

THE TYPE SPECIES OF *CALYMENE* (TRILOBITA) FROM THE SILURIAN OF DUDLEY, ENGLAND

by DEREK J. SIVETER

ABSTRACT. The type material of *Calymene blumenbachii* Brongniart in Desmarest 1817 (type species of *Calymene* Brongniart, 1822) and *C. tuberculata* (Brünnich, 1781) has been revised, with that of the latter being figured for the first time. The *nomen dubium* status accorded to *C. tuberculata* by Shirley (1933) can no longer be upheld as the syntype specimens of Silurian age are, on preparation, very well preserved and identifiable, though this species is now recognized as a senior (subjective) synonym of *C. blumenbachii*. In consequence application is being made to the International Commission on Zoological Nomenclature to retain the junior name in the interest of stability.

DURING recent work on the Calymenidae in preparation for the second edition of the *Treatise on Invertebrate Paleontology (Trilobita)*, nomenclatural problems have resurfaced regarding the conservation of the generic name *Calymene* Brongniart in Brongniart and Desmarest, 1822, type genus for the family, and the right of Milne Edwards (1840) to stand as the author of the family name. These uncertainties prompted Whittington (1983) to petition the International Commission on Zoological Nomenclature (ICZN) in favour of both claims. Subsequent study by the present author has further shown that *C. blumenbachii* Brongniart in Desmarest, 1817, the type species of *Calymene*, is a junior (subjective) synonym of *Trilobus tuberculatus* Brünnich, 1781. The purpose of this paper is to give evidence of this synonymy by providing new data on the type material of both species. Additionally, the paper is a prerequisite to an application to the ICZN (Whittington and Siveter, in press), by way of a rider to Whittington's 1983 proposals, to use its plenary powers to suppress the senior name *tuberculata* in favour of *blumenbachii*, on the grounds that only the latter name has been used for the species by various authors during the last fifty years.

The terminology and photographic and preparation techniques are those previously employed by Siveter (1977, 1979, 1980, 1983). Repositories holding material used in this revision are: Université P. et M. Curie, Laboratoire de Paléontologie des Invertébrés, Paris (UPMC); Geologisk Museum, Københavns Universitet (MGUH).

THE TYPE SPECIES OF *CALYMENE*

The type material of Calymene blumenbachii Brongniart in Desmarest, 1817

No material of *C. blumenbachii* was figured by Desmarest (1817) but Brongniart in Brongniart and Desmarest (1822) illustrated two syntype specimens, one (*ibid.*, pl. 1, fig. 1A, B) a partially enrolled example, the other (*ibid.*, pl. 1, fig. 1C, D) an extended incomplete individual; Dudley was indicated (*ibid.*, pp. 9, 11, and 143) as the type locality (and I can confirm that this name appears on the specimen label accompanying the enrolled form). Shirley (1933) relocated this material in the Sorbonne, Paris, together with a third specimen 'which probably belonged to Brongniart' but which Shirley left out of his account because of its uncertain curatorial history. Shirley also selected the enrolled syntype to stand as 'the type' (that is lectotype) for the species, and figured it (*ibid.*, pl. 1, figs. 1-3), though not the second (now paralectotype) specimen. Since this time the type suite of specimens has remained unstudied.

Dr Françoise Bigey (Université P. et M. Curie, Laboratoire de Paléontologie des Invertébrés, Paris) subsequently rediscovered the lectotype in the collections of her institute, the Sorbonne

Geology Collection having been 'removed to new buildings' (pers. comm. 5 February 1974); I have since fully prepared this specimen and it is refigured herein (Pl. 90, figs. 1-5), but the paralectotype was reported by Dr Bigey as missing. Further, Brongniart's material has 'been shared in the past between the Muséum National d'Histoire Naturelle and Paris University' (pers. comm. Dr Bigey, 23 November 1983), though Dr J.-C. Fischer, sub-director of this museum, informs me (1 September 1984) that the paralectotype is not in their collections, and it does not appear in the recently published catalogue of type and figured trilobites housed there (Carriol 1984). For the present it is missing.

