

be necessary to place it in an independent section of the class. To this we may assign the name of POLYZOA ASPIDOPHORA. Indeed I regard *Rhabdopleura* as entitled to a rank at least as high as that of the ECTOPROCTA and ENDOPROCTA; and the ASPIDOPHORA will thus constitute a third great section of the class.

The hydroid affinity attributed to *Rhabdopleura* by the elder Sars, and accepted by his son, is based on a misconception of hydroid structure and development, as doubtless the distinguished Scandinavian zoologist would, on more mature consideration, have been among the first to admit\*.

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MOLLUSCA OF H.M.S. 'CHALLENGER' EXPEDITION.

III. TROCHIDÆ, viz. the Genera *Sequenzia*, *Basilissa*, *Gaza*, and *Bembix*. By the Rev. R. BOOG WATSON, B.A., F.L.S., &c.

[Read December 5, 1878.]

THE following group of genera are of considerable interest. They are nearly all from very deep water. Of the *Sequenzias*, two species are new; and some additional information of interest has been obtained regarding the genus. *Basilissa* is a new genus whose labial and basal sinus connect it with *Sequenzia*; while both genera present *Pleurotomaria* features hitherto unknown among the Trochidæ. *Gaza* is utterly distinct, not alone from these two genera, but from any thing known in the family, in which a reverted thickened lip is an entire anomaly. The genus *Bembix*, here proposed, is made for a new form of the Trochidæ, presenting an epidermis.

SEQUENZIA, *Jeffr.*

J. G. Jeffreys, Report on the Biology of the 'Valorous' cruise, Roy. Soc. Proc. No. 173, 1876, p. 200.

In all the species of this genus I have seen, besides the infrasutural sinus resembling that of *Pleurotoma*, there are two others—one, which is rather sharp and slight at the carina, and another, opener, on the base: between all of these the lines of growth curve out strongly towards the mouth. This might probably be accepted as a generic character. It is a feature very difficult to trace; but it certainly exists. In a perfect shell the mouth-edge

\* See Ray Lankester in Quart. Journ. Micr. Sci., Jan. 1874.



would of course exhibit it ; but all the specimens I have seen are more or less chipped.

The nacre of the shell is a feature that connects this genus with the Trochidæ. The nacreous layer is evidently not thick ; and when the shell is young and perfectly fresh it is altogether so translucent that the nacre hardly appears as more than a pearly lustre ; and in all cases it has more of the beauty of the actual pearl than that of the mother-of-pearl shell, but the nacreous layer is unmistakably present. The exterior calcareous layer is thin and very highly translucent, but still not glassy.

### *List of Species.*

- |                                      |                                |
|--------------------------------------|--------------------------------|
| 1. <i>Sequenzia formosa</i> , Jeffr. | 3. <i>S. carinata</i> , Jeffr. |
| 2. <i>S. ionica</i> , W.             | 4. <i>S. trispinosa</i> , W.   |

#### 1. SEGUENZIA FORMOSA, Jeffr.

St. 24. N. of Culebra Island. St. Thomas, Danish W. Indies. March 25, 1873. 390 fms. Several young and broken specimens.

St. 56. Bermudas. May 29, 1873. 1075 fms. *Globigerina*-ooze. 4 specimens, hardly full-grown.

Var. LINEATA, W.

St. 120 ? Pernambuco. Lat. 8° 73' S., long. 34° 28' W. September 9, 1873. 675 fms. Mud. 1 young specimen.

St. 122 ? Pernambuco. Lat. 9° 10' S., long. 34° 50' W. September 10, 1873. 350 fms. Mud. 1 young specimen.

J. G. Jeffreys, 'Valorous' Expedition, Roy. Soc. Proc. No. 173, 1876, p. 200 :—From N. Atlantic, 1450 fms. Bay of Biscay, Spain, and Portugal, 718–795 fms. Gulf of Mexico, 325 fms. Fossil, Trapani, Sicily (*Sequenzia*).

*Shell*.—Small, conoidal ; spire high ; base inflated, white, glossy, with high spiral threads. *Sculpture*. Of spiral threads there are ten on the last whorl—one small, sharp, just at the suture ; two, strong and sharp, of which the lower forms the basal carina ; the upper, which is sometimes even the more prominent, lies a little higher than halfway between the basal and the sutural spiral : on the base there are seven, very equal in strength and in distribution—the first lies somewhat remote from the basal carina, and is separated from it by a broad shallow furrow ; the last lies pretty close to the pillar and twines round it. On the upper whorls only the sutural and supracarinal spirals are seen. There are microscopic spirals on all the surface. Longitudinals—there are many hair-like,



sharply projecting, flexuous, defining the lines of growth on the upper whorls, but these become very faint on the later whorls. *Colour* pure white with pearly translucency when fresh, but weathering opaque with a pearly gleam through the calcareous surface-layer. *Spire* high and conical, in some specimens a little depressed. *Apex* small, rounded, slightly tabulated, with the  $1\frac{1}{4}$  embryonic whorl projecting, round, glossy, but slightly roughened. *Whorls* 8, of slow and regular increase, angulated above, sharply carinated, inflated on the base, which is also slightly angulated by the third infracarinal spiral. *Suture* only doubtfully traceable (under the microscope) in the middle of the sutural spiral. *Mouth* perpendicular. *Outer lip* thin and sharp, not patulous, not descending, with an open not deep angular sinus near the suture, from which the line of the edge runs outwards uninterrupted across the second spiral, and forms a round projecting point, retreating again so as to form a second sinus, smaller and sharper, in the line of the basal carina, from which it again runs outwards into a rounded point in the exterior basal furrow, and from this again retreats, sharply changing its direction on the fifth spiral, and then again retreating, as before, to the sixth spiral, where it forms a third, open, obtuse-angled sinus, and then passes in regularly to the centre. *Pillar-lip* twisted, with a deep rounded sinus above, a strong twisted tooth at about two thirds of its length, another narrower rounded sinus below, and a sharp tooth at the point. The pillar is strengthened by a pad, which is spread out on the base so as to cover the seventh (counting from the suture) spiral, and envelops the pillar so as to leave a minute furrow behind it, but ceases at the pillar-tooth. *Umbilicus* completely closed (but in some young specimens presenting a minute hole, see var. *lineata*, W.). H. 0·2. B. 0·14, least 0·12. Penult. whorl 0·04. Mouth, height 0·07, breadth 0·06.

