



## XLI.—On the classification of some British fossil Crustacea, with notices of new forms in the University Collection at Cambridge

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(*R. acris, flore pleno albo*), and of the lesser spearwort (*R. Flammula*). Found by Mr. E. Doubleday in the leaves of the hart's-tongue (*Scolopendrium vulgare*). *Ent. Mag.* iii. 414, 415.

2. *Ph. albiceps*, Meig. vi. 194. Larva subcutaneous in the leaves of the cow-parsnep (*Heracleum Sphondylium*), and the field-thistle (*Cnicus arvensis*). Pupa-case black.
3. *Ph. Aquilegiæ*, Hardy MSS. Nigricans; hypostomate sordide subflavo, proboscide alba; fronte flava; antennis palpisque nigris; thorace brevi, subrotundato, convexo, nigro-grisescente, subnitido, lineis dorsalibus longitudinalibus duabus obscuris ægre distinguendis, adumbrato; scutello concolore; abdomine griseo-nigricante, nitido, incisuris interdum stricte albescentibus; vitta laterali parva alba; ventre nigro; pedibus nigris, genubus perobscurius pallidis; halteribus albis; alis hyalinis, ad bases exalbidis, nervo transverso singulo. Long. corp. prope lin. 1.

The larva forms blotches in the leaves of the common columbine (*Aquilegia vulgaris*). It is closely allied to *Ph. albiceps*, but is darker, with the thorax shorter and rounder, and the white dashes before the wings not developed. The pupa-case is brown.

To these may be added others whose changes are still incomplete, found within the leaves of the bean (*Vicia Faba*), the burdock (*Arctium Lappa*), the field-thistle (*Cnicus arvensis*), the wild angelica (*Angelica sylvestris*), the red clover (*Trifolium pratense*), the red hemp nettle (*Galeopsis Tetrahit*), the climbing buckwheat (*Polygonum Convolvulus*), the quicken (*Triticum repens*), the meadow-sweet (*Spiræa Ulmaria*), and the kidney-vetch (*Anthyllis vulneraria*).

Penmanshiel, by Cockburnspath, Oct. 13, 1849.

XLI.—On the Classification of some British Fossil Crustacea, with Notices of new Forms in the University Collection at Cambridge. By FREDERICK M'COY, Professor of Geology and Mineralogy in Queen's College, Belfast.

[Continued from p. 335.]

Ord. EDRIOPHTHALMA.

(Trib. *Isopoda*.)

*Archæoniscus Brodiei* (M. Edw.).

As this interesting Wealden Crustacean (first I believe taken for an oolitic Trilobite) has not yet been fully described, the following notice may be acceptable:—

*Char.* Oval, moderately convex; *head* semicircular, the angles rounded, bearing two large oval or slightly reniform glomerated masses of minute round *eyes*; *thoracic segments* seven, broad, slightly granulated, with obtusely rounded ends, each extremity having a long triangular facet on its anterior margin (to facilitate rolling into a ball); *abdomen* of five segments, the first three abruptly smaller than the thoracic rings, the fourth a little larger, and the fifth forming a semicircular caudal shield, rather smaller and more convex than the head, bearing along its middle a narrow, defined, semicylindrical axal lobe, its rounded termination not reaching much more than halfway to the margin, the anterior end extending a variable distance towards the thorax.

I have not seen any trace (after examining about fifty specimens) of the lateral notches in the caudal shield for the articulation of lateral appendages, which Dr. Milne-Edwards says he thinks he saw. The only known species averages 6 lines long and  $3\frac{1}{2}$  lines wide.

(Col. University of Cambridge.)

#### Ord. ENTOMOSTRACA.

(Trib. *Pæcilopoda*.)

This group being distinguished from other Entomostraca by having crustaceous, didactyle, ambulatory thoracic feet as well as membranous, respiratory abdominal ones, is I think clearly the place for those remarkable genera, *Eurypterus* and *Pterygotus*; I cannot conceive why Dr. Burmeister should imagine the first of those genera to have no shell, and overlooking the didactyle structure of the larger crustaceous chelæ, &c., place it in his group *Palaæda* (Dal.), which, as he observes (Organiz. Trilob., Ray ed. p. 53), might be united with the *Phyllopoda*. The figure and description given by Römer of the American species of *Eurypterus* in his paper in Dunker and Von Meyer's 'Beiträge zur Naturgeschichte der Vorwelt,' powerfully favour this view of approximating the genus to *Limulus*. With regard to the second genus, *Pterygotus*, M. Agassiz having renounced his original opinion of its being a fish, has, in his work on the Fishes of the Old Red Sandstone, referred it to the Entomostraca without indicating any particular division. Some years before the appearance of the 'Poissons fossiles des vieux grès rouge,' I had an opportunity of examining some much more perfect examples of this Crustacean than are there figured, which were brought before the Geological Society of Dublin by Dr. Scouler under the name *Lepidocaris* (from the scale-like sculpturing of the cephalic shield)\*, and except the enormous difference in size, and *perhaps*

\* See Dr. Apjohn's President's Address.

a difference of superficial sculpturing, I see nothing in it different from *Eurypterus*; and when we bear in mind that the *Idothea* of Scouler\* is avowedly a *Eurypterus*, I cannot see how *Pterygotus* is to be separated as a genus, at least on any better grounds than the above. The tribe *Pæcilopoda* might be resolved into two families: 1st, *Limulidæ*, having, besides the head, a second shield formed by the anchylosis of all the abdominal segments (*Limulus*); 2nd, *Eurypteridæ*, having all the abdominal segments distinctly separated (*Eurypterus*, *Pterygotus*, *Bellinurus*). The first division has not, I believe, been found lower than the oolites, the *Limuli* quoted by several British geologists from the coal-measures of Coalbrook Dale, &c. belonging clearly to the second division, and should rather be referred to *Bellinurus* of König.

*Pterygotus leptodactylus* (M'Coy).

*Sp. Char.* Large pincers having the hand about 5 lines wide, sculptured with fine short, irregularly flexuous, elevated lines; the penultimate or immoveable finger exceedingly slender, compressed, about 2 inches 10 lines long, and only 2 lines wide at base, gradually tapering to less than a line towards its obtuse point, nearly straight, or with a scarcely perceptible inward curvature; sides divided into ridges by three or four longitudinal furrows, thicker towards the back; last joint or *moveable finger* similar to the immoveable one, but rather smaller; inner edges of both fingers destitute of teeth or tubercles.

