

AUSTRALIAN MUSEUM SCIENTIFIC PUBLICATIONS

Hedley, Charles, 1924. A revision of the Australian Pinnidae. *Records of the Australian Museum* 14(3): 141–153, plates xix–xxi. [26 June 1924].

doi:10.3853/j.0067-1975.14.1924.838

ISSN 0067-1975

Published by the Australian Museum, Sydney

nature culture **discover**

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6 College Street, Sydney NSW 2010, Australia



A REVISION OF THE AUSTRALIAN PINNIDÆ.

BY

CHARLES HEDLEY.

(Plates xix-xxi.)

The Pinnidæ are a small family of marine bivalves including many fossil and about fifty recent species which occur throughout the warmer seas of the world. Though thin and brittle these shells are notable for their length, being exceeded in this respect only by the Giant Clams. They live planted point downwards with the tips of the broad ends projecting above the surface of zosteria flats. An ugly wound may be inflicted on the bare feet of those who tread on their sharp blades, from this the shells are called in Australia "Razorbacks." The doings of a commensal crab, *Pinnotheres*, frequently a guest in the *Pinna* mansion, is related by classic legends either as the behaviour of a rascal or of a grateful attendant.

The first attempt at classification of the Pinnidæ was by Chemnitz, who in 1785 drew attention to a feature separating various species of *Pinna*. In some, for instance *P. incurvata*, the apical muscle scar has a ridge running lengthwise down the centre; in others, as in *P. atrata*, this ridge is absent. Apparently prompted by this observation, Gray proposed¹ the genus *Atrina* for the second group, with *P. nigra* for type. As the basis of this genus he cited "1844." This has been shown by Iredale to indicate the following passage,—“The *Pinna* have an elongated shell with a longitudinal crack filled with a cartilage in the middle of each valve, and *Atrina* are shorter shells without any such crack.—Gray, Synopsis of the Contents of the British Museum, 44th Edition, 1842, p. 83.” Iredale² advises that the name *Atrina* should date from the nomination of a type in November, 1847.

This classification was expanded first by the Adams brothers and then more fully by Dr. E. von Martens³. As the latter has explained, the feature noted by Chemnitz is comparatively trivial. The essential characters of *Pinna* are that the shoulder of the shell towards the apex is externally angled and fissured, while that of *Atrina* is rounded and entire; inside the valve, *Pinna* has a long narrow sinus which extends through the middle of the nacreous tract for most of its length, while the nacreous tract of *Atrina* is not thus cleft. These features are contrasted in Pl. xix, fig. 3 and Pl. xx, fig. 12 of the present paper.

An excellent account of the structure and habits of *Atrina* is given by Grave⁴.

¹ Gray—Proc. Zool. Soc., 1847, p. 199.

² Iredale—Proc. Malac. Soc., x, 1913, pp. 294-309.

³ Von Martens—Ann. Mag. Nat. Hist., (3), xvii, 1866, pp. 81-88.

⁴ Grave—U.S. Fisheries Bureau, Bull. xxix, 1911, pp. 411-439, pl. 48-50.

Suter⁵ has unfortunately transferred *Pinna zelandica* Gray, to *Atrina*, whereas it really is, as Gray said, a *Pinna*. On the other hand, *P. senticosa* Gould is probably an *Atrina*.

Probably *Pinna* is more modified and *Atrina* the more primitive form.

By Lamarek in 1799 and again by Gray in 1847 the type of *Pinna* was indicated to be *Pinna rudis*, the first of the genus in the Linnean presentation. This genotype has been so generally misconstrued that it is worth attention. In the tenth edition of the "Systema Natura," Linné introduced *Pinna rudis*, basing it on two discordant figures, the first being "Rumph. mus. t.46.f.L. *Pinna lata*," a broad black shell from Amboyna; the second was "Argenv. Conch. t.25.f.F. *Perna*," a narrow horn-coloured eight-ribbed shell from an unknown locality. Six years later the same quotations were repeated for *P. rudis* in the Museum of Queen Ulrica. But in 1767, in the twelfth edition of the "Systema," another reference was added, "Ginan. adr. 2.t.25.f.116," being a species from the Adriatic, scored with twenty longitudinal furrows, and which agreed with neither of the others.

Though not included in the original party, Lamarek⁶ misinterpreted the Red Ham shell from the West Indies, so well figured by Chemnitz⁷ as being the Linnean *P. rudis*. Dispossessed of this title, the Red Ham shell may now resume its proper name of *Pinna ferruginea* Bolten.

Bolten⁸ fixed this name on *Pinna nigra* of Chemnitz while Dr. Gwyn Jeffreys⁹ stoutly contended that *Pinna rudis* meant the British shell. The controversy between candidates for the use of the name of *Pinna rudis* need not be followed further.

A final effort was made by Linné to compose the confusion that he had caused, for in his concluding notice of *P. rudis* he separated as variety *beta* the black shell from Amboyna. Because the description applies to the shell figured by Argenville and not to that of Rumphius, the former must carry the name of *Pinna rudis*. Hanley¹⁰ wrote "Argenville's engraving is not so unlike the ideal, but was apparently drawn from a broken specimen; it has been quoted by Dillwyn for his *carnea*, and by Lamarek for his *flabellum*, which latter, purified in its synonymy, seems identical with the former." *Pinna carnea* (= *flabellum*) was recognised as a native of Porto Rico in the West Indies, by Dall and Simpson.¹¹

⁵ Suter—Manual of New Zealand Mollusca, 1913, p. 893.

⁶ Lamarek—Syst. Anim. s. Vert., 1801, p. 112.

⁷ Chemnitz—Conch. Cab., viii, 1785, p. 218, t. 88, fig. 773.

⁸ Bolten—Mus. Bolt. (2), 1798, p. 159.

⁹ Jeffreys—Journ. de Conch., xv, 1867, p. 230.

¹⁰ Hanley—Ips. Linn. Conch., 1855, p. 148.

¹¹ Dall & Simpson—U.S. Fish Comm., Bull, xx, 1, 1900, p. 462.

Australian Fossils.

The following species of fossil Pinnidæ are noted as recorded from Australia.

Pinna australis Hudleston, from Western Australia.¹²

Pinna cordata Pritchard, from Victoria.¹³

Pinna inermis Tate, from South Australia.¹⁴

Pinna reticosa Chapman, from King Island, Tasmania.¹⁵

Atrina tateana nom. mut., from South Australia; as *Pinna semicostata* Tate¹⁶ was pre-occupied by a recent species from the Hawaiian Islands, *Pinna semicostata* Conrad,¹⁷ another name is here proposed.