The type material of Trilobus tuberculatus Brünnich, 1781

Four specimens comprised the syntype suite of this species, the type locality of which was indicated by Brünnich (1781, p. 391) as 'Rensnest' (= Wren's Nest), 'Dudley'. Shirley (1933, p. 63) examined this material of *C. tuberculata* and concluded that the specimens which he referred to as the 'third' and 'fourth' were, respectively, the pygidium of an undescribed Ordovician calymenid from Shropshire and an almost complete asaphid from the Ordovician of Scandinavia or the eastern Baltic. He claimed that the 'first' specimen, 'a cranidium more than half buried in matrix and six attached thoracic segments . . . is impossible to refer to any of the species . . . occurring at Dudley' and that the 'second' specimen, 'twelve thoracic segments and an attached pygidium . . . cannot be identified with certainty'. Shirley did not name the 'first' or 'second' specimens in his paper but in a letter (23 June 1933) to Dr J. P. J. Ravn, the then Curator of the Geologisk Museum, Københavns Universitet (where the material is housed) he writes: 'I cannot identify specimens one and two further than *Calymene* sp. (at Dudley I have recognised at least four species). They have a matrix which is similar to other specimens from Dudley and there seems to be no doubt that they came from that locality.'

Dr S. Floris, the present Curator, has loaned me (18 January 1984) the first two (MGUH 16.805, 16.806) and fourth (MGUH 16.807) of the syntypes, the third one (Shropshire Ordovician calymenid) being reported as missing. The 'Rensnest' locality information given by Brünnich in his paper is also written on the original labels of all these three syntypes, including that of the Ordovician asaphid. However a Wren's Nest origin is corroborated for at least one of the two syntypes which are of Silurian age, that referred to by Shirley as the 'first' specimen (MGUH 16.805) and which is selected below as the lectotype for the species, by evidence from ostracodes recovered from the surrounding matrix (Pl. 90, figs. 6 and 7). Dr David Siveter has kindly supplied the following comments on these: 'The ostracodes are an almost complete female right valve of the beyrichiacean *Osmotoxotis phalacra* Siveter, 1980, a left valve of the thlipsuracean *Thlipsura v-scripta* Jones and Holl, 1869, and two other indeterminate non-palaeocope specimens. *T. v-scripta* is known from the Homerian Stage and possibly the upper part of the Sheinwoodian Stage, Wenlock Series to the lower Gorstian Stage, Ludlow Series of the West Midlands and the Welsh Borderland, and from at least the Wenlock Series on Gotland (Siveter 1978). *O. phalacra* is unknown outside the Homerian Much Wenlock Limestone Formation of the West Midlands and the Welsh Borderland; it has been recorded (Siveter 1980) from Mayhill, the Malverns, Ledbury, and the type and other localities at the Wren's Nest. The figured *O. phalacra* specimen (Pl. 90, fig. 6) is only the fourth female of the species known from the Wren's Nest and it shows exceptional preservation, having a sculpture of fine reticulo-striation and sparse tubercles not previously observed in females from this locality.' Ostracodes have not been recovered from the matrix around the 'second' specimen of Shirley but there is no reason to doubt that it, too, came from the Wren's Nest.

Photographs of the two Dudley syntype trilobites were taken before (Pl. 91, figs. 7, 10, 12) and after (Pl. 91, figs. 1-6, 8, 9, 11, 13) preparation, so that the nature of the specimens as seen by Shirley and Brünnich is on record; also casts were made of the specimens before they were prepared. Both syntypes were found to have one more thoracic segment, that is seven (Pl. 91, fig. 9) and thirteen (Pl. 91, fig. 1), than the number given by Shirley. In order to fix the concept of *Trilobus tuberculatus* in keeping with the previously held notion of this species as a Silurian *Calymene* from Dudley, the specimen illustrated herein on Plate 91, figs. 3, 6, 8, 9, 11-13 is now selected as lectotype (MGUH 16.805).

