is extraordinarily long, the intervals between the septa, at first short and irregular, become during the progress of the growth, unusually long. The siphuncle is narrow and straight, generally situated near the ventral surface. The decollation is oblique, following the direction of the septa.

The commencement of the *Ascoceras* stage is partially indicated by the increased distance between the septa. Very important changes in the shape of the animal, and probably also altered functions must have supervened, when its shell, thus rapidly, as it were, developed the very abnormal *Ascoceras* form. The septa were pushed up along the dorsal, and greatly depressed along the ventral side, where also the cochleate or bullate siphuncle is placed. In no other genus of the Cephalopoda are such aberrant septa developed. The most curious feature is that, with the exception of the lowest or oldest one, they are all incomplete, having a large lacuna in their central part on the dorsal side. They have thus been secreted only along the interior wall of the shell, leaving an empty space between their thin linings. Hence the different aspect they present in many of the figures in various publications. Thus they are continuous along the outside of a cast of the interior (Barrande, Céphalopodes, pl. 93, fig. 1), and truncated, discontinuous and resting on each other in a median, longitudinal section (Barr. *l.c.* pl. 93, fig. 4).

The discovery of these Gotland specimens of *Ascoceras* fully confirms the views of Bronn, expressed in 1855, at a time when neither he nor any one else had seen perfect specimens, as to the relationships of this genus. Barrande stated that *Ascoceras* possessed only a single deciduous chamber below the "lateral chambers," and he regarded the genus as the prototype of *Nautilus*. Bronn, on the other hand, invited by Barrande to give an opinion on the subject, suggested that if *Ascoceras*, at an early stage, threw off a portion of its growth, consisting of regular air-chambers with a siphuncle, then "*Orthoceras is rather to be designated as the early stage of Ascoceras*" (Neues Jahrbuch für Mineralogie, etc., 1855, p. 283, footnote **).

III.—Ostracoda from the Weald Clay of the Isle of Wight.

By Prof. T. Rupert Jones,[1] F.R.S., etc.

Contents.

SOME new species having been found in the Isle of Wight during the lately renewed examination of its geology by the Geological Survey, and the known Wealden species of that island not having

[1] Mr. C. D. Sherborn, F.G.S., has kindly assisted the writer in the examination of these Ostracoda.

been hitherto so distinctly indicated as might be, it is thought advisable to give some notes on, and a résumé of, this interesting series of fossil species.

1. Cypris cornigera, sp. nov. Figs. 1*a*–1*f*, p. 536.

Valves suboblong; straight on the dorsal; elliptically rounded on the ventral margin; unequally rounded at the ends. Bearing a delicate sharp spine, or straight horn, at the front end of the dorsal line, pointing obliquely upwards (outwards and forwards). The extremities of the valves differ much in individuals, according to the state of preservation, and possibly according to sex. The front end is highest (broadest), and often boldly rounded, but sometimes showing a slight outward and downward slope at its upper part, just in front of the horn. The horn is, or has been, present on examples of both right and left valves, but it has very often been lost, and we have not been able to see it in place in a closed carapace.

The highest end, that which bears the spine, is also the most compressed (Fig. 1*f*); and therefore in all probability is the anterior; and hence the larger valve, overlapping the other ventrally, is the left (Fig. 1*e*).

The anterior and posterior margins of the valves are slightly bevelled on the inside. The hinge-line is simple. The surface is smooth; but, readily dissolving away, both inside and out, into numerous little pits with rounded mouths, according to some structural peculiarity, the valves appear to be coarsely and irregularly punctate in many instances.

This species occurs in two specimens of dark-grey shale, marked No. 3685 and No. 3688 (Geological Survey), from Atherfield Point, Isle of Wight. In the latter piece of shale it was associated with *Metacypris Fittoni* and a Fish-bone.

