes available to identify the margaritiferids as a natural derived group within the Unionoida.

In summary, the moderate genetic distance between margaritiferids and unionids may not be fully interpreted at this time. However, the genetic distance exhibited by the margaritiferids represents the most discrete among "unionaceans" (excluding the Hyriidae, for which there are no genetic data). Furthermore, an alternative interpretation of morphological characters suggests that margaritiferids represent a distinct, derived group. Based on these arguments the Margaritiferidae is considered a valid family group.

Acknowledgements

Some of the information presented in this paper is based on material in the Museum of Comparative Zoology, the American Museum of Natural History in New York City, and the Peabody Museum at Yale University. To the respective curators of these collections, Kenneth J. Boss, Richard I. Johnson, William K. Emerson, and Willard D. Hartman, we are deeply grateful. We also thank Ann E. Pratt and William L. Fink for their comments and assistance.

LITERATURE CITED

- ABBOTT, R. T. 1974. *American Seashells*. 2nd edition, van Nostrand Reinhold Co., N. Y. 663 pp.
- AWAKURA, T. 1968. The ecology of parasitic glochidia of the fresh-water pearl mussel, *Margaritifera laevis* (Haas). Scientific Report Hokkaido Fish Hatchery. No. 23. pp. 1-21. (In Japanese.)
- BOSS, K. J. 1982. Mollusca, in Parker, S. P. (ed.) *Synopsis and Classification of Living Organisms*. Vol. 1. Pp. 945-1166. McGraw-Hill Book Co., New York.
- DAVIS, G. M. 1978. Experimental methods in molluscan systematics, in Fretter, V. and J. Peake (eds.), *Pulmonates*, Vol. 2A—Systematics, Evolution and Ecology. Pp. 99-169. Academic Press, London.



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- STANLEY, S. M. 1970. Relation of Shell Form to Life Habits of the Bivalvia (Mollusca). Geological Society of America. Memoir 125. 296 pp.
- SUBER, T. 1915. Identification of the glochidia of fresh-water mussels. Report United States Fish Commission, Appendix to Volume V. Pp. 1-9.
- TOLSTIKOVA, N. V. 1974. Microstructural characteristics of freshwater bivalves (Unionidae). Paleontological Journal 8: 55-60.

MISCELLANY

Dates of publication of the Molluscan portion (including the brachiopods) of the "Fauna del Regno di Napoli" (1829-1886) by Oronzio Gabriele Costa and Achille Costa.

by

Richard I. Johnson

This work was issued in signatures of varying amounts of text, at irregular intervals, and never completed. Sherborn (1910) pointed out that most of the signatures are dated and that the dates occur on, or near, the back fold of the signatures; thus they are mostly obliterated in bound copies of the work. Erasmo (1949) published the dates on the signatures based on a copy of the work in the department of zoology at the University of Bari, at the University of Naples, and on other copies elsewhere. He indicated the number of plates that appeared with each section but was unable to give their dates of publication. This is of little importance here, since nomenclature occurs on only one of the plates mentioned.

The unbound portion of the "Fauna" in my possession, and the bound one in the Museum of Comparative Zoology agree with the description given by Erasmo, except that he claimed the section on gastropods should have 19 plates, while both of these copies have only 18. The text for *Tritonium* mentions a plate 12, but it is not known if this was published, or if it is the plate referred to by Erasmo.

The author is very grateful to Dr. Robert Robertson of the Academy of Natural Sciences of Philadelphia for making a copy of Erasmo's work available from what may be the only set of the Journal, in which it appears, in the United States.

LITERATURE CITED

- ERASMO, GEREMIA D'. 1949. Le date di pubblicazione della "Fauna del Regno di Napoli" di Oronzio Gabriele Costa e di Achille Costa. Rendiconto dell'Accademia delle Scienze Fisiche e Matematiche, Napoli, series 4, 16: 14-36.
- SHERBORN, C. D. 1910. On the dates of publication of Costa's "Fauna del Regno di Napoli", 1829-1886. Annals and Magazine of Natural History, London, series 8, 5: 132.

The only title page was issued with the general introduction which appeared with the section on mammals in 1839 and consists of pp. I-XV.

ACEFALI SENZA CONCHIGLI by O. G. Costa

"Following the later name given by Cuvier, Costa designated these as Tunicata".

pls. 1, 2

sig. 1, pp. 1-8 Catteri generali. gen. *Bifora* 1 Jul. 1840

pl. 3* Inscribed *Polychrates scutulatus* [new species].

sig. 2, pp. 1-3 gen. *Polychrates* 16 Oct. 1838

GASTEROPODI by O. G. Costa

pls. 1-3

sig. 1, pp. 1-8 Caratt. gen. e classif.—Gasteropodi polmonati.

gen. *Limax*, *Helix* no date

sig. 2, pp. 9-16 gen. *Helix* (cont.) no date

sig. 3, pp. 17-24 gen. *Helix* (cont.) no date

sig. 4, pp. 25-32 gen. *Helix* (cont.) 6 May 1839

pl. 4

sig. 5, pp. 1-8 gen. *Vitrina* 18 Mar. 1848

sig. 6, pp. 9-12 gen. *Vitrina* (cont.) 10 Mar. 1848

pl. 1

sig. 7, pp. 1-8 Gaster. pettinibranchi. gen. *Solarium*, *Trochus*
..... 12 May 1841

pl. 4

sig. 8, pp. 1-4 gen. *Janthina* 13 May 1841

pls. 1, 2

sig. 9, pp. 1-8 gen. *Pileopsis*, *Crepidula* 15 Apr. 1841

sig. 10, pp. 9-16 gen. *Calyptraea*, *Sigaretus* 15 May 1841

sig. 11, pp. 17-20 gen. *Sigaretus* (cont.) 20 Apr. 1844

pl. 11, [pl. 12 not seen]

sig. 12, pp. 1-8 gen. *Tritonium* 1 Mar. 1859

- pl. 1
 sig. 13, pp. 1-8 Gastropodi eteropodi. gen. *Atlanta* 1 Dec. 1852
- pls. 1-4
 sig. 14, pp. 1-8 Gasteropodi tubibranchi. gen. *Dentalium* ... 1 Jul. 1851
 sig. 15, pp. 9-16 gen. *Dentalium* (cont.) 3 Jul. 1851
 sig. 16, pp. 17-24 gen. *Dentalium* (cont.) 7 Jul. 1851
 sig. 17, pp. 25-32 gen. *Dentalium* (cont.), [e *Ditrupa*] 25 Jul. 1851
 sig. 18, pp. 33-40 gen. *Dentalium* (cont.) 27 Jul. 1851
 sig. 19, pp. 41-48 gen. *Dentalium* (cont.) 13 Sep. 1851
 sig. 20, pp. 49-56 gen. *Dentalium* (cont.) 13 Sep. 1851
 sig. 21, pp. 1-3 gen. *Odontina* 30 Jan. 1851
- pls. 1-3
 sig. 22, pp. 1-8 Gaster. scudibranchi. gen. *Halyotis*, *Padollus*
 9 Oct. 1838
 sig. 23, pp. 9-16 gen. *Stomatia*, *Stomatella*, *Fissurella* 15 Oct. 1838
 sig. 24, pp. 17-24 gen. *Fissurella* (cont.), *Emarginula* 17 Oct. 1838
 sig. 25, pp. 25-32 gen. *Emarginula* (cont.), Gaster. ciclobranchi
 27 Oct. 1838
- pl. 3
 sig. 26, pp. 1-8 gen. *Chiton* 4 May 1841

PTEROPODI by O. G. Costa, pp. 1-10, pls. 1, 2 and
 Achille Costa,* pp. 11-28, pls. 3-5.
 *page 11 is signed "A. C."

- pls. 1-5
 sig. 1, pp. 1-8 Pteropodi gen. *Cymbulia*, *Hyalea* 3 Apr. 1840
 sig. 2, pp. 9-16 gen. *Hyalea* (cont.), *Cleodora* 10 Dec. 1873
 sig. 3, pp. 17-24 gen. *Cleodora* (cont.), *Spirialis*, *Tiedemannia*,
Pneumodermon, *Trichocyclus* 27 Dec. 1873
 sig. 4, pp. 25-28 gen. *Clionopsis*—Catal. sistematico—
 Spiegazione delle Tavole 16 Dec. 1873

BRACHIOPODI by O. G. Costa

- pls. 1-3
 sig. I, pp. 1-8 Brachiopodi: Caratt. gen.—gen. *Terebratula*
 1 Oct. 1851
 sig. 2, pp. 9-16 gen. *Terebratula* (cont.) 8 Oct. 1851
 sig. 3, pp. 17-24 gen. *Terebratula* (cont.) 15 Nov. 1851
 sig. 4, pp. 25-32 gen. *Terebratula* (cont.) 17 Nov. 1851
 sig. 5, pp. 33-40 gen. *Terebratula* (cont.) *Orthis* 24 Nov. 1851
 sig. 6, pp. 41-48 gen. *Orthis* (cont.), *Platydia* 5 Jan. 1852
 sig. 7, pp. 49-56 gen. *Thecidea*, *Crania*—Osservaz.—Indice
 alfabetico delle specie 26 Jan. 1852
 sig. 8, pp. 57-60 Spiegazione delle Tavole 27 Jan. 1852



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mentioned *A. placentalis* and added *A. peracuta* (Dall 1899). Garrard (1978: 517) also advocated this procedure and additionally synonymized his own *Russetia* under *Discotectonica*. In this paper we critically evaluate the type species of *Discotectonica* and give our reasons why *Discotectonica* cannot be construed as being synonymous with *Acutitectonica*. We also describe and illustrate a new species of *Acutitectonica*.

Systematics

Family Architectonicidae Gray 1850

Subfamily Philippiinae Boss 1982

Genus Acutitectonica Habe 1961

Acutitectonica Habe 1961. Coloured Illustrations of the Shells of Japan, p. 30, pl. 13, fig. 21 (type species, *Solarium acutissimum* Sowerby 1914, original designation and monotype; Kii, Japan).

Russetia Garrard 1961. Journal of the Malacological Society of Australia, 5: 23, pl. 1, figs. 11a, b (type species, *Russetia dilaniatus* Garrard 1961 [= *Solarium acutissimum* Sowerby 1914], original designation and monotype; Recent, trawled in 160 fathoms east of New Castle [New South Wales, Australia]).

Description. Shell moderately large, more or less depressed conical; protoconch usually small, with or without anal keel; body whorls sharply angled at the periphery; spiral and basal cords weakly to moderately strong and beaded; lip simple; aperture triangulate with basal outer margin subsinuate; siphonal canal strong; umbilical wall narrow, strongly axially marked; radular teeth five per row with central tooth knob-shaped or pointed and without lateral cusps in species examined. In addition, two species (*Acutitectonica acutissima* and *A. disca*) show a remarkable internal structure found in the esophageal region of the gut (see Boss and Merrill, 1984, for details); this structure has sometimes been mistaken for the radula (Habe, 1952; Melone, 1975). Operculum corneous, paucispiral with an off-center nucleus and internal spiraled process.

Remarks. The genus *Acutitectonica* has living representatives in the tropical and subtropical deeper waters of the world, ranging from 25 to 230 fathoms, including such Indo-Pacific species as the type, *A. acutissima* (Pl. 44, figs. 1–3) from off southern Queensland and New South Wales, Australia through the Philippine Islands and to Japan, and *A. kuroharai* (Kuroda and Habe 1961) from off southern Queensland and Japan (Garrard, 1978). The genus is represented in the eastern Pacific by *A. disca* (Philippi 1844)¹ which is also present on both sides of the Atlantic, in the eastern Atlantic and the Mediterranean by *A. lepida* (Bayer 1942)² and *A. bannocki* (Melone and Taviani 1980) [Recent?] only lately discovered in the Mediterranean. A new species described herein is presently known only from the type locality in the western Atlantic.

Acutitectonica, along with the genus *Philippia*, has been placed in the subfamily Philippiinae because of its radular characteristics (Boss and Merrill, 1984).

Marwick (1931) proposed a new subgenus *Discotectonica* with *Architectonica balcombensis* Finlay 1927, a replacement name for *Solarium acutum* Tenison-Woods 1879, *non* Conrad 1854,³ as the type species; the type locality is "Tertiary beds on the banks of the Muddy Creek, a tributary of the Wannon River, about five miles from Hamilton in Western Victoria", an Eocene Australian outcrop according

¹We consider the following nomina to be synonyms of *A. disca*: the variant spellings *discum* and *discoideum*, *Solarium placentale* Hinds 1844 and its variant spellings *placentula* and *placentulum*, *S. pseudo-perspectivum* 'Brocchi' Jeffreys 1880, *non* Brocchi 1814, *S. perspectiviforme* Tiberi 1872 and *S. peracutum* Dall 1889.

²We include the following as synonyms: *Solarium pseudoperspectivum* 'Brocchi' Hanley 1863, *non* Brocchi 1814, *S. pulchellum* Tiberi 1868, *non* Michelotti 1841, *nec* d'Orbigny 1842 and *S. mediterraneum* Monterosato 1872, *non* Philippi 1853.

³Not 1860 as quoted by Finlay (1927) and others. Conrad introduced *Architectonica acuta* in 1854 in *Walies*, p. 289, Pl. 17, figs. 1a, 1b; a lectotype was designated by Palmer in Harris and Palmer, 1947, pp. 275–276 as listed in Moore (1962); the *nomen* was not listed in Ruhoff (1980).

to Harris (1897). Wenz (1939) utilized *Discotectonica* as a subgenus for *Architectonica* for New Zealand and Australian species of Eocene to Oligocene age. Subsequently the age of the type species has been redated to the Tertiary Balcombian Geological Horizon, or more specifically the Middle Miocene (Chapple, 1941; Garrard, 1978).

We herein reproduce Tenison-Woods' (1879) original description, comments, and illustration (Text fig. 1A and B) of the type species for *Discotectonica* as a basis for comparison with *Acutitectonica*.

SOLARIUM ACUTUM. Pl. 21, fig. 11.

S. t. parva, depressa, discoidea, tenui, nitente; anfrac, 4, omnino planatis, liratis, ad margines duobus liris majoribus granulosis insignitis; ad peripheriam acutis; basi in medio conspicue convexa, tenuiter lirata; umbilico costulis et liris granulosis in lineis 4 vel 5 marginata. Apertura transversim ovata. Alt. 1½, diam. 6.

This fossil is not very common. It is easily distinguished by its very small size and depressed form and very acute periphery, where the edge of the shell is produced into a sharp projecting keel. The upper surface is distinctly lirate, and the edges of each whorl margined with rather broad granular lines, two or three in number, the central one where there are three, being much smaller. The under side is abruptly convex in the middle, and faintly lirate. The umbilicus is broadly margined with three to five spiral lines of granules or riblets, varying in size and forming a very elegant pattern. In the figure of this shell on Plate 21, the side view and base with the umbilicus are represented. The species is not like any existing or fossil, its nearest representative is *S. millegranum*, Lamarck. Prof. Tate informs me that this species reaches nine-tenths of an inch in diameter, and that then the ornament is slightly different.

Tenison-Woods (1879) stresses the very small size (6 mm) and a greatly depressed form as easily distinguishing characters. Its aperture clearly portrayed in the type figure (Text plate 1A, B), is distinctly different from true *Acutitectonica* in lacking or possessing a very reduced columellar margin which forms the umbilical wall and the strong siphonal canal of *Acutitectonica*. The "abruptly convex" base of *S. acutum* is reflected in the angulation x-y-z of the apertural view of Text fig. 1B and the basal view of Text fig. 1A which is unlike the more or less flattened to weakly convex base of the typical *Acutitectonica* (Text fig. C, x, z).



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The mistaken interpretation of *Discotectonica* as *Acutitectonica* is probably based on the figures of "*S. acutum* Tenison-Woods" provided by Harris (1897: 244, Pl. 7, figs. 6a-c) and reproduced by Wenz (1939: 671, fig. 1913). That specimen is about 19 mm in diameter (3 times larger than the original of Tenison-Woods)—Harris' fig. 6c shows an enlargement of a pie-shaped section of the base, indicating the rather strong numerous (7) periumbilical sulci and granulations. Although Harris does not provide an apertural view there is every indication that it is an *Acutitectonica* as seen in the flattened or weakly convex base, sharp peripheral edge, and the umbilical wall.

Further confounding the issue, Garrard (1978: 520), who noted that the holotype of *S. acutum* Tenison-Woods 1879 was lost, designated a neotype for it. We do not concur with Garrard's selection since the specimen he designated does not agree with the original description, explanatory notes, and figure of Tenison-Woods (1879).¹ Tenison-Woods stressed the small size of his *S. acutum*, namely, 6 mm in diameter and 1.5 mm in height; the specimen designated neotype is 17.5 mm or nearly 3 times larger and its height is 7.0 mm or more than 4 times greater than *S. acutum*. Not only is this neotype larger in size but its proportions differ from that of the holotype; the height/diameter ratio for the holotype (1.5/6) is 0.25 while for the neotype (4/17.5) it is 0.4. Clearly the holotype was, as Tenison-Woods described and illustrated it, depressed, certainly more so than in the neotype. Actually, Tenison-Woods' type figure was even more depressed than his illustration of the apertural view shows since the figure was not aligned to show the exact outline of the aperture as indicated by the exposed dorsal surface of the body whorl above the upper margin of the aperture.

Garrard (1978) also stated: "No other Australian Tertiary fossil species in the genus *Architectonica* possesses the acute

¹Therefore, the specimens described and figured by Garrard for what he considered to be "*Solarim acutum* Tenison-Woods" and its replacement name "*Architectonica (Discotectonica) balcombensis* Finlay" represent an unnamed species of *Acutitectonica*.

peripheral keel and concave basal area adjoining....” which indicates that his specimens were representatives of a species of *Acutitectonica* (Garrard 1978, Pl. 6, figs. 6–8; Pl. 10, figs. 7–9); for the true *S. acutum*, Tenison-Woods (1879) stressed that the base was abruptly convex as clearly shown in Text fig. 1A and B. It is true that *S. acutum* has a depressed form and acute peripheral keel as expressed in Tenison-Woods’ type figure (Text fig. 1A and B). However, it must be emphasized that the species is dorsally depressed to the peripheral keel and lacks the even dorsal and basal symmetry of a typical *Acutitectonica* (Text fig. 1C).

Acutitectonica sindermanni new species

Plate 45, figures 1–3

Plate 46, figures 1–2

Description. Shell size medium–small, 8.9 mm in maximum diameter, 4.4 mm in height. Shell strong, color whitish (dead shell); spire depressed-conic; carina sharply keeled; umbilicus moderately open; whorls $3 \frac{1}{3}$ —defined by a strong dorsal penultimate cord and an even stronger peripheral cord. Protoconch anastrophic, very large (1.33 mm), inflated, emerging and inverting in a single whorl, with an anal keel. Sculpture on dorsum consists of five moderately developed spiral cords and a relatively strong peripheral cord. The first, third, and fourth cords moderately weak, second and fifth comparably stronger; no spiral threads interspersed with cords; sutures well defined. Spiral cords crossed by rather light axial plicae to produce weakly nodulated cords. Basal spiral sculpture consists of a strong nodulated umbilical cord, a moderately strong spiral cord adjoining the peripheral cord, and additional very faint spiral cords and threads on body. Axial plicae radiate above the umbilical cord towards the periphery gradually weakening and disappearing about midway to the periphery; a distinct suture separates the umbilical cord and the axial plicae; a wide, shallow excavation divides the penultimate and peripheral cords. Umbilical wall recessed, rather smooth—marked by very fine axial striae and occasionally by craggy growth plications; aperture subquadrate, sharply keeled at the periphery, lip thin and simple, siphonal canal grooved. Radula and operculum unknown.