The pincers, instead of being excessively thick and strong, and armed with great teeth on the inner edge as in the *Pterygotus Anglicus* (Ag.), are perfectly unarmed, and so long and slender as possibly to indicate a separate subgenus, which might be named *Leptocheles* (λεπτὸς, *tenuis*, χηλή, *forceps*). It strikes me (judging from the figures) that the *Onchus Murchisoni* (Ag.) is not an Ichthyodorulite, but the long finger of the chelæ of this Crustacean,—the size, form and sculpturing agreeing very nearly—while the base presents no trace of the abrupt diminution for insertion into the flesh, which would occur in all true *Onchi*. In the same bed with the long chelæ was found a specimen of the terminal or moveable finger, and one perfect claw with both fingers *in situ* of a much shorter form than the other; the hand being about 3 lines wide, the penultimate immoveable finger about 1 inch long, and rapidly tapering from  $2\frac{1}{2}$  lines wide at the base to the obtusely pointed apex; it is longitudinally sulcated like the longer one above described; the last joint or moveable finger is very different, being perfectly flat, triangular, 7 lines long,  $1\frac{1}{2}$  line wide at base, and tapering rapidly to

\* See Edinb. Journal of Science, vol. iii.

a point, the inner edge being straight and simple, the outer edge slightly convex. The hands of both kinds of chelæ are similarly sculptured with short, fine, sharp, irregularly curved, longitudinal plicæ, proving their identity, and that thus, like the recent *Pæcilopoda*, more than one pair of feet were didactyle.

In the fine olive schists (of the age of the Upper Ludlow rock) of Leintwardine.

(Col. University of Cambridge.)

Trib. *Phyllopoda* (= *Branchiopoda*, M. Edw.).

This tribe might be divided into the five following families, all having membranous feet:—

1. **DAPHNIADÆ** (= *Cladocera*). *Carapace* oval, compressed, the posterior portion bivalve, inclosing the body, the anterior end forming a separate beak-shaped hood for the head. *Eye* single, semicomound\*. *Feet*, only four pair, foliaceous. *Antennæ*, first pair small; second pair very large, branched and bristled for swimming. (Type *Daphnia*, &c.)

The *Daphnia*? *primæva* (M'Coy), Syn. Carb. Foss. Irel. t. 23. f. 5; is the only probable example of this family I know in the fossil state.

2. **BRANCHIPODIADÆ**. *Carapace* none, all the body-rings distinct and naked. (Type *Branchipus*.)

I know of no fossil example of this group.

3. **TRILOBITADÆ** (= *Palæadæ*). Head and abdomen covered by separate dorsal shields, thoracic segments naked, separately moveable, generally trilobed by two longitudinal depressions. *Eyes* two, large, semicomound, or absent.

This very extensive group is only known in the fossil state, and apparently confined to the palæozoic rocks. I will offer some observations of detail below.

4. **APODIADÆ**. *Carapace* a semi-oval, horizontal shield, not covering the abdominal segments, which are distinct. *Eyes*, one simple and two large semicomound ones. *Feet*, about 60 pair. (Type *Apus*.)

The carboniferous genus *Dithyrocaris* is I think referrible to this group, though I have not yet detected the eyes. (See Syn. Carb. Foss. Irel. t. 23. f. 2.)

\* I use this term to particularize that type of eye so common among the Entomostraca, in which a mass of minute eyes are covered by one simple, undivided, external cornea, being thus intermediate between the simple eye, and the true compound eye in which the external cornea is faceted, and divided into as many portions as there are eyes beneath.

5. LYMNADIADÆ. *Carapace* a vertical, bivalve, oblong shell inclosing the whole body. *Eyes* two, semicomound, either separate or united in one medial mass. *Feet* 20 to 30 pair. (Type *Lymnadia*, &c.)

(Fam. *Trilobitadæ*.)

*Homologies of the 'cephalic shield' of Trilobites.*—This has been less attended to than almost any part of their structure. The apparently anomalous nature of the facial suture has been spoken of by Burmeister, who saw no clue to its nature; the nature of the parts outside the eye-line, or 'wings' as they were called, has also been alluded to as inexplicable; while those who, comparing the Trilobites with *Branchipus*, supposed the body of the animal to occupy the axial lobe only, have expressed their astonishment at the eyes being placed on the lateral lobes, or 'cheeks.' When we bear in mind that the carapace of a crab, for instance, is a great backward prolongation of one of the rings of the head, and is quite distinct from the posterior cephalic and the thoracic segments which it covers, and which exist in a membranous state beneath it, we are prepared to admit, that though the segmental furrows on the glabella of many Trilobites indicate cephalic rings, they by no means prove the cephalic shield to be formed of the ankylosis of such rings, which may only exist below, *impressing* it like the various regions on the back of a crab. To determine of what rings it is composed, I started with the main characteristic of the first ring of all Crustacea, which is, to bear the eyes when they are present; the second and third bear the antennæ, and the remainder of the cephalic rings bear the parts of the mouth. The eyes of Trilobites, when they exist, are always connected with the piece anterior and external to the eye-line; this piece is usually continuous from side to side at the front margin, and I think is probably the first or ophthalmic ring; its lateral portions produced backwards, and bearing its peculiar appendages, the eyes, with it: every ring being theoretically divisible into six pieces, affords an explanation of the suture which sometimes separates the two parts in front, and even of the rostral shield of *Calymene* (if it belongs to this ring). On this view the facial suture becomes at once intelligible as the line of separation between the first and second cephalic rings, analogous to the divisional line between one thoracic ring and another. The piece within and behind the eye-line should on this supposition be the second or antennary ring; and as remarkably supporting this, I must refer to p. 42 of my 'Synopsis of the Silurian Fossils of Ireland,' where I announced the discovery of the remains of antennæ, as a deep pore on each side of the

front of the glabella, in the furrow which surrounds it, and in which, when clear of matrix, I have observed them in *Trinucleus*, *Acidaspis*, *Calymene*, *Ampyx*, *Griffithides*, &c. We would thus have the cephalic shield of Trilobites composed of an extension of the two first cephalic rings. The protuberance called the glabella probably contains the stomach, which is always in Crustacea large and over the mouth; the segmental furrows indicating the rings which bear the parts of the mouth.

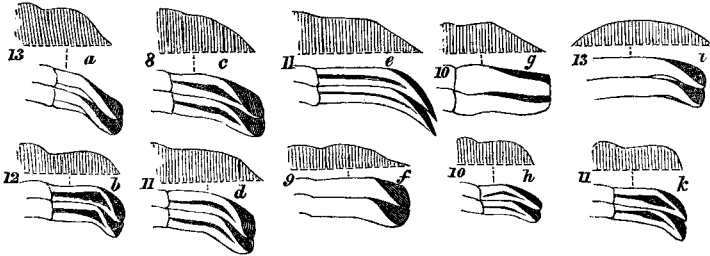
After much labour in investigating the characters of Trilobites, I venture to propose the following classification of the group, founded in the first instance on a consideration of the variations in structure of the *pleuræ* or lateral portions of the thoracic segments, which I find to afford definite characters, easily found in all moderately well-preserved specimens. The two principal methods hitherto proposed fall far short of a natural or satisfactory classification;—that of Dr. Burmeister taking as the principle of division, the presence or absence of the power of rolling into a ball; and Hawle and Corda resting their great divisions on the integrity or denticulation of the edge of the pygidium. The latter I believe to be of only specific importance; and the former, though of imperfect application as stated by the author, becomes included in the following arrangement. An extended examination of the subject will show that Quenstedt, &c. cannot be followed in the attempt to base the primary divisions on the *number* of the thoracic segments—I have satisfied myself at least that that character loses among the Entomostraca the importance which it bears among the other Crustaceans, and that in the present family it is only of subgeneric value. In the following remarks I introduce two new terms—“*facet*” for the smooth, flat, triangular space at the extremity of the anterior margin of the *pleuræ* of certain Trilobites—and “*pleural groove*” for the shallow sulcus which extends from the axis a variable distance towards the extremity of each of the *pleuræ*;—it is to the under side of this latter, as suggested by Burmeister, that the gill-feet were probably attached\*. To facilitate the appreciation of those characters, I subjoin sketches of the *pleuræ* of the more important genera, as the needful information is not given in the greater number of figures and descriptions of Trilobites hitherto published; the numerals prefixed to each figure indicate the number of thoracic segments in each genus.

I propose dividing the family of Trilobites into the five following subfamilies:—1. *Asaphinæ*; 2. *Paradoxinæ*; 3. *Ogyginæ*;

\* The term ‘*fulcrum*,’ as sometimes applied to a point on the anterior edge of the *pleuræ*, clearly conveys a false mechanical notion, besides being synonymous with the already current term ‘*knee*’ used by Pander and Portlock.

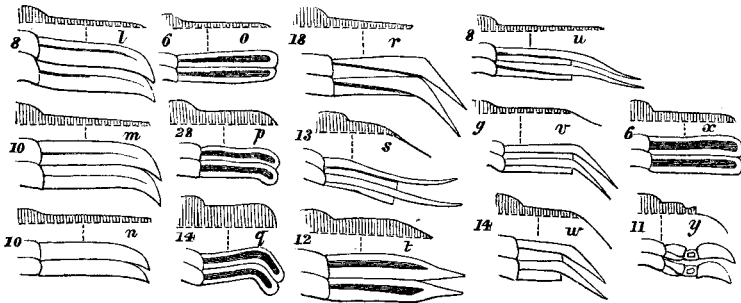
*Faceted pleuræ of Trilobites.*

*a*, Calymene; *b*, Ellipsocephalus; *c*, Asaphus; *d*, Phacops; *e*, Odontochile; *f*, Dysplanus; *g*, Illænus; *h*, Forbesia; *i*, Homalonotus; *k*, Trimeroccephalus.



*Non-faceted pleuræ of Trilobites.*

*l*, Ogygia; *m*, Lichas; *n*, Bronteus; *o*, Ampyx; *p*, Harpes; *q*, Conocephalus; *r*, Paradoxides; *s*, Zethus; *t*, Cryphæus; *u*, Acidaspis; *v*, Stau-rocephalus; *w*, Olenus; *x*, Trinucleus; *y*, Ceraurus.



4. *Harpedinæ*; 5. *Agnostinæ*. The British genera would arrange themselves as follows, and where the value of any of the groups was not previously settled, I have added a few explanatory words.

1st Subfam. ASAPHINÆ.

Pleuræ bent down at the ends, each with a distinct trigonal facet at the anterior edge.

These are the most perfectly organized Trilobites; they have a compact ovate form, and from the deflexion of the margin are of considerable depth; they all, I believe, have the power of rolling into a ball, and are the only Trilobites having the triangular facets at the anterior edges of the ends of the pleuræ. The following are British genera and subgenera:—

Gen. 1. PHACOPS (*in a wider sense than Emmerich*). Lateral cephalic angles prolonged backwards; glabella wider in front than at base; sides with three large segmental furrows; eyes



largely faceted; facial suture cutting the lateral cephalic margin in front of the angles; eleven thoracic segments.

Subgen. 1. *Phacops* (Em.). Pygidium with eight to twelve joints in the axis; hypostome simple.

Subgen. 2. *Odontochile*\* (H. & C.). Pygidium with twelve to twenty-two joints in axis; hypostome dentated.

Subgen. ? 3. *Chasmops* (M'Coy). Eyes small, "hiant;" middle pair of lateral glabellar lobes obsolete.

Subgen. 4. *Portlockia* (M'Coy). Two anterior pair of lateral glabellar lobes obsolete; lateral cephalic angles rounded.

2. CALYMENE (*in a wider sense than Brongniart*). Lateral cephalic angles not prolonged, exactly bisected by the facial suture; eyes small, "hiant;" glabella narrower in front than at base; thirteen thoracic segments.

Subgen. 1. *Calymene* (Br.). Axis of body strongly defined from the lateral lobes; three segmental furrows to each side of glabella.

Subgen. 2. *Homalonotus* (König). Axis not defined from lateral lobes; no segmental furrows to glabella.

3. TRIMEROCEPHALUS (M'Coy†). General character of *Portlockia*, but without eyes or facial sutures.

4. ASAPHUS (*in a wider sense than Brong.*). Cephalic and caudal shields nearly equal; external cornea thick, smooth; facial suture cuts the posterior margin within the angles; eight thoracic segments.

Subgen. 1. *Asaphus* (as restricted to the type of *A. cornigerus*, not British) = *Hemicypturus* (Gr.).

Subgen. 2. *Isotelus* (DeKay).

Subgen. 3. *Basilicus* (Salt.). General character of *Isotelus*, but with many simple segmental furrows to pygidium.

5. ILLÆNUS (Dal.). Head and tail nearly alike, axial furrows only indenting their margins; facial suture cutting the posterior margin; pleuræ with long, narrow, obscure facets and no pleural grooves.

Subgen. 1. *Illænus* (Dal.). Ten thoracic segments, lateral cephalic angles rounded.

Subgen. 2. *Bumastus* (Murch.). Resembling *Illænus*, but the thorax not trilobed.

Subgen. 3. *Dysplanus* (Burm.). Like *Illænus*, but cephalic angles prolonged and only nine thoracic segments.

6. FORBESIA (M'Coy). Glabella distinct; facial suture cutting the middle of posterior margin; pygidium with articulated axis

\* *Dalmanina* of Emmerich, not of Robineau-Desvoidy.

† For characters see below.

and duplicate lateral furrows; thoracic segments ten, pleural grooves slightly oblique, facets large.

- Subgen. 1. *Forbesia* (M'Coy) = *Æonia*, Burm. Cephalic angles produced; glabella with three pair of segmental furrows; ends of neck-segment forming large tubercles.
- Subgen. 2. *Prætus* (Stein.). Cephalic angles not produced; no segmental furrows to glabella.

7. PHILLIPSIA (Portk., extended). General character of *Forbesia*, but only nine thoracic segments. (Carboniferous.)

- Subgen. 1. *Phillipsia* (Portk.). Base of glabella wide, sides with three segmental furrows.
- Subgen. 2. *Griffithides* (Portk.). Base of glabella contracted, sides without segmental furrows.

2nd Subfam. PARADOXINÆ.