The question of synonymy

As Shirley (1933) noted, on priority grounds many Scandinavian and continental authors (e.g. Lindström 1885) used the senior name *C. tuberculata* rather than *C. blumenbachii* for late Wenlock calymenids of this type. Shirley nevertheless effectively declared *C. tuberculata* a *nomen dubium* because of 'inadequate description and types', and said that 'the name *tuberculata* for any species of *Calymene* must be allowed to fall'. After preparing the Silurian material of Brünnich I am convinced that there are no significant morphological differences from that of Brongniart and that they are conspecific (see discussion below and Pls. 90 and 91). All the material is from the Dudley area, though it is unknown in the case of *C. blumenbachii* whether its type locality is specifically the Wren's Nest, as for *C. tuberculata*, there being two other Silurian inliers (Dudley Castle Hill and Hurst Hill; Butler 1939) in the district. The type horizon for all the material is indisputably the Much Wenlock Limestone Formation, of late Homerian age, considering the ostracode evidence presented above and the fact that I have not noted any specimens of this species from Dudley, of which there are very many, in any other formation.

The type species

The type species of *Calymene* Brongniart in Brongniart and Desmarest, 1822 is *C. blumenbachii* Brongniart in Desmarest, 1817, by subsequent designation of Shirley (1933), and not, as stated by Whittington (1983), *Calymena blumenbachii* Brongniart in Desmarest, 1817 by original designation. Bassler's (1915) designation of *C. tuberculata* to stand as the type species pre-dates that of Shirley, but it is invalid (see Whittington and Siveter, in press).

SYSTEMATIC PALAEOLOGY

Family CALYMENIDAE Milne Edwards, 1840

Genus CALYMENE Brongniart, 1822

Type species. *Calymene blumenbachii* Brongniart in Desmarest, 1817, from the Much Wenlock Limestone Formation, Homerian Stage, Wenlock Series, Dudley, West Midlands, UK, by subsequent designation of Shirley 1933, p. 53.

Calymene blumenbachii Brongniart, 1817

Plate 90, figs. 1-5; Plate 91

- ?1750 nondescript petrified insect; Lyttelton, p. 105, pl. 1, figs. 9-14; pl. 2 (*pars*). [From the figures it is probably *C. blumenbachii*.]
 ?1750 *scolopendrae aquaticae scutatae*; Mortimer, p. 106, pl. 1, figs. 15-18. [From the figures it is possibly *C. blumenbachii*.]
 1781 *Trilobus tuberculatus* Brünnich, p. 389. [Suppression requested, Whittington and Siveter, in press; ICZN pending.]
 1816 Le Calymène de Blumenbach; Brongniart in Desmarest, p. 50.
 1817 *Calymena blumenbachii*, Brong.; Brongniart in Desmarest, p. 517. [Suppression of *Calymena* Desmarest, 1817 requested, Whittington 1983; ICZN pending.]
 1822 *Calymene blumenbachii*; Brongniart in Brongniart and Desmarest, p. 11, pl. 1, fig. 1A-D.
 ?1839 *Calymene blumenbachii* Brongniart; Murchison, p. 653, pl. 7, figs. 6 and 7, *non* fig. 5.
 1851 *Calymene blumenbachi* (Brong.); M'Coy (*pars*) in Sedgwick and M'Coy, p. 165.
 ?1852 *Calym. blumenbachi*. Brongn.; Barrande, p. 566, pl. 5, fig. 8; *non* pl. 19, fig. 10; *non* pl. 43, figs. 46-48.
 ?1859 *Calymene blumenbachii* Brongniart; Murchison, p. 235, pl. 18, fig. 10.
 1865 *Calymene blumenbachii*, Brongn.; Salter, p. 93, pl. 8, figs. 8, 10, 12-14, ?figs. 7, 15, 16, *non* figs. 9 and 11, pl. 9, figs. 1 and 2.
 1868 *Calymene ceratophthalma*; Woodward, p. 489, pl. 21, fig. 1 (*pars*), ?fig. 2.
 1869 *Calymene blumenbachii*; Woodward, p. 43.
non 1872 *Calym. blumenbachi*. Brongn.; Barrande, p. 36, pl. 14, fig. 33.
non 1879 *Calymene blumenbachii*, Brongniart; Nicholson and Etheridge, p. 140, pl. 10, figs. 2-6.