Holotype. Museum of Comparative Zoology, No. 294313. Height 4.4 mm; maximum diameter 8.9 mm.

Type locality. About 105 miles north of Cabo Orange, Brazil (06°05'N. Lat.; 51°21'W. Long.), in 96 meters.

Remarks. *Acutitectonica sindermanni* is known from a single adult specimen. The species is distinct and has characters that easily separate it from *A. disca*, *A. bannocki*, and *A. lepida*, the other Atlantic forms. The protoconch is almost twice as large as in *A. disca* (1.32 to 0.72 mm) and possesses an anal keel. Other characters separating it from *A. disca* are dorsally the stronger delineated spiral cords in *A. sindermanni* which number six, including the peripheral cord; three are rather uniform with no spiral threads between them. The weakly developed dorsal spiral cords and threads in *A. disca* number about eight. In *A. disca* the basal cords are also generally more weakly developed except for two strong spiral cords adjoining the umbilical cord—the area of strong axial sculpture in *A. sindermanni*. The dorsal surface is more strongly developed in *A. bannocki* with a combination of axial and spiral dominance—the axial sculpture of the inner part of the whorl is actually contoured and separates it clearly from the outer flatter spiral sculpture. Dorsal spiral sculpture is lacking in *A. lepida* except for penultimate and peripheral cords.

Acknowledgments

This species is named for Dr. Carl J. Sindermann, Northeast Fisheries Center, Sandy Hook Laboratory, New Jersey, friend and erstwhile colleague of the senior author. We thank Mr. Richard I. Johnson and Dr. Ruth D. Turner for critical review of the manuscript.

LITERATURE CITED

- BOSS, K. J. AND A. S. MERRILL. 1984. Radular configuration and the taxonomic hierarchy in the Architectonicidae (Gastropoda). Occasional Papers on Mollusks, Museum of Comparative Zoology, Harvard University, 4(66): 349-411.
- CHAPPLE, E. H. 1941. New species of Tertiary Mollusca from Victoria. *Memoirs of the National Museum of Victoria*, 12: 119-124.



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Plate 44

Fig. 1. *Acutitectonica acutissima* (Sowerby 1914). Japan. MCZ 294338; maximum diameter 37.6 mm, height 14.5 mm; dorsal view.

Fig. 2. The same; apertural view.

Fig. 3. The same; basal view.

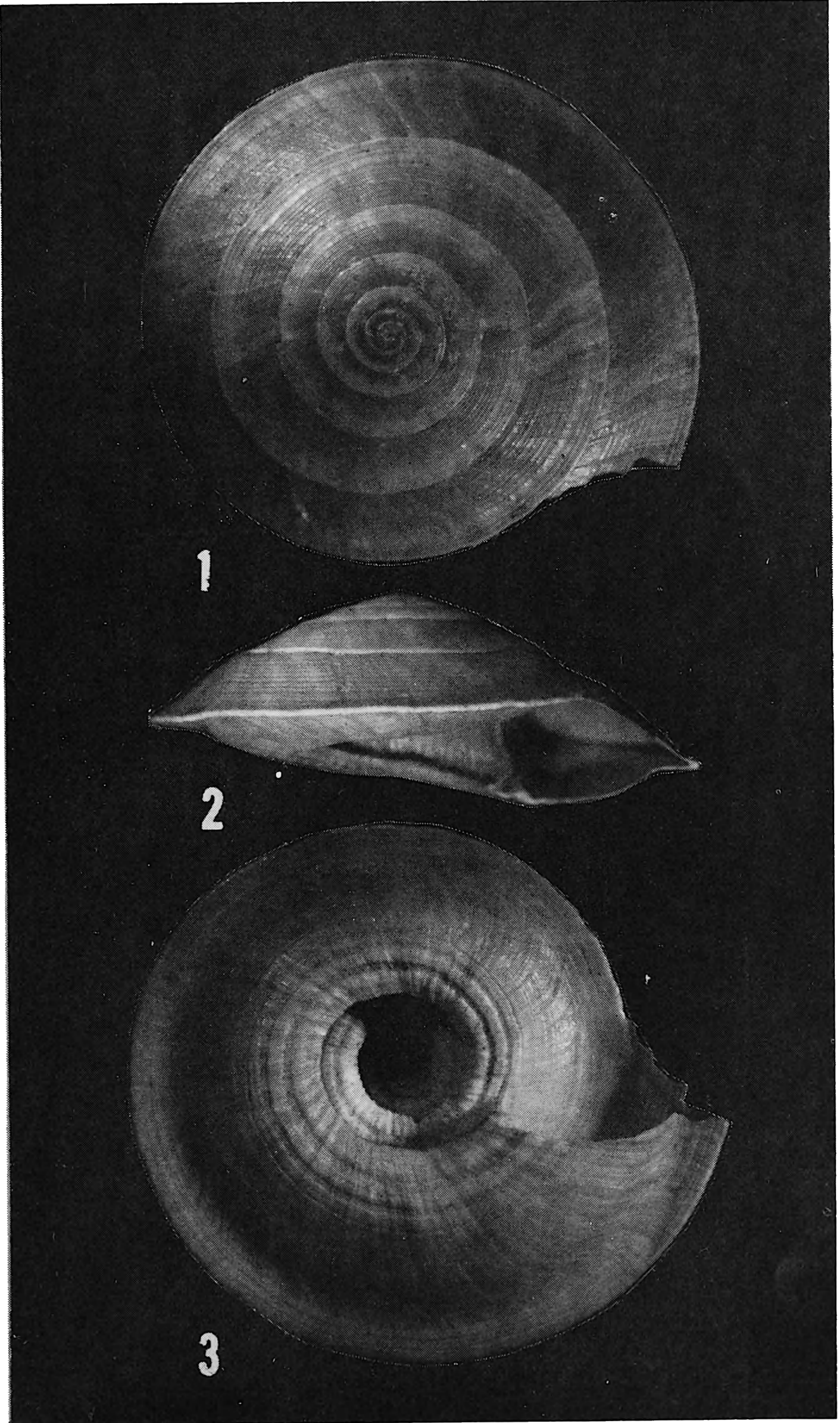


Plate 44

Plate 45

Fig. 1. *Acutitectonica sindermanni*, new species. 105 miles north of Cabo Orange (06°05'N. Lat.; 51°21'W. Long.), Brazil in 96 meters. Holotype MCZ 294313; maximum diameter 8.9 mm, height 4.4 mm; dorsal view.

Fig. 2. The same; apertural view.

Fig. 3. The same; basal view.



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Plate 46

Fig. 1. *Acutitectonica sindermanni*, new species, holotype temporarily coated with magnesium to highlight the configuration of the dorsal spiral sculpture ($\times 8.5$).

Fig. 2. Same specimen enlarged to show detail of the very large anastrophic protoconch. Maximum diameter of the protoconch, 1.33 mm ($\times 19$).

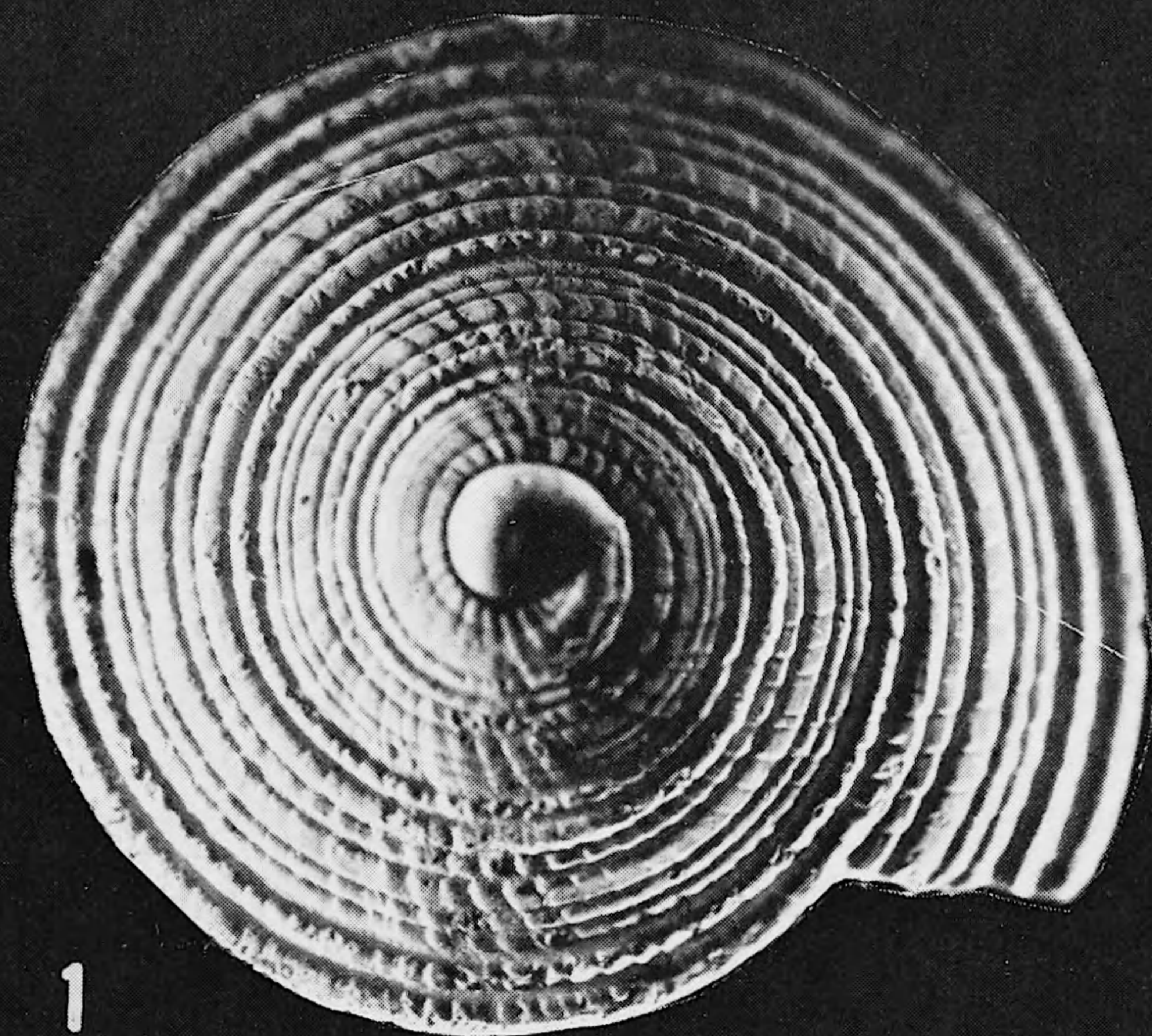


Plate 46

MISCELLANY

Ignaz Elder von Born (1742–1791) was a member of the German nobility, though born in Transylvania. At the age of 13 he was sent to Vienna to study with the Jesuits, who convinced him to join their order, which he quit after sixteen months. He then went to Prague where he studied jurisprudence, and later natural history and mining. In 1770 he became associated with the department of mines and the mint, and he soon became counselor of mines. After publishing a work on his mineral collection, he was admitted to a number of learned societies, and his reputation was such that Empress Maria Theresa (reigned, 1740–1780) called him to Vienna in 1766 to arrange and describe the Imperial Collection. Upon the death of the Empress in 1780, the project was discontinued, but not before Baron Born was able, at least, to study the imperial shells. The first work was a modest volume (1788)¹ followed by a large folio volume with elegant plates (1780).²

Born used the system of binomial nomenclature introduced by Linnaeus in both his works. He also used this system of nomenclature in a satire on the orders of monks then found in the Empire, *Specimen monachologiae* (1783). It was long after (1852)³ translated into English.

The shells described by Born, many new to science, now in the Vienna State Museum, were restudied by Brauer (1878)⁴ who was then curator of the Imperial Zoological Museum.

Richard I. Johnson

¹Born, Ignaz E. von. 1788. I. a Born... Index Rerum Naturalium Musei Caesarei Vindobonensis Ima. Testacea.—Verzeichnis S1... pp. [xlii] 458 [78], 1, hand colored pl. 8vo. Vindobonae [Vienna].

²_____ 1780. Testacea Musei Caesarei Vindobonensis... pp. 442 [15], 18 hand colored plates, and text illustrations. folio Vindobonae [Vienna].

³[Born, I. E. von]. 1852. Monachologia: or, Handbook of the Natural History of Monks: arranged according to the Linnaean system. By a Naturalist. pp. 77, illustrated. 8vo. Edinburgh.

⁴Brauer, Friedrich. 1878. Bemerkungen über die im kaiserlich zoologischen Museum aufgefundenen Original-Exemplare zu Ign. v. Born's Testaceis Musei Caesarei Vindobonensis. Sitzungsberichte der Kaiserlichen Akademie der Wissenschaften. Mathem. naturw. classe. 77 (1) 2:



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MacDonald (1860: 76-77) was the first to discover and describe the jaws and radula of an architectonicid and he recognized, in the case of *Solarium* [= *Architectonica*] *perspectivum*, a ptenoglossate condition similar to the Epitoniidae and Janthinidae. He described the species as follows:

The oral teeth [=jaws] form a narrow circular band consisting of a pavement of sharp dental cells, whose points, as in other cases, are directed forwards.

The lingual pavement [=radula] is small, but elongated in form and divided into two lateral areas, supporting several series of long and gracefully curved unciniate teeth, which seem to decrease in length from within towards the lateral borders of the membrane, where they also become bifid in the vertical direction.

Troschel (1861) was the first to figure the radulae and jaws for architectonicids. For *Solarium* [= *Architectonica*] *perspectivum* he counted at least 60 rows of long, narrow teeth (Pl. 47, figs. 1-5) and found that each row has a total of 28 teeth (Pl. 47, fig. 12) and concluded, since he could find no central tooth, that there was none. Therefore, the radula formula is 14-0-14. The lateral teeth are prong-like with the longer ones central or medial in position and the shorter at the margin of the radula (Pl. 47, fig. 1). The longer ones have simple pointed cusps (Pl. 47, fig. 5) while those somewhat more lateral in position, though still prong-like, have a small lateral cusp along shaft of the tooth (Pl. 47, figs. 8 and 11a); the more marginal laterals are not only shorter but the small cusp mentioned above becomes longer (Pl. 47, fig. 2); Troschel likened these teeth to a fork with unequal tines. He also illustrated the lateral teeth in a view so one could not see the small tines clearly (Pl. 47, fig. 3). These teeth measure from 0.06 mm to 0.2 mm in length. He described the jaw of *A. perspectiva* (Pl. 47, fig. 6) as consisting of lancet-like elements arranged like tiles on a roof though not perfectly regular; the free edge is irregular with some of the pointed rod-like elements projecting; these elements measure 0.0075 mm broad by 0.0275 mm long.

Troschel (1861; 1875) could only observe portions of the radula of *Philippia lutea* [= *P. hybrida*, since his specimen was from the Mediterranean Sea]. He noted the presence of numerous teeth, thereby relating it to *Solarium* [= *Architectonica*] but he never gave a radular formula, nor specifically noted the presence or absence of a central tooth though he implied there was no central tooth. He clearly illustrated the lateral teeth as having from two to three prong-like cusps (Pl. 47, fig. 7); however, the dental elements he mentioned as central, or in the middle, in position (Pl. 47, fig. 9) are confusing and probably represent some error in judging the preparation. He observed that the jaw of *P. hybrida* has bluntly rounded, rod-shaped elements which are about four times longer than broad and arranged in 4–6 irregular rows, somewhat like roof tiles (Pl. 47, fig. 10).

Troschel (1875) recounted his earlier work on *Architectonica perspectiva* and studied the radula of another specimen, one from the Philippines which though labelled *Solarium zonatum* he equated to *A. perspectiva*. The angles of the recurved tines of the more marginal lateral teeth (Pl. 47, figs. 11b, c, d) differ somewhat from the specimen he previously figured in 1861 (Pl. 47, figs. 2 and 4). However, the essentials are the same.

Troschel (1875: 157) in an addendum, discussed *Torinia* [= *Heliacus*] *cylindracea*. Although he had difficulty with his preparation because of the minuteness of the radula and was uncertain of the completeness of his observation since the teeth had become disassociated, he could still surmise that the radula of *Torinia* [= *Heliacus*] is a modified taenioglossate one with five teeth per row, giving the formula 2-1-2—two laterals flanking a central tooth. He said the central tooth (Pl. 48, fig. 1) is almost rectangular in shape with the cutting edge consisting of a single central cusp flanked on each side by about 14 rather deeply incised, very narrow cusps. Both lateral teeth are narrow and basally blunt, widened distally and having deeply cleft, finger-like cusps, seven on the inner lateral and eight on the outer (Pl. 48, fig. 2). The central tooth measures 0.08 mm by 0.05 mm. Because of the presence of the central tooth and the limited number of lateral teeth in *Torinia* [= *Heliacus*], he established

a new family, the Toriniacea [=Heliacidae] and separated it from the Soliariacea [=Architectonicidae] in which he placed *Solarium* [=Architectonica] and *Philippia*.

Marshall in Tryon (1885) reproduced Troschel's figures for *Solarium* [=Architectonica] and *Philippia* and stated that the teeth "are long, spiniform, pronged and without central tooth." For *Torinia* [=Heliacus], he noted "there is a small central tooth, a lateral tooth with pectinated and incised edge united to the central tooth and two marginal teeth which are straight and digitated at their extremities."

Bouvier (1886: 99 and 105) recounted Troschel's (1875) observations on the radula and jaws of *Solarium* [=Architectonica], noting that the laterals are numerous, spiniform and terminating in one, two or three cusps. Discussing the radula of *Torinia* [=Heliacus], he correctly noted the central tooth with its large central cusp bordered by numerous small cusps and the lateral teeth with their six or seven terminal cusps though he incorrectly stated that there were six lateral teeth per row, the true taenioglossate condition, instead of four.

Thiele (1925) made rather extensive comments on the radular configuration of the Architectonicidae. He rightly pointed out Marshall's (1885) incorrect interpretation of the dental elements of *Torinia* [=Heliacus], that his "central tooth" and "lateral tooth" really are, respectively, the central knobby cusp and lateral, finely denticulated cusps of the central tooth. He contrasted the radulae of *Torinia* [=Heliacus], *Philippia*, and *Architectonica* referring to Troschel (1875) for *Torinia*. He figured (Pl. 48, fig. 3) the central tooth of *Torinia* [=Heliacus] *trochoidea*. This is a side view rather than the usual frontal view but still shows the heliacine configuration of the central tooth—a central cusp flanked by numerous (here 15) fine lateral cusps. The lateral teeth are narrow and distally broadened, terminating in several adjacent finger-like long, narrow, curved cusps of which the outermost are broadest and shortest. He found, after having examined different species, that the form of the lateral teeth in *Torinia* [=Heliacus] varies as does the number of cusps,



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hangeren" (Pl. 48, figs. 8 and 9); the inner lateral tooth has four, the outer five, long, thin, also bristle-like cusps (Pl. 48, figs. 10 and 11, respectively); he then stated that *Philippia*, by its radular structure is closer to *Torinia* [= *Heliacus*] than to *Solarium* [= *Architectonica*], because in the latter the number of teeth is much increased and some of the lateral ones are simply pointed while others are forked (Pl. 48, fig. 12).

Thiele (1929), summarizing the features of the family, stated the radular formula of *Solarium* [= *Architectonica*] as 14-0-14 with the central tooth being absent and the lateral teeth longer and singly pointed more centrally, and shorter and forked more laterally. He characterized *Torinia* [= *Heliacus*] as having five teeth per row, describing the central and lateral teeth as previously known, and then for the first time noted that *Philippia* also has five teeth per row with a central tooth not broader than the lateral teeth and bearing bristle-like projections ("borstenartigen Fortsätzen") on the cutting edge; the lateral teeth are like *Torinia* with several cusps.