Mr. Gwyn Jeffreys tells me (*in litt.*, Nov. 15, 1878) that he has got the operculum of this species, and that it "is ear-shaped, very thin, paucispiral (having only two whorls); the spire very small, excentric, and placed on the columellar side, thus resembling somewhat that of *Solarium* and *Adeorbis*"—a feature which, according to Quoy and Gaimard, is shared by *Euchelus*, Philippi's subgenus of *Trochus*.

To the young specimens from Pernambuco, var. *lineata*, W., I



have put a query; for though I cannot separate them, still the longitudinal sculpture is stronger, and there is an umbilicus.

2. *SEGUENZIA IONICA*, *W.*\*

St. 24. Culebra Island. St. Thomas, Danish W. Indies. 390 fms. Mud. 7 young specimens.

St. 73. W. of Azores. June 30, 1873. Lat. 38° 30' N., long. 31° 14' W. 1000 fms. *Globigerina*-ooze. 2 specimens and fragment.

*Shell*.—Small, depressedly conical, sharply carinate, and spirally lirate, umbilicate, smooth. *Sculpture*. There is a sharp carina at the periphery; above this is a spiral liration formed by a sharp angulation, which on the upper whorls lies near the suture, but on the later whorls lies nearer the carina. The carina is margined below by a broad, shallow, round furrow, which is defined on its inner side by a sharp spiral thread. The umbilicus is defined by a sharp thread, outside of which is a shallow furrow and two or three more spiral threads; the centre of the base is nearly smooth, but has also some feeble spirals, which increase in strength toward the outside and toward the centre. Besides these, the whole surface is covered with sharp, not approximate, microscopic spirals. Longitudinals—there are numerous distinct lines of growth, which on the second whorl are like minute radiating spokes, and in the superior sinus (*i. e.* between the suture and the first spiral) are sharp and distinct, and more remote than elsewhere on the surface, except on the base round the umbilicus, where, though less sharp, they are even more distinct. *Colour* a dead chalky white, with an exquisite pearly nacre below the outside layer and within the shell. *Spire* low and scalar. *Apex* flattened, the embryonic  $1\frac{1}{2}$  whorl, though somewhat tumid and large for the genus, being somewhat immersed. *Whorls* 7, of regular and slow increase until the last, which increases somewhat more rapidly; angulated above, tumid on the base, where (unlike *S. carinata*) the edge of the umbilicus is the most projecting part. *Suture* linear, very minute, but defined by a very slight shelf, which projects horizontally just below it. *Mouth* perpendicular, squarish, but too much broken for description. *Outer lip*, the lines of growth show it to have the same three sinuses as those described in *S. formosa*. *Pillar-lip* patulous, a little reverted, scarcely twisted, with a broad deep sinus above, a strong, but not sharp,

\* So called from its resemblance to the volute of the Ionic capital.



twisted tooth projecting at about three fourths of its length, below which is a smaller sinus running out into a point at the extreme end of the pillar. *Umbilicus* large, funnel-shaped, deep, sharply defined by the edge of the base, the spiral of which runs out to the point of the pillar-lip. Within the umbilicus is a strongish undefined spiral furrow answering to the pillar-tooth, and the lines of growth are strongly defined. H. 0·18. B. 0·24; least breadth 0·21. Penultimate whorl 0·04.

This species differs from *S. carinata*, Jeffr., in being more depressed and broader, much more angulated and more lirate above, more tumid and lirate on the base, of which the carina is less flanged, and the most prominent part is the edge of the umbilicus, not the centre; here, too, the last whorl and the mouth are larger. The young of this species look disproportionately small and high.

### 3. SEGUENZIA CARINATA, Jeffr.

St. 73. West of Azores. June 30, 1873. Lat. 38° 30' N., long. 31° 14' W. 1000 fms. *Globigerina*-ooze. 1 specimen.

St. 78. San Miguel, Azores. July 10, 1873. Lat. 37° 24' N., long. 25° 13' W. 1000 fms. *Globigerina*-ooze. 1 specimen.

St. 85. Palma, Canaries. July 19, 1873. Lat. 28° 42' N., long. 18° 6' W. 1125 fms. Volcanic sand. 4 specimens, young.

St. 120. Pernambuco. September 9, 1873. Lat. 8° 37' S., long. 34° 28' W. 675 fms. Mud. 2 specimens, young.

J. Gwyn Jeffreys, Biol. Val. Cruise, Proc. Royal Soc. No. 173, 1876, p. 201. N. Atlantic, 690 fms. 'Porcupine' Expedition, 1870, Bay of Biscay, off Spain and Portugal, 718–1095 fms.