- non 1906 *Calymene blumenbachi*, Brongniart, 1822; Reed, p. 133, pl. 17, figs. 12 and 13.
 1933 *Calymene blumenbachi* Brongniart, 1822; Shirley, pp. 52, 59, pl. 1, figs. 1-5.
 1936 *Calymene lata* sp. nov. Shirley, p. 414, pl. 30, figs. 11-13; pl. 31, fig. 4.
 non 1957 *Calymene (Calymene) blumenbachi blumenbachi* Brongniart, 1822; Tomczykowa, pp. 97, 135, pl. 3, figs. 3 and 4; text-fig. 6a, b.
 1959 *Calymene blumenbachii* Brongniart, 1822; Whittington in Moore, p. O452, fig. 353.1a-c.
 1970 *Calymene blumenbachi blumenbachi*; Schrank, p. 135, pl. 9, figs. 5 and 6.
 non 1977 *Calymene blumenbachi* Brongniart, 1822; Männil, p. 250, pl. 4, figs. 6 and 7; pl. 5, figs. 1-4.
 ?1980 *Calymene blumenbachi* Brongniart; Chatterton and Campbell, p. 95, fig. 4.
 1980 *Calymene blumenbachii blumenbachii* Brongniart, 1822; Siveter, p. 784, pl. 97, fig. 10; pl. 100, figs. 9-11.
 1983 *Calymene blumenbachii* Brongniart in Desmarest, 1817; Whittington, p. 177.
 1984 *Calymene blumenbachii* Brongniart; Thomas, Owens and Rushton, fig. 23 (*pars*).

Lectotype. Subsequently designated Shirley 1933, p. 53. A complete, partially enrolled specimen, Collections de Paléontologie de l'Université P. et M. Curie, No. 3409/77; figured Brongniart in Brongniart and Desmarest 1822, pl. 1, fig. 1A, B; Shirley 1933, pl. 1, figs. 1-3; herein Plate 90, figs. 1-5.

Paralectotype. The more or less complete specimen which formed the basis for Brongniart in Brongniart and Desmarest 1822, pl. 1, fig. 1C, D. This specimen now appears to be lost (see above).

Type stratum and locality. Much Wenlock Limestone Formation, Homerian Stage, Wenlock Series, Dudley, West Midlands. Bassett (1976, pp. 211 and 212) regarded at least the base of this formation at Dudley as being of *lundgreni* Biozone age, with the upper part being most likely of *ludensis* Biozone age.

Additional material. All of the major and most provincial museums in Britain have well-preserved material of this species and there is no attempt here to provide a complete list; the total number of specimens is probably several hundred. It is also well represented in the collections of numerous foreign repositories.

Diagnosis. A species of *Calymene* with a short preglabellar area, about one-tenth as long (sag.) as glabella; anterior border low relative to dorsal surface of frontal glabellar lobe and steeply to more or less vertically inclined, having a fairly sharp dorsal edge; preglabellar furrow very short (sag. and exsag.), moderately deep. Strongly inflated glabella projects well above and well in front of fixed cheek. Pygidium with strongly convex (tr.) axis, six to eight axial rings, five pleural furrows.

Description. Cephalon is subsemicircular in outline, 2.1 (Pl. 90, fig. 1) to 2.2 (Pl. 91, fig. 6) times as wide as long. Glabellar outline is bell-shaped, 1.0 (Pl. 91, fig. 6) to 1.1 (Pl. 90, fig. 1) times as long as wide, projects well in front of fixed cheeks. Occipital ring slightly narrower (tr.) than glabellar width at 1p lobes, gently convex in profile, is longest medially but gradually shortens abaxially and flexes forwards at axial furrow where it is weakly inflated. Occipital furrow moderately long (sag.), not deeply incised behind central glabellar area, becomes slit-like abaxially. Lobe 1p is fairly large, subquadrate, has a quite strongly convex outer margin, is strongly swollen and separated from median lobe by very shallow posterior extension of furrow 1p. The latter is deep and widest (exsag.) at axial furrow, runs inward and backward between lobes 1p and 2p, bifurcates adaxially, longer posterior branch turning first backward then inward, anterior branch directed forward and inward, continuing very weakly anteriorly across inner side of lobe 2p. Distinct intermediate lobe within fork of furrow 1p. Lobe 2p