Erroneous and Doubtful References.

Pinna ceylanica is recorded by Paetel¹⁸ as from Australia. There is no such species.

Pinna cumingii is recorded by Reeve¹⁹ as from Australia. It has not been observed since then from that locality. As Hanley in the original description wrote "Hab. Peruvia" that is more probable. But it is not included in Dall's list of Peruvian shells.²⁰

Pinna magnifica is catalogued by Paetel²¹ as from Australia. There is no such species.

Pinna pectinata is listed by Jay²² as from New Holland. The species is European and the locality erroneous.

Pinna ramulosa is recorded by Clessin²³ as from Moreton Bay. This species was originally recorded from the West Indies. Clessin's error probably arose from the duplication of species 52 by Reeve.

Pinna rotundata is recorded by Menke²⁴ as from New Holland. Apparently this is an error of identification.

Pinna serrata is recorded by Hanley²⁵ as from New South Wales. This species belongs to the West Indies and the Australian reference is an error.

Pinna squamosa is recorded by Hanley²⁶ as from Australia. Apparently this is an error of identification.

¹² Hudleston—Geol. Mag., n.s., (3), vii, 1890, p. 244, pl. ix, fig. 6.

¹³ Pritchard—Proc. Roy. Soc. Victoria, n.s., vii, 1895, p. 228, pl. xii, figs. 4-5.

¹⁴ Chapman—Proc. Roy. Soc. Victoria, xxxii, 1920, p. 229.

¹⁵ Chapman—Mem. Nat. Mus. Melbourne, iv, 1912, p. 47, pl. vi, fig. 8.

¹⁶ Tate—Trans. Roy. Soc. S.A., viii, 1886, p. 122, pl. xiv, fig. 9, and op. cit. xxvii, 1899, p. 276.

¹⁷ Conrad—Journ. Acad. Nat. Sci. Philad., vii, 1837, p. 245, pl. 20, fig. 11.

¹⁸ Paetel—Cat. Conch. Samml., 1890, p. 209.

¹⁹ Reeve—Conch. Icon., xi, 1858, pl. xvi, fig. 29.

²⁰ Dall—Proc. U.S. Nat. Mus., xxxviii, 1909, p. 254.

²¹ Paetel—Cat. Conch. Samml., 1890, p. 208.

²² Jay—Cat. Shells, 1839, p. 31.

²³ Clessin—Conch. Cab., viii, 1891, p. 95.

²⁴ Menke—Moll. Nov. Holl. Spm., 1843, p. 36.

²⁵ Hanley—Cat. Rec. Bivalves, 1843, p. 252.

²⁶ Hanley—Cat. Rec. Bivalves, 1843, p. 252.

Catalogue of Australian Species.

PINNA ATROPURPUREA Sowerby.

Pinna atropurpurea Sowerby, Tankerville Catalogue, p. 23, No. 531a appendix, p.v. 1825; *Id.*, Hanley, Cat. Rec. Bivalves, 1843, p. 255; *Id.*, Reeve, Conch. Icon., xi, 1858, pl. xxii, fig. 41; *Id.*, von Martens, Ann. Mag. Nat. Hist., (3), xvii, 1866, p. 87; *Id.*, Clessin, Conch. Cab., viii, 1890, p. 71, pl. 27, fig. 2.

Hab.—Queensland:—Cape Flattery (self).

This species has not been previously recorded from Australia. I found a single specimen alive on the sand flat under Cape Flattery in July, 1916.

PINNA ATTENUATA Reeve.

Pinna attenuata Reeve, Conch. Icon., xi, 1858, pl. xxiv, fig. 46. *Id.*, Clessin, Conch. Cab., viii, 1890, p. 59, pl. 27, fig. 1. *Id.*, Lynge, D. Kgl. Danske Vidensk. Selsk. Skrifter, 7, v, 1909, p. 149.

Pinna stutchburii Reeve, Conch. Icon., xi, 1859, pl. xxxiii, sp. 64. *Id.*, Pagenstecher in Kossmann, Zool. Ergebnisse, i (2), 1877, p. 31. *Id.*, von Martens, Ann. Mag. Nat. Hist., (3), xvii, 1866, p. 87. *Id.*, Clessin, Conch. Cab., viii, 1891, p. 74, pl. 30, fig. 2.

Hab.—Queensland: Moreton Bay (type, S. Stutchbury.)

Von Martens has insisted that *P. stutchburii* is a synonym of *P. attenuata*, which he refers to a group *Cyrtopinna* proposed by Mörch²⁷ for *P. incurva*, Gmelin.

Reeve notes that the Queensland shell is called after an esteemed resident of Bristol, who had then (February, 1859) lately died. Stutchbury was once Government Geologist of New South Wales.

PINNA DOLABRATA Lamarck.

(Plate xx, fig. 9; plate xxi.)

Pinna sp., Peron, Voy. Terr. Austral., ii, 1816, p. 81.

Pinna dolabrata Lamarck, An. s. vert. vi, 1819, p. 133; *Id.*, Blainville Dict. Sci. Nat., xli, 1826, p. 69; *Id.*, Gray, in King's Survey, appendix ii, 1827, p. 478.

Pinna zeylanica Angas, Proc. Zool. Soc., 1865, p. 655 (not of Gray).

Pinna inermis Tate, Trans. Roy. Soc. S.A., ix, 1887, pp. 71, 107, pl. iv, fig. 5; *Id.*, Chapman, Proc. Roy. Soc. Victoria, xxxii, 1920, p. 229.

P. dolabrata, Clessin, Conch. Cab., 1890, p. 69.

²⁷ Mörch—Cat. Conch. Yoldi, 1852, p. 51.

Hab.—South Australia:—St. Vincent Gulf (Angas); Western Australia:—Eucla (Tate).

Under this name Lamarck described a fine *Pinna*, 14 inches long, which has been neglected by subsequent writers. His locality “? les mers australes,” indicates Peron as the collector, because others of his shells were thus cited. The locality labels of Peron seem to have been usually defective. To give an idea of the form of *P. dolabrata*, Lamarck quoted a figure of Chemnitz which is something like it.

Peron himself writes that in January 1803 he found a large bed of *Pinna* in a sheltered bay of Kangaroo Island. The shells were sunk in a floor of sandy mud, covered by two feet of water at low tide and were so abundant that he could easily have collected thousands of them.