Habe (1943), working on *Heliacus dorsuosus*, illustrated the central tooth with its median cusp flanked by numerous lateral serrations (Pl. 49, fig. 3) and both lateral teeth, in this case, each with nine narrow, digitate cusps (Pl. 49, figs. 1 and 2).

Habe (1952) illustrated three odd structures, each having three long spiniform cusps, which he considered with no explanation to be the radula of *Discotectonica* [= *Acutitectonica*] *acutissima* (Pl. 58, fig. 2); we think that this is a separate structure and consider it subsequently.

Robertson (1970) reviewed the literature on the radula of *Philippia*, remarking that Troschel's (1861) *P. lutea* was *P. hybrida* and that Thiele's (1925) *P. hybrida* was really *P. (Psilaxis) radiata* since the name *P. hybrida* was at that time (Thiele 1925; 1928; 1929) being applied to *P. radiata*. He stated that Troschel (1861; 1875) was wrong in believing that *Philippia hybrida* has about as many teeth as *Architectonica* (i.e. about 28). In point of fact, Troschel said he had a difficult time manipulating the tiny radula and that he could only make out single teeth or parts of the radula; he was not

able to give an exact number of teeth in *Philippia*; he only remarked that the teeth were numerous and similar to *Architectonica* in their general arrangement. Robertson also found that the radula was difficult to study and stated that, for *Philippia*, there were no subgenerically distinguishing characters. Robertson extracted radulae from six specimens representing four species and gave measurements for the length and height of the radula, the number of rows of teeth and the size of the shell. For four species the radular length varied from 0.33 to 1.4 mm and the number of rows of teeth from 29 to 58. Robertson noted that the "narrow and bilaterally symmetrical teeth are densely packed together... and their bases are positioned in an irregular diagonal pattern across the ribbon." He described the philippiine radula in general using *P. radiata* as an example. We have reproduced his figures 9 B-D as our Pl. 49, figs. 4-6. Robertson said: "I think it more likely that the innermost teeth are the ones that are smallest, narrowest, and singly pointed (fig. 9A). The other two kinds of teeth differ in length, thickness, curvature, and the number of distal spines. The longer ones (fig. 9B) have two or three spines, while the shorter ones are laterally thicker and more curved and have three to six spines (fig. 9C). One of the latter teeth, definitely not from the center of the radula, in frontal view (fig. 9D) resembles Thiele's figure (1928, p. 87) of a *Psilaxis* 'central'". He also said there appeared to be five teeth per row, but was unable to discern the arrangement of the teeth on the radula—whether there were consistently five in a row or if they were variable or even asymmetrical. It is obvious that Robertson misinterpreted his data as will be clearly shown by Melone's (1974) work with species of *Philippia* (*Philippia*) *hybrida* and Climo's (1975) analysis of *P.* (*Psilaxis*) *oxytropis*. Robertson stated that the jaws differed between the subgenera *Philippia* and *Psilaxis*. The species referable to *P.* (*Philippia*) *hybrida* are subcircular while those in *P.* (*Psilaxis*) (e. g. *krebsii*, *oxytropis* and *radiata*) have jaw rods that are elongate. This may be the reason he thought Troschel's 1861 *P. lutea* was *P. hybrida* since Troschel figured bluntly rounded, rod-shaped elements about four times longer than broad (Pl. 47, fig. 10) while Thiele (1925)

showed them for *P. hybrida* (= *radiata*) to be rather bluntly rounded and tapering to points on their free edges (Pl. 48, fig. 7).

Melone (1974) described and illustrated with excellent SEM photographs the radulae of two species of philippiines and two species of heliacines. Now for the first time one can see clearly in full three-dimensional aspect the shapes, sizes and positions of various architectonicid radular teeth. Melone kindly sent us a superb set of these photomicrographs which he used in this study, some of which are reproduced in Plates 50 to 53. We take this opportunity to extend our thanks for his cooperation.

Melone (1974) discussed and figured the radula of *Philippia hybrida* (Pl. 50, figs. 1 and 2); it consists of five teeth per row with a formula $1+1+R+1+1$ where R equals the rachidian or central tooth, plus a lateral and marginal tooth on each side. The central tooth measures 90.0 u in length and 6.0 u in breadth with a long digitiform spine or cusp on either side of the shorter central cusp; the central cusp measures $15.0\text{ u} \times 1.5\text{ u}$ and the outer cusps $35\text{ u} \times 2.5\text{ u}$; the lateral and marginal teeth are 100 u by 6 u and have three sharp digitiform distal cusps [it appears to us that there are only two cusps on the outer lateral tooth]. He also worked with the radula of *Architectonica mediterranea* [= *Acutitectonica lepida*] (Pl. 53, figs. 1 and 2); it consists of five teeth per row with an elongate, narrow, prong-like smoothly knobbed central tooth measuring $150\text{ u} \times 12\text{ u}$ flanked by a lateral and marginal tooth on each side which terminate in seven fine, curved, and pointed cusps; the lateral and marginal teeth measure $160\text{ u} \times 12\text{ u}$. He remarked that the radula of this species is very similar to that of *Architectonica nobilis* for which he has unpublished data and for this reason a systematic revision of the genus *Architectonica* is required.

Also Melone (1974) described and illustrated the radula of *Heliacus architae* (Pl. 51, figs. 1 and 2). The central tooth is narrow and long ($32\text{ u} \times 15\text{ u}$) and it terminates in a single simple median cusp ($17\text{ u} \times 3\text{ u}$) which is flanked by 13–15 smaller short (1 u) dentiform cusps; the inner and outer lateral teeth ($65\text{--}70\text{ u} \times 8\text{ u}$) have several (6) spiniform processes; the lateral teeth tend to arch over the smaller



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With formula 2-1-2. Central tooth about as long as outer marginal, curved, with a posteriorly-projecting basal buttress; tricuspid, the central cusp more robust than the two outer, and more curved causing lateral cusps to lie above it when tooth is viewed in profile; cusps much shorter than on marginal teeth. Inner marginal tooth tracing a long, sigmoid curve in profile with three long, curved cusps, the apical one longest and set a little apart from the outer two; basal portion wide with a curved locking buttress. Outer marginal shorter than inner, crown more curved and with four or five cusps, equal in width but in a decreasing length series from apex; about same length as central tooth.

Investigating the radula of 14 species, most of which were previously unknown anatomically, Merrill (1970) confirmed, in his comprehensive but unpublished dissertation on the family Architectonicidae, many previous observations and contributed much new information on the radula. We are herewith incorporating his data into this text and augmenting it by our more recent analyses.

The Indo-Pacific species, *Architectonica perspectiva*, has a radula up to 2 mm in length with the formula 14-0-14. We find that there is no central tooth in this species, confirmed both by light and scanning electron microscopy (Pl. 56, fig. 1a-e; Pl. 63, fig. 2; Pl. 64, figs. 1-3). The lateral teeth are long and prong-like, with the two marginal ones being shorter, forked and bicuspid; these teeth measure 0.05 mm to 0.25 mm in length, in very close concordance with Troschel's (1861: 96) measurements. Occasionally there is an anomalous placement of sharply bicuspid lateral teeth (Pl. 64, figs. 2 and 3) placed at some distance inward from the margin of the radula; the difficulty in counting the number of teeth per row is indicated by the jumbled, entanglement of the teeth (Pl. 64, fig. 1). The related *A. nobilis*, a west Tethyeen species, has 60-70 rows of teeth with only 14 teeth in a transverse row and is thought to be without a central tooth, thus giving a formula of 7-0-7 (Pl. 56, fig. 2a-c; Pl. 63, fig. 1). The prong-like centrally disposed teeth are long up to 0.2 mm in length and with a single cusp while the single outer marginal tooth is short about 0.05 mm in length, forked and bicuspid. In our SEM preparation (Pl. 65, fig. 1) certain elements were present in the central field of the radula (Pl. 65, fig. 2) which might be construed as being a central tooth because they are so placed and appear to be morphologically differentiated from the

elongately cusped lateral teeth; that is they have short, pointed cusps. Although we are unable to confirm the presence of these elements by conventional microscopy we cannot be certain if the radular formula of *A. nobilis* is 7-0-7 or 7-1-7. The jaws of both *A. perspectiva* and *A. nobilis* are made up of numerous pointed rods (Pl. 56, figs. 1b and 2b). SEM analysis of the jaws of *A. nobilis* confirms the pointed configuration of the jaw rods (Pl. 67, fig. 1) and shows an unusual hexagonal pattern on the base of the jaw (Pl. 67, fig. 2). The radula of *Architectonica c.f. laevigata* from the Indo-Pacific is less than 1 mm in length (Pl. 66, fig. 1) and has a short pointed central tooth and seven lateral teeth on each side; the lateral teeth are recurved, prong-like and forked with long, tapering subequal cusps (Pl. 66, figs. 2 and 3); thus, the radular formula is 7-1-7.

The genus *Philippia*, on the basis of several well-defined shell characters, has been subdivided taxonomically into *Philippia s.s.* and *Psilaxis*. The radula of *P. (Philippia) lutea*, type species of the genus, (Pl. 57, fig. 1d) of the Indo-Pacific compares closely to that of *P. (Philippia) hybrida* of the eastern Atlantic (Pl. 50, figs. 1 and 2; Pl. 65, fig. 3); it has five teeth per row with the formula 2-1-2; the radula is about 0.5 mm in length and 0.1 mm in breadth. Characteristically the central tooth which may attain a length of about 0.07 mm, has a narrow central or median cusp flanked on each side by a long filiform cusp (Pl. 65, fig. 3). The inner lateral tooth has three, the outer lateral two cusps (Pl. 57, fig. 1f). The Atlantic *P. (Psilaxis) krebsii*, type species of the subgenus, has a radular formula of 2-1-2 with five teeth per row and about 32 rows (Pl. 57, fig. 2a-d). The central tooth, which may attain 0.07 mm in length, has a strong, somewhat knobby central cusp bordered by a slender pointed cusp on each side. The inner lateral tooth has five sharp spiniform cusps while the outer lateral has three cusps. The jaws of *P. lutea* and *P. krebsii* are similar in consisting of rounded, pointed rod-shaped elements (Pl. 57, figs. 1a and 2a). Robertson (1970) noted a subgeneric difference in the shape of the jaw elements, those of *Psilaxis* being elongate and those of *Philippia s.s.* being subcircular. Our observations and illustrations (Pl. 57, figs. 1a and 2a) do not indicate the differences described which seemed clear to Robertson. Our

SEM observation of the jaws of *P. hybrida* confirms the pointedness of the rods and also shows them to have a medial longitudinal furrow (Pl. 68, fig. 1); the basal portion of the jaw exhibits a pattern of papillose knobs (Pl. 68, fig. 2).

Acutitectonica disca has a radula up to 0.75 mm in length with five teeth per row, giving the formula 2-1-2; the central tooth, up to 0.10 mm in length, is long, slender with a simple knobby, somewhat bulbous distal portion (Pl. 58, fig. 1c and d); the inner and outer lateral teeth have up to eight cusps (Pl. 58, fig. 1c-e). The rod-like jaw elements are blunt (Pl. 58, fig. 1b).

Additionally in the esophagus of *A. disca* there is a long, slender and rod-like cuticularized structure about 0.10 mm in diameter along which at regular intervals of about 0.10 mm are found pairs of three spined or pronged recurved appendages, two on each side of the rod or four to the row (Pl. 58, fig. 3; Pl. 55, figs. 1-4). Habe (1952) illustrated similar small recurved hooked portions mistaking them for the radula of *A. acutissima* (Pl. 58, fig. 2). Melone (1975) examined a specimen of *A. acutissima* and also misconstrued this rod-like structure as a radula. Illustrated with fine SEMs (Pl. 54, figs. 1-3) he showed the structure to be between 7-10 mm in length and about 0.20 mm in width with pairs of three pronged recurved elements disposed at about 0.15 mm intervals. He considered each row of these elements as consisting of a pair of lateral and marginal teeth separated by a minute central dental element and, thus, gave a formula of 1-1-R-1-1. The lateral and marginal elements have essentially the same morphology and are indeed reminiscent of lateral teeth, consisting of a subtriangular, anteriorly recurved and posteriorly projecting arcuate lamella with three very long posteriorly pointed cusps. The median element or "central tooth" consists merely of a tiny uncinus. Since we found both a similar structure (Pl. 55, figs. 1-4; Pl. 58, fig. 3) and the true radula (Pl. 58, fig. 1) in the esophagus of *A. disca*, it must be considered as an independently derived and accessory feature in the alimentary canal of *Acutitectonica*; its function remains unknown but presumably it is associated with feeding.



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cusps and become shorter distally; the long narrow (about 0.11 mm by 0.01 mm) inner and outer teeth have several spiniform cusps. The jaw rods are somewhat irregular in shape and distally pointed (Pl. 60, fig. 2a).

The shells of *Heliacus bisulcatus* and *H. architae* were each under 5 mm in greatest diameter making it difficult to manipulate the tiny radulae into suitable positions to see salient features clearly if at all. The radula of *H. bisulcatus* (Pl. 61, fig. 1) is narrow, about 0.01 mm in width and has a cowed central tooth with a short, knobby median cusp flanked by 6–8 short rather blunt or knobby denticulations on its inner fold or cutting edge; the lateral teeth, up to 0.09 mm in length, have 6–8 finger-like cusps while in the related *H. architae* (Pl. 61, fig. 2) the central tooth is somewhat broad in comparison to its length, only 0.01 mm in width, with a subtriangular median cusp flanked by about eight blunt cusps; the lateral teeth, up to 0.05 mm in length, bear two or three curved spine-like cusps. The rod-like jaw elements are pointed (Pl. 61, fig. 1b). With the greater resolution of the scanning electron microscope, Melone (1974) had very similar length measurements for the central and lateral teeth of *H. architae* (Pl. 51); the width of the central tooth is 15 μ versus ours of 0.01 mm and the width of the lateral teeth is between 65–70 μ against ours of 0.05 mm; he could more clearly discern the numbers of lateral cusps on each side of the central cusp of the central tooth (13–15) instead of our eight and for the lateral teeth (six) instead of our two to three.

In *Pseudomalaxis nobilis*, the radula (Pl. 62, fig. 1) has a basally broad, about 0.023 mm, central tooth narrowing to a beak, about 0.013 mm, as a distal cusp bearing projection; its median or central cusp, is bordered laterally with numerous (up to 20) sharply pointed serrations; the lateral teeth, which are about 0.08 mm in length and 0.008 mm in width, are rather strongly curved distally and bear four finger-like pointed cusps.

In *Spirolaxis centrifuga* (Pl. 62, fig. 2) the radula has a central tooth which is broad and rectangular, about 0.013 mm in width and 0.02 mm in length, with a median cusp flanked by four denticulate lateral cusps; the lateral teeth are narrow, about 0.07 mm by 0.002 mm, and each have two

spiniform, finger-like cusps. A unique feature of this species is the configuration of the jaws which consist of numerous, elongate, multi-cusped strap-like plates (Pl. 62, fig. 2a).

Conclusions

From the preceding review of the literature plus our added work on the radula of the Architectonicidae, we postulate that the family is divisible, by its radular configuration into three principal groups, herein ranked as subfamilies (Architectonicinae, Philippiinae, Heliacinae) and thus confirming, with slight modifications, the earlier opinions of Thiele (1925), Merrill (1970), and Boss (1982).

The Architectonicinae are known by the structure of the radula of four species, *Architectonica perspectiva*, *A. nobilis*, *A. reevei*, and *A. c.f. laevigata*, having respectively the radular formulae, 14-0-14, 7-0-7 (or 7-1-7), 7-1-7, and 7-1-7; they are thus characterized by having numerous lateral teeth. Climo's (1975) description of the radula of *A. reevei* is important in at least two respects; its configuration links the purely ptenoglossate condition with the modified taenioglossate one found in both the Philippiinae and Heliacinae, and its central tooth has a shape like the Philippiinae, providing another transition between the Architectonicinae and Philippiinae. Further, both *Architectonica reevei* and *A. c.f. laevigata* (compare Pl. 49, figs. 9 and 10 and Pl. 66, figs. 2 and 3) have seven similarly forked bicuspid lateral teeth on either side of the central tooth, giving both the same radular formula; however, the central tooth of *A. c.f. laevigata* is comparable to that of the philippiine *Acutitectonica* (see Pl. 66, figs. 2 and 3 and Pl. 53, figs. 1 and 2) while the central tooth of *A. reevei* is like that of the philippiine *Psilaxis* (see Pl. 49, figs. 7 and 8 and Pl. 57, fig. 2d). Conchologically the species differ somewhat with *A. reevei* having a shell more similar to that of the Philippiinae and *A. c.f. laevigata* having a shell more closely resembling the Architectonicinae. Melone's (1974) undocumented assertion that *A. nobilis* has a radula very much like *Acutitectonica* which has only five teeth per row is unwarranted since *A. nobilis* clearly has numerous lateral teeth.

For the Philippiinae, the radula has five teeth per row, giving the formula 2-1-2 with the central tooth being a long narrow structure. Climo (1975) pointed out Robertson's (1970) errors in interpreting the radula of *Philippia* and substantiated the presence of a central tooth as noted by Thiele (1925) and Melone (1974). Although Robertson (1970) did not believe that the subgenera of *Philippia* could be distinguished by their radulae; such is not the case since *Philippia s.s.* has a central tooth with a narrow central cusp flanked by long filiform lateral cusps while *Psilaxis* has a central tooth with a knobby central cusp flanked by short cusps. *Acutitectonica* is also distinguished by its radular features, namely the central tooth is a simple naked knob, that is to say, a single cusped structure without lateral cusps. This radular character along with its conchological features serves to separate it at the generic level. The unique cuticularized esophageal structure in *Acutitectonica* further separates it from *Philippia*.

One unresolved problem concerns Thiel's (1927; 1928) illustration of the central tooth of what he called *Philippia hybrida* which Robertson (1970) referred to as *P. radiata*. This is the presence of the two bristle-like cusps on either side of the blunt, knobby central cusp (Pl. 48, figs. 8 and 9). Although Robertson (1970) stated that his lateral tooth of *P. radiata* (Pl. 49, figs. 5 and 6) resembled Thiele's figure of a central tooth, he did not mention that Thiele's figure had two pairs of bristle-like cusps while his only had one pair. His figure of the central tooth of *P. radiata* appears just like the other radularly known species of the subgenus *Psilaxis*, e.g. *P. oxytropis* and *P. krebsii*, which have only one cusp on each side of the knobby central cusp of the central tooth.

It might be added that the jaws of the Architectonicinae and the Philippiinae may differ in that *A. nobilis* has a hexagonal pattern discernible on the base of the jaw while in *P. hybrida* there are numerous papillose knobs.