2. Candona Mantelli, sp. nov. Figs. 2*a*, 2*b*, p. 536.

In a light-grey compact shale (No. 3791, Geological Survey), from the Wealden beds between Atherfield Point and Shepherd's Chine, there are on the bed-planes many Ostracoda belonging to *Metacypris Fittoni* (Mantell), small; *Cypridea spinigera* (Sow.), young individuals; *Cypridea tuberculata* (Sow.); *Cypridea Valdensis* (Fitton); and *Candona Mantelli*, sp. nov.

The last somewhat resembles *Candona candida*[1] (Müller), and is evidently allied both to that species and to *C. Phillipsiana*, Jones (Geol. Mag. 1878, p. 108, Pl. III. Fig. 3), but the latter is too large, and much too high and less symmetrical. In the form before us the posterior extremity is more evenly rounded than in *C. candida*, and the anterior is not so high. Of the new species the right valve figured in outline (Fig. 2*a*) is the largest and best preserved of the many specimens on the shale.

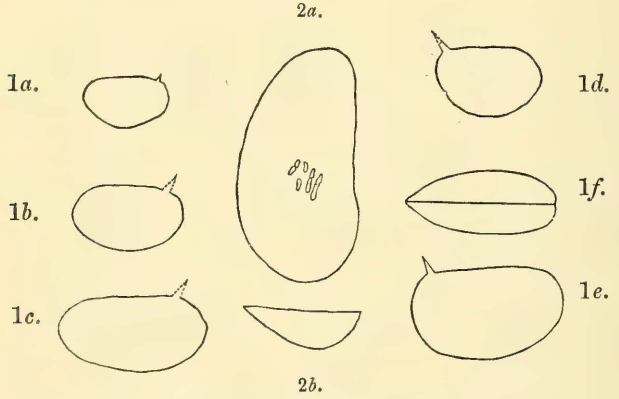
Subreniform, broader (that is, higher), and more boldly curved behind than in front; elliptically arched on the back, slightly sinuous on the ventral margin. Surface smooth and very delicately

[1] See Geol. Mag. 1878, p. 108, *footnote*.

punctate; almost equally convex, but sloping more rapidly in the dorsal region; hence the edge-view of the carapace would be lanceolate, and the end-view (Fig. 2*b*) acute-ovate. The ventral margin has a minutely-frilled appearance, which is lost, however, where the edge curves inwards at the middle.

The spots marking the muscular attachment on each valve consist of four oblique, parallel, but rather irregular, rows of little oval marks. These are in pairs, which unite at their ends in three, but remain separate in one, of the groups. On the inside of the valve the spots are little depressions; on the outside they appear translucent. The pattern is more like that of *Cypris* (*Candona*) *reptans* (fig. 7*e*, pl. 1, Monogr. Tert. Entom.), than that of *Candona candida*; the direction, however, of the rows of little marks is from the postero-dorsal to the antero-ventral region, which is contrary to the usual condition for muscle-spots in such a form of valve.

As this *Candona* differs from those already known, I propose to name it after my old friend the late Dr. G. A. Mantell, one of the most zealous elucidators of the geology of the Isle of Wight, and of its Wealden strata in particular.



Cypris cornigera, Jones.
- Fig. 1*a*. A right valve of a young individval.
- ,, 1*b*. A right valve of medium growth.
- ,, 1*c*. A long and low (narrow) variety; right valve.
- ,, 1*d*. A short and high (broad) variety; left valve.
- ,, 1*e*. The largest specimen; outline of left valve.
- ,, 1*f*. The largest specimen; outline of edge-view of carapace.

Candona Mantelli, Jones.
- Fig. 2*a*. Outline of a right valve. (Anterior end placed upwards.)
- ,, 2*b*. Outline of the end view of the valve.

Magnified 20 diam.; drawn by Mr. C. D. Sherborn, F.G.S.