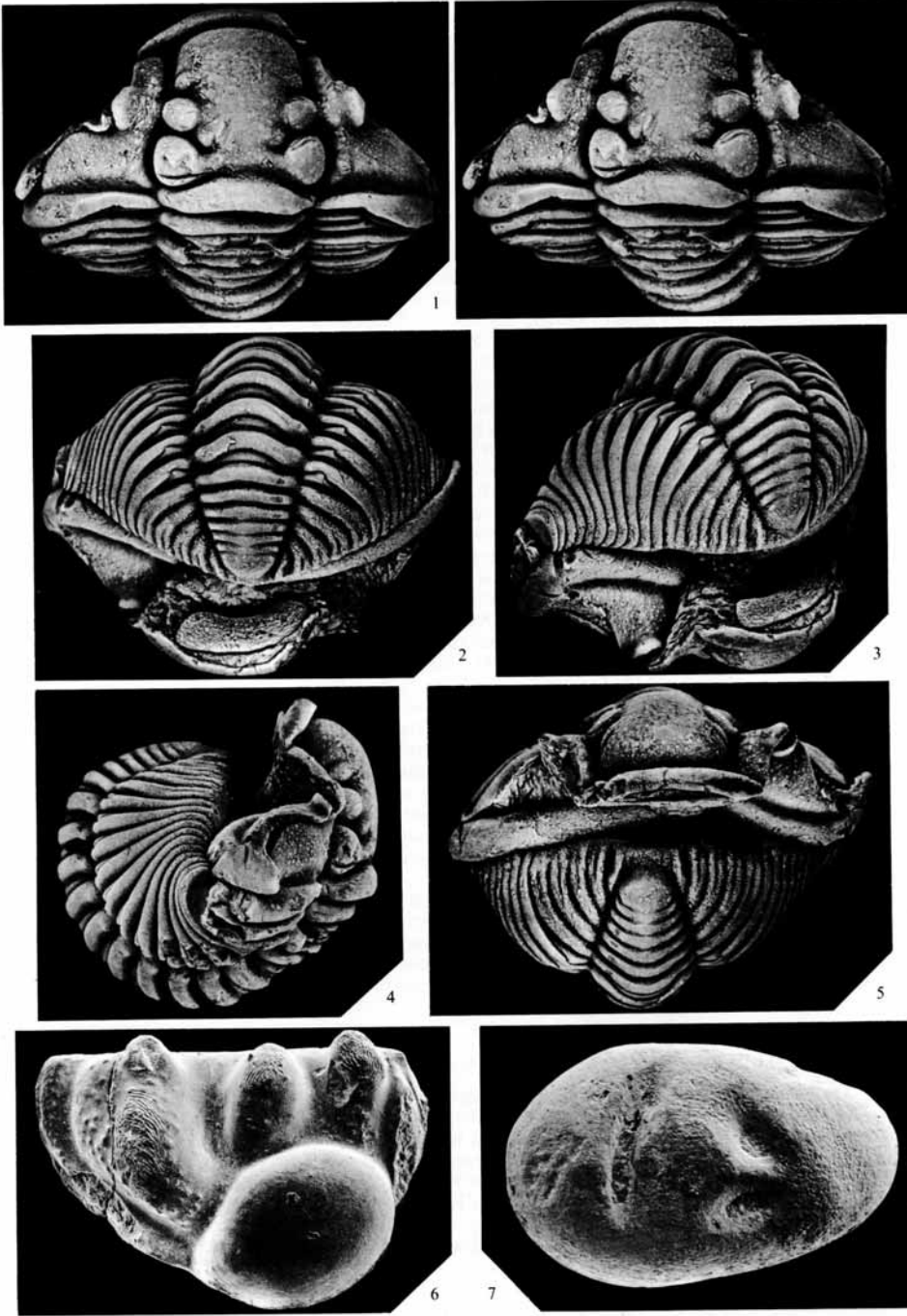
EXPLANATION OF PLATE 90

Figs. 1-5. *Calymene blumenbachii* Brongniart in Desmarest, 1817. UPMC 3409/77, Much Wenlock Limestone Formation, Dudley; lectotype; complete, partially enrolled specimen. 1, dorsal stereo-pair (cephalon); 2, dorsal (pygidium); 3, oblique (pygidium); 4, lateral; 5, frontal (cephalon); all $\times 2$. Figured Brongniart in Brongniart and Desmarest 1822, pl. 1, fig. 1A, B; Shirley 1933, pl. 1, figs. 1-3.

Fig. 6. *Osmotoxotis phalacra* Siveter, 1980. MGUH 16.803, Much Wenlock Limestone Formation, Wren's Nest, Dudley; right valve, female, lateral view, $\times 33$.

Fig. 7. *Thlipsura v-scripta* Jones and Holl, 1869. MGUH 16.804, Much Wenlock Limestone Formation, Wren's Nest, Dudley; left valve, tecomorph, lateral view, $\times 73$.

Ostracodes prepared and photographed by Dr David J. Siveter (Leicester).



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rather swollen, transversely elongate, papillate. Furrow 2p directed transversely or slightly forward. Lateral lobe 3p longest (exsag.) dorsally, narrows as it runs down side of glabella, confined by shallow though distinct 3p furrow which trends inward and forward. Small 4p lobe present. Frontal lobe with its sides vertically inclined and directed exsagittally or slightly outward posteriorly, in dorsal view anterolateral margins are rounded, anterior outline weakly (Pl. 90, fig. 1) to strongly (Pl. 91, fig. 6) convex forward. Frontal lobe is about 0.7 times as wide as glabella at lobe 1p. In lateral profile (Pl. 90, fig. 4; Pl. 91, fig. 8) dorsal surface of glabella projects well above fixed cheek, is gently convex between occipital furrow and furrow 2p, thereafter moderately to strongly convex to anterior face of frontal lobe, which falls very steeply and is undercut by preglabellar furrow.