Head large; pygidium diminutive; thorax long; pleuræ flat, not bent down at the end, terminating in long spines; pleural grooves straight; no facets.

An easily recognized group of long-bodied, flat Trilobites with large heads, the angles of which and the ends of the pleuræ are produced backwards into sharp spines. None of these can roll into a ball.

1. PARADOXIDES (not British).

- Subgen. 1. *Olenus* (Dal.). Fourteen thoracic segments; pygidium small, with entire margin.

2. CERAURUS\* (Green, emended by Hall). Glabella cylindrical, reaching the front margin, with three pair of segmental furrows; facial suture cutting the outer margin considerably in front of the angles; eleven thoracic segments; pleuræ each with a short oblique pleural groove dividing its tumid origin, ends flat, falcate; pygidium moderate, the margin with six or eight thick spines; cephalic angles prolonged.

3. CRYPTHEUS (Green) = ? *Eccoptochile* (Hawle and Corda). Head as in *Ceraurus*; twelve thoracic segments; pleuræ wide, divided by a long mesial pleural furrow not reaching the margin; ends thickened and each extended in a slender spine; pygidium of three thin flat lobes on each side.

4. SPHÆREXOCHUS (Beyrich). Glabella hemispherical; posterior pair of segmental furrows very large, circular, two anterior pair rudimentary or absent; lateral angles rounded, divided

\* *Chirusus* (Beyrich) is I think certainly a synonym of this genus; the recently published figures by Hall (Palæontology of New York), of Green's original specimen of *Ceraurus*, showing all the characters of the Bohemian genus.

- by the facial suture; eleven thoracic segments; pleuræ simple, obtuse; pygidium as in *Ceraurus*.
5. ACIDASPIS (Murch.) = *Odontopleura* (Em.).
  6. STAUROCEPHALUS (Bor.\*).
  7. REMOPLEURIDES (Portk.†).
  8. ZETHUS‡ (Pand., as defined by Volborth) = *Cybele* (Lovèn) + *Atractopyge* (Hawle and Corda).

3rd Subfam. OGYGINÆ.

Body flat, broad oval; thorax about as long as the head; pleuræ flat, falcate, with a pleural groove not reaching the margin; ends not bent down, nor produced into spines; no facets; pygidium nearly as large as the head.

This group would include (so far as I know) all flat-sided Trilobites not entering into the *Paradoxinæ*, but, unlike them, the body is wide and short, the pygidium instead of being diminutive is nearly as large as the head, and the segments are remarkably few and never extend into spines. The eyes are small or absent.

1. TRINUCLEUS (Murch.). Head surrounded by a wide, pitted margin; six body-rings; no eyes, cheeks not diagonally cut by the eye-line.

Subgen. 1. *Tetrapsellium* (H. & C.). Only four body-rings.

2. TRETASPIS (M'Coy). Resembling *Trinucleus*, but the cheeks divided by a diagonal eye-line, and with an ocular tubercle in the middle; five body-rings. (See description below.)

3. AMPYX (Dal.).

4. OGYGIA (Brong.).

Subgen. 1. *Barrandia* (M'Coy). (For characters, see below.)

5. BRONTEUS (Gold.).

6. LICHAS (Dal.).

Subgen. 1. *Trochurus* (Bar.).

Subgen. 2. *Acanthopyge* (H. & C.).

4th Subfam. HARPEDINÆ.

Head large; pygidium very small; body long, rapidly tapering; pleuræ abruptly bent down and obtuse at the ends; no facets.

\* I have recently noted the *S. Murchisoni* in the Rhiwlas limestone.

† I suspect the thoracic segments in this genus are only six to eight in number, terminating at the long spines of the *R. laterispinifer* and *R. dorso-spinifer* (Portk.), which I think probably mark the origins of the pygidium; but not having access now to perfect specimens of those rare Trilobites, I can only offer these remarks as suggestions founded on analogy.

‡ The genus *Encrinurus* seems closely allied in many respects to *Zethus*, but differs by its simple, obtuse, thoracic segments; not however being quite sure of the structure of those latter, I am unwilling to assign the genus a place in the system.

1. HARPE (Gold.).
- ? 2. HARPIDELLA (M'Coy). See below.
- ? 3. AMPHION\* (Pand.).

5th Subfam. AGNOSTINÆ.

Minute, blind; only two thoracic segments; head and abdomen covered by nearly equal and similar rotundato-quadrate shields.

This subfamily includes both the families *Phalacromides* and *Battoides* of Hawle and Corda, distinguished solely by the serration or smoothness of the margin of the tail,—a point in my mind of generic value at most.

From the absence of eyes, and the very slight powers of locomotion argued by so small a number of thoracic, feet-bearing, rings, it occurs to me that the *Agnostinæ* may hold the same position among the Trilobites that the *Suctorina* do among the Crustacea generally; that group being similarly distinguished from its allies by the want of eyes, few body-rings, little or no powers of locomotion, and abnormally and variously shaped bodies; being parasitic generally on fish. *Bophyrus*, the analogous group among the Isopod Crustacea, is always parasitic on the gills of the larger Crustacea, under their carapace; and such I strongly suspect were the habits and mode of life of the *Agnosti*, living in all probability attached to the gill-feet on the under side of Trilobites, some of the largest known species of which accompany those little animals.

1. TRINODUS † (M'Coy) = *Arthrorachis* (Hawle and Corda).
2. AGNOSTUS (? British).

Subgen. 1. *Diplorhina* ‡ (H. & C.).

\* This genus and *Encrinurus* present some points of analogy, and may serve to indicate the passage from this subfamily to the *Paradoxinæ* by means of *Zethus*, but I unfortunately cannot refer to any specimens of the body-rings of either *Amphion* or *Encrinurus* at present, and have therefore some uncertainty about them. I may here remark on the great apparent inequality of extent or numerical value of the five groups into which I have distributed the great family of Trilobites, that it results chiefly from a peculiarity of geographical distribution, and in great measure disappears when the large number of recently described foreign genera are included: thus the *Harpedinæ* and *Paradoxinæ*, which seem so meagrely represented in the above list of British genera, acquire a prodigious development in the Silurian rocks of Bohemia.

† I originally defined this genus in 1846 in my 'Synopsis of the Silurian Fossils of Ireland,' and pointed out its differences from *Agnostus*; subsequently Hawle and Corda have figured and described the group under the title of *Arthrorachis* in their 'Prodrom.' on Bohemian Trilobites, without knowledge of what I had done, also pointing out its obvious differences from *Agnostus* (or *Battus*).

‡ I have noticed the *Diplorhina triplicata* in the black Llandeilo shale of Builth.

(Descriptions of new genera and species of Trilobites.)

*Chasmops* (M'Coy), n. g.Etym.  $\chi\acute{\alpha}\sigma\mu\alpha$ , *hiatus*, and  $\acute{\omega}\psi$ , *oculus*.

*Gen. Char.* Cephalic shield subsemicircular, lateral angles produced backwards in triangular spines; *glabella* large, clavate, frontal portion very wide, transversely oval, only two distinct pairs of lateral segmental lobes, the anterior pair very large triangular, posterior pair small, middle pair obsolete or reduced to a minute tubercle; neck-segment strong: *cheeks* small triangular: *eyes* small, rounded, "hiant," corresponding in height to the middle portion of the first lateral lobe of the glabella; eye-line encircles the front of the glabella close to the margin, descends with an inward inclination to the eye, extending from behind the eye directly outwards to the lateral margin, which it cuts considerably in advance of the angles; *thorax* of eleven joints (*fid. Eichwald*); *pygidium* obtusely rounded, posterior margin deflected, anterior margin wider than the posterior; axis of about ten ribs, lateral ribs about two less, duplex.

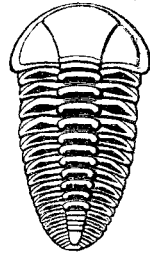
Cephalic shield of  
*Chasmops*.

The *Calymene Odini* of Eichwald may be looked upon as the type of this genus. It differs from *Calymene* in the glabella being so much wider in front than at the base, in the anterior lateral lobes being largest, in having but eleven (?) body-segments, and in its eye-line cutting the external margin in front of the angles, agreeing only in the structure of the eyes; these differences become agreements when compared with *Phacops*, from which it differs in the structure of the eyes. Of those organs in the present genus and in *Calymene* nothing is known beyond that they were of so tender and delicate a nature as readily to fall out after death, and are never found in the fossil state, their position being indicated by a hole, roughly filled by the matrix, forming the "hiant" eyes of systematists; in *Phacops*, on the contrary, the cornea is of extraordinary strength, and so firmly united to the rest of the cephalic shield, that no matter how much crushed the specimens may be, the eye always remains, and from its constant presence, coarse reticulation and large lenses, gives an appropriate name to the genus, and one which is in antagonism with that I have adopted for the present group: *Chasmops* differs besides from both those genera in the almost complete suppression of the middle pair of segmental lobes of the glabella.

*Trimerocephalus* (M'Coy).

Etym. τριμερής, *tripartitus*, and κεφαλή, *caput*.

*Gen. Char.* Elongate ovate: *cephalic shield* semicircular, with the lateral angles obtusely rounded: *glabella* very broad, gently convex, widely rounded and touching the margin in front; sides straight, converging to the narrow base; neck-furrow strong, and one fine, directly transverse, segmental furrow a little above it across the base of the glabella; *cheeks* smaller than the glabella, triangular, evenly convex, without eyes or facial sutures; *limb* almost wanting in front of the glabella, forming a narrow margin to the cheeks, and being rounded at the lateral angles forms the thick posterior margin of the shield and neck-segment; *thorax* of eleven joints, lateral lobes wider than the axis, bent down at their margin; each of the axial segments with a strong tubercle at each end; *pleurae* of equal width throughout, blunt at their ends, which are bent downwards and a little backwards, each marked along the middle by a pleural groove, angularly bent backwards about the middle, but not reaching the margin; trigonal facets small, narrow; *pygidium* small, obtusely rounded, entire, axial lobe distinctly rounded with about four or five segmental furrows; lateral lobes with about five flattened segments, each divided by a furrow.

*Trimerocephalus.*

This genus has been confounded by Count Münster, in his 'Beiträge zur Petrefactenkunde' for 1842 (only knowing the head), with *Trinucleus*, from which the structure of the body and tail, as well as the absence of the punctured border of the head, remove it very far; and it has been referred by Prof. Phillips (Palæozoic Fossils) to *Calymene*, from which the form of its cephalic shield and glabella, want of eyes and facial suture, and the different number of the body-segments, will I think sufficiently distinguish it.

I only know the genus in the Devonian rocks, the type being the *Trinucleus levis* of Münster (*Calymene levis*, Phil. Pal. Foss., not of Münster, whose *Calymene levis* is a true *Portlockia*, M'Coy). It is perhaps most allied to *Ellipsocephalus* of Zenker, which has however twelve body-rings, eyes at the sides of the cheeks, a glabella pointed in front, and a little pygidium without segmental furrows.

*Illænus latus* (M'Coy).

*Sp. Char.* *Cephalic shield* more than twice as wide as long, mo-

derately gibbous towards the base, but about one-half of the front arched over to a vertical position (or at right angles to the basal portion or plane of the body); *axal furrows* considerably less than half the length of the head, width of the included space, or glabella, equal to two-thirds the length of the head; *eyes* small, near the lateral angles, their own length in front of the posterior margin, two-thirds the width of the glabella distant from the axal furrows. Length of head 10 lines, width 1 inch 9 lines.

This is only likely to be confounded with the *I. crassicauda* (Dal.), from Gothland specimens of which it differs by the greater width of the head and less depth of the deflected front, and most remarkably by the very small size of the cheeks, resulting from the eyes being removed almost to the lateral angles; in the *I. crassicauda* they are only half the width of the glabella distant from the axal furrow, and the portion of the cheeks from the eye to the lateral angles is nearly one-third more than from the eye to the axal furrow, while in the present species the cheek beyond the eye is little more than half the width of from thence to the sides of the glabella. Heads of the *Dysplanus centrotus* (Dal.) sp. differ in their much greater proportional length.

In the Lower Silurian limestone of Wray quarry, Upper Tweed. (Col. University of Cambridge.)

*Isotelus affinis* (M'Coy).

Ref. *Isot. gigas*, *I. planus*, and *I. Powisii* of Portk. Geol. Rep. (omit synonyms) t. 6. f. 1, and t. 9. f. 2 & 3.

*Sp. Char.* Axis of the body only slightly exceeding the pleuræ in width; *pleuræ* gently arched downwards at a very obtuse angle from about halfway between the axis and the extremity; a large pleural furrow reaches from the axis to about one-third of the truncated extremity of each; *pygidium* flattened, semi-elliptical, or slightly trigonal from the straightness of the sides; axis narrow, sharply defined, gently convex, reaching as far as the concave space round the margin.

In general proportions this resembles the *Isotelus gigas* (DeKay), from all the varieties of which it is distinguished, when specimens of the same size are compared, by the much greater flatness or depression of all its parts, the long, narrow, sharply defined axal lobe of the pygidium, and the much greater length of the pleural groove of the pleuræ (nearly double that of the *I. gigas*), as well as the distance of the knee from the axis, and slight degree of deflection of the pleuræ (being bent nearly at right angles at one-third from the axis in *I. gigas*). The pygidium differs from that of the *I. Powisii* (Murch. sp.) by the absence of all seg-

mental furrows, except the first, on the lateral lobes, and by the more pointed outline and narrow margin.

Not uncommon in a Lower Silurian schist over the iron-works at Tremadoc; very similar in appearance to that at Pomeroy, co. Tyrone, which afforded the species to Col. Portlock.

(Col. University of Cambridge.)

*Griffithides meso-tuberculatus* (M'Coy).

*Sp. Char.* *Cephalothorax* 10 lines wide; *glabella* widely pyriform, broadly rounded in front, gently convex and narrowing posteriorly with concave sides, very minutely granulated, length 5 lines, width 4 lines; *cheeks* triangular, flat, smooth; *eyes* large, reniform, very minutely reticulated, with a large convex eye-lobe\* connected with the base of the glabella by a small, oblique, oval nucleus; *limb* broad, convex, with nine or ten imbricating striæ, two-thirds concealed in front of the glabella, ending posteriorly in acute spines as long as the glabella; neck-segment broad; *pygidium* 6 lines long and  $7\frac{1}{2}$  lines wide; axial lobe 2 lines wide, cylindrical, slightly tapering, of sixteen rings, each ornamented with about ten lengthened oval tubercles; lateral lobes depressed, of ten broad, flat divisions, each having a fine impressed line running close to its posterior margin, smooth to the naked eye, but with a strong glass one or two rows of minute crowded granules are seen; margin wide.

The axial lobe of the pygidium being strongly tuberculated and the lateral lobes nearly smooth, distinguish the species from all other carboniferous Trilobites I know of. It is allied to the *G. calcaratus* (M'Coy) and *G. longispinus* (Portk.).

Common in the shales of the carboniferous limestone of Derbyshire.

(Col. University of Cambridge.)

*Cryphæus Sedgwickii* (M'Coy).

*Sp. Char.* *Cephalic shield* subsemicircular; *glabella* slightly clavate, smooth, three segmental furrows on each side, the posterior pair longest, turning backwards and inwards nearly to the neck-furrow, inclosing a triangular space on each side longer than wide, the width rather less than that of the undivided portion of the glabella between their bases, the two anterior pair of furrows shorter; *cheeks* broad, gently convex, closely and coarsely pitted: *thorax*, *axal lobe* very convex, narrow, slightly tapering, nearly parallel-sided, smooth, of twelve seg-

\* *Eye-lobe* seems preferable to *eye-lid* for the lobe covering the inner and upper aspect of the eye.



ments, three similar ones belong to the pygidium, the terminal one being obtusely trigonal; the side lobes are flattened, and more than double the width of the axial lobe; *pleurae* nearly straight, narrow, and for the greater part of their length flattened, and having a broad, nearly mesial pleural sulcus deeply punctured like the cheeks, dividing each into two parts, the posterior largest and forming a thick, smooth, rounded ridge, bent down and a little backwards in the distal third of its length, swelling to a thick narrow ridge in the middle, the sides and extremity expanding into a broad, thin, foliaceous appendage; the pygidium terminates in six broad ovate, leaf-like, semimembranous flaps. Length of thorax and pygidium 2 inches 2 lines, width 2 inches 3 lines, width of axial lobe 6 lines.

This magnificent Trilobite can only be confounded with the *Eccoptochile clavigera* (Beyrich sp.), from which it is distinguished by the much greater width of the lateral lobes of the thorax, and the thin, flat, leaf-like appendages of the pygidium, which in that species resemble thick pear-shaped clubs. A comparison with the old description and casts published by Green induces me to place this Trilobite in his little-known genus *Crypheus*, and to doubt very much the propriety of separating *Eccoptochile* of Hawle and Corda from it, the only difference being the thickness of the marginal appendage in the Bohemian genus.

The nearly entire specimen described was collected by Prof. Sedgwick from the Wenlock shale two miles north of Builth.

(Col. University of Cambridge.)

*Ceraurus octo-lobatus* (M'Coy).

*Sp. Char.* *Pygidium* transversely elliptical, twice as wide as long, two first rings of the axis narrow, distinct, third or terminal one large, terminating in four flattened elliptically pointed lobes; two rather larger similar lobes on each side. Length  $2\frac{1}{2}$  lines.

This curious little species differs from all of this and the allied genera in having the terminal segment of the pygidium quadri-lobate, so that the margin of the pygidium exhibits eight marginal pointed lobes in all.

It is figured in the 'Memoirs of the Geol. Survey' from Sholes Hook, under the same reference as the cephalic shields there called *Sphaerexochus juvenis* (Salter)\*, but not alluded to in the text.

In the limestone of Rhiwlas.

(Col. University of Cambridge.)

\* Corrected to *S. clavifrons* (Dal.) in the list of plates prefixed to the same work.

*Ceraurus Williamsii* (M'Coy).

*Sp. Char.* *Cephalothorax* semielliptical, length rather more than half the width; *glabella* semicylindrical, gibbous, rounded in front, with nearly parallel sides, three nearly equidistant, curved, segmental furrows on each side, the basal pair nearly confluent at their ends with the neck-furrow, inclosing a tumid ovate space on each side, separated by an undivided space about one-fourth of the width of the glabella; *thorax* twice the length of the glabella, axial segments large, two-thirds the width of the pleuræ, each of which has a very large, diagonally cleft, oblong tubercle at its origin, beyond which there is a neck-like contraction of the margin, followed at one-third from the axis by a hemispherical tubercle about half its diameter distant from the first, beyond which the distal two-thirds of each pleura is falciformly dilated into a thin, flat, fin-like appendage, the anterior margin of which is very convex, posterior margin slightly concave, extremity pointed; *pygidium* small, the six marginal spines small, all extending to about the same distance backwards, the anterior pairs therefore longest; they are thick, triangular, and three or four times wider than the others. Length of entire animal 1 inch 4 lines, of glabella 5 lines, width about 9 lines.

The disconnected, broadly falcate, paddle-shaped pleuræ help to distinguish this beautiful little species, which by its narrow elongate form resembles a *Remopleurides*. One entire specimen collected from the schists at Golen Goed, Myddfai, by Mr. Williams of Llandovery, and presented to Prof. Sedgwick by him.

(*Col.* University of Cambridge.)

*Ogygia radians* (M'Coy).

*Sp. Char.* *Pygidium* nearly semicircular, slightly convex; axis conical, undefined at the end, having three narrow segmental furrows at the anterior end, lateral lobes with three broad radiating ribs faintly divided at their axial ends by a small pleural furrow; margin tumid, entire. Length 4 lines, width 7 lines.

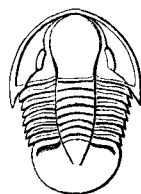
I provisionally give this name to a small pygidium not unlike that of the *Barrandia Cordai*, but, from the duplicate lateral furrows, belonging more probably to *Ogygia*; probably confirmatory of this view I observe in the 2nd Decade of the 'Geol. Surv.' t. 7. f. 5. a small eight-jointed true *Ogygia* from Builth, having the pygidium almost identical with the present species, if, as I suspect, the duplicating furrows have been accidentally omitted (the figure alluded to is given as the probable young of the *Ogygia dilatata* (Phil.), a trilobite which has not been found at Builth, but abounds in the schist at Waterford).

Not uncommon in the black Wenlock shale of Pen Cerrig, Builth.

(Col. University of Cambridge.)

*Barrandia* (M'Coy), n. g.

*Gen. Char.* Body ovate, depressed; *cephalic shield* semicircular, with the lateral angles produced backwards into short spines; *glabella* widely clavate, the axial furrow strong and nearly parallel at the base, becoming obsolete towards the front; *eyes* large, narrow, reniform; *eye-line* behind the eye cutting the posterior margin about the middle, in front of the eyes arching forwards, first outwards and then inwards; *thorax* of seven segments; *axis* convex, nearly as wide as the pleuræ, tapering towards the pygidium; *pleuræ* flat, their ends slightly falcate and bent backwards, no facets, a slightly oblique submesial pleural furrow not quite reaching the end; *pygidium* semicircular, entire, having very few simple segmental furrows placed near the anterior margin (one to three in number); *axis* short, having one to three small segmental furrows.



*Barrandia.*

This I conceive to be a subgenus of *Ogygia*, from which it differs in its fewer thoracic segments, and having but very few and simple ribs to the tail. The genus agrees with the description given by Hawle and Corda of their genus *Alceste*, with the exception of this having seven thoracic rings and that having but four; it is remarkable that *Alceste* is figured by those authors with three segmental furrows to the pygidium, while this has only one, making the *total* number of segments visible the same in both; the number of the pygidial segments is however of course liable to vary with the species, while the thoracic ones are supposed to be constant. I know but one species, the following\*.

*Barrandia Cordai* (M'Coy).

*Sp. Char.* Length one-fourth more than the width, length of

\* Since the above was written Mr. Salter has figured (2nd Decad. Geol. Surv. pl. 7. f. 4) a species of this genus, with three segments to the pygidium, which he gives without any apparent reason as the young of an Irish species of *Ogygia* (*O. dilatata*, Phil., *O. Portlocki*, Salt.). My reasons for dissenting from this view are, 1st, it is contrary to analogy of other allied Trilobites to suppose that the young and adult differ in the number of their thoracic segments; 2nd, in the Cambridge collection, specimens of the *Ogygia Buchi*, half an inch wide, have exactly the same number of segments and other characters as an adult six inches long; 3rd, the supposed young has only been found at Builth, where the Irish species, his supposed adult thereof, has never been found, being only known in the schists at Waterford, where it abounds, but where the supposed young have not occurred.

head, thorax and pygidium almost equal; *cephalic shield* slightly more than twice as wide as long, lateral angles very short; *eyes* half their length from the axial furrow; *pygidium* depressed, length rather more than half the width, axis two-thirds the length, conical, segmental furrows one on each side, obtuse. Length 11 lines.

Black Wenlock shale of Builth.  
(Col. University of Cambridge.)

*Ampyx latus* (M'Coy).

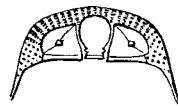
*Sp. Char.* Entire animal transversely ovate, length one-fifth less than the width; *cephalic shield* smooth, front margin regularly curved, width three-fifths the length; *glabella* moderately tumid, pyriform, having a narrow vertically elongate (? ocular) swelling close to the middle third of each side, and two short, minute segmental furrows at each side of the narrow base; *thoracic segments* five, pleuræ of each side twice the width of the axial lobe; *pygidium* very obtusely and regularly rounded, four times wider than long, axis with about seventeen minute segmental furrows, sides with about eight. Length of entire animal  $3\frac{1}{2}$  lines.

This rare species is most allied to the *A. parvulus* (Forb.) and the *A. nasutus* (Dal.), from both which the perfect animal is easily known by its transversely oval form; the regular curvature and great width of the cephalic and pygidial shields easily distinguish those parts when found separate; the latter agrees nearly in form with that of the *A. parvulus*, from which it differs equally with the former in all the other characters of cephalic shield, &c.

Rare in the black Wenlock shale three miles north of Builth.  
(Col. University of Cambridge.)

*Tretaspis* (M'Coy), n. g.

*Gen. Char.* General characters of *Trinucleus*, but having only five body-rings, the base of the glabella having two short segmental furrows at each side, and the cheeks being traversed diagonally by a nearly straight eye-line, extending on each side from the junction of the cheeks and glabella in front, towards the lateral angles cutting the posterior margin a little within the angles, and usually exhibiting a small ocular (?) tubercle in the middle. Types of the genus *Trinucleus seticornis* (His.) sp., *T. Bucklandi* (Bar.), &c.



*Tretaspis.*  
Cephalic shield showing the eyes and diagonal facial sutures.

In my 'Synopsis of the Silurian Fossils of Ireland' I pointed

out the course of the eye-line in this genus, which separates it at once from *Trinucleus*, and renders it probable that the small tubercle in the middle of the cheeks in the *T. seticornis*, *T. fimbriatus*, &c. are true eyes. The furrows at the base of the glabella also are distinctive for the genus\*.

*Trinucleus gibbifrons* (M'Coy).

*Sp. Char.* *Cephalic shield* nearly semicircular, length rather more than one-third of the width; *glabella* pyriform, rounded in front, gradually narrowing towards the base, compressed, exceedingly gibbous, its height above the cheeks nearly equaling its width; on each side of the neck-furrow (in casts) there is a deep puncture and another similar a little in front of it, a small spine on the middle of the neck-furrow; *cheeks* spherical triangles, height and width about equal, moderately convex; border of moderate width, three rows of punctures in front of the glabella, and five rows in front of the cheeks, more numerous at the sides, generally connected in front by radiating furrows, forming an imperfect fimbriation. Usual length of cephalic shield 3 lines. Surface very minutely granulated.

This very common species is figured without a name by Col. Portlock (Geol. Rep. pl. 1 B. f. 13 & 14). The fine granulation of the lobes of the head, and the extreme prominence of the gradually narrowing, pyriform, compressed glabella, separate this at once from either the *T. Caractaci* or *T. latus*, with which it seems to have been confounded; it is wider than the former, less so than the latter. From the two little punctures on each side of the base of the glabella, this strongly approximates the *T. scyllarus* (His.) as distinguished from *T. seticornis*; but although with abundance of specimens I cannot find an ocular tubercle or eye-line in the midst of the cheeks as in *Tretaspis*, to which those species belong; those punctures indicate no doubt the existence of the muscles of the jaws and their appropriate rings, but are not extended into transverse segmental furrows as in those last-named species; in the radiation of the border and number of rows of pores in front it approaches slightly the *T. radiatus* (Murch.), but is distinguished by the head being rounded, the

\* The statement of Mr. Salter (Mem. of the Geol. Surv. vol. ii. pt. 1. p. 335), speaking of Hawle and Corda's work, that "*Tetrapsellium* is distinguished from *Trinucleus* solely by a swelling in the axial furrow of the head; it is almost identical else with *T. seticornis*"—might mislead the English reader with the idea that the present genus was identical with *Tetrapsellium*; the fact is however, in his stricture on the Bohemian authors, Mr. Salter seems to have overlooked the grand character of their genus, namely its having but four body-rings ("vier Leibringe," H. & C. Monog. p. 42. 8th line); it agrees otherwise with the common type of *Trinucleus*.

cheeks wider, and the border not being more than half the depth, as well as being by no means so distinctly radiated.

Common in the lower Silurian limestone of Golden Grove; the schists of Tre Gil; and Caradoc sandstone of Alt y Anker, Meifod; also at Pen y Craig. A variety with a shorter shield, the lobes of which are more spherical, perhaps from pressure, occurs in the black Wenlock shale three miles north of Builth.

(Col. University of Cambridge.)

*Harpidella* (M'Coy), n. g.

*Gen. Char.* *Cephalic shield* subtrigonal, surrounded by a thick, narrow, flattened border; sides nearly vertical, compressed; *cheeks* entirely surrounding the glabella in front, forming there a narrow tumid border, widening backwards as they descend into tumid, broad, triangular, nearly vertical wings, having large prominent eyes near the middle of their posterior margin, and from them on each side an obscure impressed line extends upwards and inwards to about the first third of the glabella (perhaps indicating the *eye-line*); *glabella* very convex, semielliptical, obtusely rounded in front, surrounded by a strong defining sulcus; two segmental furrows on each side, the first very strong, curving, from about the middle of the sides of the glabella, inwards and backwards into the neck-furrow, so as to include a large tumid ovate lobe on each side; a little above this, the very short and faintly marked anterior segmental furrow curves in the same direction; *surface* granulated. (Type of the genus *Harpes? megalops*, M'Coy, Syn. Sil. Fos. Irel. t. 4. f. 5.)

The head alone of this genus is known, which differs from *Harpes* (Gold.) in its small size, narrow unpunctured rim, absence of the ocular tubercle on the anterior part of the cheeks, great size and basal position of the eyes, &c.

(Fam. *Lymnadiadæ*.)

*Ceratiocaris* (M'Coy), n. g.

Etym. *κεράτιον, siliqua*, and *καρίς, squilla*.

*Gen. Char.* *Carapace* bivalve, the dorsal line simply angulated (? undivided), with a slight furrow beneath it on each side; sides semielliptical, much elongated from before backwards, evenly convex, ventral margin gently convex, posterior end abruptly truncated obliquely; on each side near the anterior end considerably below the hinge-line is an ocular (?) spot, sometimes raised and distinct, in some spe-



*Ceratiocaris.*

a. The ocular spot.

cies flat ; surface marked with fine, imbricated striæ, obliquely longitudinal.

In their pod-like form some of the species resemble such shells as *Solenocurtus* and *Solenimya*, except in the abrupt truncation of the posterior end ; others resemble the Crustacean genus *Dithyrocaris*, with which I think their affinity lies, though they differ in form and want the peculiar ridges of that group. I conceive they were phyllopodous Crustaceans allied to *Lymnadia* ; the peculiar texture and kind of lineation of the surface resemble what we find in Crustacea allied to *Apus* rather than in Mollusca ; the general pod-like form, large size, and posterior truncation separate them from any of the large species of *Cythere* or *Cypridinia*, and the two ocular spots separate them from all others. I suspect from some of the specimens that the two sides meet along the dorsal line at an angle of  $45^\circ$ , with probably little power of motion. The ocular spots even when flat may generally be recognized with care from the difference in their mineralization ; they are often dark-coloured as if retaining some of their pigment, and have a slightly granular aspect, corresponding in fact very closely, both in position on the shell and in apparent structure, with the double-eyed *Cypridinia* of the Indian Ocean. In one species there is a short sulcus extending on each side from the medial line behind the eye obliquely backwards and outwards, reminding us of the perhaps somewhat similar nuchal furrow of *Apus*. I only know the genus in the upper Silurian rocks.

*Ceratiocaris solenoides* (M'Coy).

*Sp. Char.* Sides meeting along the back at an acute angle, each being nearly four times longer than wide, the ventral margin nearly straight and parallel with the dorsal line ; anterior end narrowed and truncate obliquely forwards and outwards from the dorsal line ; posterior end scarcely narrowed, truncated obliquely backwards and outwards ; valves evenly convex, the edge slightly thickened ; *ocular spot* a little depressed, close to about the middle of the truncated anterior margin ; from the internal (dorsal) anterior angles a small furrow extends a little way obliquely backwards and outwards ; oblique longitudinal striæ very close and fine ; *eyes* two-thirds of a line in diameter ; width of each side from dorsal to opposite margin  $5\frac{1}{2}$  lines.

This much resembles a little *Solen* in form. The ocular spot is generally dark-coloured.

Common in the Upper Ludlow rock of Benson Knot.

(Col. University of Cambridge.)

*Ceratiocaris ellipticus* (M'Coy).

*Sp. Char.* Each side longitudinally elliptical, evenly convex,

about twice and a half longer than wide, greatest width of the side and curvature of the margin about one-third from the anterior end, which is elliptically pointed; posterior end obtusely rounded, the oblique truncation nearly effaced; ventral margin convex; ocular spot elevated like a small tubercle, twice its diameter from the dorsal line, and about one-fourth the length from the anterior end; I believe the striæ of the surface have the direction usual in the genus, but they are very delicate. Length 1 inch 3 lines, greatest width of the sides 6 lines.

The elliptical form, prominence of the eye-spot, and its distance from the anterior end, mark the species well.

Rare in the Upper Ludlow rock of Benson Knot.  
(*Col.* University of Cambridge.)

*Cytheropsis* (M'Coy).

Syn. *Cytherina* (Burm., not of Lamarck).

I provisionally propose this name for the little bean-shaped bivalve Entomostraca of the palæozoic rocks, which were formerly referred by myself and others to *Cythere*, but which Dr. Burmeister suggests should rather be referred to the *Phyllopoda*. As apparently the same forms of carapace exist both in the *Phyllopoda* and *Lophyropoda*, it is clearly more logical to refer those fossils to the former group, which we believe to have abounded at the palæozoic period, than, by placing them with the analogous types of the *Lophyropoda*, to quote the occurrence of that tribe at those early periods without sufficient reason.

In M. Bosquet's memoir on the Entomostraca of the Maëstricht Chalk, he proposes to refer all the ornamented species which I have described and figured in my Synopsis of the Mountain Limestone Fossils of Ireland, to the recent genus *Cypridina*; this I suppose is on the supposition that the tubercles represent the lateral eyes of that genus; but though the eyes were possibly lateral also in the fossil group, there is no evidence of the fact, nor reason for supposing they were not similarly placed in the plain ones; I therefore think the plain and ornamented species should not be divided, and for the above reason think they are both better placed with the *Phyllopodes*. It is singular that Prof. Burmeister, in establishing this genus and stating that the palæozoic limestones contained the only representatives of it, should have applied to them the Lamarckian name *Cytherina*, which is a mere *double emploi* of Latreille's recent genus *Cythere*. The carboniferous genus *Bairdia* (M'Coy) is distinguished from the above by its attenuated recurved extremities.