3. Cypridea[1] Valdensis (Fitton).

This was the *Cypris faba* of Sowerby, "Mineral Conchology,"

[1] This genus is described at large in the Quart. Journ. Geol. Soc. vol. xli. 1885, p. 336. Remarks on the possible alliance existing between *Cypridea* and *Chlamydotheca* have been made by Dr. G. S. Brady in the "Proceed. Zool. Soc." 1886, p. 90; and in the "Journ. Linn. Soc." vol. xix. 1886, p. 200, 201.

1824, pl. 485, pp. 136–8; and was named *Cypris Valdensis* by Dr. Fitton[1] in 1836. See Geol. Mag. 1878, p. 109 and 277, Pl. 3, Fig. 11; and Quart. Journ. Geol. Soc. vol. xli. 1885, pp. 315–318, and 336–337. It is of very general occurrence in the Wealden beds,[2] especially the Weald Clay, and notably in the dark and thinly-laminated shales at Compton Bay in the Isle of Wight. It occurs, but is rare, in the Purbeck beds of Dorset.

4. Cypridea Dunkeri, Jones.

Cypridea Dunkeri, Jones, Quart. Journ. Geol. Soc. vol. xli. 1885, p. 339, pl. 8, figs. 9, 10, 17.

To the synonyms mentioned at p. 339, *op. cit.*, add:

Cypridea granulosa (Dunker), Jones, Geol. Mag. 1878, p. 110, Pl. III. Fig. 16.

This species is rather rare, but occurs in the Weald Clay of Grange Chine,—West of Brook Point,—Brixton Bay,—Atherfield,—and Sandown, in the Isle of Wight. It is rarer elsewhere, but has been found in the Wadhurst Clay and the Netherfield Limestone of Sussex, and in the Upper and Middle Purbeck beds of Dorset.

5. Cypridea spinigera (Sowerby).

Cypris spinigera, Sowerby, in Fitton's Memoir "On the Strata below the Chalk," Trans. Geol. Soc. ser. 2, vol. iv. 1836, p. 345, pl. 21, fig. 3. Figured also by Mantell, Lyell, and other authors.

Cypridea spinigera, Jones, in Morris's Catal. Brit. Foss. 1854, p. 104.

Cytherideis unicornis, Jones, Mem. Geol. Surv. Isle of Wight, 1856, p. 158, pl. 7, figs. 24–26; Monogr. Tert. Entom. 1856, p. 48.

Cypridea Valdensis, Bristow, Mem. Geol. Surv. Isle of Wight, 1862, p. 4, fig. 1.

Cytherideis unicornis, Jones, Geol. Mag. 1870, pp. 157, 158.

Cypridea spinigera, Jones, Geol. Mag. 1878, p. 109.

——————— Jones, Q.J.G.S. vol. xli. 1885, pp. 316, 333, and 334.

——————— Jones and Sherborn, Geol. Mag. 1887, p. 386.

In the Quart. Journ. Geol. Soc. 1885, *Cypridea spinigera* was mentioned as being common in the upper part of the Weald Clay at Compton Bay, Atherfield, and Sandown in the Isle of Wight, and as occurring also in the Wealden beds, but more rarely, of Sussex and Surrey. We now find that it occurs abundantly in the Tertiary beds of Hamstead Cliff on the north coast of the Isle of Wight. Specimens from this locality were described and figured in the Geol. Surv. Memoir I. of W. 1856, under the name of *Cytherideis unicornis*, as a subreniform Ostracod, sulcate and tuberculate when young, but with a sharp spine on each valve when adult. Careful examination of a further series of specimens leaves no doubt that it is the same species as that so plentiful in some of the Wealden strata. The Tertiary specimens are not so well preserved as those in the Wealden clays, nor are they so abundant; but many perfect specimens, young and adult, can be readily matched from the two formations. The Tertiary specimens are plentiful in a crushed state on the laminæ of a dark-grey marl ("D 6," Geol. Survey) of the Lower Hamstead series, Hamstead Cliff.