Little controversy surrounds the characterization of the radula of the Heliacinae as exemplified by the type species of *Heliacus*, *H. cylindricus*, with its formula of 2-1-2. The central tooth, which shows a considerable range of variability in shape in the subfamily, is reminiscent of many



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- HABE, T. 1943. On the radulae of Japanese marine gastropods (1). *Venus*. Kyoto. 13(1-4): 68-76.
- _____. 1952. Pholadomyidae, Clavagellidae, Pandoridae, Juliidae and Condyllocardiidae in Japan. *In* T. Kuroda, ed. *Illustrated Catalogue of Japanese Shells*, no. 18, pp. 121-132.
- MACDONALD, J. D. 1860. Further observations on the metamorphosis of Gastropoda, and the affinities of certain genera, with an attempted natural distribution of the principal families of the order. *Transactions of the Linnean Society of London*. 23: 69-81.
- MARSHALL, W. B. 1885. Monograph of the family Solaridae. *In* G. Tryon. *Manual of Conchology*. Series 1, 9 [1887]: 3-32.
- MELONE, G. 1974. Note su alcuni Architectonicidae (Gastropoda, Prosobranchia) del Mediterraneo. *Quaderni della Civica Stazione Idrobiologica di Milano*. 5: 23-28.
- _____. 1975. Considerazioni sistematiche su un architectonide giapponese: *Acutitectonica acutissima* (G. B. Sowerby, 1914) (Gastropoda, Prosobranchia). *Conchiglie*. Milan. 11(7-8): 165-174.
- MERRILL, A. S. 1970. The family Architectonicidae (Gastropoda: Mollusca) in the Western and Eastern Atlantic. Unpublished PhD dissertation, University of Delaware, 338 pp, 42 pls, microfilm or Xerox copy Univ. Microfilms, Ann Arbor, Michigan (order No. 71-6444).
- MÖRCH, O. A. L. 1860. Beiträge zur Mollusken fauna Central-Amerika's. *Malakozoologische Blätter*. Cassel. 6: 102-126.
- ROBERTSON, R. 1970. Systematics of Indo-Pacific *Philippia* (*Psilaxis*) architectonicid gastropods with eggs and young in the umbilicus. *Pacific Science*. Honolulu. 24: 66-83.
- THIELE, J. 1925. Gastropoda der Deutschen Tiefsee-Expedition. II Teil. *Wissenschaftliche Ergebnisse der Deutschen Tiefsee-Expedition... "Valdivia," 1898-1899*. vol. 17, pp. 35-382 [17(2), 348 pp].
- _____. 1926. Solenogastres. Mollusca. *In* Kükenthal, Willy and Thilo Krumbach. *Handbuch der Zoologie*. Berlin. 5(1): 1-160.
- _____. 1928. Über ptenoglosse Schnecken. *Zeitschrift für wissenschaftliche Zoologie*. Leipzig. 132: 73-94.
- _____. 1929. *Handbuch der systematischen Weichtierkunde*. Berlin. Vol. 1, pt. 1. 376 pp.
- TROSCHEL, F. H. 1861. Ueber die systematische Stellung der Gattung *Solarium*. *Archiv für Naturgeschichte*. Berlin. 5: 91-99.
- _____. 1875. Das Gebiss der Schnecken zur Begründung einer natürlichen Classification. Berlin. Vol. 2. pp. 133-158.

PLATES 47—68

Plate 47

Figs. 1-6 and 11-13. *Architectonica perspectiva*. Figs. 7-10. *Philippia hybrida*.

Fig. 1. Portion of radular ribbon to show forked lateral teeth in more marginal position (after Troschel 1861, fig. 4).

Fig. 2. Lateral teeth viewed to show cusps or tines (after Troschel 1861, fig. 7).

Fig. 3. Lateral teeth viewed so cusps or tines not easily discerned (after Troschel, 1861, fig. 8).

Fig. 4. Marginally positioned lateral tooth (after Troschel 1861, fig. 6).

Fig. 5. Most medially positioned lateral tooth without cusps (after Troschel 1861, fig. 4).

Fig. 6. The jaw with its pointed rod-shaped elements (after Troschel 1861, fig. 3; 1875, fig. 4a).

Fig. 7. Lateral teeth with two and three pronged cusps (after Troschel 1861, fig. 12; 1875, fig. 5e).

Fig. 8. Lateral teeth along length of row with tiny cusp on shaft (after Troschel 1861, fig. 5).

Fig. 9. Centrally located dental element (not representative) (after Troschel 1861, fig. 11; 1875, fig. 5b).

Fig. 10. The jaw with its roundly pointed, rod-shaped elements (after Troschel 1861, fig. 10; 1875, fig. 5a).

Fig. 11a-d. Individual lateral teeth of the radula (after Troschel 1875, Pl. 15, figs. 4c, d, e, and f) showing *a*, a more centrally disposed tooth larger in size and with a minute cusp on the shank and *b*, *c*, and *d* progressively more marginally positioned lateral teeth showing proportionate increase in distinctness of the two prong-like cusps.

Fig. 12. A complete half row of the radula (after Troschel 1875, Pl. 15, fig. 4b), the long uncusped lateral teeth being medial in position.

Fig. 13. Individual radular tooth (after Thiele 1926, fig. 52).



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Plate 48

Fig. 1. The central tooth of *Torinia* [= *Heliacus*] *cylindracea* with central or medial knobby cusp and numerous fine lateral denticulations (after Troschel 1875, fig. 7a).

Fig. 2. The two lateral teeth of *Torinia* [= *Heliacus*] *cylindracea* with seven cusps on the inner lateral and eight on the outer lateral (after Troschel 1875, fig. 7b and c).

Fig. 3. Lateral view of the central tooth of *Torinia* [= *Heliacus*] *trochoidea* (after Thiele 1925, Pl. 46 [34], fig. 16).

Fig. 4. Frontal view of the central tooth of *Philippia* (after Thiele 1925, Pl. 46 [34], fig. 18 *pars*).

Fig. 5. Lateral view of the lateral tooth of *Philippia* (after Thiele 1925, Pl. 46 [34], fig. 18 *pars*).

Fig. 6. Jaw rods of *Torinia* [= *Heliacus*] *trochoidea* (after Thiele 1925, Pl. 46 [34], fig. 17).

Fig. 7. Jaw rods of *Philippia* (after Thiele 1925, Pl. 46 [34], fig. 19).

Fig. 8. Lateral view of the central tooth of *Philippia hybrida* (after Thiele 1928, fig. 8).

Fig. 9. Frontal view of the central tooth of *Philippia hybrida* (after Thiele 1928, fig. 8).

Fig. 10. Inner lateral tooth of *Philippia hybrida* (after Thiele 1928, fig. 8).

Fig. 11. Outer lateral tooth of *Philippia hybrida* (after Thiele 1928, fig. 8).

Fig. 12. Two lateral teeth of *Architectonica* (after Thiele 1928, fig. 9).

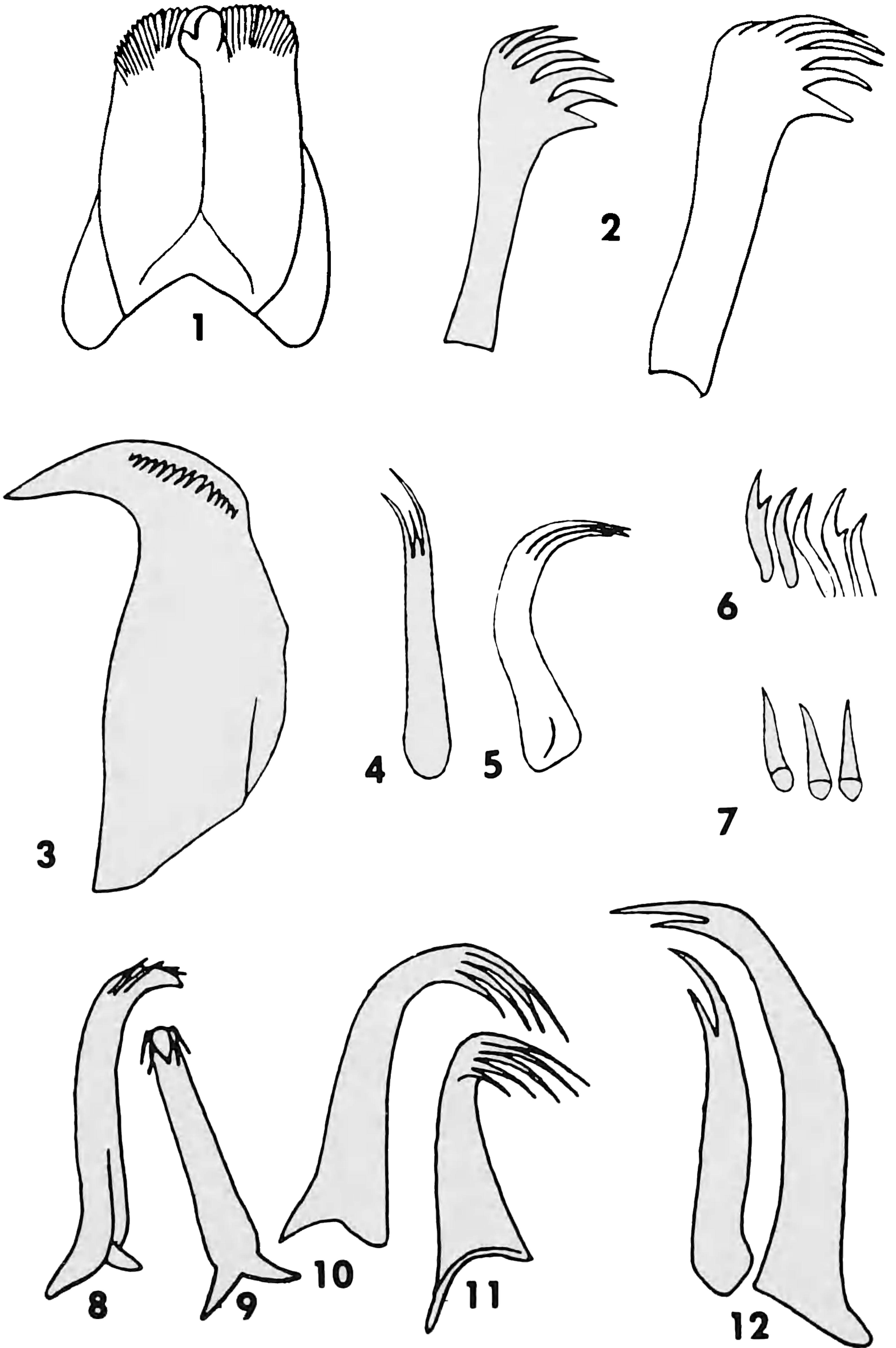


Plate 48

Plate 49

Fig. 1. The outer lateral tooth of *Heliacus dorsuosus* (after Habe 1943, fig. 5 *pars*).

Fig. 2. The inner lateral tooth of *Heliacus dorsuosus* (after Habe 1943, fig. 5 *pars*).

Fig. 3. The central tooth of *Heliacus dorsuosus* (after Habe 1943, fig. 5 *pars*).

Fig. 4. A lateral tooth, in side view of *Philippia radiata* (after Robertson 1970, fig. 9C).

Fig. 5. Central tooth, in frontal view of *Philippia radiata* (after Robertson 1970, fig. 9D).

Fig. 6. Central tooth, in lateral view of *Philippia radiata* (after Robertson 1970, fig. 9B).

Fig. 7-10. Radula of *Architectonica reevei* (after Climo 1975, fig. 4B).
Fig. 7. Front view of central tooth. Fig. 8. Lateral view of central tooth.
Fig. 9. Lateral view of inner lateral tooth. Fig. 10. Lateral view of outer lateral tooth.

Figs. 11-14. Radula fo *Philippia oxytropis* (after Climo 1975, fig. 4A).
Fig. 11. Outer lateral tooth. Fig. 12. Inner lateral tooth. Fig. 13. Frontal view of central tooth. Fig. 14. Lateral view of central tooth.



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Plate 50. Portion of the radula of *Philippia hybrida*. a = outer lateral tooth. b = inner lateral tooth. c = central tooth. (Courtesy of G. Melone).

Fig. 1. 1000 ×

Fig. 2. 2000 ×

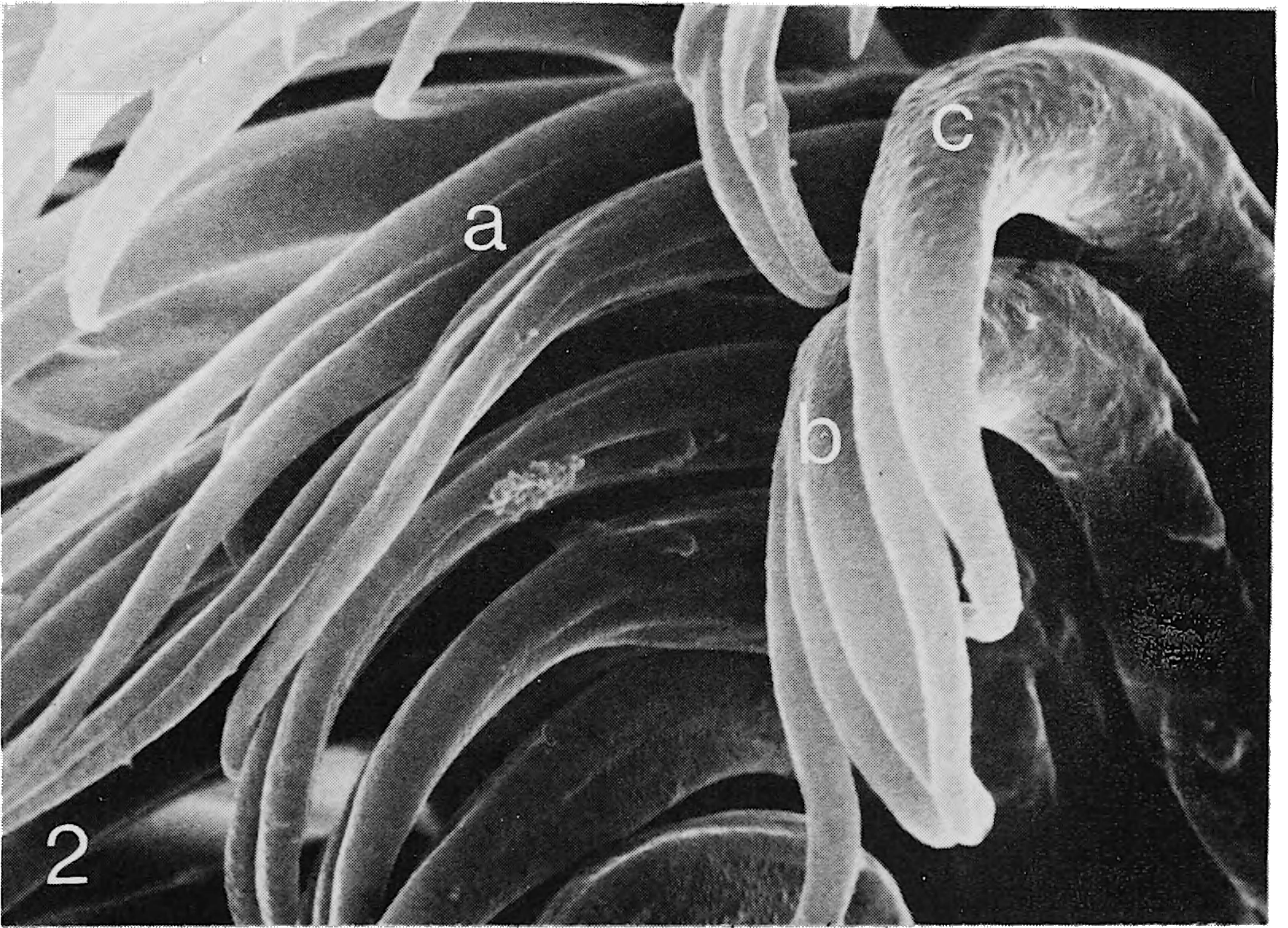
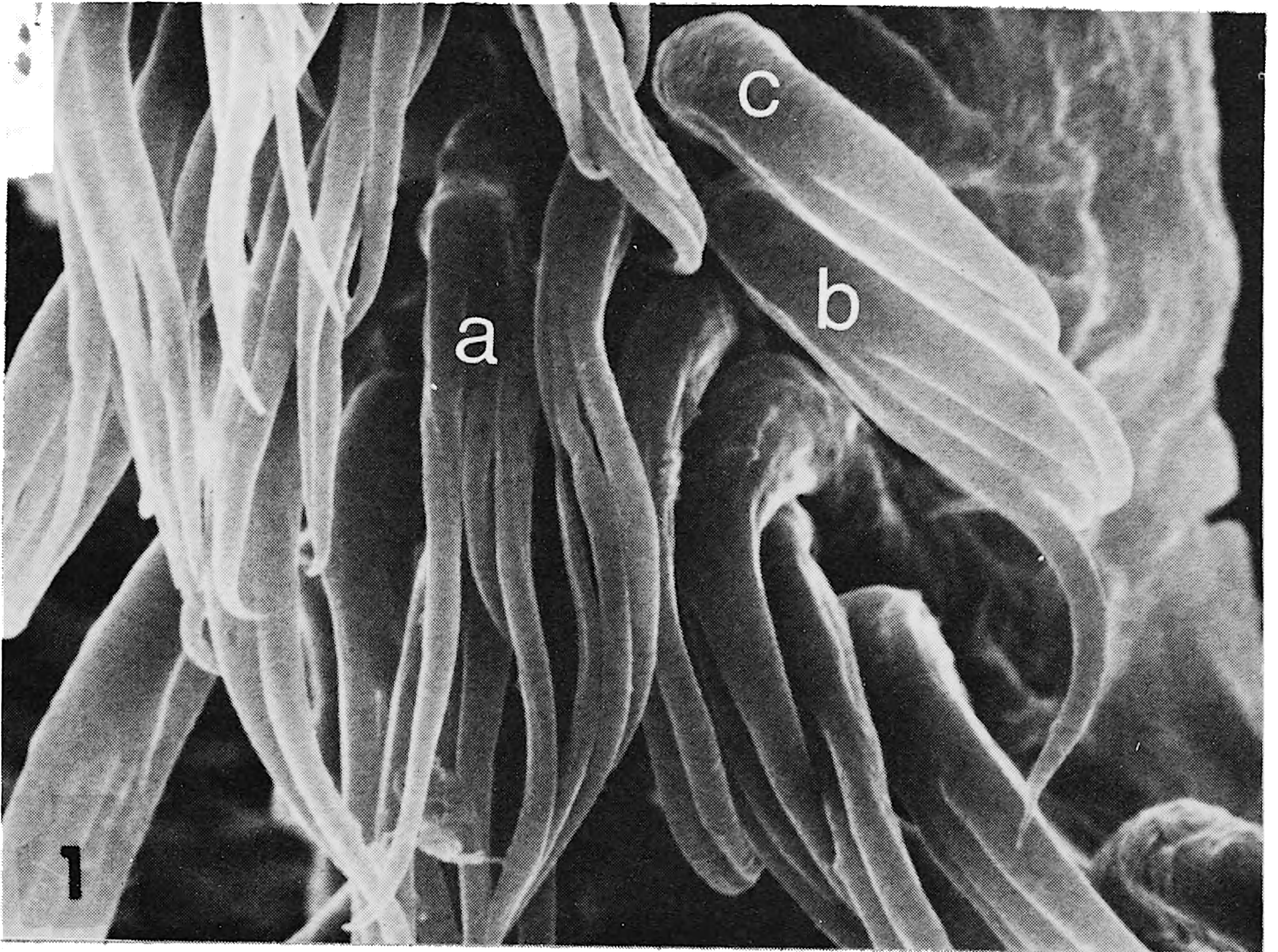


Plate 50

Plate 51. Portion of the radula of *Heliacus architae*. a = outer lateral tooth. b = inner lateral tooth. c = central tooth. (Courtesy of G. Melone).

Fig. 1. 2000 ×

Fig. 2. 5000 ×



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Plate 52. Portion of the radula of *Heliacus fallaciosus*. a = outer lateral tooth. b = inner lateral tooth. c = central tooth. (Courtesy of G. Melone).