Axial furrow very shallow at occipital ring, narrowest at base of lobe 1p, becomes progressively wider (tr.) and much deeper to furrow 1p; around lobe 1p it undercuts and its abaxial face curves very steeply downward and slightly inward; it is just continuous under bridge of lobe 2p and genal buttress, from here to preglabellar furrow it is uniformly narrow, deep, and trench like. Anterior pit is below posterior part of frontal lobe. Preglabellar furrow very short (sag. and exsag.), moderately deep. Anterior border is a very short raised rim, in lateral view (Pl. 90, fig. 4) it curves vertically upward and a little inward, its dorsal surface is quite sharply edged and does not reach far up anterior face of frontal lobe (Pl. 90, fig. 5); opposite axial furrow it is slightly swollen (Pl. 91, fig. 3). Anterior margin moderately convex forward (Pl. 90, fig. 1) and upward (Pl. 90, fig. 5).

Posterior border becomes considerably wider (exsag.) and less convex abaxially from fulcrum before narrowing (exsag.) slightly near genal angle (Pl. 91, fig. 3). Posterior border furrow widest opposite fulcrum, has shallow anterior and steep posterior slope. In lateral profile postocular part of fixed cheek slopes (exsag.) gently to moderately to posterior border furrow, preocular part is rather narrow (tr.), curves steeply downward and forward. Furrow between fixed cheek and anterior border is shallower than preglabellar furrow. Palpebral lobe is moderately (Pl. 91, fig. 11) to quite steeply (Pl. 90, fig. 5) inclined with mid-length opposite anterior part of lobe 2p, it is longer (exsag.) than lobe 2p but not as long as lobe 1p, its outer margin is slightly pointed. At contact of posterior facial suture and ocular suture, palpebral lobes are 1.6 times as wide apart as width of glabella across 2p lobes. Posterior branch of suture runs transversely from palpebral lobe then turns obliquely backward to lateral border where it bends more sharply backward and finally slightly outward to bisect lateral and posterior margins; anterior branch directed forward and slightly inward to anterior border, turns sharply inward on outer face of border to connective suture (Pl. 91, fig. 11). Visual surface of eye is not preserved, reniform in outline, supported by eye socle from which convex main field of free cheek descends very steeply to distinct, broadly U-shaped lateral border furrow (Pl. 91, figs. 3 and 8). Lateral border turns sharply over and under; doublure acutely reflexed.