Note.—This species, or one extremely like it, has turned up in a specimen given to me by the late Dr. Mantell as coming from the

[1] Another species (*Cypridea Austeni*) was figured in his memoir instead of the true *Cypridea Valdensis*. See Geol. Mag. 1878, p. 277.

[2] See Q.J.G.S. 1885, pp. 333 and 334.

Oxford Clay of the Trowbridge Railway-cutting, Wiltshire, and also in a piece of the Oxford Clay of Skye, collected by Messrs. Geikie and Young, and there associated with *Estheria*. If its freshwater habitat in the Hamstead series be a criterion, and if these other specimens prove trustworthy, it points to more freshwater or estuarine conditions in the Oxfordian Series than are usually thought of.

6. Cypridea Austeni, Jones.

Cypris Valdensis, Fitton (*in part*), Trans. Geol. Soc. ser. 2, vol. iv. 1836, p. 204, etc., pl. 21, fig. 1. Copied by various authors.
———— Mantell, Wonders of Geology, 7th edit. 1857, vol. i. p. 419, lignogr. 104, fig. 3.
———— Lyell, Elements of Geology, 6th edit. 1865, p. 346, fig. 341.
———— Mantell, Geol. Excurs. Isle of Wight, 3rd edit. 1874, p. 223, lignogr. 25, fig. 3.
Cypridea Austeni, Jones, Geol. Mag. Dec. II. Vol. V. 1878, pp. 109, 110, 277, Pl. III. Fig. 8.

This oblong *Cypridea* was figured by Fitton instead of the real ovate *C. Valdensis*, and it has been often copied for the latter. The figures in Mantell's works quoted above are given by him as representing specimens from the Wealden beds at Brook Bay, Isle of Wight. As such they may be noticed here, although possibly *C. Valdensis* may have been really intended, and the figure copied from Fitton by mistake.

In the same lignograph Mantell gave a figure of *Cypridea spinigera* (after Sowerby's drawing), as having also been got from Brook Bay. He also copied his fig. 2 from Sowerby's fig. 4 in Fitton's Memoir, namely, *Cypridea granulosa* (Sow.), the same as *Cypridea fasciculata* (Forbes), as an Isle-of-Wight specimen; but that was certainly an error, for that species occurs only in the Middle Purbeck beds. See Q.J.G.S. vol. xli. pp. 340–342.

Cypridea Austeni has been found at Peaseworth, in Surrey, and at Shotover, near Oxford.

7. Darwinula leguminella (Forbes).

Quart. Journ. Geol. Soc. vol. xli. 1885, pp. 332, 333, 346, pl. 8, figs. 30 and 31.

This little Ostracod occurs in the Weald Clay at Atherfield and Sandown; also in some Wealden beds of Sussex and Kent, in the Upper and Middle Purbecks of Dorset, and the so-called Wealden (Purbeck ?) beds of North Germany. In the Geol. Mag. April, 1886, p. 147, Pl. IV. Figs. 4 *a*, *b*, *c*, this species is recorded also from a Jurassic freshwater bed in Colorado.

The genus is the type of a separate family according to Brady and Robertson, "Monogr. Post-Tert. Entom." 1874, pp. 116 and 140. As the name was changed from *Darwinella* to *Darwinula*, the family name is now *Darwinulidæ*. *D. Stevensoni*, B. and R., is abundant in the fen rivers of the East of England.

8. Cyprione Bristovii, Jones.

Quart. Journ. Geol. Soc. vol. xli. 1885, p. 344, pl. viii. figs. 27, 28, 29, 32.