Fig. 1. 1000 ×

Fig. 2. 2000 ×

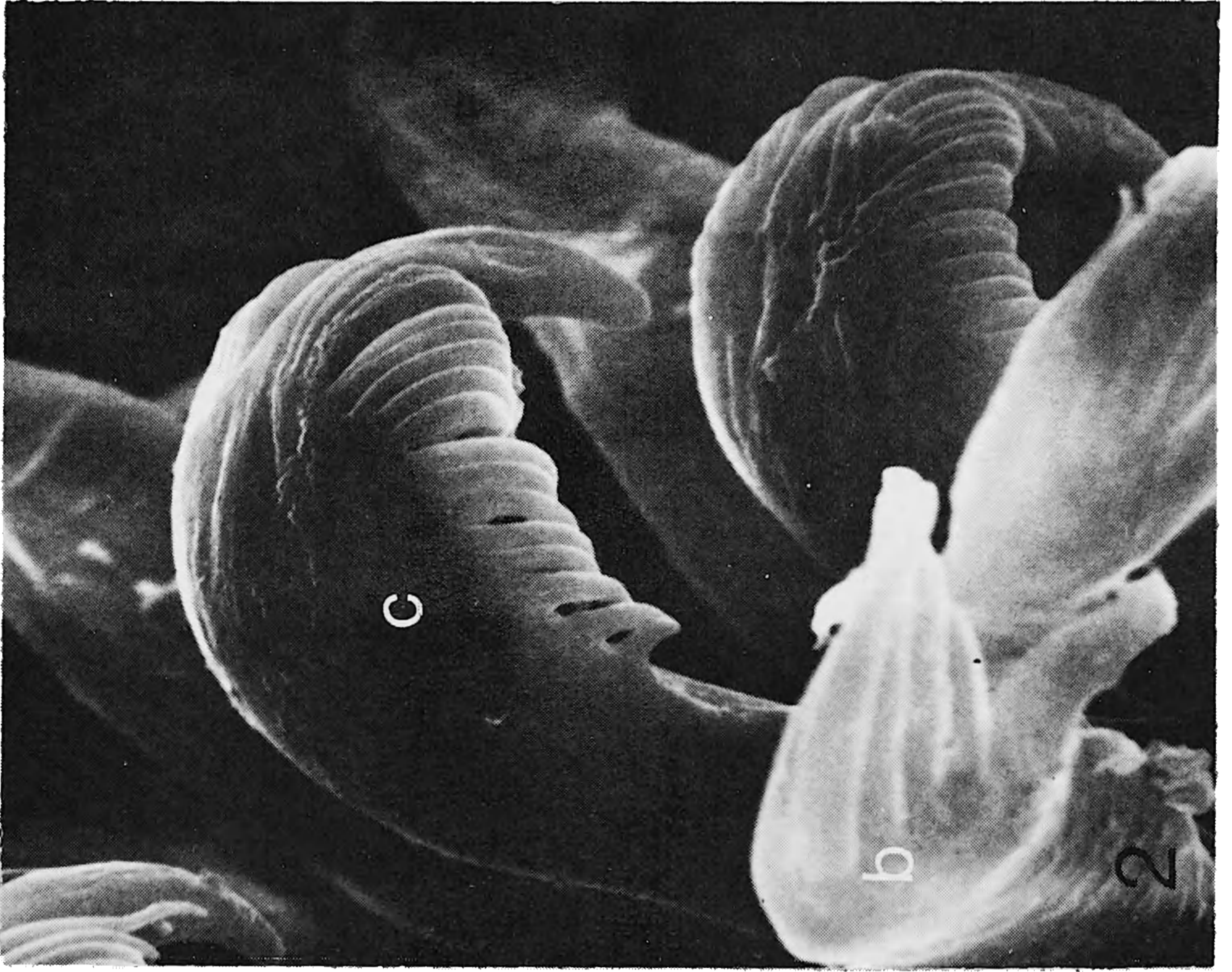


Plate 52

Plate 53. Portion of the radula of *Acutitectonica lepida* a = outer lateral tooth. b = inner lateral tooth. c = central tooth. (Courtesy of G. Melone).
Fig. 1. 500 ×
Fig. 2. 1000 ×



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Plate 54. The accessory cuticularized rod-like structure from the esophagus of *Acutitectonica acutissima* (after Melone 1975).

Fig. 1. The structure aligned to show rows of double pairs of recurved elements (200 ×).

Fig. 2. The same enlarged to show recurved elements in greater detail (1000 ×). L = Lateral element. M = Medial element.

Fig. 3. The same viewed from a different angle (1000 ×). L = Lateral element. M = Medial element.

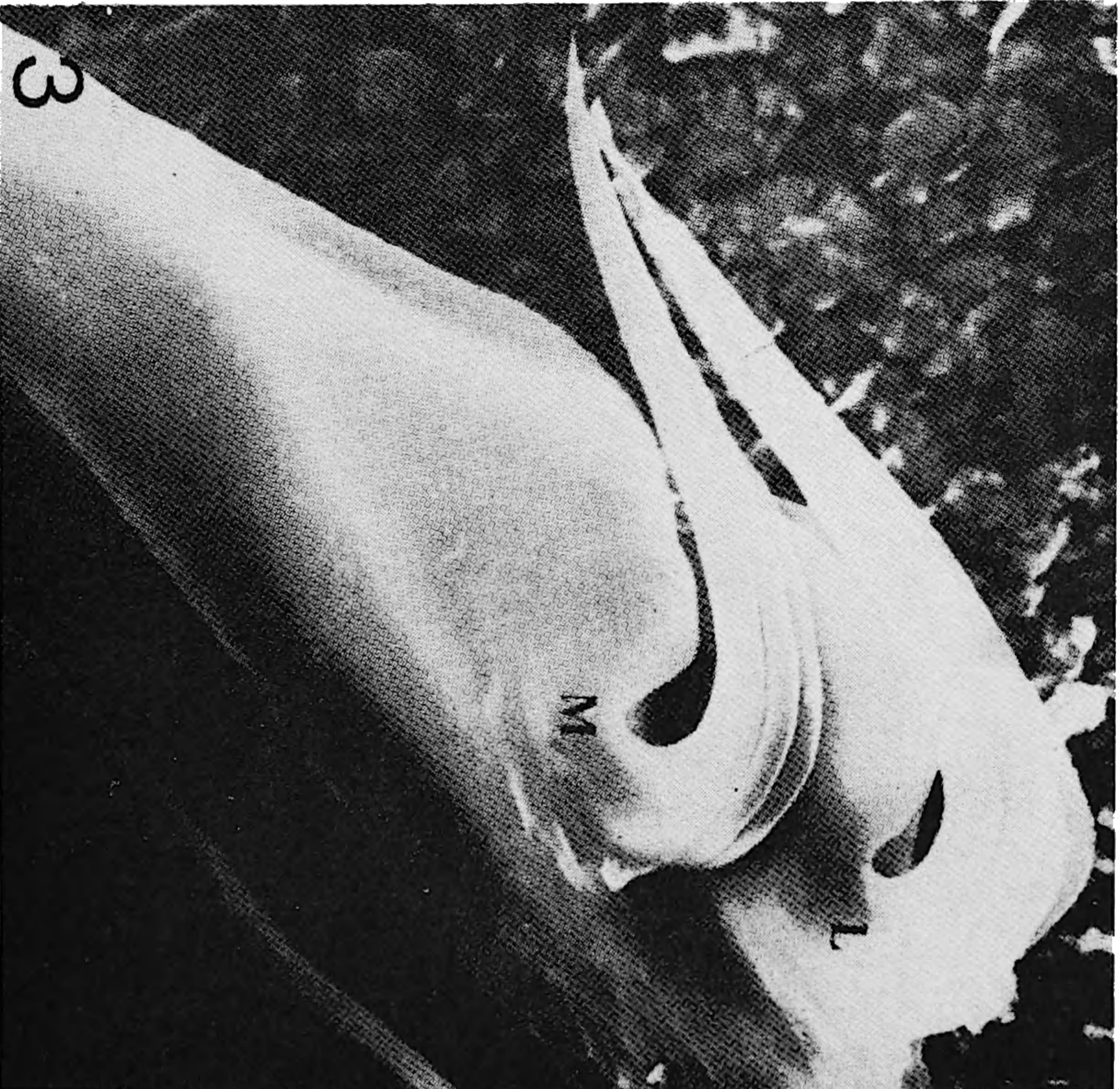
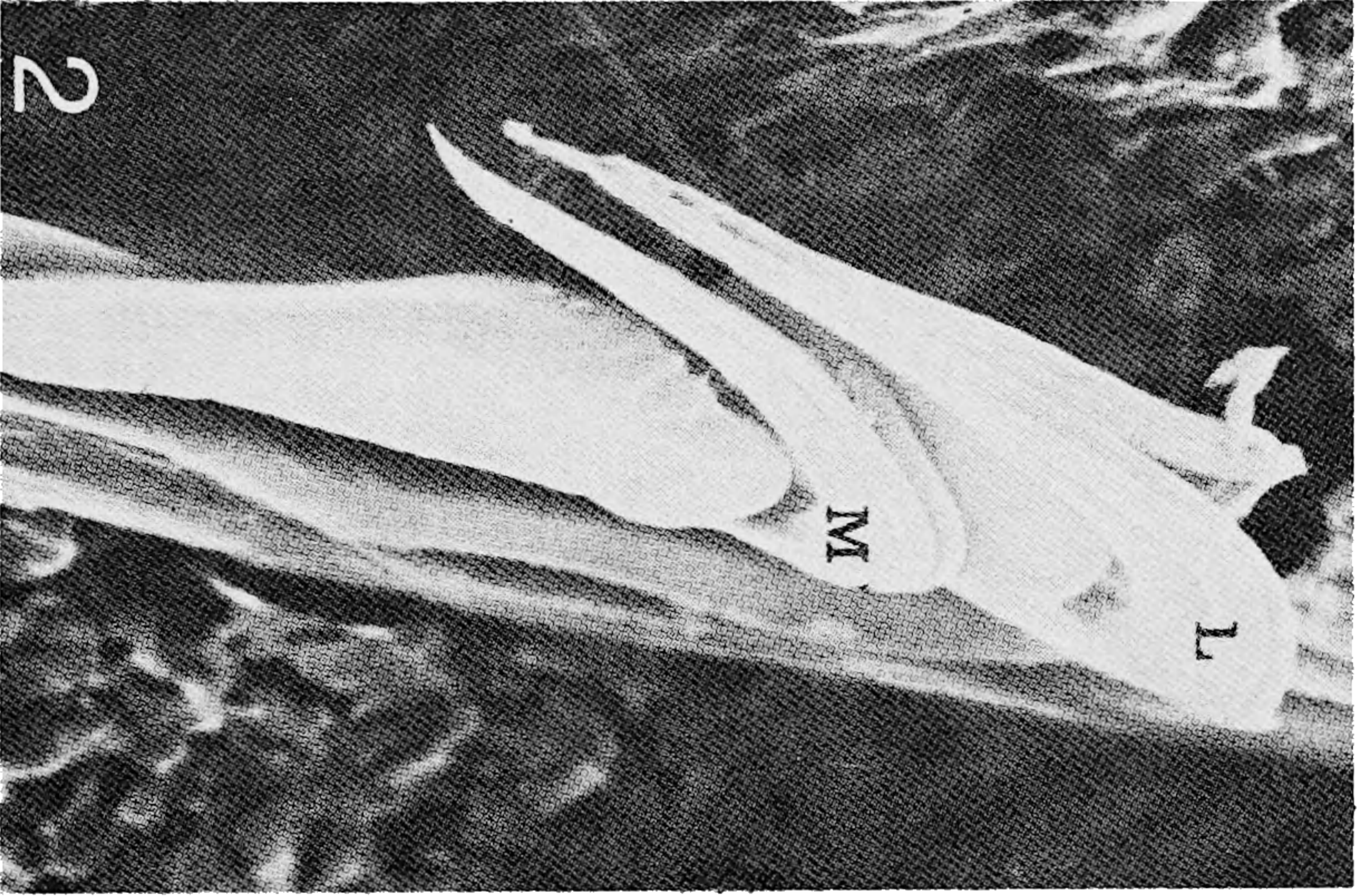
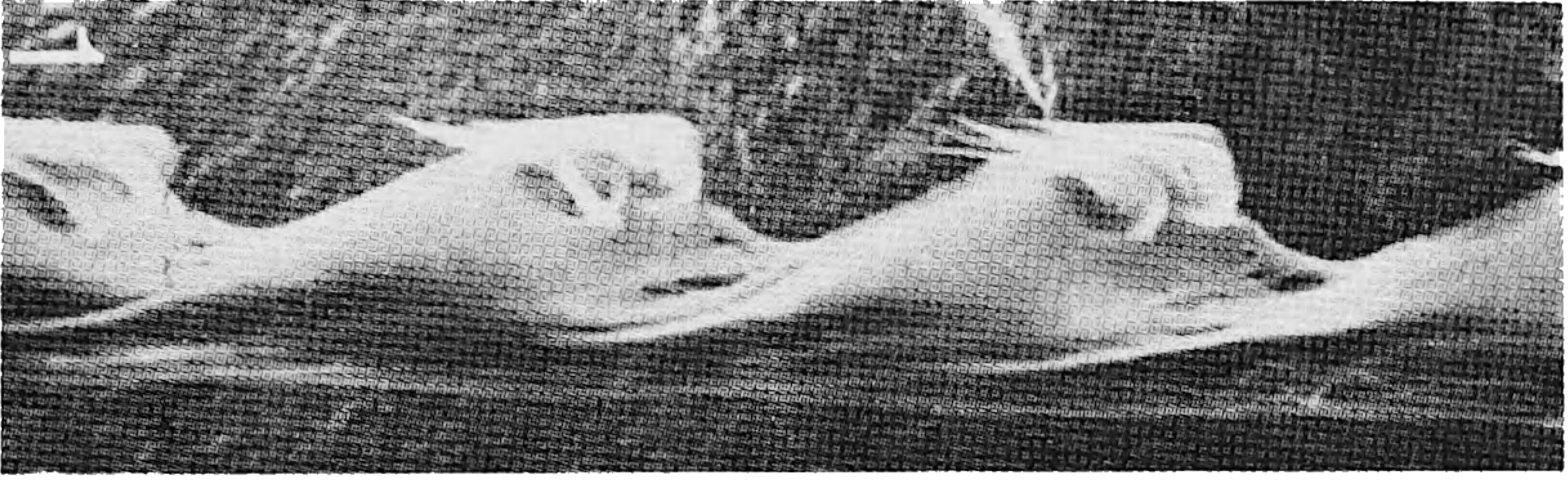


Plate 54

Plate 55

Fig. 1 The accessory cuticularized rod-like structure from the esophagus of *Acutitectonica disca* from El Colorado, Sonora, West Mexico in 80 fathoms. (40 ×). (about 4 mm in length).

Fig. 2. The same enlarged to show rows of double pairs of recurved elements (200 ×).

Fig. 3. The same enlarged to show recurved elements in greater detail (1500 ×).

Fig. 4. The same viewed from a different angle (1500 ×).



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Plate 56

Fig. 1. *Architectonica perspectiva*. Kiwengwa, NE Zanzibar (ANSP); maximum diameter 47.0 mm. a. Portion of cuticularized esophageal tube showing position of radula and jaws within. b. Elements from portion of the jaw. c. Part of a single row of ptenoglossate radular teeth. d. Smallest lateral tooth observed. e. Largest tooth observed near the central part of a row of teeth.

Fig. 2. *Architectonica nobilis*. NE of Cape Kennedy, Florida (USNM); maximum diameter 48.5 mm. a. Portion of cuticularized esophageal tube and the entire buccal cavity showing position of radula and jaws within. b. Elements from portion of the jaw. c. Part of a single row of ptenoglossate radular teeth (figs. 2b, c, same scale).

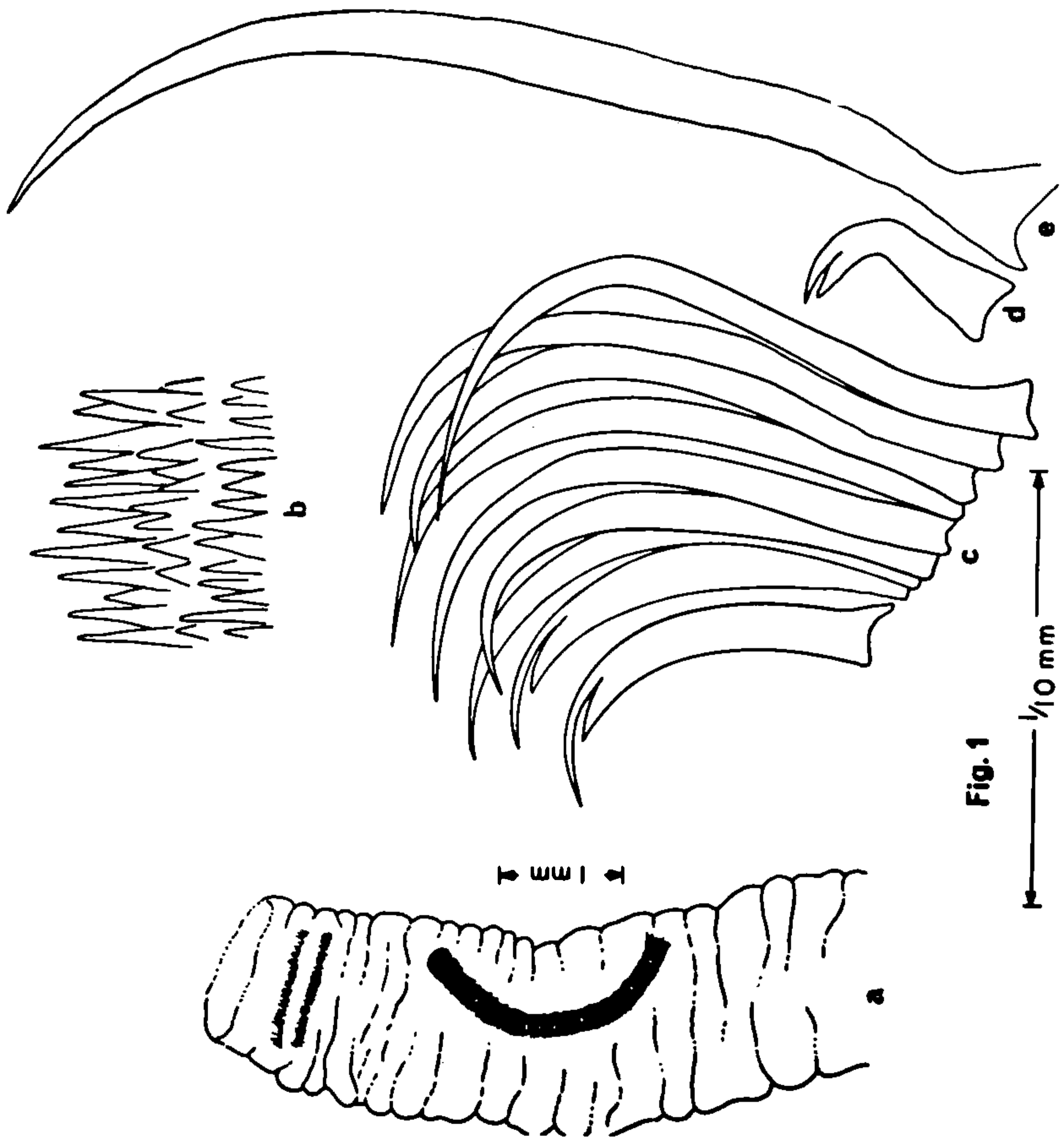
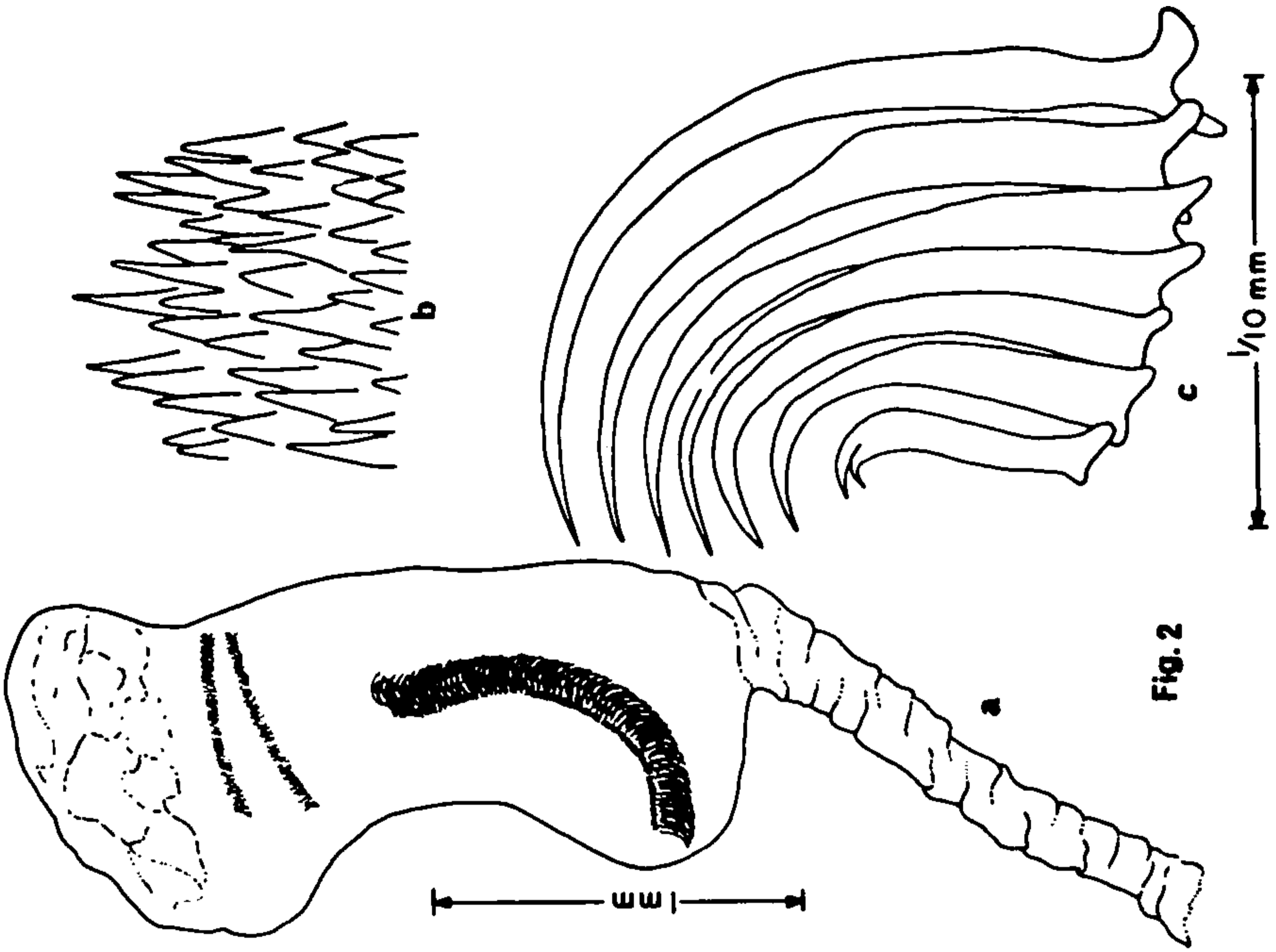