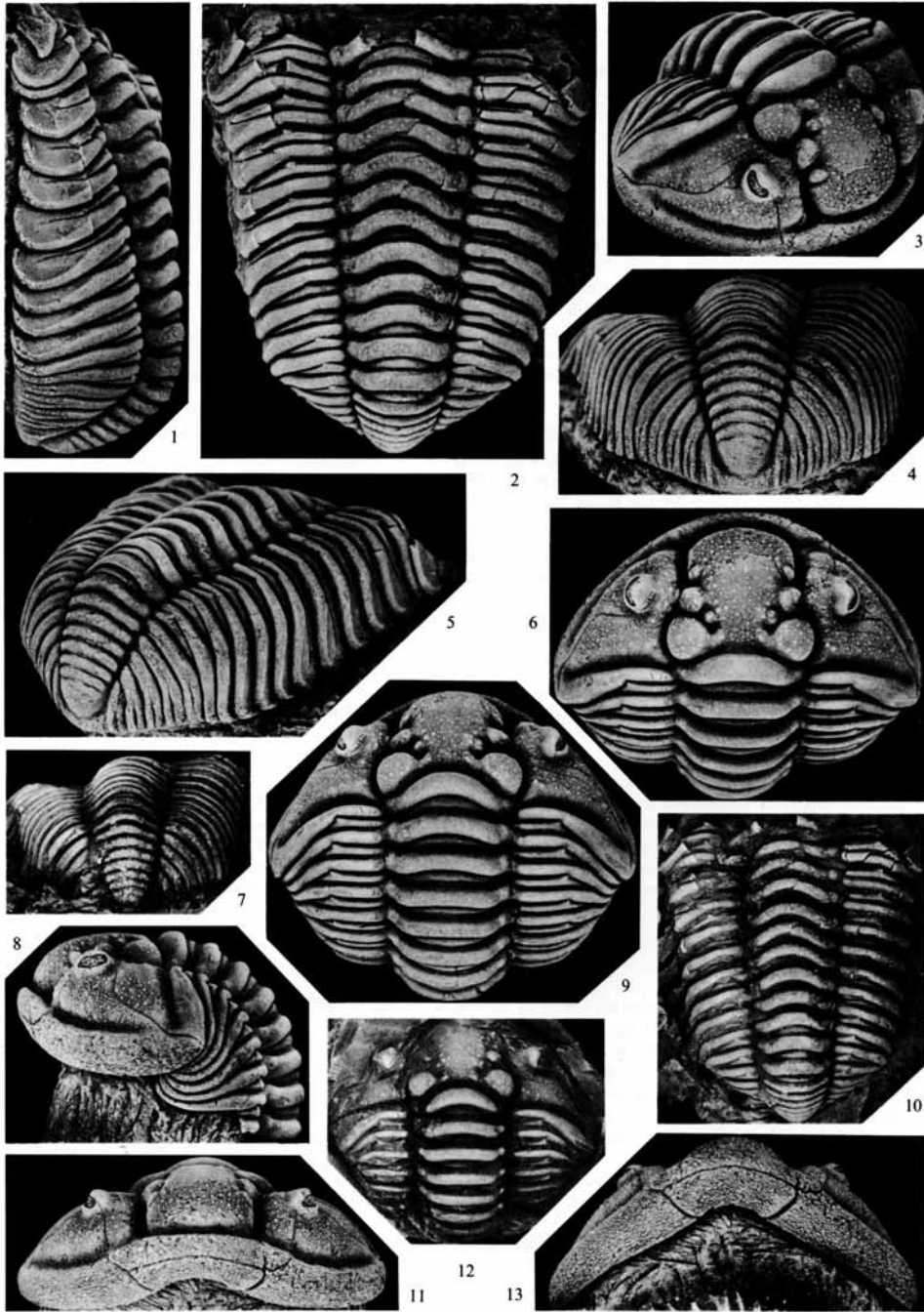
Rostral plate (Pl. 90, fig. 2; Pl. 91, fig. 13) composed of border and doublure sectors. Border sector and rostral suture broadly arched; connective suture abaxially convex. Hypostoma apparently missing on figured material.

