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LI.—A Revision of "A Survey of the Species and Varieties of Pupa, *Draparnaud* (*Jaminia*, *Risso*), occurring in South Africa," by James Cosmo Melvill, M.A., F.L.S., and John Henry Ponsonby, F.Z.S.* By HENRY C. BURNUP.

[Plate X.]

As there are no greater authorities on the South-African molluscan fauna than the authors of the paper under review, it is only after long hesitation that I have ventured on my present task.

The Survey having been largely based upon notes of mine comprised in a lengthy correspondence, and many of the passages therein which appear to require correction or further elucidation having been written in consequence of the authors having misunderstood certain parts of those notes, I feel justified in here offering opinions in opposition to the published views of these eminent writers.

The meaning of many sentences in their paper was distorted or rendered obscure through an unfortunate succession of printer's errors, only a few of which were emended in the "Errata" to the volume. In some few instances opinions were expressed as being mine, which, in fact, were not mine, though they were probably arrived at through the study of my initial work.

Thus, the consignment of so many species to the synonymy of *P. fontana*, Krs., was not prompted by me, as would appear to be the case from the text. Neither do I concur in the view that *P. intradentata*, Burnup, is a variety of *P. dysorata*, M. & P.

Among the printer's errors the most unfortunate is the rendering of the word *labrum* (outer lip) into *labium* (inner lip) in nearly every instance in which it was used in the MS., so completely altering the meaning.

This and a few other misrenderings have necessitated the publication of amended descriptions of the species affected, in the following pages.

Since the publication of the paper under discussion the kindness of friends and correspondents, especially Messrs. Ponsonby, Farquhar, and Tomlin, Dr. Sturany, and Major Connolly, has enabled me to study certain forms, specimens of which were unobtainable before, to describe two new varieties, add a few notes on matters not referred to in Melvill and Ponsonby's paper, and offer some new figures.

* Ann. & Mag. Nat. Hist. ser. 8, vol. i. (1908) pp. 70-86, pls. i. & ii.

I am particularly indebted to Mr. Ponsonby for the patient care with which he, during a recent visit to South Africa, discussed the Survey with me, and encouraged me to publish the emendments and additions to be found in the present revision.

Although Mr. Woodward's arguments in favour of the supercession of the name *Pupa*, Drap., by *Jaminia*, Risso*, seem to me quite convincing, I have in the following notes and descriptions, for the sake of convenience in reference, adhered as far as possible to Melvill and Ponsonby's nomenclature.

1. *Pupa crawfordiana* (M. & F.).
(Pl. X. figs. 1, 2.)

Melvill and Ponsonby say of this species: "Allied to *P. layardi*, Bens."; but it is easily distinguishable by its stouter form, less ventricose whorls, shallower sutures, more regularly conical spire, less mammillated apex, rather smoother surface, less effuse peristome, and by the absence of the seventh, minute, plait to be seen, in *P. layardi*, at the junction of the parietal wall with the columella. The arrangement of the other peristomatal processes is practically identical in both species.

The original figure is defective in form and deficient in detail, so I herewith offer new figures drawn from the co-type in Mr. Ponsonby's collection, kindly lent to me for the purpose. Mr. Ponsonby has compared my figures with the type in the British Museum, and finds that they correspond accurately, except that the *callus* in the type is not chipped as in the co-type, so verifying that part of the original description recording the peristome as continuous. Of the co-type it would be more accurate to say that the ends of the peristome converge and are connected by a callus. A comparison of fig. 2 with fig. 4 well illustrates the difference in profuseness of peristome.

Dimensions of co-type :—Alt. 6·96, lat. 3·38 mm.

2. *Pupa cryptoplax*, M. & P.

The specimen figured in the Survey measures as follows :—

Height 3·36, width 1·95 mm.

The dimensions of other specimens measured are :—

Height 3·76, width 2·15 mm.

„ 3·36, „ 2·15 „

„ 3·12, „ 2·00 „

* B. B. Woodward, Journ. of Conch. vol. x. (1903) pp. 358-361.

Burnup del.

II

12.

J. Green lith.

SOUTH AFRICAN PUPIDÆ

3. *Pupa dadion*, Bens.

This species is ovoviviparous.

Further localities :—Karkloof, Nottingham Road, and Inhluzani Mountain, Natal.

4. *Pupa damarica*, Ancey.

1888. *Pupa damarica*, Ancey, Le Naturaliste, p. 200.

1892. *Pupa ovampoensis*, M. & P. Ann. & Mag. Nat. Hist. ser. 6, vol. ix. p. 91, pl. vi. fig. 11.

1901. *Pupa ridibunda*, M. & P. Ann. & Mag. Nat. Hist. ser. 7, vol. viii. p. 320, pl. ii. fig. 11.

1908. *Pupa ovampoensis*, M. & P. Ann. & Mag. Nat. Hist. ser. 8, vol. i. p. 79, pl. ii. fig. 16.

1910. *Leucochilus damaricum* (Anc.), Bttg. Abhandl. d. Senckenb. naturf. Gesell. Bd. xxxii. p. 446.

There seems little, if any, reason to doubt the justice of Bœttger's discrimination in placing *P. ovampoensis*, M. & P., in the synonymy of this species, as Ancey's description conveys a faithful image of the shell known to South-African collectors as *P. ovampoensis*; but it must not be lost sight of that $1\frac{1}{2}$ mm., Ancey's width dimension, seems excessive, 1 mm. being the greatest width that I have observed with a height corresponding to that of Ancey's type, though in one very large specimen in my collection from Johannesburg (*McBean*), whose height is 2.5 mm., the width almost equals Ancey's measurement, being 1.11 mm.

The figure chosen by Melv. & Pons. to represent their species in the Survey is that of the lirate var. from Rustenberg (*McBean*), which shows more sculpture than the normal form, but agrees in other respects. The shell figured measures 2.25 mm. high and 1 mm. wide.

5. *Pupa dysorata*, M. & P.

The emended description given in the Survey has become somewhat involved, owing apparently to two causes, viz., firstly, to the authors having included *intradentata* as a var. of this species (with which I cannot agree) and their desire to differentiate the typical form, in its description, from its supposed var.; and, secondly, to their having misunderstood the position of the "deep-seated postlabial* tooth" of *intradentata*, treating it as a columellar process instead of one situate "in the gullet." In addition to this, my measurement of the type, kindly lent to me by Mr. E. R. Sykes, is

* Perhaps the common expression "labial," used to express pertaining to any part of the peristome or lip, is confusing, and *labral* would be better when the position wished to be indicated pertains to the labrum.

misquoted. It therefore seems desirable to substitute the following description :—

Shell minute, umbilicate, shortly cylindrical, thin, shining, horn-coloured ; spire cylindrical, being almost equally wide at the third, fourth, and fifth whorls ; sutures impressed, apex rounded ; whorls about $5\frac{1}{2}$, convex, deeply closely transversely striate, excepting the apical whorls, which are smooth, the last rounded below and compressed about the umbilicus ; aperture erect, somewhat quadrate, rounded above and below, exceeding $\frac{1}{3}$ the height of the shell. Peristome slightly thickened and expanded, widely so at the columellar margin (which in the type is longitudinally chipped), paler than the rest of the shell, with labrum slightly bent inwards about the middle and columella nearly straight. There are no apertural processes.

Height 1.57, width 0.9 mm. (type in Coll. E. R. Sykes).

Hab. Griqualand East.

In the very large series of shells from divers localities in South Africa that I was privileged to examine no duplicate of this unique specimen, with its very distinctive characters, could be identified.

6. *Pupa farquhari*, M. & P.

The dimensions of the shell figured in Melvill and Ponsonby's paper are :—

Height 4.24, width 2.07 mm.

7. *Pupa fontana*, Krauss.

Of the eight forms consigned to the synonymy, I have seen well-authenticated specimens of four only, viz. *amphodon*, *elizabethensis*, *endoplax*, and *frustillum* ; and I agree with the authors that these names cannot stand. Of the remaining four, viz. *charybdica*, *custodita*, *keræa*, and *omicronaria*, having seen no representatives, I can offer no opinion ; but I am prepared to accept their views.

On p. 75 of the Survey, 10th line from the bottom, the substitution of the word *labium* for *labrum* destroys the meaning of the sentence.

The following localities may now be added :—

Edendale, near Maritzburg, and at the mouth of the Tongaat River on the Natal coast.

Boettger (1910) places this species, with *P. tetrodus*, Bttg., in *Pupilla* (see note at foot of p. 411).

8. *Pupa griqualandica*, M. & P.

This species must be closely akin to *P. bisulcata*, Jick., from Abyssinia, judging alone from description and figure, for I have not been able to examine the type or authenticated specimens of Jickeli's species. Mr. Ponsonby has, however, very kindly examined for me the specimens in the British Museum bearing that name, in conjunction with specimens of *griqualandica*, and, while finding them "very similar," pronounced them to be "at once separable," basing the separation apparently mainly upon the presence of "*a large prominent tooth on the outer lip*" of *bisulcata*. This tooth or plait, if not so large, is also present in *griqualandica*, though, perhaps through being in shadow, is not so conspicuous in the figures chosen by Melvill and Ponsonby to illustrate their species as in Jickeli's figure. No mention is made in Melvill and Ponsonby's description of the two *sulci* on the outer lip (corresponding with the labral plaits) to be discerned in *griqualandica* as represented in the figure of *bisulcata*. On the other hand, Jickeli does not record the presence of the sixth, minute, internal basal plait "visible in some specimens," which appears to me to be a constant character of *griqualandica*, though it is easily overlooked owing to its extreme smallness and internal position. The dimensions given by Jickeli represent a considerably larger and comparatively narrower shell than *griqualandica*, but, as they do not correspond with the proportions of his figure, one or other must be wrong—so neither is reliable. If his figure actually represents a shell of $1\frac{1}{2}$ mm. in height, its width is 1.27 instead of 1 mm. as he states.

The dimensions of the shells figured in Melvill and Ponsonby's paper are as follows:—

Fig. 8. Height 1.52, width 0.89 mm.

Fig. 9. „ 1.41, „ 0.83 „

The average of twenty-one specimens measured by me is:—Height 1.53, width 0.87 mm., the largest being height 1.6, width 0.99 mm.

The following new localities may be added:—Edendale Falls, near Maritzburg, and mouth of Tongaat River, Natal coast.

9. *Pupa haploa*, M. & P.10. *Pupa intradentata*, Burnup.

1908. *Pupa dysorata*, M. & P., var. *intradenta*, Burnup, M. & P. Ann. & Mag. Nat. Hist. ser. 8, vol. i. p. 73, pl. i. figs. 5, 6.

Typographical errors in the original render a new description necessary.

Shell minute, rimate, subcylindrical, elliptical, thin, translucent, shining, very pale brown; spire elongate-turbinate, with greatest width at the fourth whorl; sutures rather deeply impressed, apex very obtuse; whorls $5\frac{1}{2}$, very convex, closely transversely striate, excepting the first $1\frac{1}{2}$, which are smooth, the last compressed round the umbilical region; aperture nearly erect, rounded, nearly $\frac{1}{2}$ the height of the shell. Peristome slightly thickened and reflexed, more so at the columellar margin, scarcely paler than the rest of the shell, with labrum slightly straightened about the middle and much receding towards the base; columella arcuate. The only tooth, conspicuous, white, rounded, and remote, is situate inside, about midway between the last suture and the base and about half a turn from the labrum.

Height 1.47, width 0.79 [fig. 5 (Survey)].

" 1.33, " 0.78 [fig. 6 (")].

Hab. Pretoria (*Farquhar & Ponsonby*). Major Connolly has since supplied me with many specimens, quite agreeing with the type, from the same locality.

The following are the dimensions of the largest and smallest adult specimens measured:—

Largest: height 1.51, width 0.80.

Smallest: " 1.32, " 0.75.

This is the smallest of the South-African group examined by me, and is of a paler colour than most. As compared with *P. perplexa*, which seems to be its nearest ally, it is smaller, smoother, paler, and less cylindrical, is only rimate instead of umbilicate, has the peristome less reflexed, and is destitute of the postcolumellar and parietal plaits. As compared with *dysorata*, of which *intradentata* appears in the Survey as a variety, it is smaller, more slender, paler, less cylindrical, more loosely coiled, with more ventricose whorls and deeper sutures, and is rimate instead of umbilicate; the aperture is smaller and rounder, receding more at the base, and is furnished with a tooth in the gullet, not found in *dysorata*.

I am indebted to Mr. Ponsonby for making a careful comparison between Mr. Sykes's type of *dysorata* and the type of *intradentata* in the British Museum, when he was able to confirm most of the details given above.

11. *Pupa iota*, M. & P.

If the word *labrum* be read instead of "*labium*" in each

case where the latter occurs, the description in the Survey seems sufficiently to describe the species.

The dimensions of the shell depicted in the figure are :—Height 2·06, width 0·87 mm.; the smallest apparently mature specimen that I have measured being 1·67 high and 0·81 mm. wide, and having only about $6\frac{1}{2}$ whorls.

Var. *livingstoneæ*, Burnup.

A new locality may be recorded for both the typical form and the var., viz. Stander's Kop, Transvaal (*Connolly*).

The type of the var., said to be in my collection, has since been transferred to the British Museum with the types of the other new forms described in the Survey. Its dimensions are :—Height 2·02, width 0·84 mm.

12. *Pupa layardi*, Benson. (Pl. X. figs. 3, 4.)

The fig. presented by Melv. & Pons. does not express the detail with sufficient accuracy for the purposes of comparison; I therefore take this opportunity of offering new figures for comparison with those of ?*layardi*, var. *minor*, Bens. (?= *P. stoaphora*, Bens.), and *P. crawfordiana* (M. & P.) on same plate.

The shells chosen for my illustrations do not include that figured by Melvill and Ponsonby, though Mr. Ponsonby kindly laid his shell at my disposal for the purpose. They are chosen from a series collected at Hermanus, Caledon Division, in the Cape Province, by Mr. R. M. Lightfoot, as being fresher shells than his, free from extraneous matter in the aperture, and more nearly approaching the size and proportions of Benson's type. In all essential characters they agree closely with the shells given to Mr. Ponsonby by Mr. Benson.

Since the peristome is not at all thickened at the edge, but, on the contrary, is remarkably thin and brittle, the lips are invariably more or less chipped. One of the most conspicuous differences between the present species and *P. crawfordiana*, M. & P., is the absence from the latter of the trumpet-like extension of the peristome observable in the former.

The dimensions of the specimens here figured are as follows :—

Fig. 3. Height 7·87, width 3·26 mm.

Fig. 4. „ 7·87, „ 3·67 „

The shells of this species may be either white or horn-colour, and the position of the seventh peristomatal process,

the denticle between the inferior parietal and the columellar plait, is very variable ; it is sometimes seen on the parietal wall, sometimes on the columella, and sometimes in the angle between.

Var. *minor*, Bens. ? (Pl. X. figs. 5, 6.)

I also take this opportunity of offering figures of two shells in the collection of Mr. Ponsonby given to him by Mr. Benson as representing his species *P. stoaphora*. They agree in all essentials with *P. layardi*, Bens., except in their smaller size and darker colour (the larger specimen is chestnut-brown, the smaller rather paler).

The following are the dimensions :—

Fig. 5. Height 6·88, width 3·07 mm.

Fig. 6. „ 5·67, „ 2·75 „

The figures are given as a contribution towards answers to Melvill and Ponsonby's questions, "What is *P. stoaphora*, Bens.?" and "Can this be a synonym of the var. *minor*?" Since the shells given out by the author as *P. stoaphora*, Bens., seem to agree so closely with the description of his *P. layardi*, var. *minor*, and since neither Messrs. Melvill and Ponsonby nor Dr. Sturany can trace the debatable species, it seems reasonable to infer that Benson changed its name to var. *minor* before publication of his differentiation.

13. *Pupa noltei*, Bttg.

Böttger * places this species in *Leucochiloides* (*Microstela*).

14. *Pupa perplexa*, Burnup.

Excepting that the word *labrum* is printed "*labium*," the description in the Survey appears as it was written. As, however, it contains certain ambiguous expressions, I emend it as follows :—

Shell very small, umbilicate, cylindrical, thin, translucent, shining, pale brown ; spire cylindrical, rounded above, sutures impressed, apex obtuse ; whorls 6, very convex, closely transversely lirate, except the first two which are smooth, the shell at the fourth, fifth, and sixth whorls of nearly equal width, the last half-whorl acquiring its greatest expansion a little below the suture and then being flattened beneath, forming an infrasutural angle, the last whorl compressed towards the umbilicus ; aperture rounded, nearly $\frac{1}{2}$ the height of the shell ; peristome whitish, reflexed, especially

* Abhandl. d. Senckenb. naturf. Gesell. Bd. xxxii. (1910) p. 445.

at the columellar margin, thickened, the ends converging and connected by a thin callus; labrum slightly incurved about the middle; columella straight. The processes of the aperture consist of a small white parietal plait running inwards and there becoming strong, a stout white post-columellar plait also running inwards, and a profoundly post-labral tooth or plait hidden by the columella.

The following are the dimensions of the shell figured in the Survey:—

Fig. 17. Type: height 1.72, width 0.82 mm.

„ 18 (sectional). „ 1.80, „ 0.77 „

Twenty-four out of twenty-six specimens measured by me show very little variation in dimensions, the remaining two, both apparently mature, being somewhat more divergent, viz.:—

Largest: height 1.88, width 0.83 mm.

Smallest: „ 1.50, „ 0.77 „

Bloemfontein (*Connolly*) may now be added to the localities quoted by Melv. & Pons.

Judging by the descriptions and figures alone, for I have not seen Jickeli's species, this shell must be akin to his *P. lardea*, *schilleri*, and *similis* from Upper Nubia*, whose apertural processes seem arranged much on the same plan, its nearest ally being the last named; *similis* is, however, about one-fourth wider than the present species and has half a whorl less, while the peristome is less expanded and the labrum less bowed inwards, and there is no callus. *P. lardea* and *schilleri* are more divergent, being not so high as *similis* and broader in proportion.

15. *Pupa pretoriensis*, M. & P.

16. *Pupa psichion*, M. & P.

I have not seen specimens that could be referred to either of the above two species in the very large series of shells from Pretoria that I have been fortunate enough to have laid at my disposal for examination, though the number, since my first study of the group, has been greatly augmented by the collections of Major Connolly.

17. *Pupa quantula*, M. & P.

The co-type in Mr. Ponsonby's collection, figured in the

* Jick. Faun. L. u. Süßw. Moll. N.O.-Af. (1874) pp. 124, 125, 296, pl. v. figs. 14-16.

Survey, is the only specimen of this species that I have seen. Its nearest ally seems to be *P. dysorata*, M. & P., which it strongly resembles in its remarkably cylindrical form, but from which it may easily be distinguished by its greater length, comparative narrowness, rounder aperture, and much finer sculpture.

18. *Pupa sykesi*, M. & P.

Var. *inconspicua*, Burnup.

Although, while differentiating *inconspicua* from *sykesi*, M. & P., from the material then at my disposal, I considered it to be a distinct species, I can now only concur with Melv. & Pons. in treating them as one. In coming to this decision I am largely indebted to Dr. R. Sturany, who not only identified for me specimens from Dukuduku Forest, Zululand, as being *P. pentheri*, Stur., but also sent me co-types of his species collected by Dr. Penther at Umbilo Road, Durban. His specimens are somewhat intermediate between *sykesi*, M. & P., and *inconspicua*, Burnup, and leave no doubt as to all three forms belonging to one species. *P. pentheri* must therefore be placed in the synonymy of *sykesi*, and *inconspicua* may be retained as an elongate, narrow, fusiform variety of the same species.

In adopting my description of the var. *inconspicua* in its entirety to represent their species, Melvill and Ponsonby are led into certain errors, in that their type is more conic and less fusiform than the var., and has only about $6\frac{3}{4}$ whorls instead of $7\frac{1}{2}$, while the aperture is more than, instead of nearly, $\frac{1}{4}$ of the height of the shell; besides which the dimensions given do not refer to the type, which measures:—

Height 1·82, width 0·83.

It may be noted that while the height of *inconspicua* is greater than that of the type, the width is less. As this attenuate form has so far only been met with at Dargle, it may well be a local race.

19. *Pupa tabularis*, M. & P.

The dimensions of the figured specimen, which is in Mr. Ponsonby's collection, are not given in the Survey. They are as follows:—

Height 3·63, breadth 1·88 mm.

20. *Pupa tetrodus*, Bttg.

1870. *Pupa tetrodus*, Bttg. Ber. Offenbach. Ver. Naturk, xi. p. 46, pl. i. figs. 1 a-c.

1880. *Pupa (Vertigo) sinistrorsa*, Craven, Proc. Zool. Soc. p. 618, pl. lvii. fig. 8.
 1891. *Vertigo thaumasta*, Melv. & Pons. Ann. & Mag. Nat. Hist. ser. 6, vol. viii. p. 239.
 1892. *Vertigo thaumasta*, Melv. & Pons. ibid. vol. ix. p. 94, pl. vi. fig. 7.
 1908. *Pupa (Vertigo) sinistrorsa*, Craven, Melv. & Pons. Ann. & Mag. Nat. Hist. ser. 8, vol. i. p. 83.
 1910. *Pupilla* tetrodus* (Bttg.), Abhandl. d. Senckenb. naturf. Gesell. Bd. xxxii. p. 446.

21. *Pupa (Fauxulus) capensis* (Kurr).

Var. *kurri* (Krauss).

Var. *pottebergensis* (Krauss).

These varietal names seem scarcely worth perpetuating, as all intermediate forms, as well as other forms with attributes of equal varietal value, exist.

22. *Pupa (Fauxulus) fryana* (Bens.).

23. *Pupa (Fauxulus) glanvilleana* (Ancey).

As Mr. Ancey described this shell very carefully and with close attention to detail in order that it might be recognized from description alone without the help of a figure, it may be taken for granted that no important feature was omitted from his diagnosis. It therefore appears to me that Melvill and Ponsonby erred in choosing the figure of my shell, found at Dargle, Natal, to illustrate Ancey's species in their Survey, for that shell does not by any means closely agree with Ancey's description, being shorter and wider than the typical *glanvilleana*, and possessing two plaits on the base of the peristome not mentioned in Ancey's description, besides showing other discrepancies. I cannot but doubt if the two forms belong to one species, but in our present ignorance as to what Ancey's shell really is through no figure having been published with his description, and the type not being available for reference, it is impossible to estimate exactly the extent of the divergence, so I have deemed it best tentatively to treat the Dargle shell as a variety of *glanvilleana*, with which it seems to have much in common.

* If B. B. Woodward's arrangement be followed, *Pupilla* becomes the subgen. *Janimia* (s. s.).

Var. *darglensis*, new var.

Melv. & Pons. Ann. & Mag. Nat. Hist. ser. 8, vol. i. (1908) pl. ii. fig. 23 [as *Pupa (Fauuxulus) glauvilleana* (Anc.)].

Shell small, conic-oval, rimate and very narrowly perforate, thin, shining, greyish horn-coloured, translucent, sinistral. Spire ovately conic; apex obtuse and mammillated. Whorls $7\frac{1}{2}$, slightly convex, gradually increasing, with suture distinct but not deep, obliquely sculptured with close, sharply-cut, arched oblique striæ, except the first $1\frac{1}{2}$ which are smooth, the last more convex, rounded below, much constricted towards the peristome and impressed towards the rima and small perforation, the long inrunning peristomatal processes and spaces between being represented on the outside by alternate grooves and ridges. Aperture upright, irregularly ovate, nearly closed with the following inrunning white plaits:—parietal 2, the first arising as a narrow thread high on the body-whorl, becoming broader and contorted as it descends, always receding inwards, to below the centre of the aperture, whence it is bent sharply back, embracing the parietal wall, till it is lost sight of in the interior of the shell; the second, also arising high on the body-whorl, is expanded on the left till it meets the peristome, with which it combines till the lobe of the labrum is reached, whence it doubles back in two foliaceous folds and descends as a simple plait, receding inwards and following a line parallel with the first till it too is lost sight of in the interior of the shell; labral 3, of which the upper two are small, though deeply penetrating the aperture, and rather close together; the third, though equally narrow, is very long and sinuous and as, in its progress towards the interior, it embraces the expanded outer lip, it is lost to sight till the far end reappears in the gullet; columellar 3, of which the upper two arise, thread-like, on the edge of the labium, becoming stouter as they curve inwards, the upper one entering at the junction of the parietal wall with the columella, and the lower about the middle of the columella, after taking a wide sweep towards the centre of the aperture; the lowest columellar plait is smaller, but long and penetrating: lastly, there are two plaits on the base of the peristome similar to the lowest columellar plait. Peristome widely expanded, but little thickened except by the plaits which arise close to the margin, paler than the rest of the shell, becoming white at the edges, where its outline is slightly peaked at the sources of the plaits; the ends converge and are connected by a stout glossy callus reaching

high on the body-whorl. The labrum is strongly lobed above the middle and bayed immediately below; on the lower part of this lobe the peristome is slightly thickened, almost to the extent of forming an eleventh plait, between which and the foliated extension of the lower parietal plait is formed a partly covered channel to the interior.

Height 3·77, width 2·13 mm.

Hab. Dargle (*Burnup*), also Inhluzani Mountain, Karloof, and Mid-Illovo, all in Natal.

The colour of the shell in life is often whitish grey.

As a contribution towards the elucidation of this intricate group, Mr. J. R. le B. Tomlin has kindly sent me a shell, received by him many years ago from either Mr. Ancey or Miss Glanville as representing Ancey's species. It is not likely to be a co-type, as Ancey only mentions the one locality, East London, and Mr. Tomlin's shell comes from Albany: moreover, it does not agree in detail with Ancey's description; I can therefore only consider it a second variety. I am indebted to Mr. W. L. Radford for a further example, agreeing in all essentials with Mr. Tomlin's shell, which he collected for me at East London. As, therefore, my only two specimens come from different localities, a geographical, varietal name seems inexpedient; I therefore propose to associate it with Mr. Tomlin's name:—

Var. tomlini, new var. (Pl. X. fig. 7.)

Shell like var. *darglensis*, but larger and more conical, with peristome less effusively expanded, callus not extending so high on the body-whorl, and aperture not so much closed by plaits. The lobe and sinus of the labrum are less developed and the thickening of the peristome on the lower part of the lobe "almost forming an eleventh plait" is entirely absent, its place being taken by the first labial plait. The lower parietal plait is shorter and its foliated extension to the peristome much less effuse, leaving the sutural canal more open. In place of the two inrunning plaits on the base of the peristome there is only one, about equidistant between the lowest labral and lowest columellar plait. The colour of the varietal type is almost white, that of the co-type pale brown.

Height (type of var.) 4·0, width 2·11 mm.

" (Radford's specimen) 4·17, width 2·27.

Hab. Albany (*Tomlin*), East London (*Radford*), both in the Cape Province.

In comparing these varieties with Ancey's description it must be borne in mind that probably what that author treats

as the uppermost of four "palatal" processes is much in the same position as that which I consider a second, or lower, parietal plait. Although, since (in the varieties at any rate) the process in question arises on its one side high on the callus on the body-whorl, and on its other side on the lobe of the labrum, it is conceivable that one student might consider it a parietal, while another treated it as a labral plait; yet I think there can be no doubt that it is (in the varieties) at least the homologue of the second parietal plait to be found in all other members of Ancey's section *Anisoloma*.

The var. *tomlini*, then, should be easily distinguished from the type by this plait being less strongly developed, and by the presence of a narrow perforation and a basal plait, absent from the type.

24. *Pupa (Fauxulus) mcbeaniana* (M. & P.).
(Pl. X. fig. 8.)

This striking shell, larger than the preceding species and its varieties, may be horn-coloured, greyish-brown, or milk-white. Normally this species has nine peristomatal processes, viz. two parietal, two columellar, one basal, and four labral, of which last named the lowest is large, the central small, and above this, in the sinus of the labrum, are two, very small and close together. In the type, which is not available to me for examination, these two small plaits may be merged into one broad plait, as in the case of a shell from Inhluzani Mountain, in my collection; for the authors do not refer to a pair, nor does the original figure show it. One shell in my collection, also from Inhluzani, bears an additional plait at the base of the columella; but as it is only one example in many, and is otherwise normal, it must only be looked upon as a sport.

As the original figure is very deficient in the detail of the peristomatal processes, a new figure, drawn from a shell in my collection, collected at Dargle, is published herewith.

The dimensions of the figured specimen are as follows:—
Height 4·5, width 2·58 mm.

25. *Pupa (Fauxulus) pamphorodon* (Benson).

This species seems very variable as to size, the type measuring 9 mm. high and 4 wide, while the only specimen that I have measured accurately is 7·5 mm. high and 3·75 wide.

26. *Pupa (Fauxulus) pereximia* (M. & P.).27. *Pupa (Fauxulus) ponsonbyana* (Morelet).
(Pl. X. figs. 9-12.)

As Morelet's description and original figure* do not clearly define the positions, nor even the number, of the peristomatal processes with distinctness, and, moreover, his figure, if correctly drawn, depicts an imperfect shell with the edges of the peristome clipped off, a new series of figures is here offered, which it is hoped will define the species sufficiently clearly to obviate the necessity of revising the description. The figures are drawn from four shells from Grahamstown, kindly supplied to me by Messrs. Ponsonby and Farquhar, and show to some extent the variability in size and general form of this very interesting little species. The measurements of a few other shells are given, below the dimensions of the figured specimens, showing the extremes of such shells as I have examined.

Fig. 9. Height 3.43, width 1.71 mm.

„ 10. „ 3.05, „ 1.43 „

„ 11. „ 2.97, „ 1.55 „

„ 12. „ 2.81, „ 1.43 „

Dimensions of a few other specimens:—

Height 3.52, width 1.52 mm.

„ 3.59, „ 1.86 „

„ 3.33, „ 1.73 „

„ 2.84, „ 1.42 „

„ 2.74, „ 1.43 „

The crown of little hairs about the middle of the last whorl, referred to by Ancey [Journ. de Conch. vol. xlix. (1901) p. 141], arises in the peripheral sulcus and extends upwards in the suture, but the hairs are very easily rubbed off. They are not shown in the figures, because washing, so necessary to obtain a clear view of the peristomatal processes and a correct estimate of the depth of the sculpture and suture, has removed every vestige of the hairy coronet. I have examined many specimens and have found the number of peristomatal processes, in addition to the two parietals, to be invariably seven.

So far I have only collected two specimens in Natal (at

* Journ. de Conch. vol. xxxvii. (1889) pp. 9, 10, pl. i. fig. 5 [*Pupa (Faula) ponsonbyana*, Morelet].

Hilton Road and on Zwaartkop near Maritzburg), and they are remarkably high and narrow, the former measuring 3.53 mm. high and 1.62 mm. wide.

The dimensions referring to shells figured in the Survey and herein are taken in the same positions as the shells are shown in the figures; thus the measured width of any specimen may vary considerably according to whether it is drawn showing a front or a side view, especially if the labrum be much expanded.

The types of the new varieties described in this paper will be placed in the British Museum.

EXPLANATION OF PLATE X.

Figs. 1, 2. *Pupa crawfordiana* (M. & P.).

Figs. 3, 4. *Pupa layardi*, Bens.

Figs. 5, 6. *Pupa layardi*, var. *minor*, Bens.?

Fig. 7. *Pupa (Fauxulus) glanvilleana* (Ancey), var. *tomlini*, new.

Fig. 8. *Pupa (Fauxulus) mcbeaniiana* (M. & P.).

Figs. 9, 10, 11, 12. *Pupa (Fauxulus) ponsonbyana* (Morelet).

BIBLIOGRAPHICAL NOTICE.

The Amphipoda of Bermuda. By B. W. KUNKEL. Trans. Connecticut Acad. Arts and Sciences, vol. xvi. pp. 1-116 (1910).

THE tropical Amphipodous Crustacea are still so imperfectly known that this account of species collected in shallow water at the Bermuda Islands is very welcome. Forty-five species of Gammaridea and Caprellidea are described and figured in considerable detail, of which fifteen are regarded as new, and three new genera are established. No mention is made of the Hyperiidea, though it is hardly to be inferred that this extensive suborder is unrepresented in the Bermudan fauna. In some cases the identification of species described by previous authors is not placed beyond doubt. For example, the form referred on p. 10 to *Amphilochus brunneus*, Della Valle, differs from the original account of that species in several of the most important specific characters, but no explanation or discussion of the fact is given. The author's references to literature are scanty and not always correct. For the Caprellidæ he quotes Mayer's Monograph of 1882, but neither the important "Nachtrag" to that work published in 1890 nor the equally important "Siboga" Report of the same author (1903). Verrill's description of *Cyamus fascicularis* is reprinted, but no attempt is made to show why the species should be regarded as distinct from *Cyamus physeteris*, Pouchet.

W. T. C.