Plate 56

Plate 57

Fig. 1. *Philippia (Philippia) lutea*. Cape of Good Hope, Africa (USNM); maximum diameter 9.5. mm. a. Elements from portion of the jaw viewed obliquely from under the jaw. b. Entire radula and jaws within portion of cuticularized esophageal tube. c. Outline of the shape of a single row of teeth as viewed from the underside of the radular ribbon. d. Central (left) and two lateral radular teeth. e. Front and oblique views of central radular tooth. f. Side views of lateral teeth.

Fig. 2. *Philippia (Psilaxis) krebsii*. Castle harbor, Bermuda (MCZ); maximum diameter 5.5 mm. a. Elements from portion of the jaw. b. Front view of central radular tooth (left) and side view of two lateral teeth. c. Side view of central radular tooth (left) and two laterals. d. Front view of a complete central radular tooth.



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Plate 58

Fig 1. *Acutitectonica disca*. W of Conakry, Guinea (UZM); maximum diameter 14.0 mm. a. Entire cuticularized buccal cavity including a portion of esophageal tube showing position of radula within the esophageal tube. b. Portion of jaw elements. c. Side views of central (left) and two lateral radular teeth. d. Side views of entire central radular tooth (left) and lateral tooth. e. Side views of lateral teeth to show varying number of cusps (figs. 1b, c, d, e, same scale).

Fig. 2. "Radula" of *Acutitectonica acutissima* (redrawn from Habe, 1952).

Fig. 3. Portion of peculiar cuticularized rod-like structure removed from the esophageal tube of *A. disca* with rows of recurved elements, two on each side of the rod or four to a row.

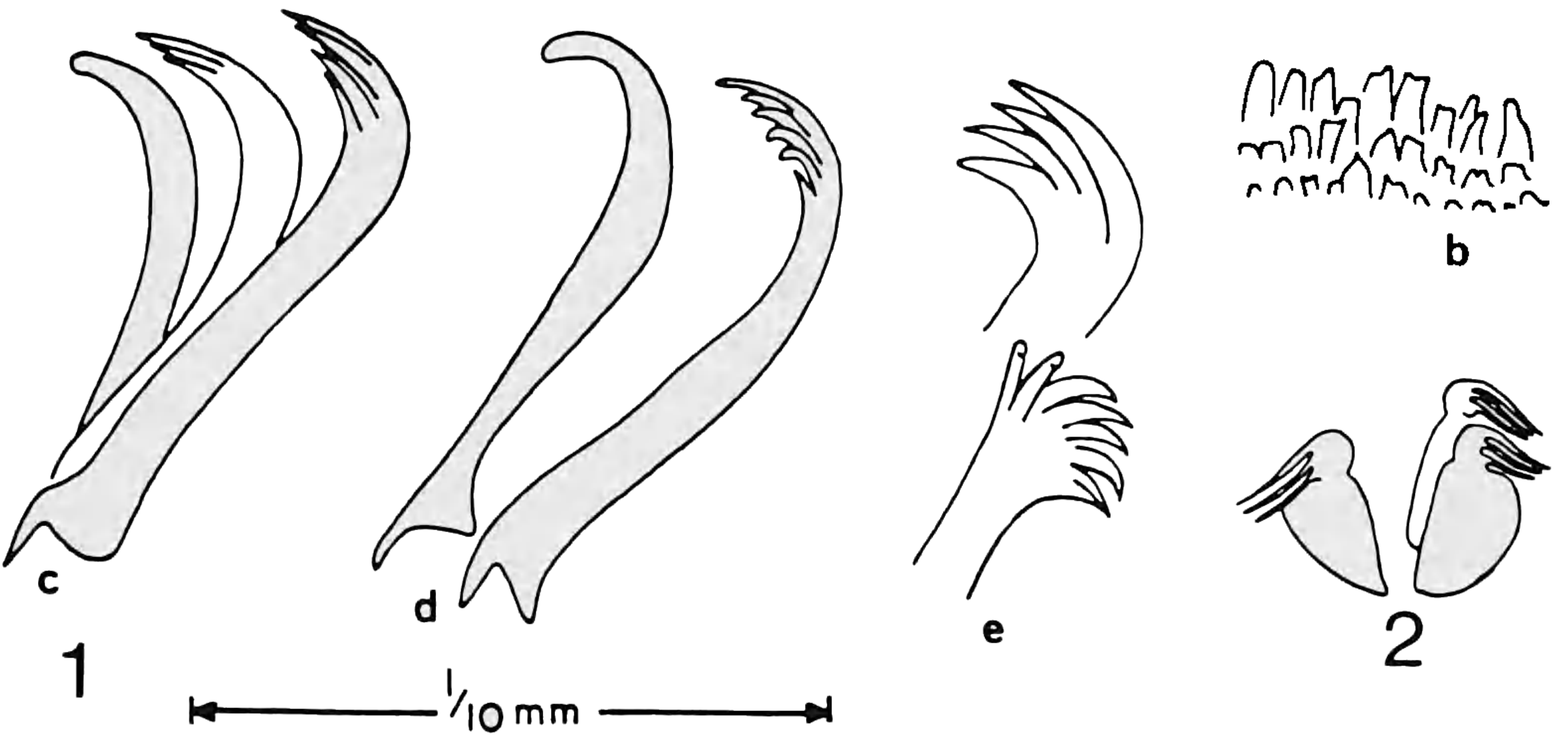
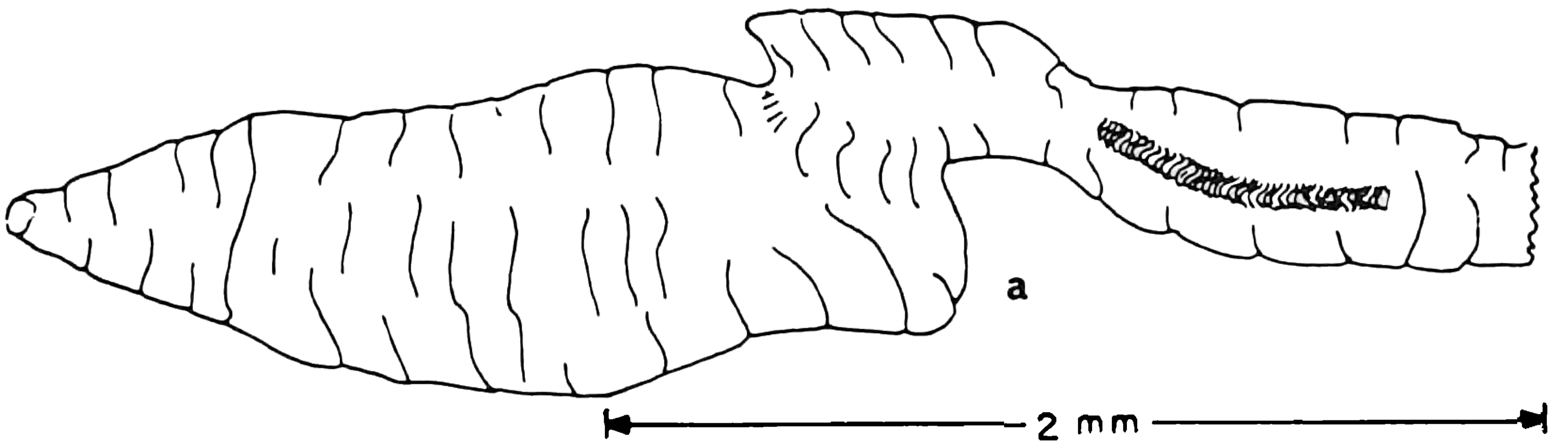


Plate 58

Plate 59

Fig. 1. *Heliacus (Heliacus) cylindricus*. Buccoo Reef and Bay, Tobago (ANSP); maximum diameter 10.6 mm. a. Portion of jaw elements. b. Front view of central radular tooth (left) and side view of two lateral teeth. c. Oblique view of central radular tooth.

Fig. 2. *Heliacus (Heliacus) perrieri*. Ragged Keys, Florida (MCZ); maximum diameter 16.1 mm. a. Portion of jaw elements. b. Position of jaws and radula in cuticularized esophageal tube. c. Front view of central radular tooth (right) and side view of two lateral teeth (note: cusps on either side of central knob are pressed out from the normal overlapping position—caused by pressure of cover slide). d. Side view of two lateral teeth. e. Front (left) and side views of two lateral teeth (cusps in lateral tooth, front view, pressed out similar to central tooth in fig. 2c).



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Plate 60

Fig. 1. *Heliacus (Gyriscus) jeffreysianus*. Sardinia, Italy (USNM); maximum diameter 8.7 mm. a. Front view of central radula tooth (left) and oblique view of two lateral teeth. b. Front (top) and side views of central radular tooth (note: cusps in lower central tooth pressed out by pressure of cover slide). c. Front (left) and side views of lateral teeth.

Fig. 2. *Heliacus (Solatisonax) borealis*. N of Iraconbo, French Guiana (BCF); maximum diameter 13.5 mm. a. Portion of jaw elements. b. Side view of complete radular (note regular spacing of the individual rows on the odontophore). c. Front view of portion of central radular tooth (left) and side view of portion of lateral tooth. d. Side view of central radular tooth (left) and two lateral teeth.

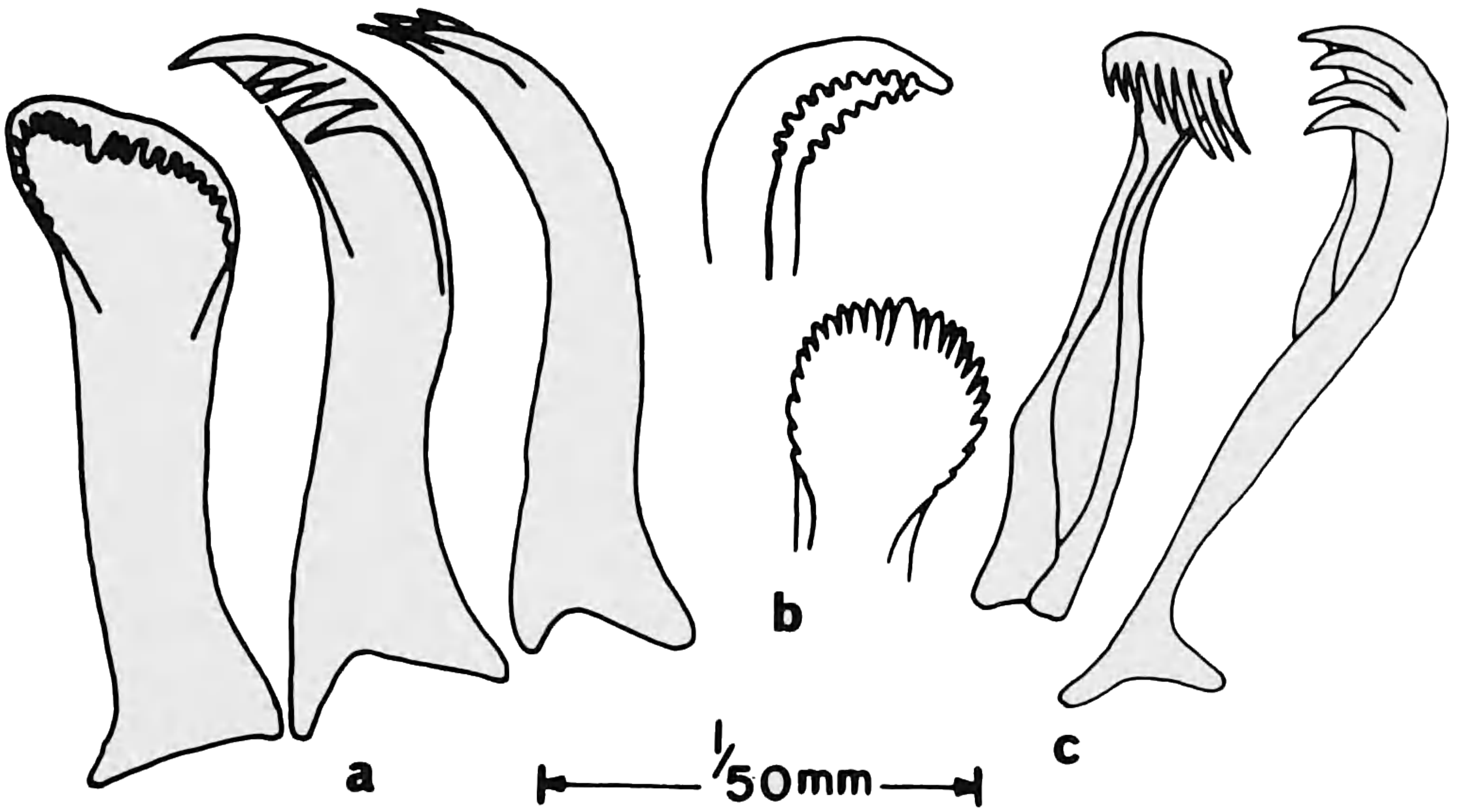


Fig. 1

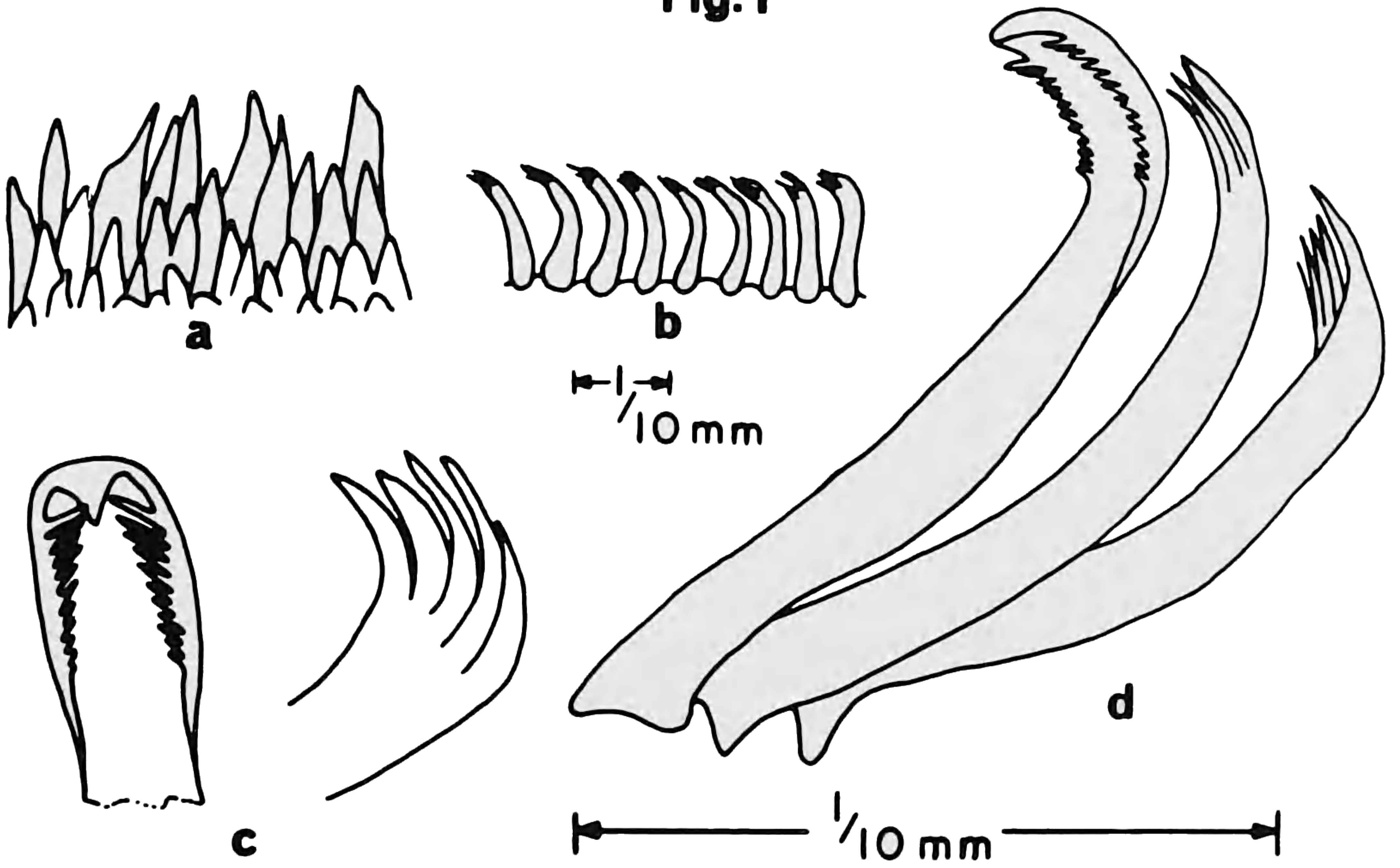


Fig. 2

Plate 61

Fig. 1. *Heliacus (Pseudotorinia) bisulcatus*. Off Government Cut, Miami, Florida (USNM); maximum diameter 4.8 mm. a. Oblique front view of central (left) and two lateral radular teeth. b. Portion of jaw elements. c. Front view of central radular tooth (left), side (right top) and front view of lateral teeth.

Fig. 2. *Heliacus (Pseudotorinia) architae*. Gulf of Naples, Italy (USNM); maximum diameter 3.8 mm. a. Front view of central radular tooth. b. Oblique view (left) and side view of lateral teeth. c. Side view of central radular tooth.



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Plate 62

Fig. 1. *Pseudomalaxis nobilis*. SE of Egmont Key, Florida (USNM); maximum diameter 11.2 mm. a. Side view of central radula tooth (left) and two lateral teeth. b. Front (bottom) and side (top) views of central radular tooth. c. Side view of lateral teeth.

Fig. 2. *Spirolaxis centrifuga*. Madeira (USNM); maximum diameter 3.2 mm. a. Portion of jaw elements. b. Front view of central and two lateral radular teeth. c. Side view of two lateral teeth.

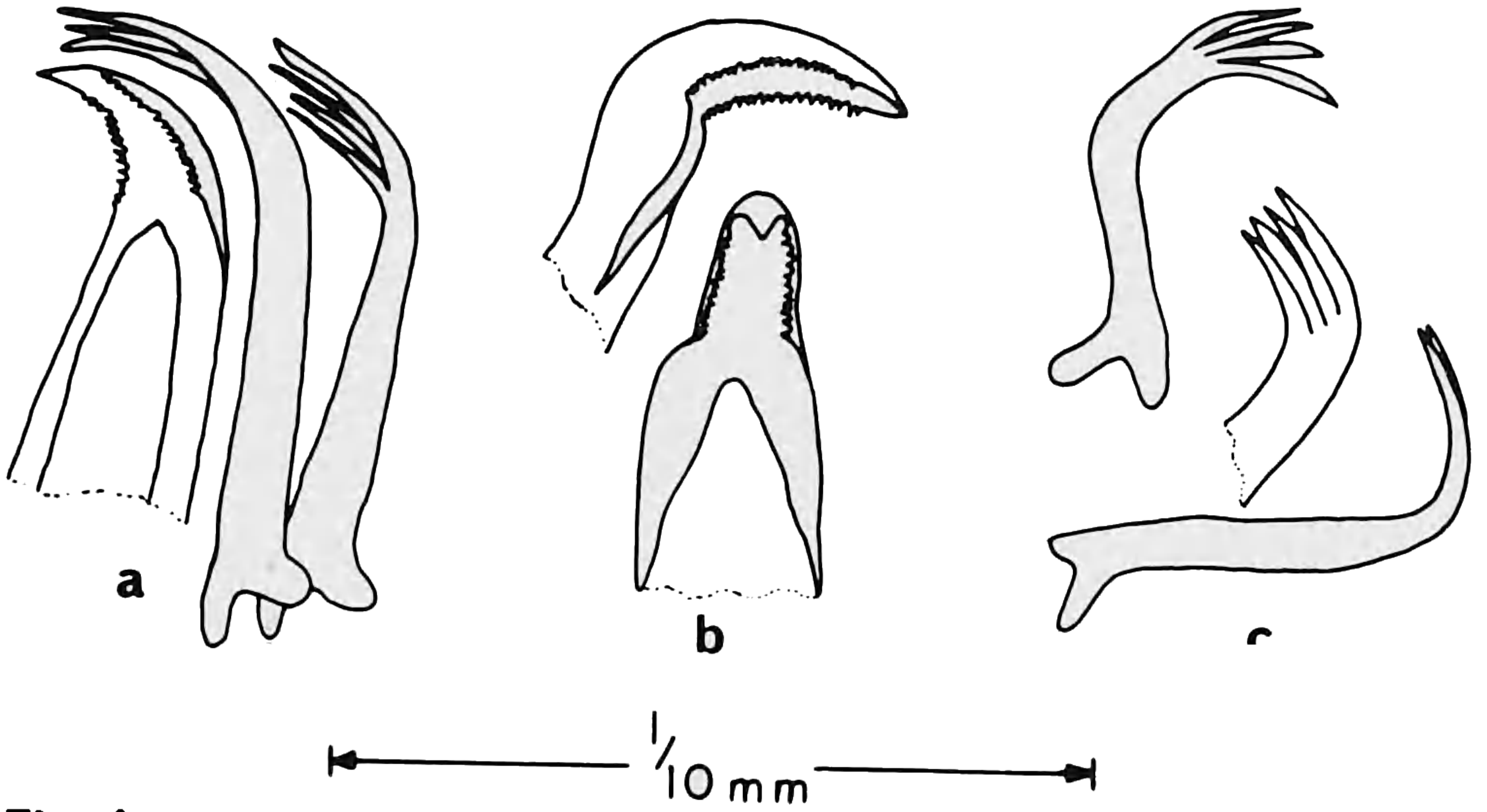


Fig. 1

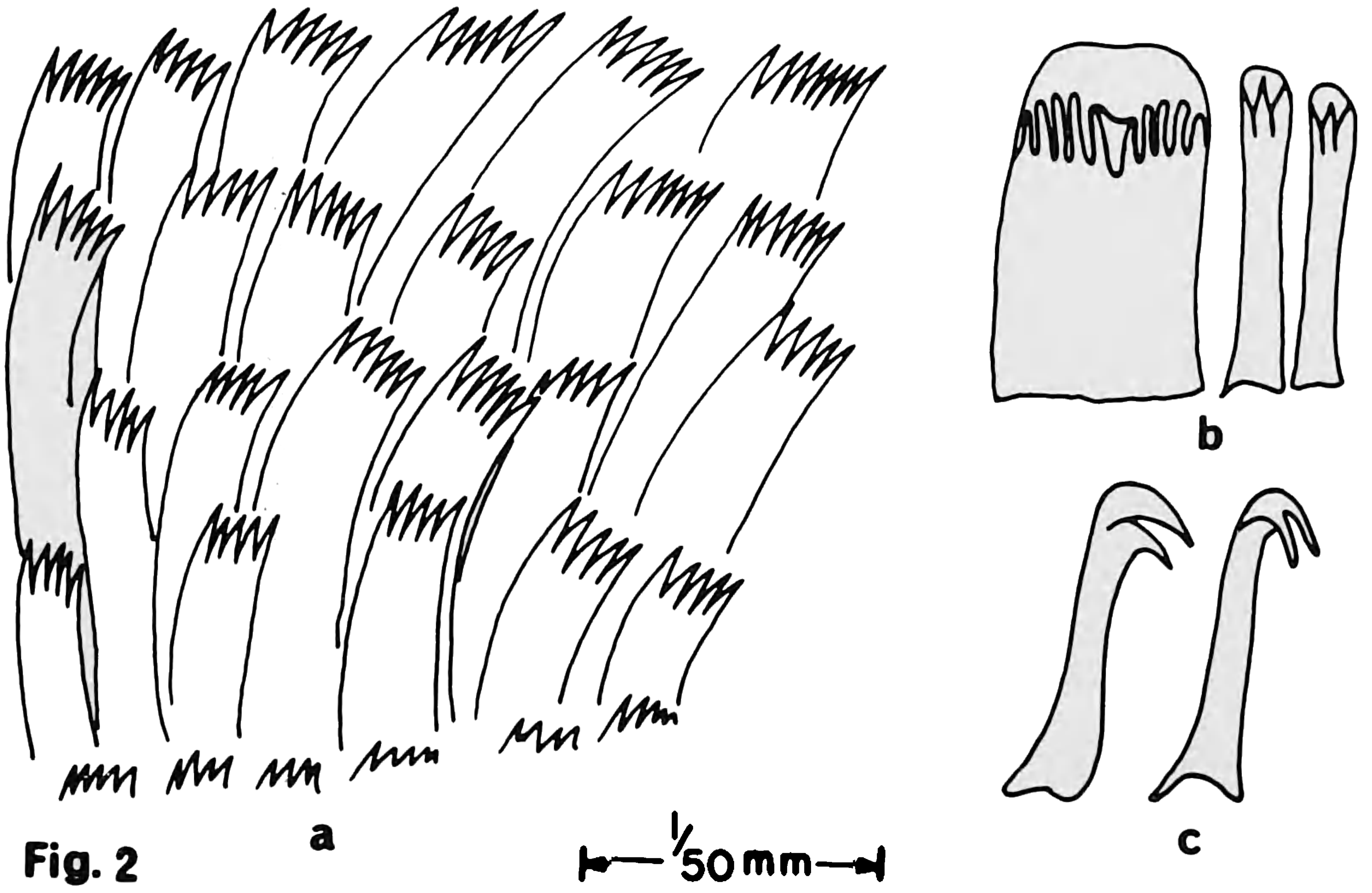


Fig. 2

Plate 63

Fig. 1. Portion of the radula of *Architectonica nobilis* from Brazil showing some rows of teeth with the more marginal lateral teeth being bicuspid, the more medial lateral teeth single pronged and the absence of a discernable central tooth (650 ×).

Fig. 2. Portion of a row of radular teeth of *Architectonica perspectiva* from between Du Rowa and Kai Dulah Is., Kai Islands, Moluccas, Indonesia (USNM 747000) showing bicuspid marginal lateral teeth at far right (660 ×).



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Plate 64. The radular of *Architectonica perspectivum* from between Du Rowa and Kai Dulah Is., Kai Islands, Moluccas, Indonesia (USNM 747000).

Fig. 1. Portion of radula showing entanglement of individual teeth (230 ×). Circle indicates area of enlargement in fig. 3.

Fig. 2. Enlargement of central field showing absence of anything distinguishable as a central tooth (800 ×).

Fig. 3. Enlargement of circled area of fig.1 to show bicuspid teeth (a) (1700 ×).

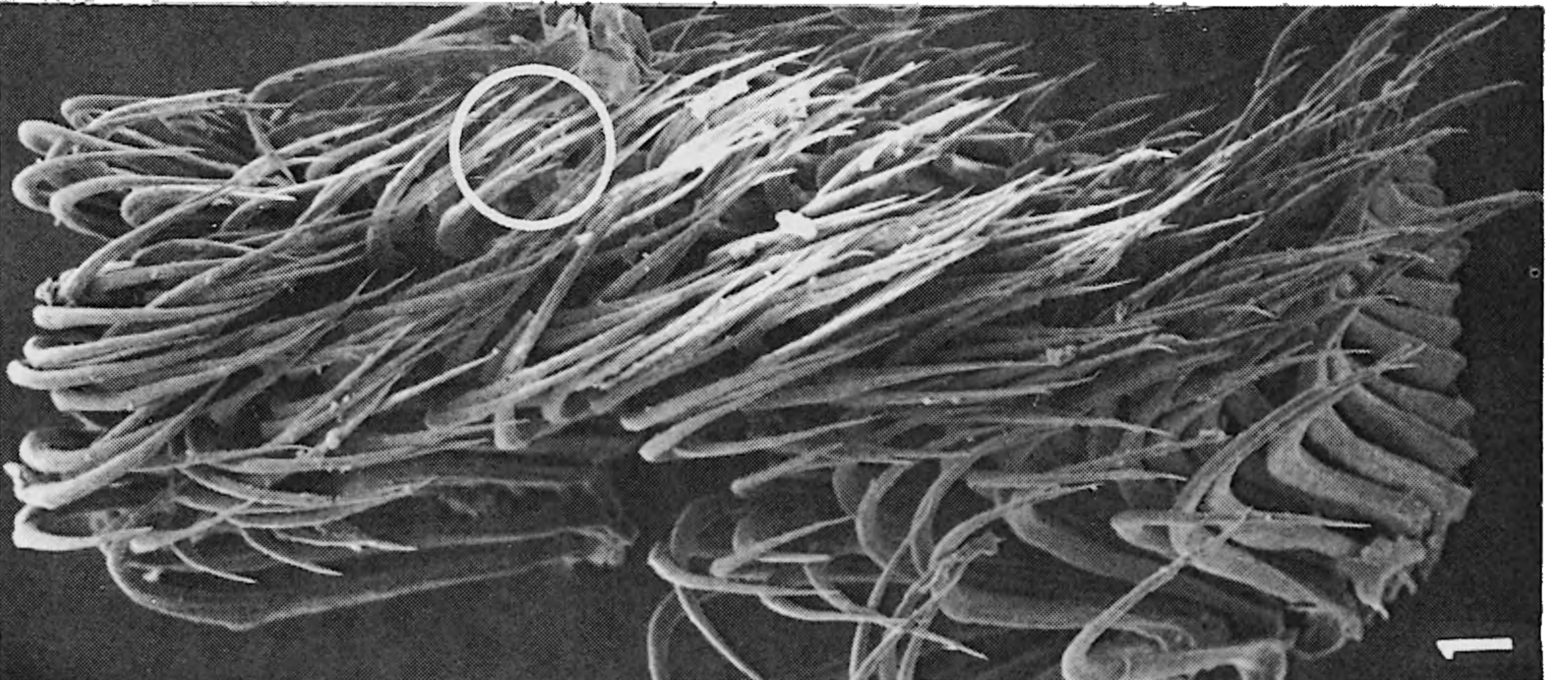
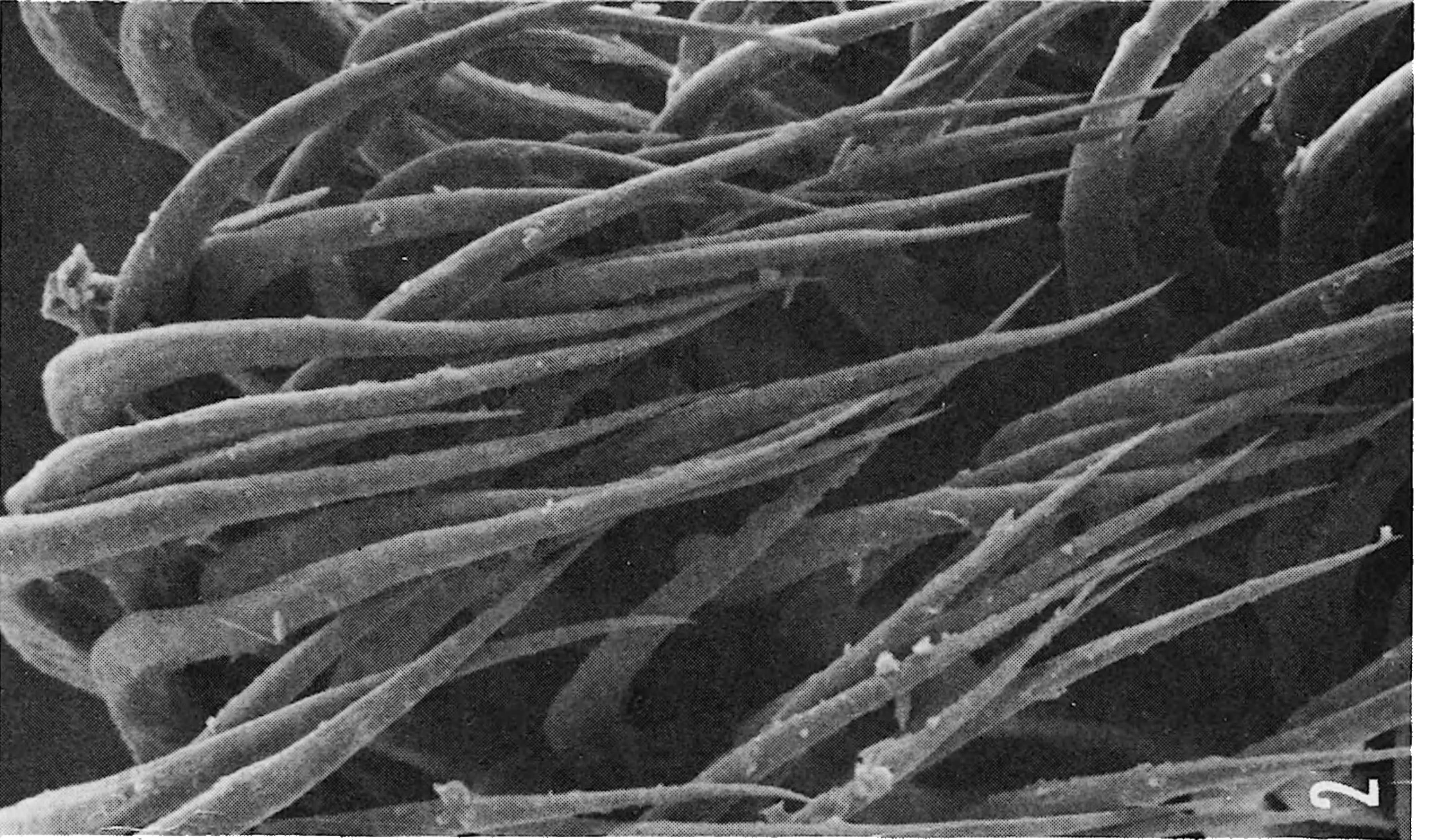
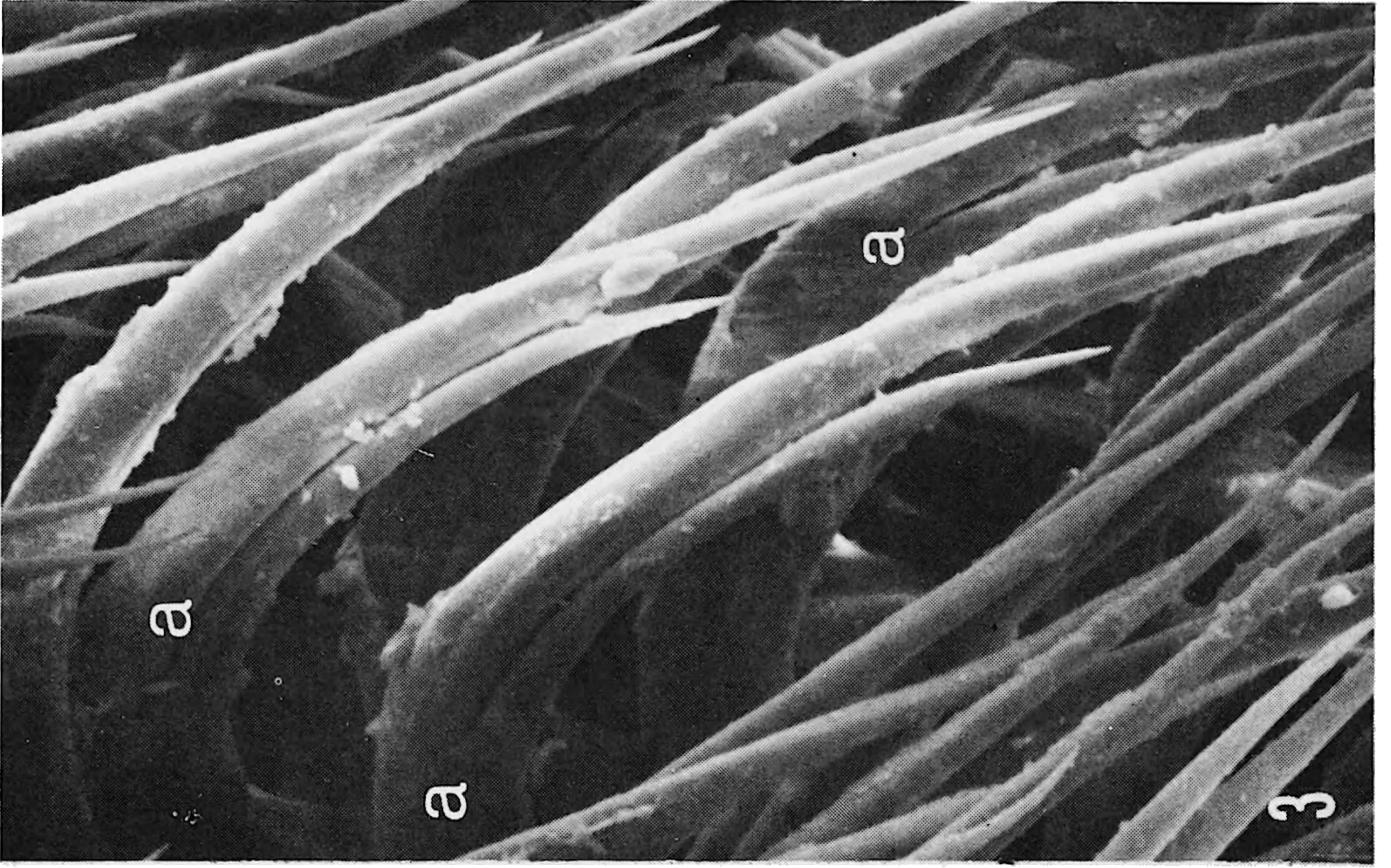


Plate 64

Plate 65

Fig. 1. Portion of radular ribbon of *Architectonica nobilis* from M/V *Silver Bay* Sta. 2399 (160 ×) showing central field somewhat spread open.

Fig. 2. Enlargement of circled area of fig. 1 showing two hooked teeth of central portion of the radula (1700 ×).

Fig. 3. The central tooth of *Philippia hybrida* from Sicily (2750 ×).



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Plate 66. The radula of *Architectonica c.f. laevigata* from near Tranggan, Aru, Moluccas, Indonesia (USNM 747441). a = Lateral tooth. c = Central tooth.

Fig. 1. Whole mount of the radula (240 ×).

Fig. 2. Rows of radular teeth showing individual central teeth and bicuspid lateral teeth (800 ×).

Fig. 3. Enlargement of rows of radula to show single pronged central tooth and bicuspid lateral teeth with seven on each side (1000 ×).

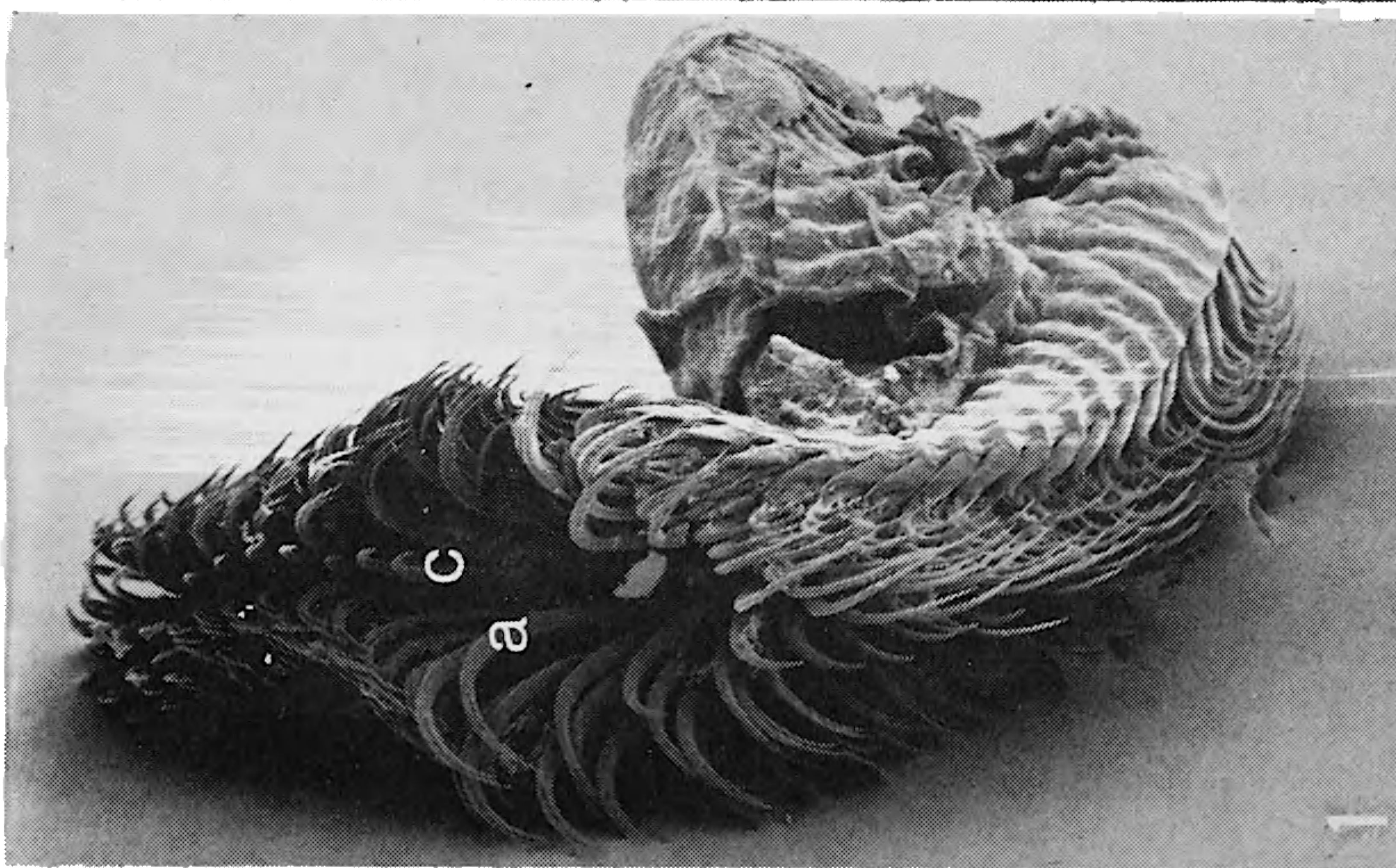
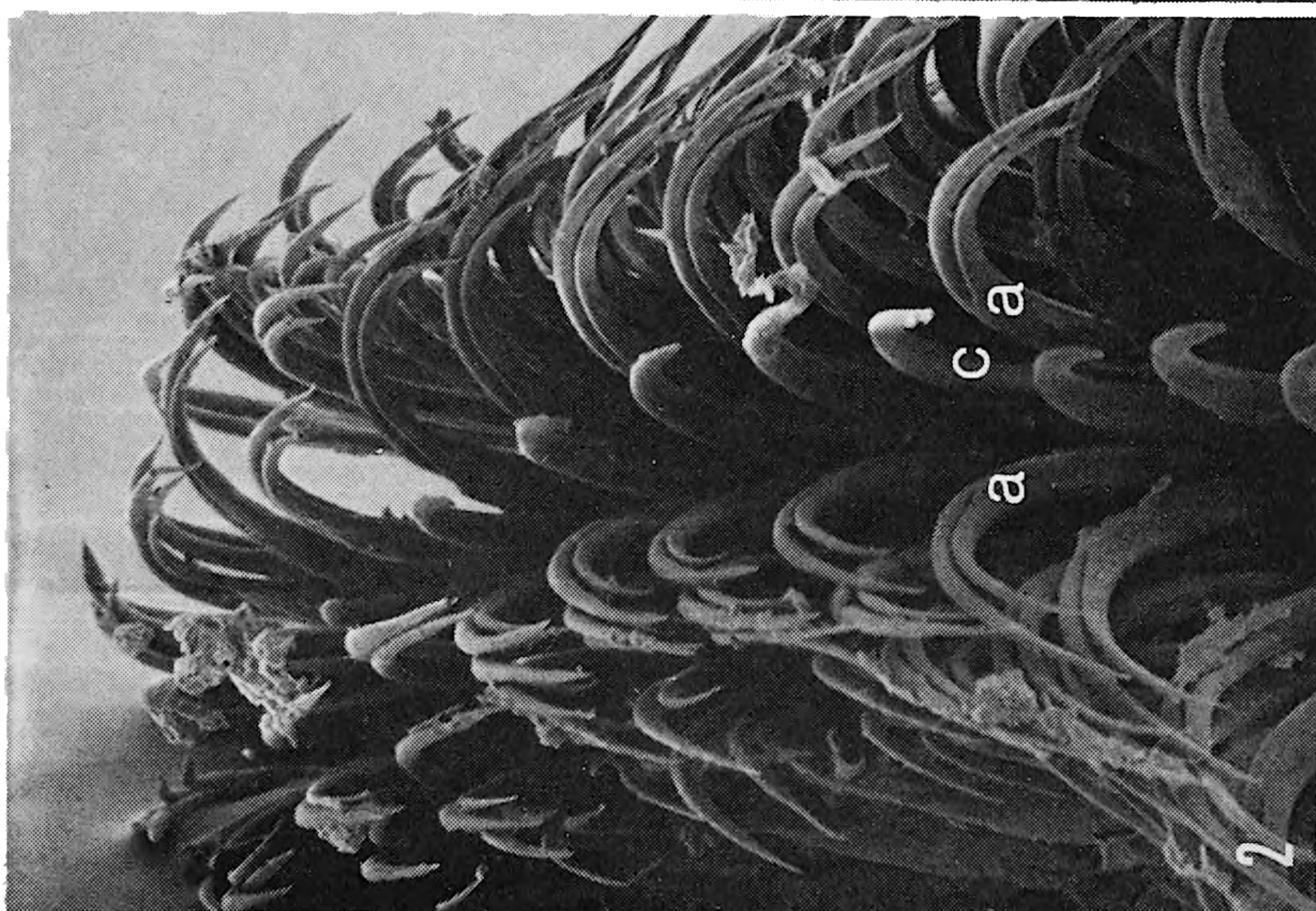
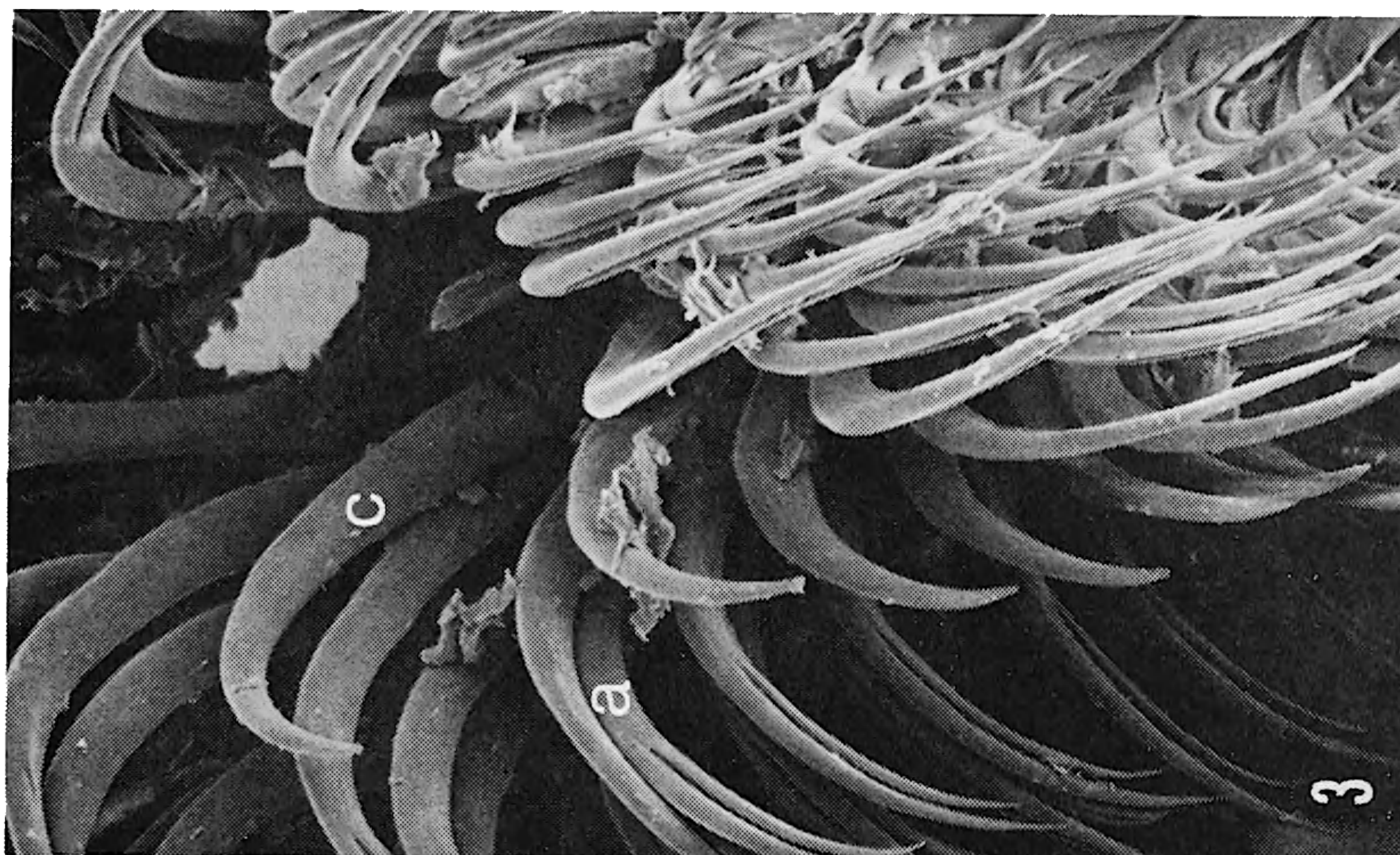


Plate 66

Plate 67

Fig. 1. Portion of the upperside of the distal edge of the jaw of *Architectonica nobilis* from Brazil to show pointed tips of the jaw elements (about 2200 ×).

Fig. 2. Portion of the underside of the jaw of *A. nobilis* to show hexagonal pattern of base of jaw elements (about 2800 ×).



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Plate 68

Fig. 1. Portion of the upperside of the distal edge of the jaw of *Philippia hybrida* from Sicily (USNM) to show incised pointed tips of the jaw elements (2000 ×).

Fig. 2. Portion of the underside of the jaw of *P. hybrida* to show papillose bulbous bases of jaw elements (2000 ×).

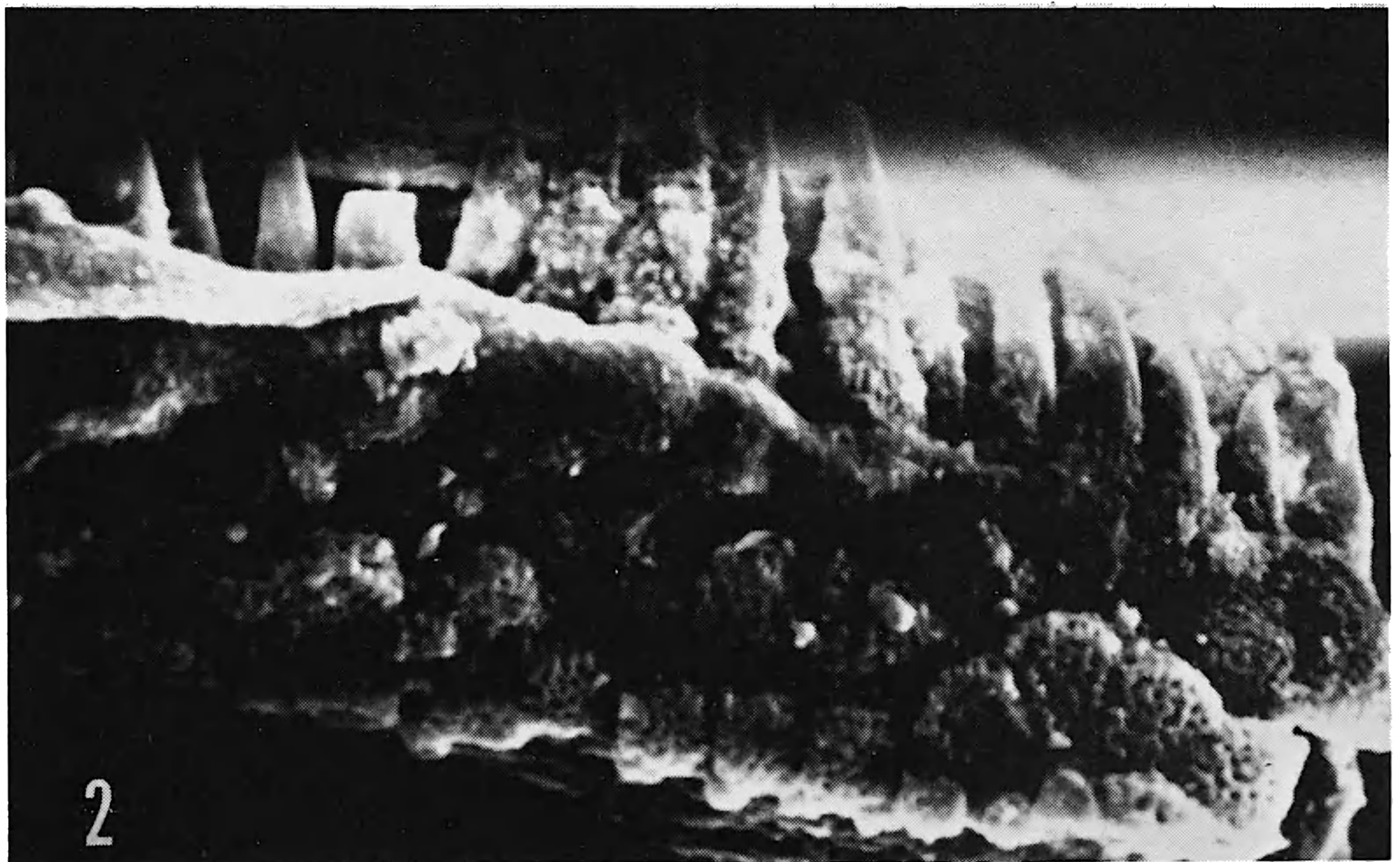


Plate 68

MISCELLANY

The first popular shell book.

The first illustrated book, devoted entirely to shells, was Filippo Buonanni's (1638-1725) *Ricreatione dell' occhio e della mente nell' osservazione delle Chioccioline* (1681), which may be translated as, "Refreshment for the eyes and mind through the study of shells." Buonanni was born in Rome. He was a Jesuit priest, and a student of Athanasius Kircher (1602-1680). Kircher was a German Jesuit who became learned in many branches of the humanities and sciences; among these were deciphering hieroglyphics, optics, and astronomy. Kircher published on many subjects and became well known. He was called to Rome by Pope Urban VIII and was appointed professor of mathematics at the Roman college of the Society of Jesus in 1638, the year Buonanni was born. Like many of his learned contemporaries, he collected rarities of nature, art, and superstition, which he added to the college's earlier collections. In time the collection became known as the Kircher Museum. Buonanni succeeded to the post occupied by Kircher on the latter's death in 1680, and while he published his *Ricreatione* the following year, based on Kircher's shells, he did not become curator of the Museum until 1689. Those shells which remained extant were deposited, during the early part of the present century, in the Museo dell' Instituto di Geologia e Paleontologie in Rome.

Buonanni's classification is of nugatory interest. He promulgated many of the mythical beliefs of the earlier commentators. For example, he believed, like Aristotle, that "all [shelled mollusks] are generated spontaneously by the mud—oysters by dirty mud, and others by sandy mud," and that they were heartless and bloodless. He was convinced that both observation and authority supported spontaneous generation, though this erroneous theory had been disproved by two other Italians, Francesco Redi and Marcello Malpighi, some years before. The illustrations are reasonably accurate, but reversed.

Richard I. Johnson



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