*Shell*.—Small, broadly conical, rounded on the base, sharply angulated, umbilicate, thin, polished, vitreous. *Sculpture*. There is a sharp circumbasal carina, which on the spire sometimes projects a little above the suture, and there is generally concealed by the succeeding whorl. In the middle of the whorls is a slight spiral thread, which on the earlier whorls is much stronger and somewhat lower in position than on the last; it defines the inferior edge of the generic sinus. The base is margined by a broad flat flange, and the edge of the umbilicus is defined by a fine sharp thread. Besides these there are some faint traces of microscopic spirals on the whole surface, especially on the base; and the basal sinus has on its outer edge more or less traces of a fine spiral thread. Longitudinals—there are many hair-like flexuous lines of growth. *Colour* glassy when fresh and young, in older shells



opaque white, but even then showing barely the faintest trace of pearly nacre. *Spire* conical, rather depressed, and with a slight convexity of its contour-lines. *Apex* very small and sharp, flattened on the one side, and with the minute embryonic  $1\frac{1}{2}$  whorl projecting roundly on the other. *Whorls* 7, of gradual increase, slightly convex above, flatter below, and a very little constricted above the sutural flange, whose edge is sharp below and rounded above. The base projects rather sharply from the inner side of the carinal flange, and then passes rather flatly across to the edge of the umbilicus, into which it slopes steeply. *Suture* linear and a very little impressed. *Mouth* perpendicular, almost square, but a little rounded both on the sides and at the angles. *Outer lip* sharp and thin, not patulous, not descending; the curves of its edge are similar to those described in *S. formosa*, there being three sinuses, one near the suture, a second at the carina, and a third toward the exterior of the base. *Pillar-lip* is patulous and a little reverted, scarcely twisted, with a broad deep sinus above, a strong twisted projecting tooth at about three fourths of its length, below which is a smaller sinus running out into a point at the extreme end of the pillar. *Umbilicus* large, funnel-shaped, deep, defined by a fine spiral thread, which runs out to the point of the pillar-lip; within the umbilicus is a shallow furrow answering to the pillar-tooth, and above is another spiral thread, stronger, but less sharp than that on the edge; the curved lines of growth are strongly defined in the umbilicus. H. 0.15. B. 0.17, least 0.15. Last whorl 0.037. Mouth, height 0.049, breadth 0.5.

This species is so thin and transparent that scarcely any trace of nacre can be recognized; but by carefully occluding the light on the outside, and thus having all the light reflected from the inside of the mouth, the pearly lustre is distinctly visible, especially at the outer upper corner.

#### 4. SEGUENZIA TRISPINOSA, W.\*

St. 120. Pernambuco. September 9, 1873. Lat.  $8^{\circ} 37'$  S., long  $34^{\circ} 28'$  W. 675 fms. Mud. 12 specimens, old and young.

*Shell*.—Small, high, conical, scalar, with three rows of tubercled lirations, umbilicate, thin, smooth. *Sculpture*. There is a sharp circumbasal carina, above this is a broad shallow furrow; about one third up the whorl is a narrow and blunt liration; a little more remote is a third, separated by a

\* From the three rows of spinous lirations.



narrow, horizontal, flat surface from the suture. All these three lirations are ornamented with little tubercles or blunt spines, which are strongest on the highest thread, and there number about twenty-five on the body-whorl, on the second thread there are about twenty-eight. The base, which is rather flatly arched, has round the outside a flat surface hardly deep enough to be called a furrow, defined on the inner side by a clear narrow line, within which the curve of the base rises a little and has some faint spirals. The edge of the umbilicus is sharply defined by a fine line, outside of which is a broad shallow furrow bordered externally by a slight spiral; there is another narrower furrow, the outer side of which is the most projecting part of the base, but beyond this is rather flat and has some obsolete spirals. On the upper whorls the spirals are feeble and without tubercles, which only appear distinctly on the fourth whorl. Longitudinals—the flexuous lines of growth are very faint. *Colour* porcellanous when young and fresh, but weathering to a chalky white, with a pearly nacre below the thin surface and within the mouth, especially at the outer upper corner. *Spire* conical, high, scalar. *Apex* very small and sharp, flattened on the one side, and with the minute  $1\frac{1}{4}$  embryonic whorl projecting tumidly on the other. *Whorls*  $7\frac{1}{2}$ , of gradual increase: the upper ones are rounded; the later flat below the suture, then angulated, then flat on the conical slope of the spire, and then very slightly constricted above the carina, very slightly rounded on the base, with a flat and slightly impressed, but sloping border round the outside, sharply angulated at the umbilicus. *Suture* linear, but strongly defined by the constriction and impressed angulation of the shell at that point. *Mouth* perpendicular, nearly square. *Outer lip* sharp and thin, not patulous, not descending. The curves are very faintly indicated by the lines of growth, but are similar to those described in *S. formosa*, Jeffr., there being three sinuses, one near the suture between the first and second spinose thread, a second, very small but sharp, at the carina, and a third toward the exterior of the base. *Pillar-lip* is patulous and reverted, with a furrow behind it, twisted, with a broad deep sinus above; a strong twisted projecting tooth at about two thirds of its length, below which is a smaller sinus running out into a point at the extreme end of the pillar; this point corresponds to the umbilical carina. *Umbilicus* more open than large, perpendicular and deep, being only slightly



narrowed by the reverted pillar-lip and by the corresponding ridge which twines spirally round the pit-wall. Below this ridge is a very strongly marked furrow, which corresponds to the pillar-tooth. H. 0.14. B. 0.15; least breadth 0.13. Last whorl 0.06. Mouth, height 0.05, breadth 0.06.

This species most resembles *S. carinata*, Jeffr., but is narrower, sharper, and the last whorl is larger: the suture is angulately impressed instead of being faintly linear; the spiral threads are stronger, and are picked out with tubercles; the base is more equably curved, the spirals on it are stronger: the umbilicus is smaller, and is more strongly defined, not only by the stronger carina, but by the extracarinal furrow. The pillar-tooth comes in higher up than in that species.

BASILISSA, *W.*, gen. nov. (βασιλισσα, *queen*.)

Testa conica, carinata, umbilicata, margaritacea, anfractu ultimo superne sinuato; columella recta, parum obliqua, tenuis, superne excavata, inferne vix dentata, ad basin autem valde angulata; apertura rhomboidea, labiis nec conniventibus nec callo palatali junctis.