Thorax has thirteen segments. Gently convex (sag.) axial ring very gradually widens (exsag.) abaxially from median line and is produced into gently inflated node at axial furrow (Pl. 91, fig. 9). Articulating half-ring about as wide (sag.) as axial ring sagittally; articulating furrow shallow medially, deeper and narrower (exsag.) abaxially. Posterior pleural band strongly convex (exsag.), forms a narrow bounding rim around the flat pleural facet. Dorsally the pleural furrow is relatively wide (exsag.), deep, and U-shaped, reduced to a rill-like slit on pleural facet (Pl. 91, fig. 1). Anterior pleural band tightly convex (exsag.), narrower, and slightly lower than posterior band.

Pygidium is slightly less than twice as wide as long. Axis is slightly less than half the pygidial width (Pl. 90, fig. 2), reaches well above pleural regions, is strongly convex (sag.), has seven (Pl. 90, fig. 2) or eight (Pl. 91, fig. 4) axial rings (other specimens have only six). All axial rings except the last defined posteriorly by complete ring furrows which are weakest medially; last ring furrow discontinuous; terminal axial piece rounded. Axial furrow clearly impressed, weakest posteriorly. Inner part of pleural region falls steeply from axial furrow, outer

EXPLANATION OF PLATE 91

Figs. 1-13. *Calymene blumenbachii* Brongniart in Desmarest, 1817. 1, 2, 4, 5, 7, and 10, MGUH 16.806, Much Wenlock Limestone Formation, Wren's Nest, Dudley; paralectotype of *C. tuberculata* (Brünnich, 1781) and 'second' specimen of Shirley (1933), pygidium and thorax. 1, lateral; 2, dorsal; 4, posterior; 5, posterior-oblique; all views of prepared specimen, $\times 2$. 7, posterior; 10, dorsal; both views of unprepared specimen, $\times 1.5$. 3, 6, 8, 9, and 11-13, MGUH 16.805, Much Wenlock Limestone Formation, Wren's Nest, Dudley; lectotype of *C. tuberculata* (Brünnich, 1781) and 'first' specimen of Shirley (1933), cephalon and partial thorax. 3, oblique; 6, dorsal (cephalon); 8, lateral; 9, dorsal (thorax); 11, frontal; 13, ventral; all views of prepared specimen, $\times 2$. 12, dorsal (thorax) view of unprepared specimen, $\times 1.5$.



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part becomes vertically inclined. There are five distinctly impressed pleural furrows which are best marked at their mid-length and almost reach lateral margin (Pl. 90, fig. 3; Pl. 91, fig. 5). Interpleural furrows are slightly longer than pleural furrows, deepest distally, become very faint more proximally though are never completely effaced, are slightly better impressed again immediately adjacent to axial furrow. Fifth interpleural furrow runs on outside of an exsagittally directed ridge which probably represents anterior pleural band of sixth pleura and confines (abaxially) the postaxial sector. Inside this ridge is a very shallow furrow. In lateral profile there is a break in slope between terminal axial piece and postaxial sector. Border rolls under at lateral margin, is widest (tr.) anteriorly.

Sculpture on glabella and fixed and free cheek inside posterior and lateral borders consists of closely spaced large to small granules. