

XX.—*A Revision of the History, Synonymy, and Geographical Distribution of the recent Terebratulæ.* By LOVELL REEVE, F.L.S., F.G.S.

Forty years ago, when M. Valenciennes prepared for Lamarck, who was already blind, the monograph of this genus for his 'Histoire des Animaux sans Vertèbres,' the shells of only twelve or fourteen species of recent *Terebratulæ* had been observed, the soft parts of only one, and the organization of the Brachiopods generally was very imperfectly known. Although Linnæus had remarked that the animal of *T. caput-serpentis* differs not less from any other animal that he had found in shells, than night from day—"animal quod intus conditur a vermibus qui aliis in conchis omnibus sibi invicem fere sunt similes non differt minus quam a nocte dies,"—the *Terebratulæ* and their allies were still arranged with the lamellibranchiate Conchifera.

De Blainville, and subsequently, by a more elaborate investigation, Professor Owen, ascertained that the branchiæ do not exist in the form of lamellæ, but are incorporated by a system of vessels with the mantle-lobes. Along with the discovery of the phenomenon that the mantle-lobes of the Brachiopods perform not only the office of secreting the shell, but also that of respiration, another peculiarity was observed, namely, that the valves are differently placed from those of other bivalves with regard to the position of the animal—that, in fact, they are not side-valves connected dorsally by a cartilage and ligament, but dorsal and ventral valves, connected, in the *Terebratulæ*, by closely interlocking tooth-like processes in relation with an internal apophyseal skeleton, and a complicated system of muscles to which may be added a force acquired through the animal's habit of affixing itself to foreign bodies by a fibrous byssus-like tendon. Another peculiarity which presented itself was the presence of a pair of internal ciliated arms. The Brachiopods, even as late as 1830, were arranged by Cuvier and his contemporaries in immediate proximity to the Cirripedes: it had, however, been observed that the ciliated arms of the Brachiopod are quite distinct organs from the cirri of the Cirripede; and Professor Owen's beautifully detailed exposition of its anatomy removed all doubt on the subject. Projecting from the mouth of the animal on either side, they correspond (or, to speak scientifically, are homologous) with the labial palps of other bivalves, prolonged, as it were, on muscular tubes, so as to require being folded or coiled up. In *Terebratula* an internal bony skeleton or apophysis is formed, proceeding from the hinge in connexion with the dorsal valve, for the support of the arms; and being

extremely variable in structure, it affords excellent characters to the conchologist for the distinction of groups.

The *Terebratulæ* are chiefly deep-dwelling Brachiopods; and from the little trouble devoted to dredging them from their native haunts, the varieties of the apophysial skeleton were not until lately known. The dredgings of M. Gaudichaud, M. D'Orbigny, MM. Quoy and Gaimard, Capt. King, Mr. Cuming, Capt. Belcher, Professor Forbes, Mr. MacAndrew, Mr. Barlee, and others, have furnished specimens with internal skeletons, coupled with valuable bathymetrical observations; and the different forms of apophysis, and corresponding development of the arms, have been well observed by M. D'Orbigny, Mr. Davidson, Mr. Woodward, and Mr. King. Excellent systematic catalogues of both recent and fossil species have been published by Mr. Davidson, and by Dr. Gray, assisted by Mr. Woodward, in which the different forms of apophysis are employed as the grounds of subdivision; and the geographical distribution of the species in space, in depth, and in time has been worked out with much ingenuity by Professor Suess. One thing appeared to me to be wanting—a more extended comparison and verification of the recent species. No generalizations on geographical distribution can be relied upon, unless the recorded specific existence and habitat of the subjects are well authenticated. Prof. Suess's dissertation on the geographical distribution of the Brachiopods is a most able work, but bears evidence of his not having sufficiently tested the species. The very characteristic subgenus *Argiope*, for example, has its home in the Mediterranean; the Mediterranean is undoubtedly its southern limit; but Dr. Suess gives New Zealand as a habitat\*, on the ground that an obscure specimen in the Paris Museum, which Mr. Davidson somewhat too precipitately described (as he has himself generously acknowledged to me) as a new subgenus with the name of *Waltonia Valenciennesii*, is an *Argiope*. This shell is identical with a species, now well enough known, described subsequently by Mr. Davidson with the name *Terebratella Evansii*. Dr. Gray places it under *Magas*, and I incline to concur with this view; but with *Argiope* the species has no relation whatever; and Professor Suess might have detected this, even without any examination of the specimen, from Mr. Davidson's excellent figures of it. Again, Professor Suess gives *Terebratella* as one of the types of the South African province of geographical distribution; but this conclusion is drawn from a statement that a shell in the British Museum, named by Sowerby *T. Algoensis*, from Algoa Bay, is a *Terebratella*. Upon examining this shell, I

\* "Die fünfte und letzte Art dieser kleinen Sippe ist in Neu-Seeland zu Hause."—Wohns. der Brach. p. 34.

find it to be a bleached fragmentary odd valve of the South African *Kraussia rubra*. Professor Suess gives *Kraussia* as one of the types of the Korean waters, on the authority of Mr. Davidson, adding that the original habitat given by Mr. Adams and myself, in the 'Mollusca of the Voyage of the Samarang,' for *T. Capensis* (now *Kraussia Deshayesii*) ("Cape of Good Hope, dredged at the depth of 120 fathoms"), is probably erroneous. The Cape of Good Hope is especially the home of the *Kraussia*; the only species out of that locality is an abnormal one, *K. Lamarckiana*, a native of South Australia and New Zealand. Mr. Davidson's mistake in giving Corea as the habitat of *Kraussia Deshayesii* arose from a displacement of tickets in Mr. Cuming's cabinet. I mention these instances, not with the view of casting disparagement on Dr. Suess's philosophy, but as exemplifying the inconvenience of going into philosophical dissertations before the materials have been thoroughly sifted and verified. The specimens which have come under my notice (and I have examined some hundreds, embracing every form of apophysis hitherto known) are from the Paris Museum, kindly forwarded to me by M. Valenciennes, at the suggestion of Professor Milne-Edwards, and from the fine collections of the British Museum, Mr. Cuming, Mr. Lombe Taylor, Mr. Metcalfe, and Mrs. De Burgh.

### Synopsis of Species.

#### Subgenus 1. TEREBRATULA, Lhwyd (pars).

*Apophysis a small, simple, unreflected loop projected on a pair of rather elongated blades.*

1. *Terebratula vitrea*, Born, Test. Mus. Cæs. p. 119, p. 116 vign.; Conch. Icon. pl. 3. f. 8 a, b, c.