An additional occurrence of Wealden Ostracoda discovered by the Geological Surveyors in the Isle of Wight is a hardish buff-coloured marl, marked "3908," from the "Wealden Cliff opposite Compton

Chine," crowded with *Cypridea Valdensis, Cypridea Dunkeri, Metacypris Fittoni,* and *Cyprione Bristovii.*

The last-mentioned species has been found also in the Tunbridge-Wells Sand at Lindfield and Tunbridge (?), in the Wadhurst Clay near Hastings and Bexhill, in the Upper and Middle Purbeck beds of Dorsetshire, and in the equivalent beds of North Germany.

Cyprione probably belongs to the *Darwinulidæ.*

9. Metacypris Fittoni (Mantell).

Cypris tuberculata, Sow. *(in part),* Trans. Geol. Soc. ser. 2, vol. iv. 1836, pp. 177, &c., pl. 21, fig. 2 *a.*

Cypris Fittoni, Mantell, Medals of Creation, 1844, vol. vii. p. 545, lignograph 119, fig. 2.

Cypridea ? Fittoni, Jones, Geol. Mag. 1878, p. 277.

Cythere Fittoni, Jones, Quart. Journ. Geol. Soc. 1885, vol. xli. p. 333.

Metacypris Fittoni, Jones, in Prestwich's 'Geology,' vol. ii. 1888, p. 263, fig. 137*a.*

This species is common in some beds of the Weald Clay of the Isle of Wight, especially at Compton Bay,—on the west of Brook Point,—at Brixton Bay,—at Atherfield, and Sandown Bay. It occurs also at Punfield Cove near Swanage, and at Pulborough and Pallingham, Sussex, in the Weald Clay; in the Tunbridge-Wells Sands at Lindfield; and in the Wadhurst Clay near Hastings. It is not rare also at some places in the Weald Clay of Kent (near Maidstone, Great Chart, Aldington, and Hythe), and the Tunbridge-Wells Sands at Langton Green. Also (doubtfully) in the Weald Clay near Hazlemere in Surrey.

The genus *Metacypris* was first noticed by G. S. Brady in 'Nature,' 1870, p. 484; and was found living, but not abundantly, in the tidal waters and "Broads" of the East of England by G. S. Brady and D. Robertson. There was only one species (*M. cordata*) met with, and they determined it as more probably belonging to the Cytheridæ than to the Cyprididæ. See Ann. Mag. Nat. Hist. ser. 4, vol. vii. pp. 19, 20; vol. ix. p. 51; and Monogr. Post-Tert. Entom. 1874, pp. 112 and 116. Also Quart. Journ. Geol. Soc. vol. xli. p. 344.

Besides the *M. Fittoni* mentioned above, there are several other fossil species. *M. Forbesii* is one of the leading fossils of the Middle Purbeck beds of Dorset (Ridgway, Durlston Bay, and Mewps Bay), *op. cit.* p. 346. In the Geol. Mag. April, 1886, p. 146, Pl. IV. Figs. 1 *a, b, c,* this species is also described from a Jurassic freshwater or estuarine limestone of Colorado, where it is associated with two other species, namely, *M. Bradyi* and *M. Whitei,*[1] *loc. cit.* Pl. IV. Figs. 2 *a, b, c,* and 3 *a, b, c. M. conculcata,* Jones, from a similar estuarine formation at Bahia in Brazil,[2] as well as *M. strangulata,* Jones, from Tertiary beds in the Province of Nagpur, Central India,[3] are referred to in the same paper, pp. 146, 147.

One of the chief characteristics of *Metacypris* is the submedian transverse suture on the dorsal region. This is very strong in *M. Fittoni,* and is the feature which led Mantell to separate this species from its somewhat similar companion, *Cytheridea tuberculata.*

[1] These three species have been described briefly and figured in the 'Bulletin U.S. Geol. Surv.' No. 29, May, 1886, pp. 23, 24, pl. iv. figs. 22-26.

[2] Quart. Journ. Geol. Soc. vol. xvi. 1860, p. 266, pl. xvi. figs. 3 *a, b.*

[3] *Ibid,* p. 187, pl. x. figs. 73 *a, b, c, d.*