In shape this species resembles *P. madida*, but the radial ridges are always smaller and closer.

I enquired of M. Bedot, custodian of the Lamarck Collection in Geneva, if *P. dolabrata* was represented there. In reply he sent me very kindly the photographs reproduced in Pl. xxi, of a co-type of *P. dolabrata*, 215 mm. in length, 97 mm. in breadth and 29 mm. in thickness. These correspond so closely to the shell from Adelaide here figured that I am assured of their specific identity.

My other figure is from a specimen 11½ inches long, collected by Mr. Walton at the outer harbour of Adelaide, South Australia, and kindly forwarded by Dr. R. Pulleine.

PINNA FUMATA *Reeve*.

Pinna fumata Reeve, Conch. Icon., xi, May, 1858, pl. xv, fig. 27, 28. *Id.*, Hanley, Proc. Zool. Soc., Nov., 1858, p. 227. *Id.*, von Martens, Ann. Mag. Nat. Hist., (3), xvii, 1866, p. 87. *Id.*, Melvill & Standen, Journ. Linn. Soc. Zool., xxvii, 1899, p. 184. *Id.*, Clessin, Conch. Cab., viii, 1890, p. 54, pl. xxii, fig. 1. *Id.*, Herdman, Report Pearl Fisheries Manaar, i, 1903, p. 37.

Hab.—Queensland:—Murray Island (Haddon); Northern Territory:—Darwin (W. H. Christie).

PINNA ISOSCELES, *sp. nov.*

(Plate xix, fig. 1.)

Shell small, subtriangular, nearly symmetrical, the ventral angle more rounded than the dorsal, almost twice as long as broad, moderately inflated. Colour, blackish brown shading anteriorly into russet and tawny olive. Sculpture:—there are seventeen low rounded equidistant ribs, parted by broader flat interstices, across the ribs

run a few distant series of scales; the ventral limb, extending for about a sixth of the height of the shell, is devoid of radial sculpture but has irregular concentric growth lines; under the lens the entire shell is densely microscopically shagreened. The adductor scars, parted by the usual *Pinna* sinus, are nacreous with a green reflection.

Length 160 mm., height 96 mm., depth of conjoined valves 22 mm.

Hab.—New South Wales:—Port Jackson, North Harbour (type, G. Besser); Sand flats at Gunnamatta Bay (F. A. McNeill); Lord Howe Island (W. R. B. Oliver and A. R. McCulloch).

This species has been misidentified as *Pinna zealandiæ* and *P. muricata*. The nearest ally is *Pinna semicostata* Conrad, of which the ventral limb, the space bare of radial riblets, is much broader.

The sculpture of *P. isosceles* distinguishes it from other wedge shaped *Pinnae* such as *P. æquilatera* von Martens, *P. moluccensis* Clessin or *P. regia* Reeve.

PINNA MADIDA Reeve.

Pinna madida Reeve, Conch. Icon., xi, 1858, pl. xvii, fig. 31; *Id.*, von Martens, Ann. Mag. Nat. Hist., (3) xvii, 1866, p. 87. *Id.*, von Martens, Journ. Linn. Soc., Zool., xxi, 1889, p. 204. *Id.*, Clessin, Conch. Cab., viii, 1890, p. 70, pl. 25, fig. 2. *Id.*, Lynge, K. D. Vidensk. Selsk. Skr. vii, 1909, p. 149.

Pinna. *sp.* (?) Kent, Naturalist in Australia, 1897, p. 209, pl. xxxvi. *Id.*, Quoy and Gaimard, Zool. Astrolabe, iv, 1833, p. 317.

(?) *Pinna bicolor* var. Odhner, K. Sv. Vet. Akad., Handl., lii, 16, 1917, p. 7.

Hab.—Northern Territory:—Port Essington (type); Western Australia:—Broome (Mjöberg); Queensland:—Bowen (E. H. Rainford), Port Curtis (Austr. Mus.), Karumba in the Gulf of Carpentaria (C. Hedley).

From Bowen, Mr. E. H. Rainford has sent a pair of *P. madida*, twelve inches long and four broad, containing a commensal shrimp. This latter was afterwards determined by Dr. W. T. Calman of the British Museum as *Anchistus inermis* Miers. Perhaps the "small lobster-like crustacean" noted by Dr. Coppinger²⁸ as obtained by Haswell from a *Pinna* at Port Molle was the same *Anchistus*. Mr. E. J. Banfield²⁹ has already noted the commensals of a *Pinna* at Dunk Island, Queensland. The same writer has given a charming account³⁰ of a pearl which he saw in the waving mantle of a living *Pinna*.

²⁸ Coppinger—Cruise of the "Alert", 1883, p. 187.

²⁹ Banfield—Confessions of a Beachcomber, 1908, p. 135.

³⁰ Banfield—Tropic Days, 1918, p. 211.

PINNA MENKEI *Reeve*.

(Plate xix, figs. 2-3.)

- Pinna menkei* Reeve, Conch. Icon., xi, June, 1858, pl. xviii, fig. 34.
Id., Hanley, Proc. Zool. Soc., Nov., 1858, p. 228. *Id.*, von Martens,
 Ann. Mag. Nat. Hist., (3), xvii, 1866, p. 87. *Id.*, Whitelegge,
 Journ. Roy. Soc. N.S. Wales, xxiii, 1889, p. 244. *Id.*, Clessin,
 Conch. Cab., 1890, viii, p. 68, pl. 26, fig. 1. *Id.*, Roth, North
 Queensland Ethnography, Bull. iii, 1901, p. 8.
- Pinna euglypta* Reeve, Conch. Icon. xi, June, 1858, pl. xx, fig. 37, 38.
Id., Hanley, Proc. Zool. Soc., Nov., 1858, p. 228.
- Pinna vespertina* Reeve, Conch. Icon., xi, June, 1858, pl. xxiii, fig. 44.
Pinna zeylanica Angas (not Gray), Proc. Zool. Soc., 1867, p. 930.

The original figure of the type of *Pinna menkei* shows a shell distorted by injury. A specimen from Camden Haven, here figured, is 300 mm. in length and 130 mm. in height, but the species is frequently broader. The posterior ventral corner is always more rounded than the posterior dorsal. The colour may be monochrome or banded, and varies from chestnut-brown to tawny olive. The sculpture consists of about eighteen rounded low ribs parted by wider shallow interspaces; the radials decrease towards the posterior margin and vanish on the ventral limb and may be crossed by a concentric series of low scales. This seems to be a common shell in Queensland, which, exceptionally and in a dwarfed condition, may reach as far south as Sydney.

Hab.—New South Wales:—Port Jackson, Rose Bay (J. Brazier), Camden Haven, Gogley Island (Fishery Department); Queensland:—Stradbroke Island (Kesteven), Port Curtis (Museum Coll.), Cape Flattery (Hedley), Gulf of Carpentaria (W. E. Roth).

VAR. CAVITERGA, *var. nov.*

(Plate xx, fig. 8.)

The original of my figure was determined by Mr. E. A. Smith as "*Pinna menkei*, var." In colour and sculpture it corresponds to normal *P. menkei*, but differs in contour. The shape is nearly that of a battered wedge, the posterior end being broad and nearly square to the median line, the hinge line is concave, the dorsal margin meets the posterior almost at a right angle, but the posterior ventral is rounded. Length 230, breadth 145 mm.

Hab.—Queensland:—Fraser's Island (type); New South Wales:—Port Jackson (A. F. B. Hull).

Dr. W. H. Dall³¹ has remarked how *Pinna* depends on environment. If the ground be hard and stony, the shells become short and wide and tend to be irregular or distorted; on soft ground they attain normal growth, inclining to be elongate, while in still water and on a sandy floor the scales and spines are most developed.

³¹ Dall—Trans. Wagner Inst., iii, 1898, p. 664.

PINNA MOLUCCENSIS *Clessin*.

Pinna molluccensis Clessin, Conch. Cab., viii, 1891, p. 82, pl. 33, fig. 1,
nom. mut. for

Pinna angustana Reeve (non Lamarck), Conch. Icon. xi, 1858, pl. xxvi,
fig. 51.

Pinna moluccensis correction Clessin, op. cit., p. 108.

Pinna angustata (sic.), Shirley, Proc. Roy. Soc. Queensland, xxiii,
1911, p. 94.

Hab.—Queensland:—Torres Strait (Shirley).

There is in the Australian Museum a specimen of uncertain history, labelled "N.S. Wales" and determined in 1889 by Mr. E. A. Smith as *Pinna angustana*.

PINNA SCAPULA *sp. nov.*

(Plate xix, figs. 6-7.)

Shell of moderate size, explanate spatuliform, unusually compressed and thin, dorsal margin concave, ventral margin sinuous, posterior margin broadly rounded. Colour:—interior, tawny olive with buff on the posterior edge; exterior, uniform fawn colour crossed by fine close concentric white lines. Sculpture:—the anterior quarter of the valve, the stalk of the leaf, has a low median fissured ridge, on the dorsal side of which are six sharp spaced elevated smooth cords which fade away posteriorly, on the ventral side are spaced concentric ridges which become smaller, closer, and finally disappear. The greater part of the disk is flat and featureless; on the posterior margin are a few imbricating lamellæ. The adductor scars are divided by the non-nacreous sinus characteristic of *Pinna*. The truncate posterior extremity is stoppered by a series of imbricating concave scales commencing about 7 mm. within the decollate apex.

Maximum length 244 mm., maximum height 132 mm., length of hinge line 140 mm., depth of single valve 13 mm.

This species is remarkable for its thin and leaf-like form and for the broad curve of the posterior end. The extraneous growth indicates that it was rooted no deeper than the byssal sinus.

Hab.—Northern Territory:—Darwin (W. H. Christie).

PINNA VIRGATA *Menke*.

(Plate xix, figs. 4-5.)

Pinna virgata Menke, Moll. Nov. Holl. Spm., 1843, p. 36. *Id.*, Reeve, Conch. Icon., xi, 1858, pl. xxiv, fig. 45. *Id.*, von Martens, Ann. Mag. Nat. Hist., (3), xvii, 1866, p. 87. *Id.*, Tate, Proc. Linn. Soc. N.S. Wales, vi, 1881, p. 402. *Id.*, Clessin, Conch. Cab., viii, 1891, p. 100, pl. 45, fig. 1.

Von Martens has bracketed this with *P. menkei*. The illustration of *P. virgata* given by Reeve does not conform either in shape, colour, or sculpture to the description of Menke, so the identity of this shell is at present unsatisfactory.

A stunted shell sent to me under another name from South Australia by Sir Joseph Verco is here figured with the suggestion that it may represent the lost *P. virgata*. For it agrees with Menke's description in the wedge shape and the peculiar sculpture of small dense overlapping and arched scales, though the bright rusty red radial lines are absent. On the South Australian shell there are nine radial cords between the cardinal margin and the median crack.

Hab.—Western Australia (type); South Australia.

ATRINA ASSIMILIS *Reeve*.

Pinna assimilis Reeve, Conch. Icon., xi, August, 1858, pl. xxxi, fig. 59. *Id.*, Hanley, Proc. Zool. Soc., 1858, Nov., p. 255; *Id.*, von Martens, Ann. Mag. Nat. Hist., (3), xvii, 1866, p. 86. *Id.*, Clessin, Conch. Cab., viii, 1891, p. 97, pl. 46, fig. 1.

Hab.—Queensland:—Raine Island (type, Ince), Cairns (Allen); Northern Territory:—Port Essington (Hanley).

ATRINA CHEMNITZII *Hanley*.

Pinna pectinata Chemnitz, Conch. Cab., viii, 1758, p. 211, pl. 87, fig. 770 not *P. pectinata* Linne.

Pinna chemnitzii Hanley, Proc. Zool. Soc., 1858, July, p. 136. *Id.*, Reeve, Conch. Icon., xi, 1858, August, pl. xxix, fig. 55, loc. cit., pl. 1, fig. 1, Feb. 1859. *Id.*, von Martens, Ann. Mag. Nat. Hist., (3), xvii, 1866, p. 86. *Id.*, Dunker, Index Moll. Mar. Jap., 1882, p. 231. *Id.*, Hidalgo, Journ. de Conch., xv, 1867, p. 170. *Id.*, Morlet, Journ. de Conch., xxix, 1889, p. 161. *Id.*, Clessin, Conch. Cab. viii, 1891, p. 95, pl. 42, fig. 2, pl. 43, fig. 1. *Id.*, Odhner, Kungl. Sv. Vet. Akad., Handl., lii, 1917, p. 7.

Pinna japonica Reeve, Conch. Icon., xi, 1858, August, pl. xxv, fig. 47. *Id.*, Lischke, Jap. Mar. Conch., i, 1869, p. 159. *Id.*, Hirase, Illustrations of a Thousand Shells, 1915, pl. 41, fig. 201.

Pinna sp., v. Martens, Preuss. Exped. Ost. Asien, i, 1867, p. 141 and Lischke, Mal. Blatt. xxiv, 1867, p. 179, *fide* von Martens, Zoological Record, 1867, p. 599.

Hab.—Western Australia:—Broome (Mjöberg).

ATRINA DELTODES *Menke.*

Pinna deltodes Menke, Moll. Nov. Holl. Spm., 1843, p. 37; *Id.*, Hanley Cat. Rec. Bivalve Shells, 1843, p. 256, footnote; *Id.*, Menke, Zeit. Malak., i, 1844, p. 63; *Id.*, Reeve, Conch. Icon. xi, 1858, pl. xxi, fig. 40; *Id.*, Tate, Proc. Linn. Soc. N.S. Wales, vi, 1881, p. 402; *Id.*, Clessin, Conch. Cab., viii, 1891, p. 80, pl. 31, fig. 2; *Id.*, von Martens, Ann. Mag. Nat. Hist., (3), xvii, p. 86, 1866.

Hab.—Northern Territory:—Near the mouth of the Victoria River (type); Torres Strait:—Darnley Island (British Museum).

ATRINA GOULDII *Reeve.*

(Plate xx, figs. 11-12.)

Pinna gouldii Reeve, Conch. Icon., xi, May, 1858, pl. xi, fig. 21. *Id.*, Hanley, Proc. Zool. Soc. Nov., 1858, p. 255. *Id.*, von Martens, Ann. Mag. Nat. Hist., (3), xvii, 1866, p. 86. *Id.*, Paetel, Cat. Conch. Samml., 1890, p. 208. *Id.*, Clessin, Conch. Cab., viii, 1891, p. 78, pl. 34, fig. 3.

Pinna vexillum Reeve, Conch. Icon., xi, 1858, pl. xix, fig. 36, not *P. vexillum* Born.

Brauer³² approved Reeve's figure of *vexillum* as representing Born's species. But the difference in contour and sculpture is so obvious that I am unable to accept that assurance. The shell here figured is notable for its dark colour, smooth surface, and the shortness of the hinge line in comparison with the total length. I suppose it to be a smooth dark form of *A. gouldii*, but for verification, as the nomenclature is so confused, a description is now added.

Shell broadly wing-shaped, rather small, thin and translucent, compressed. General colour raisin-black, shaded to indian purple and clouded with buffy-brown. Dorsal margin comparatively short, being three-quarters of the total length and meeting the posterior margin at a right angle. Posterior end obliquely rounded, ventral side evenly curved, byssal insinuation slight. Surface in general smooth, sculptured by slight irregular concentric growth lines which are most apparent on the ventral limb. The radials consist of about eleven widely spaced riblets, which attain most prominence at about one-third of the length; they do not intrude on the ventral limb and gradually vanish towards the posterior end.

Greatest length 166 mm., dorsal margin 130 mm., greatest breadth 100 mm., depth of conjoined valves 33 mm.

Hab.—Australia (Paetel). The figured specimen is labelled "Queensland," but without details. The type was reported by Hanley from Amboyna. Other specimens in the Museum were collected at the Gilbert Islands by Dr. Mackellar.

³² Brauer—Sitz. k. Akad. Wiss., lxxvii, 1878, p. 28.

ATRINA INFLATA *Dillwyn*.

- Pinna inflata* Dillwyn, Deser. Cat. i, 1817, p. 326, for Chemnitz Conch. Cab., viii, 1785, pl. 87, fig. 771. *Id.*, Hanley, Cat. Rec. Bivalves, 1843, p. 156 (not *Pinna inflata* Reeve, etc.).
- Pinna pectinata* var. *beta*, Gmelin, Syst. Nat. xiii, 1791, p. 3364.
- Pinna vitrea* Bolten, Mus. Bolt. (2), 1798, p. 159, not *P. vitrea* Gmelin op. cit. p. 3366.
- Pinna hanleyi* Reeve, Conch. Icon., xi, 1858, pl. viii, fig. 15. *Id.*, von Martens, Ann. Mag. Nat. Hist., (3), xvii, 1866, p. 86.
- Pinna serra* Reeve, Conch. Icon., xi, 1858, pl. xxiii, fig. 43. *Id.*, Clessin, Conch. Cab., viii, 1890, p. 60, pl. 28, fig. 2. *Id.*, Smith, Proc. Zool. Soc., 1891, p. 433. *Id.*, Sowerby, Marine Shells of South Africa, Appendix, 1897, p. 27. *Id.*, Lynge, K.D. Vidensk. Selsk., 7, v, 1909, p. 149.
- Pinna penna* Reeve, Conch. Icon., xi, 1858, pl. xxi, fig. 40.
- Pinna serrata* Hedley, Proc. Linn. Soc. N.S.W., xxx, 1906, p. 537.

Young examples, 70-75 mm. in length from Darwin correspond well to Reeve's figure of *P. penna*. Misled by Hanley's reference³³ of *Pinna serrata* to New South Wales, I had confused that West Indian shell with the present species.

Hab.—Queensland:—Moreton Bay (type of *P. serra*), Keppell Bay (G. Gross); Northern Territory:—Darwin (W. H. Christie).

ATRINA NIGRA *Dillwyn*.

- Pinna nigricans* Solander, Cat. Portland Mus., 1786, p. 147 (*Nom. nud.*).
- Pinna rudis* Bolten, Mus. Bolt. (2), 1798, p. 159, for *Pinna nigra* Chemnitz, viii, p. 221, t. 88, f. 774, and vignette 15, fig. A (not *P. rudis*. Linné.)
- Pinna nigra* Dillwyn, Descrip. Cat. i, 1817, p. 325 (for the same figure of Chemnitz). *Id.*, Wood, Index Test., 1828, p. 71, pl. 12, fig. 2; *Id.*, Clessin, Conch. Cab., 1890, p. 65, pl. 21, fig. 2; *Id.*, Melvill & Standen, Journ. Linn. Soc. Zool., xxvii, 1899, p. 184. *Id.*, Lamy. Bull. Mus. Hist. Nat., xii, 1906, p. 313.
- Pinna nigrina* Lamarek, An. s. vert. vi, 1819, p. 134, and Encyclopédie Méth., pl. 199, fig. 1 a, b.

Hab.—Queensland:—Torres Strait (Haddon).

Dillwyn's *P. nigra*, a symmetrical tongue-shaped shell, has been confused by later writers with another black *Atrina* of different contour and it is doubtful if Melvill and Standen have correctly identified the shell which Professor Haddon collected in Torres Strait.

³³ Hanley—Cat. Recent Bivalves, 1843, p. 254.

ATRINA STRANGEI *Reeve*.

(Plate xx, fig. 10.)

Pinna strangei Reeve, Conch. Icon. xi, Aug., 1858, pl. xxvii, sp. 52. *Id.*, Hanley, Proc. Zool. Soc., Nov., 1858, p. 254. *Id.*, von Martens, Ann. Mag. Nat. Hist., (3), xvii, 1866, p. 86. *Id.*, Clessin, Conch. Cab., viii, 1890-1, pp. 70 and 102, but not pl. 24, fig. 1 (*vexillum*).

Pinna hystrix Hanley, Proc. Zool. Soc., Nov. 9, 1858, p. 226. *Id.*, Reeve, Conch. Icon., xi, Index, 1859, for pl. xxxii, fig. 60. *Id.*, Pagenstecher in Kossmann Roth. Meer. gesamm. Moll., 1877, p. 30. *Id.*, Lynge, D.Kgl. Danske Vidensk. Selsk., Skripter 7, t. v, 1909, p. 149.

The vermiculate sculpture of the ventral limb contrasting with the sharp even radials of the rest of the disk and the proportion of height to length furnish good recognition marks. Von Martens, followed by Clessin, identified *strangei* with *vexillum* and united the variety *hystrix* to *saccata* of Chemnitz, both of which references seem to the writer to be erroneous. Specimens in this Museum from Moreton Bay exactly correspond to Reeve's figure. A shell 150 mm. in length taken in 25 fathoms off Norah Head is here figured. A valve from Ballina which develops scales on the distal radials thus approaches var. *hystrix*.

Hab.—Queensland:—Moreton Bay (type, F. Strange); New South Wales:—Ballina (Hedley), off Norah Head, 25 fathoms (McNeill & Livingstone).

ATRINA TASMANICA *Tenison Woods*.

(Plate xx, fig. 13.)

Pinna tasmanica Tenison Woods, Proc. Roy. Soc. Tasm., 1875 (March, 1876), p. 161 and 1877, p. 55. *Id.*, Smith. Chall. Zool. Rep., xiii, 1885, p. 283. *Id.*, Tate & May, Proc. Linn. Soc. N.S. Wales, xxvi, 1901, p. 440. *Id.*, Pritchard & Gatliff, Proc. Roy. Soc. Vict. (2), xvii, 1904, p. 258. *Id.*, May, Illustr. Index Tasm. Shells, 1923, pl. 3, fig. 1.

This species has not been previously noted from this State. Local specimens are 165 mm. in length, more arched on the dorsal margin and have more scales than typical shells. Colour clay, darkening to dusky brown on the apices. The riblets are half a dozen, widely spaced on the top side and another half dozen small and closely packed on the ventral limb; these carry at irregular intervals tall and subtubular scales.

Hab.—Tasmania:—North coast (type, Legrand), Port Sorrell (Miss Lodder), Circular Head (May); King Island (A. F. Basset Hull); Victoria:—Monceour Island, 38, fathoms ("Challenger"); Sorrento, Western Port and Lakes Entrance (Pritchard); New South Wales:—Shoalhaven Bight, 15-45 fathoms ("Endeavour"), off Norah Head, 25 fathoms (McNeill & Livingstone).

VAR. DUMOSA *var. nov.*

Pinna tasmanica Tate, Trans. Roy. Soc. S.A., xi, 1889, p. 69.

South Australia:—Tapley Shoal, St. Vincent Gulf, 15 fathoms (Matthews & McDougall).

This western form is smaller than the type, length 130 mm., breadth 70 mm., and the sculpture is more thorny, there being seven rows of eight or nine erect scales, exclusive of the smaller scales on the ventral limb.

ATRINA VEXILLUM *Born.*

Pinna lata Rumphius, Amboin. Rareit., 1741, p. 154, pl. 46, fig. 1.

Pinna incurvata Gualtieri, Index Test., 1742, pl. 81.

Pinna rudis var. *beta*, Linné, Syst. Nat., xii, 1767, p. 1159.

Pinna vexillum Born, Index Mus. Caes. Vind., 1778, p. 118; *Id.*, Born, Mus. Caes. Vind. Test., 1780, p. 134, pl. vii, fig. 8; *Id.*, Chemnitz, Conch. Cab., viii, 1785, p. 238, pl. 91, fig. 783; *Id.*, Gmelin, Syst. Nat., xiii, 1791, p. 3366; *Id.*, Lamarek, An. s. vert. vi, 1819, p. 134; *Id.*, Blainville, Dict. Sci. Nat., xli, 1826, p. 70. *Id.*, Hanley, Cat. Rec. Bivalves, 1843, p. 254; *Id.*, Clessin, Conch. Cab., 1890, p. 66, pl. xix, fig. 3, pl. 24, fig. 1; not *P. vexillum* Reeve.

Pinna gubernaculum Boltzen, Mus. Bolt. (2), 1798, p. 159.

Pinna nigrina Sowerby, Genera Shells, pt. 26, 1825, pl. 103; *Id.*, Reeve, Conch. Syst., i, 1841, p. 42, pl. 104; *Id.*, Chenu, Man. Conch., ii, 1862, p. 164, fig. 821; *Id.*, von Martens, (in part) Ann. Mag. Nat. Hist. (3), xvii, 1866, p. 86; *Id.*, Pilsbry, Mar. Moll. Japan, 1895, p. 147; *Id.*, von Martens, Rumphius Gedenboek, 1902, p. 128. Not *Pinna nigrina* Lamarek.

Pinna nigra Reeve, Conch. Icon. xi, 1858, pl. 3, sp. 4; *Id.*, Odhner, Kungl. Sv. Akad. Handl. lii, 1917, p. 7; *Id.*, Jones, Coral and Atolls, 1910, p. 348; *Id.*, Dautzenberg, Journ. de Conch., lxxviii, 1923, p. 60. Not *P. nigra* Dillwyn.

Pinna sp. Encycl. Meth., pl. 199, fig. 2.

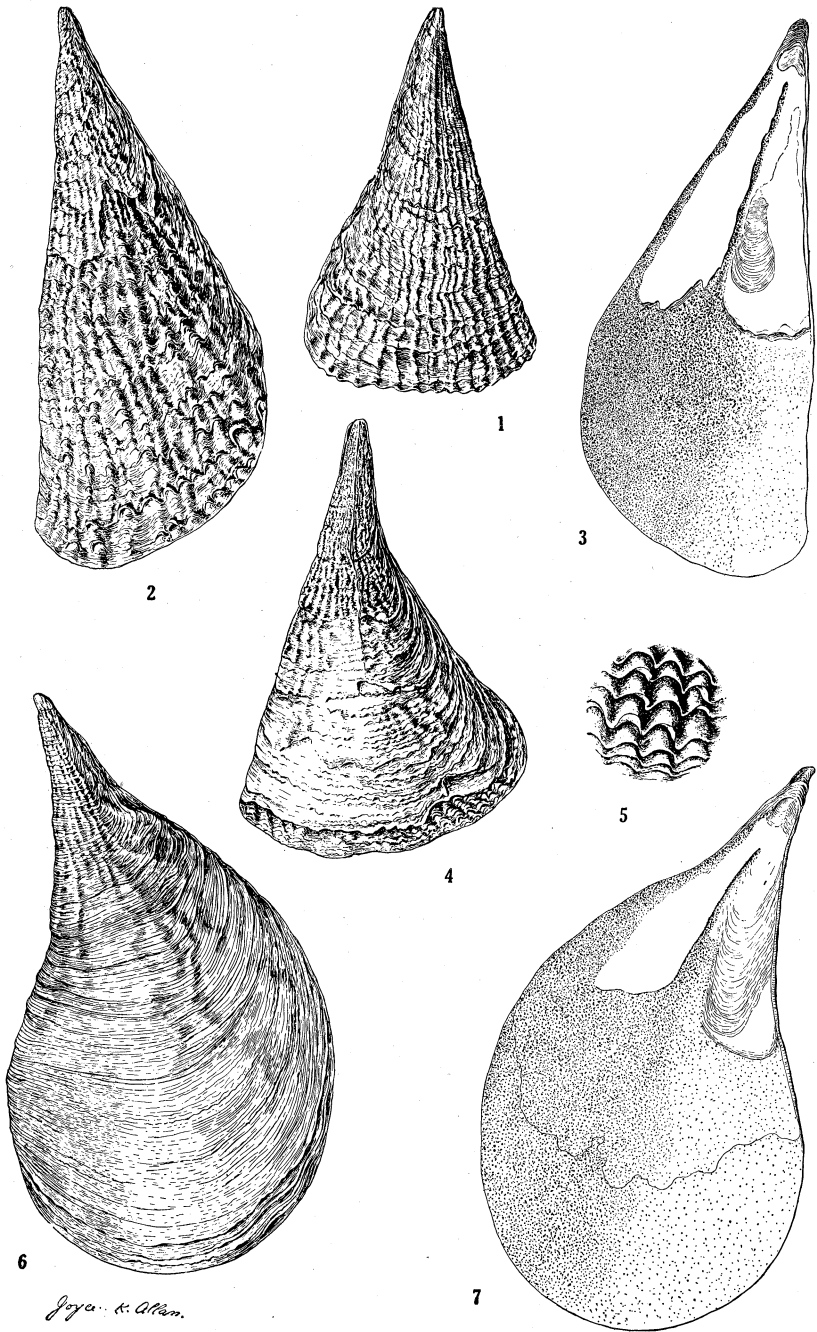
Hab.—Queensland:—Murray Island (Hedley); W. Australia:—Broome (Mjöberg). An example in this Museum from the Trobriand Islands is 12 inches long and 7 broad.

Jukes has noted³⁴ that the native names for the common *Pinna*, probably this species, were "mowba" on Darnley Island and "wagger" on Cape York.

³⁴ Jukes—Voy. "Fly," ii, 1847, p. 286.

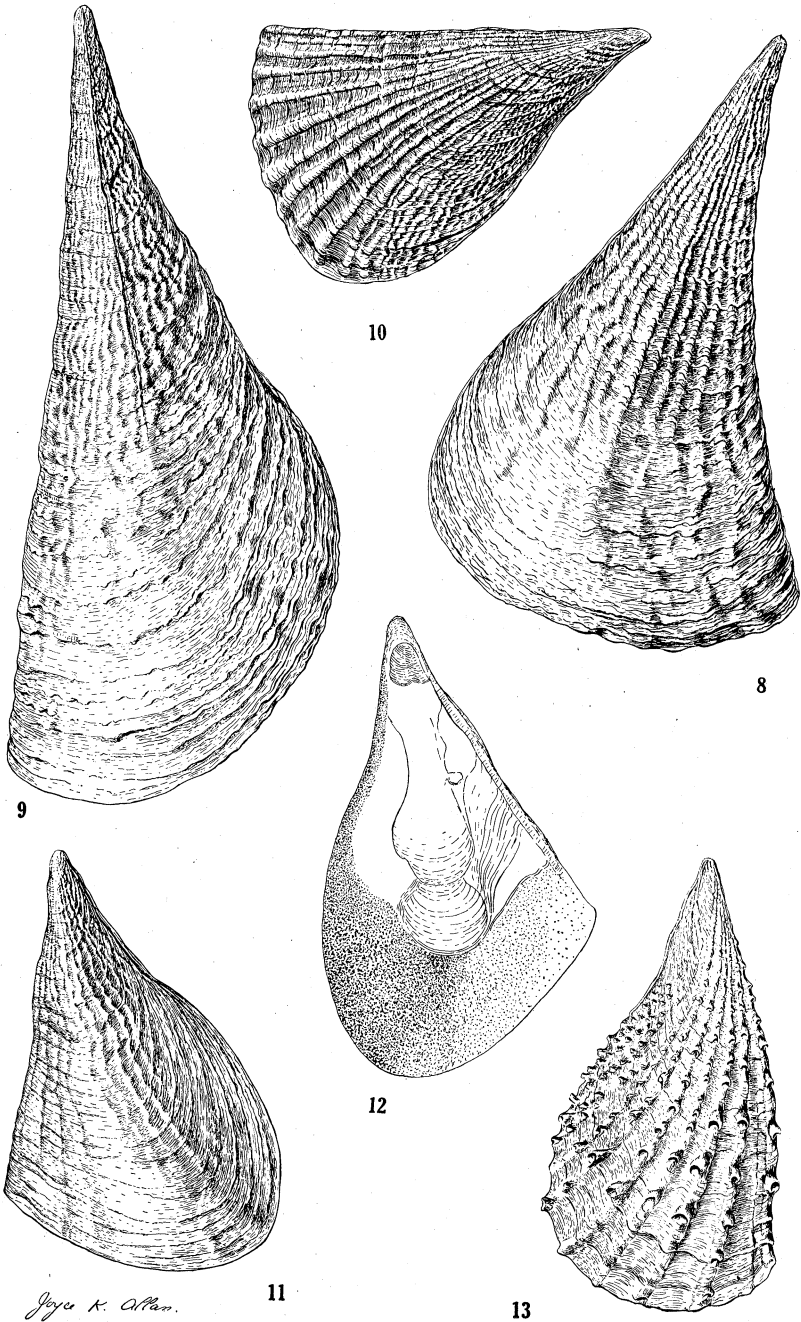
EXPLANATION OF PLATE XIX.

- Fig. 1. *Pinna isosceles* Hedley, type from Sydney.
„ 2. *Pinna menkei* Reeve, from Camden Haven; exterior.
„ 3. *Pinna menkei*; interior to show muscle scars.
„ 4. *Pinna virgata* Menke, from South Australia.
„ 5. *Pinna virgata*; sculpture enlarged.
„ 6. *Pinna scapula* Hedley, type from Port Darwin; exterior.
„ 7. *Pinna scapula*; interior.



EXPLANATION OF PLATE XX.

- Fig. 8. *Pinna menkei* Reeve, var. *caviterga* Hedley, type from Fraser Island, Queensland.
- „ 9. *Pinna dolabrata* Lamarck, from Port Adelaide.
- „ 10. *Atrina strangei* Reeve, from Norah Head.
- „ 11. *Atrina gouldii* Reeve, from “Queensland”; exterior.
- „ 12. *Atrina gouldii*; interior.
- „ 13. *Atrina tasmanica* Tenison Woods, from Norah Head.



EXPLANATION OF PLATE XXI.

- Fig. 14. *Pinna dolabrata* Lamarck, from a cotype in the Geneva Museum; exterior.
- „ 15. *Pinna dolabrata*; interior. These were photographed for me and are now published by the kind permission of M. Bedot, Director of the Muséum d'Histoire Naturelle de Genève.

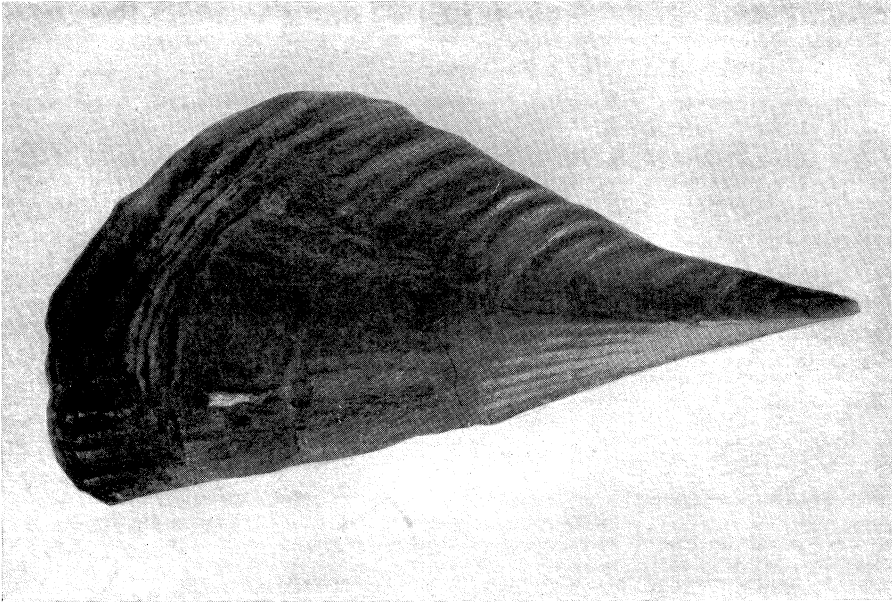


Fig. 14

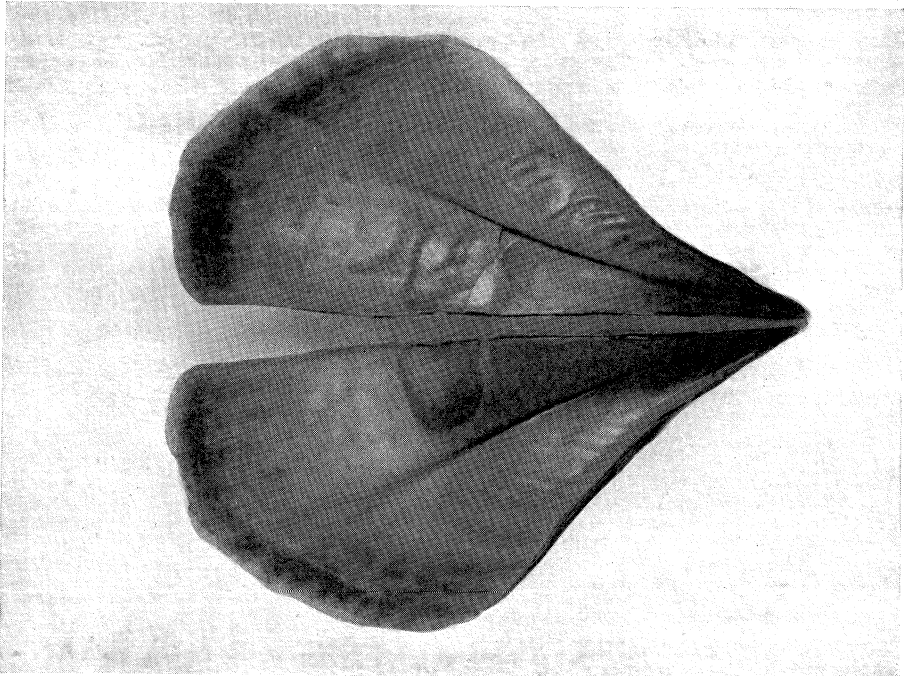


Fig. 15