The special feature of this genus is the sinus in the outer lip near its junction with the body. In the presence of such a sinus it resembles *Sequenzia*, Jeffr., but differs from that genus in this, that *Basilissa* has a wide, open, shallow, not a deep-cleft sinus, is brilliantly nacreous, and lacks the sharp tooth on the pillar with the strongly marked sinus above and below it. It also wants the carinal sinus which all the species of *Sequenzia* I have examined present; and the basal sinus can scarcely be said to exist, though on the base the lines of growth change their direction markedly below the carina.

In form, in sculpture, and in its sinus this genus recalls M'Coy's genus *Platyschisma*, a Carboniferous fossil; but that belongs to the Solariidæ, and is distinguishable at once by the absence of the mother-of-pearl structure of shell, by its rounded mouth, and by its short pillar.

*List of Species.*

- |                                 |                             |
|---------------------------------|-----------------------------|
| 1. <i>Basilissa lampra</i> , W. | 4. <i>B. alta</i> , W.      |
| 2. <i>B. simplex</i> , W.       | 5. <i>B. superba</i> , W.   |
| 3. <i>B. munda</i> , W.         | 6. <i>B. costulata</i> , W. |

1. BASILISSA LAMPRA, *W.* (λαμπρὸς, *shining*.)

St. 246. July 2, 1875. Lat. 36° 10' N., long. 178° 0' E. Mid Pacific, east of Japan. 2050 fms. Grey ooze. 1 specimen.



*Shell*.—Thin, white, opalescent, smooth, faintly reticulated. In form slightly resembling a smallish *Zonites cellarius*, with a high concave spire, sharp apex, acute carina, angulated umbilicus, and rhomboidal mouth. *Sculpture*. Smooth, glossy, iridescent, with ten to twenty faint spiral threads on the upperside of the body-whorl; the last of these which joins the lip is much stronger than the others; a little remote and below is a thread forming the keel, below which, and nearer, are two other strong threads; round the umbilicus are also two strong threads; the intermediate space on the base is marked with eight to ten impressed spiral striæ. The interstices of the spirals are crossed by longitudinals, which are regular, fine, hair-like, but distinct and well parted; their curve on the surface below the suture shows the old sinus. On the base they are radiating and are crowded and irregular, except round the umbilicus, where in the first two or three striæ they are very sharp and distinct. On the upper whorls both the spirals and longitudinals are finer, but sharper, than on the last. *Colour* a greyish, horny, translucent, opalescent white. *Spire* raised, with a concave outline. *Apex*, which consists of the single minute embryonic whorl, is slightly exserted and sharp; it is quite smooth, but the spirals and longitudinals begin sharply immediately below it. *Whorls*  $6\frac{1}{2}$ , of slow and regular increase except the last, which widens rapidly, depressed, quite flat, except the last, which is slightly rounded above, and still more slightly concave on the base, with an acute, but still rounded keel. *Suture* impressed on the body-whorl, but on the upper whorls sharply, though slightly, margined below. *Mouth* a little oblique, rhomboidal, the basal and palatal lines being nearly parallel, while the outer and inner lip diverge downwards. *Outer lip* thin, not patulous, not descending, advancing at its junction with the body-whorl, and then retreating so as to form a shallow, broad, open sinus a little below the suture, acutely, but roundedly, angulate at the periphery, nearly flat on the base, with a very slight nick at the point of the pillar, where it joins the inner lip at a slightly obtuse angle. The *pillar-lip* is straight. It is a very little thickened, and is slightly porcellaneous. It advances a little on the edge of the umbilicus; below this it is hollowed out by a receding curve, but advances again into a slight rounded projection just above its junction with the outer lip. In its whole direction it inclines slightly to the left. *Umbilicus* oblique edged, funnel-shaped, being wide in the mouth and deep, with straight converging sides. It is slightly



marked with lines of growth and a few faint spirals; while all the rest of the shell without and within is brightly opalescent, it is scarcely so at all. Height 0.3. B. 0.48, least 0.35. Penultimate whorl 0.08. Mouth, height 0.2, breadth 0.23.

This specimen is full-grown, and the animal is still within the shell, but the operculum is absent.

The species has a slight general resemblance to *Trochus* (subg. *Solariella*, S. Wood) *aureonitens*, A. Ad., but is utterly different, not only in its angulation, but in its sculpture.

2. *BASILISSA SIMPLEX*, W. (*simplex*.)

St. 323. February 28, 1876. Lat. 35° 39' S., long. 50° 47' W. Off mouth of La Plata. 1900 fms. Grey mud. 1 specimen.

*Shell*.—A rather narrow cone, with a flat base, sharply angulated, small, thin, delicate, smooth, glassy, nacreous under a thin white calcareous surface. *Sculpture*. There are longitudinals, which are faint, hair-like, and sinuated, showing the old lines of growth. Of spirals, faint, rounded, and irregular, the whole surface has traces. At the bottom of each whorl is a flat puckered band, about 0.01 inch broad, whose upper edge projects sharply, especially on the upper whorls, and whose lower edge is a slight narrow flange which forms a sharp carina at the periphery. This band forms the upper border of the suture, which is further marginated below by two not contiguous rounded threads occupying the top edge of each whorl. The base is covered by about fourteen rounded ridges and furrows, which are rather stronger toward the centre, the last one, forming the edge of the umbilicus, being specially so. *Colour*, the surface is a dead slightly creamy white, formed by a thin calcareous layer through which the underlying nacre shines. *Spire* high and conical. *Apex* broken. *Whorls* 8 (reckoning the first two as broken), of slow and regular increase till the last, which enlarges rapidly; perfectly flat, with an upper and lower border, sharply angulated and carinated at the periphery, slightly convex, but still very flat on the base, with a bluntly angulated and carinated umbilical edge. *Suture* linear, almost invisible, marginated above and below. *Mouth* perpendicular, rhomboidal, with the body-pillar and basal edges nearly equal, and the pillar and outer lip nearly parallel. *Outer lip* sharp and thin, not patulous, not descending, advancing at its junction with the body-whorl, then retreating so as to form the broad open sinus, acute-angled at the



periphery, slightly arched across the base, nicked close to the point of the pillar. *Pillar-lip* arched, strengthened by a thin pad; reverted on the umbilicus so as to leave a slight groove behind it, with a slight tooth in front. From the body-whorl it bends very much over to the left, so as largely to cover the umbilicus, and then it curves over to the right to join the outer lip on the base at an obtuse angle. *Umbilicus* small, oblique-edged, funnel-shaped, nearly covered by the pillar-lip, and contracted within, scored with hair-like lines of growth. Height 0.255. B. 0.25, least breadth 0.2. Penultimate whorl 0.075. Mouth, height 0.12, breadth 0.11.

This is a narrower shell than *Basilissa alta*, W., less ornamented and with a smaller umbilicus. Than *B. munda*, W., this is a narrower shell, the flexuous longitudinals are stronger, the suprasutural band is stronger, and in that species the infrasutural band is wanting.

### 3. BASILISSA MUNDA, W. (*mundus*.)

St. 85. July 19, 1873. Lat. 28° 42' N., long. 18° 6' W. Off Palma, Canaries. 1125 fms. Fine volcanic sand. 1 young specimen.

*Shell*.—Broadly conical, flat on the base, sharply angulated, small, thin, delicate, smooth, glossy, nacreous under a thin white calcareous surface. *Sculpture*. There are longitudinals, which are very faint but still sharp, sinuated, showing the old lines of growth. Of spirals there are over the whole surface very faint traces. At the bottom of each whorl, about .01 in. above the suture, is a sharp narrow thread, which on the last whorl is bordered below by a second, rather higher and sharper, which forms the carina, and which on the spire is buried by the overlap of the succeeding whorl. On the base there are about eleven fine spirals, within which is a strong furrow, and a projecting, crenulated, or rope-like thread forming the edge of the umbilicus. *Colour* opalescent, from the underlying nacre shining through the polished, thin, translucent calcareous layer of the surface. *Spire* high and conical. *Apex* flattened, with the minute smooth embryonic  $1\frac{1}{2}$  whorl slightly projecting. *Whorls* 6, of regular and slow increase (but the specimen is not full-grown); perfectly flat, the slope being scarcely broken by the suprasutural thread. *Suture* linear, almost invisible. *Mouth* perpendicular, irregularly rectangular, broader than high. *Outer lip* sharp and thin, with a slight open sinus; sharply angled at the periphery,



slightly arched across the base, apparently nicked at the point of the pillar. *Pillar-lip* arched, strengthened by a thin pad, reverted on the umbilicus so as to leave a groove behind it, with a slight tooth in front. From the body it bends very much over to the left, so as largely to cover the umbilicus; it then advances straight and is toothed in front. *Umbilicus* small, oblique-edged, with a crenulated margin. Height 0.13. Breadth 0.14, least 0.12. Penultimate whorl 0.03. Mouth, height 0.06, breadth 0.05.

Than *B. simplex*, W., this is a broader, smoother, less banded shell. Than *B. alta* it is lower, less ornamented, with a much smaller umbilicus.

#### 4. BASILISSA ALTA, W. (*altus*.)

St. 24. Mar. 25, 1873. Culebra Island, St. Thomas, Danish W. Indies. 390 fms. Mud. 3 specimens, one full-grown.

St. 120. Sept. 9, 1873. Lat. 8° 37' S., long. 34° 28' W. Off Pernambuco. 675 fms. Mud. 1 young specimen.

Var. OXYTOMA, W.

*Shell*.—An equilateral cone, flat-based, sharply angulated. Small, thin, delicately sculptured. Nacreous under a thin, white, calcareous surface. *Sculpture*. There are longitudinals about 45, hair-like, strongly sinuated, flexuous, for they advance markedly on the periphery, where they are each ornamented by an elongated curved tubercle, and on the base they again retreat so as to form a sinus. On the earlier whorls these longitudinals are much more distinct than on the later, and each starts from a little bead, which lies close to the suture, but these beads are very feeble on the last whorl. In the intervals of the longitudinals and parallel to them are very faint lines of growth. Of spirals there are above the carina two stronger than the rest, with a sharp intermediate furrow; above these are several hair-like lines, which become feebler towards the middle of the whorl and stronger again above, the upper whorls presenting one in particular, which connects the row of infrasutural beads. On the base below the carina are four narrow and sharp spirals, followed by about eight, which are broader and flattened, and within there is one stronger than the rest, with about sixteen rounded beads, which crenulate the edge of the umbilicus. The furrows between these basal spirals are cut into little oblong pits by the longitudinals. *Colour* a dead creamy white, with the underlying nacre gleaming through. *Spire* high and conical.



*Apex* flattened, with the minute, smooth,  $1\frac{1}{4}$  embryonic whorl somewhat tumidly projecting. *Whorls*  $8\frac{1}{2}$ , of slow and regular increase. In the earlier whorls there is a slight tumidity below the suture, a slight contraction in the middle, and a slight swelling round the base of each whorl. This last feature is feebly persistent in the later whorls, but otherwise these are flat. There is a sharp carinated angle, and the base is almost flat, with an angular tubercled umbilical edge. *Suture* linear, almost invisible. *Mouth* perpendicular, somewhat rectangular, and broader than high. *Outer lip* sharp and thin, not patulous, not descending, with a rather deep but broad and open sinus at the suture, forming a slightly acute angle at the periphery, where it advances very markedly, retreating immediately to form a sinus on the base, where it is barely arched. *Pillar-lip*, which is somewhat thickened, advances very little at its junction with the body, then retreats slightly so as to form a small sinus, bending at the same time a very little over the umbilicus. It has a sort of double point with a slight nick between them. It is very slightly reverted, and the umbilical groove behind it is very small. *Umbilicus* small, funnel-shaped, oblique-edged, crenate on the margin, and strongly scored within, and with an oblique spiral formed by the old points of the false pillar-end. Height 0.25. Breadth 0.24, least 0.22. Penultimate whorl 0.08. Mouth, height 0.09, breadth 0.1.

The variety from Pernambuco is characterized by the remarkable distinctness of its sculpture, whence its name. This species is a broader and much more ornamented form than *B. simplex* or *B. munda*.

5. *BASILISSA SUPERBA*, W. (*superbus*.)

St. 184. E. of Cape York, Australia. Lat.  $12^{\circ} 8' S.$ , long.  $145^{\circ} 10' E.$  1400 fms. Grey ooze. 1 specimen.

*Shell*.—High, concavely conical, flat-based, sharply angulated; thin, finely reticulated, cream-coloured. Nacre very faint. *Sculpture*. Spirals, there are about twenty delicate threads, very nearly but not quite regular in thickness or distance, on the upper part of the last whorl; they slowly decrease in number on the previous whorls. The two (or three) which form the carina are thrown out a little on a projecting whitish fillet, which encircles the base of the whorls. This whitish fillet extends to the base, where it forms a narrow obliquely-corrugated edging. On the base there are about thirty spirals, more crowded, flattened, and irregular than above, and the edge of



the umbilicus is defined by another whitish fillet, ornamented with about thirty oblong beads. One or two smaller and more faintly beaded threads lie within the edge of the umbilicus. Longitudinals—there are of these on the last whorl about 120, flexuous, marking the lines of growth, rather stronger, more regular, and more distant than the spirals, which run over the top of them and form little white nodes at the crossings. The intersections of these two systems cut the whole surface into rhombic reticulations, whose breadth is about 0.011 and their height 0.006. The longitudinal threads themselves are about 0.005 and the spirals about 0.003 broad. On the base the longitudinals are flattened and spread out into undulations. *Colour* creamy, on a dull polished surface, with a very faint nacreous gleam, which is pearly within the mouth; the apex is ruddy. *Spire* high and conical, with slightly concave slopes; apex broken. On the upper whorls the longitudinals are strong, while the spirals are obsolete, except the carinal fillet, which projects bluntly above the suture. *Whorls* about 14, of very regular increase, very slightly convex, sharply acute-angled at the carina; on the base, flat at the outer edge and barely convex in the middle, with a slight dip in toward the edge of the umbilicus, which is strongly defined. *Suture* linear, defined by the white carinal fillet, and also on the lower whorls by being very slightly impressed. *Mouth* perpendicular, rhomboidal, the basal and palatal lines being parallel, the other two somewhat diverging and curved, broader than high. *Outer lip* sharp and thin, not patulous, not descending, with a shallow open sinus below the suture, below this, about the middle of the whorl, it advances with a rounded sweep, retreating sharply across the carina to form the open rounded basal sinus towards the outer edge of the base. *Pillar-lip* sharp and thin; it rises from the body a good way within the edge of the umbilicus. It retreats so as to form a sinus, and there it bends over a little on the umbilicus, and it forms a sharp angle projecting into a tooth at the extreme point of the pillar. *Umbilicus* strong, deep, abrupt, there being on the base only a very slight dip in towards it, and it is defined by the white-beaded fillet. Within, besides the two spiral lines, there are slight longitudinal striations, and the inner edge of the whorls twines like a staircase round it, but concealed by the over-curve of the pillar-lip. H. 0.75. B. 0.65, least 0.6. Penultimate whorl 0.16. Mouth, height 0.2, breadth 0.28.



The form of this shell connects it with *Basilissa alta*, *B. simplex*, and *B. munda*, and it distinctly has the sinuses of the genus: the layer of nacre is very faint; there is, however, a gleam of it through the surface-layer, and within the mouth, in a favourable light and protected from light coming through the shell, there is a distinct pearly lustre.

It has some resemblance to *Eutrochus gemmatus*, Reeve, in form and in its gemmed umbilicus; and, though much higher and more conical, recalls the *Solaria* of the group *Torinia* (Gray), especially *S. trochoides*, Desh.

#### 6. BASILISSA COSTULATA, W.

St. 24. Mar. 25, 1873. Off Culebra Island, St. Thomas, Danish West Indies. 390 fms. Mud. Three rather young specimens.

*Shell*.—Small, depressedly conoidal, sharply angulated, flattish on the base, sharply and deeply umbilicated, a little porcellanous, flexuously ribbed. *Sculpture*. The whole surface is covered with longitudinal flexuous ribs, which are narrow, sharp, and uniform, and each is about 0.002 in. broad, and they are parted by intervals, which at the suture are twice and at the periphery thrice as broad as the ribs. There are about 40 of these on the last whorl. They are crossed by spirals, half the breadth of the ribs, running across the intercostal spaces and forming knobs on the ribs. Of these on the last whorl there are about seventeen, much closer-set and less uniform than the ribs; in particular the carinal spiral, which is very sharp, and the fourth and seventh above it, are stronger than the others; the last mentioned of these is especially so on the earliest whorls. On the base the longitudinals, though continued even into the umbilicus, become much less prominent and are no longer nodose; and the spirals, of which there are about fifteen, are closer-set, broader and flatter, except the first three below the carina, which are sharp and narrow. The whole base is pit-marked from the spiral interstitial furrows being cut up by the longitudinals. *Colour* dead white (on the base a little glossy) on the thin porcellanous surface, through which the nacreous layer behind gleams. *Spire* raised, with a very slightly concave outline. *Apex*, which consists of the minute smooth embryonic whorl and a half, is itself a little flattened, but rises sharply above the sculptured surface of the succeeding whorls. *Whorls*  $5\frac{1}{2}$ , of slow and regular increase till the last, which begins to enlarge rapidly. They are slightly



rounded above, very sharply angulated at the keel, and flattened on the base, with a bluntly angulated umbilical edge. *Suture* distinct, slightly impressed. *Mouth* perpendicular, square. *Outer lip* sharp, thickened by a slight internal remote callus, not patulous, not descending, advancing at its junction with the body-whorl and then slightly retreating so as to form the very shallow open sinus; right-angled at the periphery, flat on the base, where it retreats so as to form two rounded sinuses, making with the pillar an angle that is scarcely obtuse. *Pillar-lip* is straight, slightly thickened and reverted, so as to leave a slight groove behind it. It advances on the body-whorl, then retreats so as to form a slight sinus, bending at the same time shortly but sharply to the right into the umbilicus and then advancing straight forward, but a little toward the left, to its junction with the outer lip at the base. *Umbilicus* funnel-shaped, open-mouthed, oblique-edged, straight-sided, deep and contracted internally. Its edge is sharply defined by a spiral thread, and is obliquely scored by the longitudinal ribs; further in its walls are marked by hair-like lines of growth and faint spirals. Height 0.12. Breadth 0.14; least 0.11. Penultimate whorl 0.23. Mouth, height 0.063, breadth 0.061.

This species slightly resembles in sculpture the young of *Margarita striata*, Brod. (= *Trochus cinereus*, Couth., nec Da Costa), but in all details of form and ornamentation is very different. From *Trochus amabilis*, Jeffr., besides the generic features, it differs in the depressed spire, in the absence of the deep-cut suture, in the flatness of the base, and in all the features of minute sculpture.

GAZA, *W.*, gen. nov. (γάζα, *treasure*.)

Testa trochiformis, plane margaritacea, eleganter cælata, labio retroverso calloque margaritaceo incrassato; columella torta, directa, antice mucrone angulata, postice a labio penitus disjuncta, ad regionem autem umbilicalem in pulvinum margaritaceum complanata. Operculum rotundum, membranaceum, tenue, multispirale.

I wish to express by "plane" the sense of both *lucide* and *penitus*, the shell being both on the surface strikingly and throughout its whole substance entirely nacreous.

Whether this and all the other features enumerated above will prove constant is a question for time to determine. At present a new genus is inevitable; for this shell, though plainly one of the Trochidæ and of the Trochocochlea group, cannot possibly be



put into the genus *Trochus* in any of its divisions. In form it resembles most of all one of the West-Indian operculated pulmonates, such as *Alcadia*, while its exquisite nacre, its cancellated sculpture, its reflexed thickened lip, its nacreous umbilical pad, and its perpendicular externally mucronated pillar, separate it in the strongest way. In these circumstances I have yielded to the strongly expressed opinions of judges so trustworthy as Dr. Kobelt, of Frankfort, and Mr. Dall, of Washington, and take this as the type of a new genus.

1. GAZA DÆDALA, *W.* (*δαίδαλος*, *variegated*.)

St. 174. August 3, 1874. Kandavu, Fiji. Lat. 19° 10' S., long. 178° 10' E. 610 fms. *Globigerina*-ooze. 1 specimen.

*Shell*.—Depressedly globose, with a convexly conical spire, thin, translucent, horny, nacreous in its whole texture, and iridescent on the surface, with a slightly reverted and narrowly thickened lip, a thin-edged twisted pillar, the point of which runs out into a bluntly mucronated angle. *Sculpture*. Longitudinals—the whole surface is covered with strong, puckered, oblique lines of growth, which are sharp-edged, but flattened, rather regular, with many minuter ones in the intervals. The longitudinals are cross-hatched with spirals which are stronger and more regular but not perfectly uniform, consisting of square threads and furrows of equal breadth, and both scored by the longitudinals; on the earlier whorls these spirals disappear before the longitudinals do; and on the base they become on the outside feebler, closer, and finer, in the middle broader and flatter, and stronger again toward the centre of the shell. *Colour* a delicate yellowish, with a horny translucency and exquisite iridescence, which under the lens appears brilliant. *Spire* high and slightly scalar. *Apex* very small, flatly rounded, the embryonic  $1\frac{1}{4}$  whorl very slightly projecting. *Whorls* 7, of gradual increase, well rounded, the last slightly angulated below, and on the base flattened, but rather less so towards the mouth, where there is a slight contraction and downward turning of the whole whorl, without, however, any descending of the lip at its junction with the body. *Suture* very distinct, but not impressed. *Mouth* rather large, very oblique, semioval. *Outer lip* reflected and thickened by a strong but narrow, equal, rounded, white pearly callus, which almost disappears just at the upper corner, and which has a very slight furrow round its margin; it does not descend at all.



*Inner lip*—from the corner of the outer lip a very thin layer of nacre spreads out a little way across the body, but then ceases entirely. The pillar is spread out at its base as a confined, flattened, unevenly inclined, semicircular, iridescent umbilical pad, from the left corner of which the pillar proper projects, narrow-edged but rounded, twisted, straight, bending to the left, and advances into a sharply angulated, and, as seen from behind, even mucronated junction with the basal mouth-edge, to which the umbilical pad curving round the back of the pillar also attains. The inside is scored with the external sculpture, and is brilliantly iridescent. The umbilical pad is defined by a narrow furrow, and in front by a slightly tumid ridge, which is the least nacreous part of the whole shell. *Operculum* is membranaceous, horny, yellowish, with about six to seven turns, each strongly defined by a narrow line of thickening, and sharply scored with minute oblique radiating lines. H. 0.65. B. 0.87, least 0.7. Penultimate whorl 0.199. Mouth, height 0.43, breadth 0.41.

Unfortunately, though the operculum is preserved, nothing but traces of the animal remain within the shell.

BEMBIX, *W.*, gen. nov. (βέμβιξ, *a top.*)

Testa conica, alta, carinata, basi inflata, umbilicata, tenuis, margaritacea epidermide tenui membranacea induta.

The remarkable feature of this genus is its being covered with a thin, extremely persistent, smooth, fibrous epidermis, like that of some of the *Helices*, a feature to which I know nothing similar in the family. The epidermis swells up and becomes pustulated in water. In form the shell recalls some of the *Cantharidus* group, but is thinner and on the base more tumid; the axis is perforated, and the pillar is thin, reverted, and merely angulated in front. It is very unfortunate that the shell, of which there is but one specimen, is not quite full-grown, so that the form of the umbilicus and, still more, of the mouth is very doubtful. The animal, too, and the operculum are both absent. Its separation from the Turbonidæ is thus not quite satisfactory. As to the name of the genus, I think the only objection that can be taken to it is that Philippi proposed the name *Bembicium* for one of the genera of Litorinidæ, but afterwards himself withdrew it for the prior name of *Risella*, Gray.

1. BEMBIX *ÆOLA*, *W.*

St. 232. May 12, 1875. Mosima, Japan. Lat. 35° 11' N.,



long. 139° 28' E. 345 fms. Sandy mud. 1 specimen, not quite full-grown.

*Shell*.—High, concavely conical, carinated, sculptured on the upper whorls, smooth or wrinkled below, thin, with a tumid lirated base, narrowly umbilicated, with a smooth epidermis, thin, but especially so on the base. More or less nacreous all over under a thin porcellanous upper layer. *Sculpture*. The first three whorls (after the embryonic apex) are reticulated by three sharp remote spirals, and rather stronger, slightly oblique longitudinals, which rise at their intersection into small sharp pyramidal tubercles; the interstices are a little broader than high. This system gradually dies out and leaves the surface smooth, only the row of infrasutural tubercles survives in an enlarged but depressed form, and springing from these some sinuous oblique and slightly irregular longitudinal puckerings appear on the last whorl, which is nearly bisected by the sharpish, slightly expressed, finely tubercled carina. This bisection of the last whorl arises from the great prolongation and tumidity of the base, on which, below the carina, are five narrow, equally parted, spiral threads, and two intraumbilical ones, which are more contiguous. Besides this larger system of sculpture, the whole surface is covered with minute, oblique, irregular, and interrupted puckerings of the epidermis. *Colour* a brownish yellow, but below the epidermis there is a thin pure white porcellanous layer, through which and the epidermis the sheen of the nacreous layer gleams. The base is whiter, the epidermis there being very thin. Inside the mouth is an exquisite roseate nacre. *Spire* high, with a slightly concave contour, the lines of which are hardly swollen out by the slight tumidity of the last whorl. *Apex* eroded, but evidently small. *Whorls* 7 or 8, of regular increase, quite flat, except the last, which is very slightly constricted below the suture, a very little tumid on the upper slope, sharply carinated but not much angulated at the suture, and very tumid on the base. *Suture* linear, strongly defined above by the square furrow lying between the lines of tubercles which marginate the suture above and below. On the last whorl it becomes slightly pouting, from the projection of the carina and the slight infrasutural constriction. *Mouth* nearly square, very little oblique in the line of its advance, but standing out a little obliquely to the axis of the shell. *Outer lip* thin, not descending. *Pillar-lip* thin, spread out broadly at its base over the



umbilicus, which it largely conceals, with a deep narrow furrow behind it. It advances thin and pointed, curving over to the right to its angular junction with the basal lip. *Umbilicus* defined by a spiral thread and with two other spirals within it. It is not so much small as concealed by the pillar-lip. H. 0.82. B. 0.63, least 0.53. Penultimate whorl 0.19. Mouth 0.4; breadth 0.38.

Perhaps *Trochus* (*Cantharidus*) *iris*, Humph., while totally unlike in most respects, nevertheless approaches this in form more than any other shell does.

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Note as to the position of the Genus *Sequenzia* among the Gastropoda. By J. GWYN JEFFREYS, LL.D., F.R.S., F.L.S.

[Read February 6, 1879.]

THE Rev. R. Boog Watson in a valuable paper, which was lately read before the Society, on some of the Mollusca procured by the 'Challenger' Expedition, included the genus *Sequenzia* in the *Trochus* family.

When I described that genus in the 'Proceedings of the Royal Society' (No. 73, 1876, p. 200), I said that it evidently belonged to the *Solarium* family; and I gave my reason for this opinion, to which I adhere. I am sorry not to agree with my friend Mr. Watson; but such difference of opinion is useful to science.

The chief points of distinction between the genera of Trochidæ and Solariidæ consist in the shell of the latter not being pearly or nacreous inside, and in the operculum being ear-shaped and few-whorled, with a lateral nucleus and excentric spire, as in the Littorinidæ. The operculum in the Trochidæ is circular and multispiral, with a central nucleus. I have fortunately succeeded in extracting the operculum from a small fresh specimen of *Sequenzia formosa*; and I find it to be ear-shaped, very thin, paucispiral (having two whorls only), the spire being very small, excentric, and placed on the columellar side. It resembles that of *Solarium* and *Adeorbis*, genera of the same family. Mr. Watson says that my account of the operculum represents "a feature, which, according to Quoy and Gaimard, is shared by *Euchelus*, Philippi's subgenus of *Trochus*." Now all that Philippi remarks as to the operculum of *Euchelus* is, "der Deckel hat nach Quoy und Gaim. nur wenige Windungen;" but no mention is made of the shape of the operculum nor of its spire and nucleus. I have carefully examined





Watson, R Boog. 1879. "Mollusca of H.M.S. 'Challenger' Expedition: III. Trochidae, viz. the Genera *Sequenzia*, *Basilissa*, *Gaza*, and *Bembix*." *The Journal of the Linnean Society of London. Zoology* 14(78), 586–605.  
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