*Anomia vitrea*, Born.

— *terebratula*, Gmelin.

*Terebratula vitrea*, Val. apud Lamk.

*Anomia terebratula*, Dillwyn.

*Terebratula euthyra*, Philippi.

— *minor*, Suess.

*Hab.* Mediterranean (in nullipore mud, at a depth of from 92 to 150 fathoms); *E. Forbes.* Vigo Bay (at a depth of 40 fathoms); *MacAndrew.*

This and the following are the only species left to *Terebratula* proper.

2. *Terebratula uva*, Broderip, Proc. Zool. Soc. 1833, p. 124; Conch. Icon. pl. 3. f. 11.

*Hab.* Bay of Tehuantepec, Guatemala (dredged from sandy

mud at a depth of 10 to 12 fathoms); *Capt. Dare*. Falkland Islands, fide *Cuming*.

Mrs. De Burgh possesses a specimen of *T. uva* exactly similar to the original specimen, hitherto considered unique, in Mr. Cuming's collection; and Mr. Cuming has recently received three *Terebratulæ* of smaller size from the Falkland Islands, specimens of which are also in the British Museum, which I can only assign (and Mr. Woodward agrees with me) to this species.

Subgenus 2. TEREBRATULINA, D'Orbigny.

*Apophysis* a small unreflected loop arched into a circle on projecting blades.

3. *Terebratula* (*Terebratulina*) *caput-serpentis*, Linnæus, Syst. Nat. p. 1153; Conch. Icon. pl. 4. f. 15 a, b.

*Anomia caput-serpentis*, Linnæus.

— *retusa*, Linnæus.

— *pubescens*, Linnæus.

*Terebratula pubescens*, Müller.

— *caput-serpentis*, Val. apud Lamk.

— *costata*, Lowe.

— *aurita*, Fleming.

— *striata*, Leach.

— *septentrionalis*, Conthouy.

— *conica*, D'Orbigny.

*Terebratulina caput-serpentis*, D'Orbigny.

*Delthyris spatula*, Menke.

*Hab.* North and South European and North American Seas (at depths of from 10 to 150 fathoms).

The oldest, best-known, and most widely spread of the *Terebratulæ*. It ranges throughout the European Seas, from the Arctic to the Mediterranean, and appears in North America in a more finely striated form, known as *T. septentrionalis*. It is represented in the Corean and Japanese waters by *T. abyssicola* and *T. Japonica*.

4. *Terebratula* (*Terebratulina*) *Japonica*, Sowerby, Thes. Conch. i. p. 344, pl. 68. f. 7, 8; Conch. Icon. pl. 4. f. 16.

*Terebratula angusta*, Adams and Reeve.

*Hab.* Corea, Japan.

Closely allied to *T. caput-serpentis*, and, without doubt, its typical representative in the Corean and Japanese Seas.

5. *Terebratula* (*Terebratulina*) *cancellata*, Koch, Küster, Conch. Cab. vii. pl. 2b. f. 11–13; Conch. Icon. pl. 4. f. 13.

*Hab.* West Australia? *Koch*.

This species partakes very much of the character of the two

preceding, but it appears distinct. Great doubt, I think, attaches to the habitat, "West Australia," given by M. Koch.

6. *Terebratula (Terebratulina) abyssicola*, Adams and Reeve, Moll. Voy. Samarang, p. 72, pl. 21. f. 5; Conch. Icon. pl. 4. f. 14.

*Hab.* Corea; Belcher.

Mr. Davidson has truly remarked that this and the preceding species require further examination; but no other specimens have been collected since he wrote. One important error needs to be corrected. In the original description of *T. abyssicola* in 'Moll. Voy. Samarang,' the habitat of *Kraussia Deshayesii* was accidentally repeated. Mr. Cuming possesses the shell correctly labelled "Corea."

7. *Terebratula (Terebratulina) radiata*, Reeve, Conch. Icon. pl. 3. f. 7 a, b.

*Hab.* Strait of Corea?

Of this black-rayed species, which appears to me to be a very distinct one, Mr. Cuming possesses three exactly similar specimens, procured, he fancies, from the dredgings of Capt. Sir E. Belcher in the Strait of Corea.

8. *Terebratula (Terebratulina) Cumingii*, Davidson, Proc. Zool. Soc. 1852, p. 79, pl. 14. f. 17-19; Conch. Icon. pl. 4. f. 12.

*Hab.* China Seas.

A small, well-defined species, rather prominently bifurcately ridged.

### Subgenus 3. WALDHEIMIA, King.

*Apophysis* a free, largely-produced, riband-like loop, considerably reflected.

9. *Terebratula (Waldheimia) globosa*, Valenciennes apud Lamarck, Anim. sans Vert. vii. p. 330; Conch. Icon. pl. 2. f. 3 a, b, c, and pl. 6. f. 3 d, e.

*Terebratula Californica*, Koch.

*Hab.* California, Coquimbo.

When publishing this species four months since, in pl. 2 of my monograph in 'Conch. Iconica,' I ventured to assign to it the shell well known in collections as *T. Californica*, Koch. On receiving subsequently from M. Valenciennes the original type of his *T. globosa*, very clumsily figured in the 'Encyclopédie Méthodique' (which figure is copied, with all its infirmities, on a reduced scale in De Blainville's 'Malacologie'), I found the opinion that I had formed to be the correct one.

10. *Terebratula (Waldheimia) physema*, Valenciennes, MS. in Mus. Jardin des Plantes; Conch. Icon. pl. 6. f. 23 *a, b, c*.

*Hab.* Coquimbo; Gaudichaud.

This fine shell, belonging to the Museum of the Jardin des Plantes, had been regarded as a variety of *T. (Waldheimia) dilatata*; but when M. Valenciennes was making a selection of the specimens of *Terebratulæ* to send me, it appeared to him to be distinct, and he made the following note on the back of the tablet:—"Grande et belle espèce de *Térébratule (Waldheimia)* confondue avec mon *T. dilatata*, rapportée de Coquimbo en 1833 par M. Gaudichaud, et donnée par lui à M. Férussac. Achetée en 1837 avec la collection." It is intermediate in its characters between *W. globosa* and *W. dilatata*, inclining rather to the former species, of which it may possibly be only a colossal, broadly inflated variety.

11. *Terebratula (Waldheimia) dilatata*, Valenciennes apud Lamarck, Anim. sans Vert. vii. p. 330; Conch. Icon. pl. 2. f. 2, and pl. 6. f. 2 *b, c*.

*Terebratula Gaudichaudi*, De Blainville.

*Hab.* Coquimbo? Strait of Magellan?

This species I have also had the pleasure of verifying from the original type, formerly belonging to M. Dufresne, and now in the Paris Museum. The habitats rest in doubt. Coquimbo seems the most likely to be correct; but I have just been favoured with a visit from a gentleman recently arrived from the first-named habitat, who assures me that he collected some mutilated remains of a large shell, like *W. dilatata*, at the Falkland Islands. Unfortunately he threw them away.

12. *Terebratula (Waldheimia) lenticularis*, Deshayes, Rev. Soc. Cuv. 1839; Mag. de Zool. 1841, pl. 41; Conch. Icon. pl. 2. f. 4.

*Hab.* New Zealand (dredged in the Strait of Faveau at the depth of 15 fathoms); Deshayes.

Except in colour, this species is scarcely distinguishable from *T. (Waldheimia) globosa*.

13. *Terebratula (Waldheimia) flavescens*, Valenciennes apud Lamarck, Anim. sans Vert. vii. p. 330.

*Terebratula dentata*, Val. apud Lamk.

— *australis*, Quoy.

— *recurva*, Quoy.

*Waldheimia australis*, King.

*Hab.* South Australia.

The most abundant of any *Terebratula* yet collected. In the

British Museum there is a large stone, brought by Mr. Jukes from Port Jackson (a portion of which is figured in Conch. Icon. pl. 1), covered with them; and MM. Quoy and Gaimard relate, in their account of the Mollusca of the Voyage of the *Astrolabe*, that at Port Western, Bass's Straits, hundreds were brought up at each haul of the dredge, affixed by their pedicles to the débris of shells, or to one another. On the stone in the British Museum are clustered also a few specimens of the small *T. (Kraussia) Lamarckiana*.

14. *Terebratula (Waldheimia) picta*, Chemnitz, Conch. Cab. xi. p. 247, pl. 203. f. 2011, 2012; Conch. Icon. pl. 3. f. 9 *a, b*.

*Anomia picta*, Chemnitz.

*Terebratula sanguinea*, Sowerby (in 'Genera,' not in 'Thesaurus').

— *erythroleuca*, Quoy.

*Hab.* Java.

A smooth, elegantly-painted orange-red species with very little variation.

15. *Terebratula (Waldheimia) Grayi*, Davidson, Proc. Zool. Soc. 1852, p. 76, pl. 14. f. 1-3; Conch. Icon. pl. 2. f. 5 *a, b, c*.

*Hab.* Strait of Corea; *Belcher*.

When the shells collected in the 'Samarang,' under the command of Capt. Sir Edward Belcher, were under the examination of Mr. Adams and myself, the apophyses of the *Terebratulæ* had not been carefully observed, and we took this species to be the *T. (Kraussia) rubra*. Two years later, when Mr. Davidson made the apophyses a special study, he found this to be a *Waldheimia*, and a perfectly distinct species.

16. *Terebratula (Waldheimia) cranium*, Müller, Zool. Dan. Prodr. p. 209; Conch. Icon. pl. 3. f. 6.

*Anomia cranium*, Gmelin.

*Terebratula vitrea*, Fleming.

*Macandrevia cranium*, King.

*Hab.* North European Seas (at depths of from 40 to 200 fathoms).

Dr. Gray incorrectly quotes *Anomia vitrea*, Chemnitz, as a synonym of this species. Dr. Fleming named a specimen (in the 'Edinburgh Cyclopædia' and in his 'Philosophy of Zoology') *T. vitrea*; but the *Anomia vitrea* of Chemnitz is the true *Terebratula vitrea*. *T. (Waldheimia) cranium* is a Scandinavian species, and is only included in the British fauna on the ground of its discovery on two different occasions, by Dr. Fleming and Mr. Barlee, about thirty miles east of Zetland.

17. *Terebratula (Waldheimia) septigera*, Lovén, Index Moll. Scand. p. 29.

*Hab.* Norway, Finmark.

Another Scandinavian species, recently described by Lovén, of a more oblong form than *T. cranium*, more concavely depressed towards the anterior margin, and possibly distinct; but the species needs further research.

Subgenus 4. *TEREBRATELLA*, D'Orbigny.

*Apophysis a freely produced riband-like reflected loop, resembling that of Waldheimia, attached towards the middle by a cross process affixed to a central septum.*

18. *Terebratula (Terebratella) Magellanica*, Chemnitz, Conch. Cab. viii. p. 101, pl. 78. f. 710, 711; Conch. Icon. pl. 5. f. 21 a, b, c, d.

*Anomia striata Magellanica*, Chemnitz.

— *dorsata*, Gmelin.

*Terebratula dorsata*, Lamarck.

— *Sowerbyi*, King.

— *Chilensis*, Broderip.

*Delthyris dorsata*, Menke.

*Terebratella dorsata*, Davidson.

*Hab.* Straits of Magellan; King. Valparaiso; Cuming.

I include Mr. Broderip's *T. Chilensis* with Gmelin's *A. dorsata*, as well as *T. Sowerbyi* and *flexuosa* of Capt. King, already referred to it by Professor Suess; and I restore to the species the prior and very characteristic name of *Magellanica* given to it by Chemnitz.

19. *Terebratula (Terebratella) transversa*, Sowerby, Thes. Conch. i. p. 361, pl. 72. f. 114, 115; Conch. Icon. pl. 5. f. 22.

*Hab.* — ?

This shell (kindly transmitted to me by Mr. Norris, nephew of the late owner of it), which I have examined with much care, is intermediate between certain varieties of the very variable *T. Magellanica* and *T. Bouchardii*. I have not seen the second specimen of it, referred to by Mr. Sowerby as being in the collection of M. Janelle, and still leave the species in doubt.

20. *Terebratula (Terebratella) Bouchardii*, Davidson, Ann. and Mag. Nat. Hist. 1852, ix. p. 367; Proc. Zool. Soc. pl. 14. f. 4-6; Conch. Icon. pl. 5. f. 17.

*Hab.* — ?

This is another species founded on a single specimen of somewhat doubtful specific character.



21. *Terebratula* (*Terebratella*) *suffusa*, Reeve, Conch. Icon. pl. 5. f. 18.

*Hab.* — ?

A third doubtful species, partaking of the general typical character of *T. Magellanica*, but equally distinguished by details of form, sculpture, and colour which seem peculiar to it.

22. *Terebratula* (*Terebratella*) *cruenta*, Dillwyn, Syn. p. 295 ; Conch. Icon. pl. 5. f. 20 *a, b*.

*Terebratella cruenta*, Gray.

*Terebratula sanguinea*, Leach, Quoy (not of Chemnitz).

— *rubra*, Sow. (not of Pallas).

— *Zelandica*, Deshayes.

*Terebratella Zelandica*, Davidson, Suess.

*Hab.* New Zealand (dredged in Cook's Straits at a depth of 15 fathoms).

This beautiful and well-known species was described half a century ago by Dillwyn, and admirably figured about the same time by Leach in his 'Zoological Miscellany.'

23. *Terebratula* (*Terebratella*) *rubella*, Sowerby, Thes. Conch. i. p. 350, pl. 69. f. 40–42 ; Conch. Icon. pl. 7. f. 26 *a, b*.

*Terebratella rubella*, Davidson.

*Hab.* Bass's Straits, South Australia (dredged from a depth of about 27 fathoms) ; *Calvert*.

This species was thought at one time to be a variety of *T. (Waldheimia) picta* ; but it is uniformly of smaller size, and it not only has the doubly-attached loop of *Terebratella*, but is from a widely remote habitat. Japan (quoted by Professor Suess, from Sowerby, for this species) is a wrong habitat.

24. *Terebratula* (*Terebratella*) *rubicunda*, Solander, Sowerby, Thes. Conch. i. p. 351, pl. 70. f. 45–47 ; Conch. Icon. pl. 7. f. 27 *a, b*.

*Terebratula inconspicua*, Sowerby.

*Hab.* New Zealand.

This species occurs either of a purplish or deep coral-red colour, or it is colourless. It has been dredged abundantly at New Zealand ; but we have no record of the depth of its habitat.

25. *Terebratula* (*Terebratella*) *Coreanica*, Adams and Reeve, Moll. Voy. Samarang, p. 71, pl. 21. f. 3 ; Conch. Icon. pl. 7. f. 28 *a, b*.

*Hab.* Corean Archipelago ; *Belcher*.

A delicate crimson-rayed species, of which many specimens

were dredged by Capt. Belcher among the islands of the Corea. Professor Suess describes an unpublished *Terebratella* received from Dr. Gould with the habitat "Hakodadi" and name in manuscript "*T. miniata*." Can it be our *T. Coreanica*?

26. *Terebratula* (*Terebratella*) *sanguinea*, Chemnitz, Conch. Cab. viii. p. 96, pl. 78. f. 706; Conch. Icon. pl. 7. f. 25 a, b, c.

*Anomia sanguinea*, Chemnitz.

*Terebratula sanguinea*, Sowerby.

— *pulchella*, Sowerby.

*Terebratella sanguinea*, Davidson.

*Megerlia pulchella*, Davidson.

*Hab.* Philippine and Sandwich Islands.

An examination of more than a dozen specimens of this charming little species, most of them with the soft parts macerated, so as to afford excellent comparisons of the loops, has convinced me that Mr. Sowerby's *T. pulchella* is merely a variety of his *T. sanguinea* (*Anomia sanguinea*, Chemnitz), in which the deltidium plates are forced asunder by circumstances in its mode of attachment. The apophysis is the same in both forms, differing somewhat from the typical form of the apophysis in *Terebratella*, and partaking of that in *Megerlia*.

27. *Terebratula* (*Terebratella*) *Labradorensis*, Sowerby, Thes. Conch. i. p. 362, pl. 71. f. 89, 90; Conch. Icon. pl. 5. f. 19.

*Terebratella Labradorensis*, Davidson.

*Hab.* Labrador; Goodsir.

A rounded, opake-white, ribbed species, of rather small size.

28. *Terebratula* (*Terebratella*) *Spitzbergensis*, Davidson, Proc. Zool. Soc. 1852, p. 78; Conch. Icon. pl. 7. f. 24.

*Hab.* Spitzbergen.

*T. Spitzbergensis* is a small, narrowly-ovate species, smooth and semipellucid like the large *T. vitrea*. Professor Suess remarks that the figure of a species of Middendorf, which is unknown to me (*T. frontalis*), is like it. Can they be one and the same species? But Professor Suess goes on to ask, is *T. frontalis* the same as *T. transversa*?—which has no relation whatever, as a comparison of our figures of that species in 'Conch. Icon.' with *T. Spitzbergensis* will show.

#### Subgenus 5. MAGAS, Sowerby.

*Apophysis* a loop resembling that of *Terebratella*, but contracted, and having the cross piece broadly laminated next the central septum.

29. *Terebratula* (*Magas*) *Valenciennesii*, Davidson, Annals and

Mag. Nat. Hist. 1850, v. pl. 15. f. 1; Conch. Icon. pl. 8. f. 31 *a, b, c.*

*Waltonia Valenciennesii*, Davidson.

*Terebratella Evansii*, Davidson.

*Magas Evansii*, Gray.

*Argiope Valenciennesii*, Suess.

*Hab.* New Zealand.

Mr. Davidson generously yields to my suggestion that his *Waltonia Valenciennesii* and *Terebratella Evansii* are one and the same; the loop has, however, the contracted laminated structure characteristic of *Magas*, and I agree with Dr. Gray in assigning it to that genus. Professor Suess's assigning it to *Argiope* is obviously a blunder. Several specimens have come under my notice, all of a bright orange-red colour.

30. *Terebratula (Magas) crenulata*, Sowerby, Thes. Conch. i. p. 358, pl. 71. f. 96-98; Conch. Icon. pl. 8. f. 32.

*Terebratella crenulata*, Davidson.

*Magas crenulata*, Gray.

*Hab.* Santa Cruz, Canaries; fide *Cuming*.

This species has somewhat the appearance of *T. (Terebratella) Labradorensis*, or of a young *T. (Terebratella) Magellanica*; but it is convex, and ribbed in both valves, and it has distinctly the contracted laminated apophysis of the preceding species. The recorded habitat is peculiar, and, I fancy, a little doubtful.

#### Subgenus 6. BOUCHARDIA, Davidson.

*Apophysis represented by a central septum, with the laminated cross piece of Magas callously produced and thickened into the form of an anchor.*

31. *Terebratula (Bouchardia) Cumingii*, Davidson, Proc. Zool. Soc. 1852, p. 78, pl. 14. f. 10-16; Conch. Icon. pl. 8. f. 29.

*Terebratella? Cumingii*, Davidson.

*Magas Cumingii*, Gray.

*Hab.* New Zealand.

This very interesting species is in my opinion neither a *Terebratella* nor a *Magas*. It begins to show internally the callous thickening both of the valves and of the apophysis of *Bouchardia tulipa*, and is, above all, distinguished by the acuminate beak and terminal foramen peculiar to that and to the following species.

32. *Terebratulula (Bouchardia) fibula*, Reeve, Conch. Icon. pl. 8. f. 30 a, b.

*Hab.* Bass's Strait, South Australia; *Calvert*.

This remarkable shell is curiously intermediate in its characters between *T. (Bouchardia) Cumingii* and *tulipa*. The beak is more acuminate than in the former; and the area of the deltidium, which in *B. Cumingii* and *tulipa* is excavately grooved, is in *B. fibula* flat. In respect of the callous development of the interior, it is about intermediate between the other two. Mr. Calvert, of whom the *B. fibula* was purchased for the British Museum, reports that he dredged it in Bass's Strait from a depth of 200 fathoms; but Mr. Milligan, of Hobart Town, Secretary to the Royal Society of Tasmania, now in London, informs me that Bass's Strait, when sounded by Captain Stokes, was found not to be deeper in any part than from 70 to 75 fathoms.

33. *Terebratulula (Bouchardia) tulipa*, De Blainville, Dict. Sci. Nat. liii. f. 144.

*Bouchardia tulipa*, Gray.

*Terebratulula rosea*, Humphreys, ined.

*Bouchardia rosea*, Davidson.

*Pachyrhynchus roseus*, King.

*Terebratulula unguis*, Küster.

*Hab.* Brazil (dredged at Rio Janeiro from a depth of about 10 to 13 fathoms); *Macgillivray*.

*T. (Bouchardia) Cumingii, fibula, and tulipa* are distinguished from all other *Terebratulula* by the structure of the shell's beak, which is acuminate and has the foramen at the extremity. The deltidium plates are therefore dispensed with, and the lengthened area which occupies their place is either flat, as in *B. fibula*, or excavately grooved, as in *B. Cumingii* and *tulipa*. Concomitant with this change in the structure of the beak there is a change in the interior of the shell. The apophysial skeleton, retaining the cross piece of *Magas*, becomes solidified and comparatively rudimentary, and callosities begin to be formed about the hinge of *B. Cumingii*, until they assume in *B. tulipa* the function of heavy interlocking plaits.

#### Subgenus 7. MEGERLIA, King.

*Apophysis* a rather small loop on a pair of projecting blades affixed by a laminated cross piece to a central septum, and on either side by a short intermediate lobed process.

34. *Terebratulula (Megerlia) truncata*, Linn. Syst. Nat. p. 1152; Conch. Icon. pl. 11. f. 48 a, b, c.

*Anomia truncata*, Linnæus.

— *disculus*, Pallas.

- Terebratula truncata*, Lamarck.  
 — *disculus*, De Blainville.  
*Terebratella truncata*, D'Orbigny.  
*Terebratula monstrosa*, Scacchi.  
*Orthis truncata*, Philippi.  
*Megerlia truncata*, King.  
*Orthis oblita*, Michelotti.  
*Megathyris oblita*, D'Orbigny.

*Hab.* Mediterranean (affixed to corals at depths of from 50 to 100 fathoms). Cape Finisterre (at a depth of 90 fathoms). Canaries.

Mr. Jeffreys possesses a specimen of this well-known species, formerly belonging to Dr. Turton, which is said to have been dredged in Torbay; but its recorded British habitat has not been confirmed by the discovery of any further specimens.

Subgenus 8. *KRAUSSIA*, Davidson.

*Apophysis* a central septum, from the extremity of which diverge a pair of fan-like processes.

35. *Terebratula* (*Kraussia*) *rubra*, Pallas, Misc. Zool. pl. 14. f. 2-11; Conch. Icon. pl. 9. f. 37 *a, b, c*.

- Anomia rubra*, Pallas.  
 — *promontorii Bonæ Spei*, Chemnitz.  
 — *Capensis*, Gmelin.  
*Terebratula rubra*, De Blainville.  
 — *Capensis*, Krauss.  
 — *Algoensis*, Sowerby.  
*Kraussia rubra*, Davidson.

*Hab.* South Africa.

This very interesting species, though admirably figured, with its loopless bifurcating apophysis, nearly a century ago by Pallas, and again a few years later by Chemnitz, was not known to Valenciennes when preparing his monograph of the genus for Lamarck's 'Animaux sans Vertèbres,' nor even to Sowerby when publishing his monograph in the 'Thesaurus.' It is characterized by a remarkably short beak and large foramen; and the deltidium plates are accordingly very widely separated. The colouring, which is mainly on the radiating ribs, is bright coral-red. Mr. Sowerby's *T. Algoensis*, pronounced by Mr. Davidson to be a *Terebratella*, and by Dr. Gray to be a *Kraussia* "scarcely differing from *K. pisum*," is founded on a bleached fragmentary ventral valve, preserved in the British Museum, of *Kraussia rubra*.

36. *Terebratula* (*Kraussia*) *cognata*, Chemnitz, Conch. Cab. viii. p. 78, pl. 76. f. 688 *a, β*; Conch. Icon. pl. 9. f. 36 *a, b*.

*Cognata Anomiæ craniolaris basi perforata*, Chemnitz.

*Hab.* South Africa.

*Kraussia cognata* (of which a single specimen in Mr. Cuming's

collection, notwithstanding that the species was described and figured by Chemnitz, is the only one known to me) might readily be taken for a worn mis-shapen specimen of *K. rubra* but for one important character: the dorsal valve is conspicuously serrated within the margin by a row of spinous teeth. No mention is made of this character in the diagnosis of the British Museum Catalogue; but it is figured and carefully described by Chemnitz—"margine interiori subtilissime et acutissime denticulato."

37. *Terebratula (Kraussia) pisum*, Valenciennes apud Lamk. Anim. sans Vert. vii. p. 330; Conch. Icon. pl. 9. f. 36 *a, b*.

*Terebratula Natalensis*, Krauss.

*Kraussia pisum*, Davidson.

*Hab.* South Africa.

This little species, which M. Valenciennes named "the pea," and likened to a cherry-stone, resembles *K. Lamarckiana*; but it is constantly distinguished by the fineness of the radiating ridges, while it is of larger size.

38. *Terebratula (Kraussia) Deshayesii*, Davidson, Proc. Zool. Soc. 1852, p. 80, pl. 14. f. 20, 21; Conch. Icon. pl. 9. f. 35 *a, b*.

*Terebratula Capensis*, Adams and Reeve (not of Gmelin).

*Kraussia Deshayesii*, Davidson.

*Hab.* Cape of Good Hope (dredged from a depth of 120 fathoms); *Belcher*.

Very closely allied to *K. pisum* and *Lamarckiana*, but of a more triangular form, and painted in a characteristic manner with crimson rays. The habitat "Corea" given by Mr. Davidson for this species, on the authority of Mr. Cuming, is incorrect. *Kraussia Deshayesii* was dredged off the Cape of Good Hope in the same vessel in which *Terebratulina abyssicola* was dredged at Corea; and the labels got confounded together. *Kraussia* is as exclusively a type of the south temperate zone as *Terebratulina* is of the north temperate.

39. *Terebratula (Kraussia) Lamarckiana*, Davidson, Proc. Zool. Soc. 1852, p. 80, pl. 14. f. 22, 23; Conch. Icon. pl. 9. f. 34.

*Terebratella Lamarckiana*, Davidson.

*Hab.* Sydney and New Zealand.

This little species is of a broadly ovate pouch-like form, flexuous in growth and rather strongly wrinkled. It has the bifurcated apophysis of *Kraussia*, but is a little removed from the typical forms of the group, all of which are natives of South Africa. The septum in this species is continued beyond the point of bifurcation nearly to the margin, which is in both valves neatly spinulose.

## Subgenus 9. GWYNIA?, King.

*Apophysis unknown.*

40. *Terebratula* (*Gwynia*?) *capsula*, Jeffreys, Ann. & Mag. Nat. Hist. 1859, iii. pl. 2. f. 7 a, b; Conch. Icon. pl. 10. f. 39.

*Terebratula capsula*, Jeffreys.

*Gwynia capsula*, King.

*Hab.* Plymouth; *Norman.* Belfast Lough; *Hyndman.* Etretat, Normandy; *Jeffreys.*

Is this very minute form, it has been asked, an adult shell, or the fry of *Argiope cistellulum* or of some other *Terebratula*? An *Argiope* it certainly is not; and I am unable, after a most tedious examination of specimens, to add anything to what is known on the subject. Its history is as follows:—In the ‘Annals and Magazine of Natural History’ for August 1858, Mr. Jeffreys announced that a very minute brachiopodous shell ( $\frac{1}{25}$ th of an inch in length and  $\frac{1}{40}$ th, in breadth) had been found by Mr. Norman (a well-known collector of British shells resident in Durham) among some shell-sand received by him from Plymouth. “Being so excessively small,” adds Mr. Jeffreys, “as to defy any attempt to examine the internal structure without injuring the specimen, it is impossible to say whether it is an *Argiope*; but having carefully compared it with *A. cistellula*, which varies greatly in form, I am inclined to consider it at present an extreme variety of that species.” Attention being drawn to the subject, other specimens were dredged by Mr. Hyndman in Belfast Lough (reported, however, to be *Argiope cistellula*), and by Mr. Jeffreys himself at Etretat, on the coast of Normandy. After an examination of specimens under a magnifying power of 100 diameters, Mr. Jeffreys came to the conclusion that the shell was not an *Argiope*, but a form more allied to *Terebratulina*. Is it then the fry of *T. caput-serpentis*? Mr. Jeffreys thought not, because the valves are nearly equal, and have no indication of the radiating dichotomous ridges of that species. But what do we know of the Brachiopods in the fry state? Is it at all likely that they bear the detailed characteristics of the adult? He described it in the following year (Ann. and Mag. Nat. Hist. January 1859) simply as a *Terebratula*, with the remark, “it may be a question whether it ought not to be placed in a new subgenus.” Prof. King, of Queen’s College, Galway, upon seeing this announcement, lost no time in borrowing the specimens, and, in compliment to Mr. (J. Gwyn) Jeffreys, created the genus *Gwynia* for its reception (Proc. Dubl. Univ. Zool. Assoc. April 1859). Prof. King says, “The principal generic character of *Gwynia* is in the labial appendages being attached directly to the shell, and not to a loop.”

The grounds for this conclusion appear to me to be very insufficient. No loop, it is true, has been observed; but it is to be remarked that the shell much more resembles that of the free-looped *Terebratula* than that of the subgenera in which the labial appendages rest more directly on the shell. The most remarkable peculiarity of this shell, as compared with ordinary adults, is the prominence of the dorsal umbo. The shell is almost double-beaked. Its internal structure is not yet understood. "Woodward and myself," writes Mr. Davidson to me, in a letter just received, "wasted a whole day at the British Museum (April 27th, 1859) in endeavouring to find some kind of loop in *T. capsula*, but could find none, and thought it the fry of some other species."

Subgenus 10. MORRISIA, Davidson.

*Apophysis* a short simple loop attached to a central process in the form of a spur.

41. *Terebratula (Morrissia) anomioides*, Scacchi, Philippi, Enum. Moll. Sicil. ii. p. 69, pl. 18. f. 9; Conch. Icon. pl. 10. f. 40.

*Orthis anomioides*, Scacchi.

*Terebratula appressa*, Forbes.

*Morrissia anomioides*, Davidson.

*Hab.* Mediterranean (dredged in the Ægean from a depth of 95 fathoms); *Forbes*.

An *Anomia*-like form, in which the ventral valve is very little beaked, and the foramen encroaches upon the dorsal valve, occupying the place of the umbo; there is consequently no deltidium.

42. *Terebratula (Morrissia) Davidsoni*, Deslongchamps, Ann. and Mag. Nat. Hist. 1855, xvi. pl. 10. f. 20 *a, b, c, d*.

*Hab.* Mediterranean (dredged at Tunis, adhering to *Caryophyllia ramea*); *Deslongchamps*.

I do not see that the differences alleged to exist between this species and the preceding are clearly specific. Far greater differences may be observed in bivalves of similar habit of which specimens are more abundant, as of the common *Anomia ephippium* for example, which it so closely resembles externally, though minute and of a different organization. *Morrissia Davidsoni* is distinguished from *M. anomioides*, so far as the few specimens known permit of a distinction being noted, by the following characters:—The shell is larger and of a more transverse growth, with the concentric lines of increase rising almost to the sharpness of asperities. The foramen is large, and encroaches so much upon the dorsal valve as to appear almost to belong to it alone; and the



dorsal valve is flat and irregularly indented, denoting a close attachment to the body to which the pedicle is affixed.

43. *Terebratula (Morrisia) lunifera*, Philippi, Enum. Moll. Sicil. i. p. 97, pl. 6. f. 16 a-f.

*Orthis lunifera*, Philippi.

*Morrisia lunifera*, Gray.

*Hab.* Mediterranean ; *Philippi*.

A delicate hyaline species, of a more triangular form than either of the preceding two, puckered with indentations at the margin.

Subgenus 11. ARGIOPE, Deslongchamps.

*Apophysis* a loop sweeping round the valve on either side, supported in front by from one to three short marginal septa.

44. *Terebratula (Argiope) decollata*, Chemnitz, Conch. Cab. viii. p. 96, pl. 78. f. 705 a, b, c, d ; Conch. Icon. pl. 10. f. 43 a, b.

*Anomia decollata*, Chemnitz.

— *detruncata*, Gmelin.

*Terebratula decollata*, Deshayes.

— *detruncata*, De Blainville.

*Megathyrus detruncata*, D'Orbigny.

*Terebratula aperta*, De Blainville.

— *dimidiata*, Scacchi.

— *cardita*, Risso.

— *urna-antiqua*, Risso.

*Orthis detruncata*, Philippi.

*Argiope detruncata*, Deslongchamps.

— *decollata*, Davidson.

*Hab.* Mediterranean (affixed to corals at depths of from 50 to 100 fathoms).

The loop is in this well-known species supported in front by three marginal septa.

45. *Terebratula (Argiope) cuneata*, Risso, Eur. Mérid. pl. 4. f. 179 ; Conch. Icon. pl. 10. f. 44.

*Anomia Pera*, Mühlfeldt.

*Orthis Pera*, Philippi.

*Terebratula Soldaniana*, Risso.

*Argiope cuneata*, Davidson.

*Hab.* Mediterranean (at depths of from 30 to 70 fathoms) ; Canaries.

A narrower form than the preceding species, with the beak more tumidly produced, and the hinge-area consequently less abruptly truncated. The loop rests upon only one marginal septum.

46. *Terebratula (Argiope) Neapolitana*, Scacchi, Oss. Zool. ii. p. 18; Conch. Icon. pl. 10, f. 45.

*Terebratula seminulum*, Philippi.

*Orthis Neapolitana*, Philippi.

*Argiope Neapolitana*, Davidson.

— *Forbesii*, Davidson.

*Hab.* Mediterranean (at depths of from 60 to 100 fathoms); Canaries.

Of a more triangular form than the preceding species, while the valves are plicately indented at the margin in rather a characteristic manner, the radiating ribs being arranged in three fasciculi, or as it were on three shields. The apophysis is the same as in *A. cuneata*; but the margin of the valve is more thickened internally, and between it and the loop there is a distinct row of spinous teeth.

47. *Terebratula (Argiope) cistellula*, Searles Wood, Ann. and Mag. Nat. Hist. vi. p. 253 (fossil); Conch. Icon. pl. 10. f. 46.

*Megathyris cistellula*, Forbes and Hanley.

*Argiope cistellula*, Davidson.

*Hab.* Mediterranean and British Seas.

This little species, originally discovered by Mr. Searles Wood in a fossil state, has been found alive in the British seas at Zetland, in Belfast Bay, and at Exmouth, on the coasts of Guernsey and Normandy, and lastly in the Mediterranean, which is the specific home of the group.

#### Subgenus 12. THECIDEA, DeFrance.

*Apophysis callously affixed to the bed of the valve.*

48. *Terebratula (Thecidea) Mediterranea*, Risso, Eur. Mérid. pl. 4. f. 183.

*Thecidea testudinaria*, Michelotti.

— *spondylea*, Scacchi.

*Hab.* Mediterranean (attached to corals).

*Thecidea* is rather a difficult subject to observe, by reason of its habits. It bears much the same relation to the rest of the *Terebratula* that *Hinnites* bears to *Pecten*. The pedicle, like the byssus in that genus, loses its function and is dispensed with, and the animal affixes itself by the shell. The shell, as in most such instances, is of very callous and irregular growth, and it is only by the casual development of its structural details in a numerous series of specimens that its characters can be ascertained. In some fossil forms of *Thecidea* a minute terminal fora-

men has been shown to exist, but I find no trace of one in the recent species. The umbo of the ventral valve is largely produced into a thickened spondyloid beak; and in its front area a large triangular rudimentary deltidium is soldered. The dorsal valve, rudely indented and flattened, is of a horse-shoe shape; and the ventral valve, densely convex, is rayed outwardly with close-set grooves, which produce serrations on the inner margin. The apophysial system is modified into a fixed ridge in the bed of the valve, accompanied by a profusion of little indentations. When describing *Thecidea* twenty years ago (Conch. Syst. i. p. 184), I remarked that "the upper valve is flat and curiously indented, as if to fit certain corresponding parts in the body of the animal. These indentations, which spread round in a semicircular direction from the hinge, look exactly as if they were picked out in wax; and in a specimen which I have examined with considerable minuteness, they were filled with the dried remains of numerous fine cilia." No sort of loop had been observed in *Thecidea*, and it is now obvious that this indented bed of the ciliary arms is a modification of it.

#### GEOGRAPHICAL DISTRIBUTION.

It is difficult to generalize on the geographical distribution of the *Terebratula*, with the hope of arriving at many conclusions of interest, without embracing the fossil species. As might be expected in the case of a tribe of animals which existed so much more abundantly in the Silurian seas, and are perhaps destined at no very remote period to disappear altogether, they are much scattered, and are not abundant in individuals. Nevertheless there are few genera of mollusks of which the habitats and specific nature are now so well known. Of the 48 recorded species of *Terebratula* (cited rather at random by authors at from 60 to 70 in number), 4 are based upon single specimens of somewhat doubtful specific value, without any information as to their habitats—*cancellata*, *Bouchardii*, *transversa*, *suffusa*; but their relationship with undoubted species is not sufficiently obvious to admit of their being discarded. Of 3 species, *radiata*, supposed to be a native of Corea; *crenulata*, of the Canaries; and *dilatata*, of Coquimbo, or the Strait of Magellan, the habitats are not well authenticated, and appear to me to be doubtful. Of the habitats of the remaining 41 species there is no manner of doubt; but of two of these the specific value is open to criticism—*physema* and *capsula*. There remain, then, 39 species of which the subgenus (founded on the structure of the apophysis) and the habitat may be relied on.

## DISTRIBUTION OF SPECIES IN PROVINCES.

*Eastern Hemisphere.*I. *North European Province.*

Waldheimia cranium.  
 — septigera.  
 Terebratulina caput-serpentis.  
 Terebratella Labradorensis.  
 — Spitzbergensis.

II. *Lusitanian Province.*

Terebratula vitrea.  
 Terebratulina caput-serpentis.  
 Megerlia truncata.  
 Morrisia anomoides.  
 — Davidsoni.  
 — lunifera.  
 Argiope decollata.  
 — cuneata.  
 — Neapolitana.  
 — cistellula.  
 Thecidea Mediterranea.

III. *North Asiatic Province.*

Waldheimia Grayi.  
 Terebratulina Japonica.

Terebratulina abyssicola.  
 Terebratella Coreanica.

IV. *Indo-Pacific Province.*

Waldheimia picta.  
 Terebratulina Cumingii.  
 Terebratella sanguinea.

V. *Australo-Zealandic Province.*

Waldheimia flavescens.  
 — lenticularis.  
 Terebratella cruenta.  
 — rubella.  
 — rubicunda.  
 Magas Valenciennesii.  
 Bouchardia fibula.  
 — Cumingii.  
 Kraussia Lamarckiana.

VI. *South African Province.*

Kraussia rubra.  
 — cognata.  
 — pisum.  
 — Deshayesii.

*Western Hemisphere.*VII. *Magellanic Province.*

Terebratula uva.  
 Terebratella Magellanica.

VIII. *Panamic Province.*

Terebratula uva.  
 Waldheimia globosa.

IX. *Brazilian Province.*

Bouchardia tulipa.

X. *North American Province.*

Terebratulina caput-serpentis.

## DISTRIBUTION OF SUBGENERIC TYPES.

*Terebratula*.—Lusitanian, Magellanic, and Panamic provinces.

*Waldheimia*.—North European, North Asiatic, Indo-Pacific, Australo-Zealandic, and Panamic provinces.

*Terebratulina*.—North European, Lusitanian, North Asiatic, Indo-Pacific, and North American provinces.

*Terebratella*.—North European, North Asiatic, Indo-Pacific, Australo-Zealandic, and Magellanic provinces.

*Magas*.—Australo-Zealandic province.

*Bouchardia*.—Australo-Zealandic and Brazilian provinces.

*Megerlia*.—Lusitanian province.

*Kraussia*.—Australo-Zealandic and South African provinces.

*Morrisia*.—Lusitanian province.

*Argiope*.—Lusitanian and Celtic provinces.

*Thecidea*.—Lusitanian province.

## Summary.

1. Of the thirty-nine species cited in the foregoing analysis, thirty-five belong to the Old World, only four to the New. None of the species are common to both, with the single exception of *Terebratulina caput-serpentis* of the North European and Lusitanian provinces, which ranges in a modified form (*T. septentrionalis*, Couthouy) to the eastern shores of North America. Two species of *Terebratula* have been described by Dr. Gould in Wilkes's 'Exploring Expedition' (*T. caurina* and *pulvinata*), from Puget Sound, Oregon; but I have not seen them.

2. The distribution of subgenera illustrates a few characteristic centres of creation. *Megerlia*, *Morrisia*, *Argiope*, and *Thecidea*, all have their homes in the Lusitanian province,—one species only, *Argiope cistellula*, passing into the Celtic province, which has no centre of specific creation of its own. *Kraussia* has its home in the South African province, embracing four species. A fifth species, *K. Lamarckiana*, is found in the Australo-Zealandic province; but the apophysis, on which the subgenus is founded, is abnormal in its structure.

3. Of subgeneric types widely removed, *Bouchardia* presents curious instances. *B. tulipa*, a solitary species on the shores of Brazil, is undoubtedly identical in type with *B. fibula* and *Cumingii*, which are natives of Australia and New Zealand, though no faunas of any two provinces can be more generally dissimilar. The same may be said of *Waldheimia* and *Terebratella*; but these subgenera are more abundant in species and individuals, distributed in local centres of creation of more varying specific character.

4. Of specific types widely removed, a notable instance is presented in *Waldheimia globosa* of California, and *W. lenticularis*, a native of New Zealand. Not only are these very remote species of the same specific type, but the difference of their specific details is scarcely appreciable.

5. The most characteristic assemblages of species are those of *Terebratulina* in the North European and North Asiatic provinces, of *Waldheimia* in the Panamic, of *Terebratella* in the Magellanic, and of *Morrisia* and *Argiope* in the Lusitanian province.

6. Species are fewest within the Tropics. The Indo-Pacific province, which extends from Australia to Japan, and from the Red Sea and east coast of Africa to Easter Island in the Pacific, embracing three-fifths of the circumference of the globe and forty-five degrees of latitude, yields only three species—*Waldheimia picta*, *Terebratulina Cumingii*, and *Terebratella sanguinea*; and of the first two, very few individuals are known.

7. Species, with few exceptions, are very local. The excep-

tions are *Terebratulina caput-serpentis*, which ranges, as already noticed, from the Arctic to the Mediterranean Seas and to the seas of North America, and is very closely represented in the North Asiatic provinces by *T. Japonica* and *abyssicola*. Another exception to the local distribution of species is presented in *Waldeheimia picta*, which is found both at Java and at the Friendly Islands. A third exception is one of similar character: *Terebratella sanguinea* inhabits both the Philippine and Sandwich Islands. And a fourth exception occurs in *Terebratula uva*, collected originally at Guatemala, but of which small specimens, in the British Museum and in Mr. Cuming's collections, have been received from the Falkland Islands.

\*8. Lastly, the Australo-Zealandic province may be noticed as being the most prolific of forms and brilliancy of colour; but all the subgenera of this province, with the exception of *Magas*, have species, though not the same, in other provinces.

XXI.—On the Immature State of the Sea-devil (*Lophius piscatorius*). By Dr. ALBERT GÜNTHER.

[Plate X. figs. C-E.]

SMALL specimens of the European species of the Fishing-Frog or Sea-devil are extremely scarce in collections, and scarcely any attention has been paid to the remarkable changes in the form of the body and fins to which this fish is subject with age. Valenciennes is the only author who enters upon the subject at all: he says (Cuv. & Val. Hist. Nat. Poiss. xii. p. 375), "The specimen examined is 2 inches long; the disk of its head is only one-third of the total length; and the pectoral fins, which are as long as the head, appear to be more elongate than in old individuals. The same is the case with the tail, measured from the gill-opening. It appears to have a greater number of tentacles on the skin, especially on the pectorals; the margin of the pectorals appears to be finely ciliated. D. 11." The differences from old individuals, as we find them stated here by Valenciennes, agree in the chief points with our observations; but it is evident that Valenciennes took his notes from a mutilated specimen, in which the delicate appendages of the fins had been lost or shrivelled up, either previously to or during its preservation in spirits.

The two specimens observed by Düben and Koren on the western coast of Norway were much more perfect; they were 94 mm. and 78 mm. long, and exhibited such remarkable differences from the specimens commonly observed, that those naturalists were induced to describe them as a new form, under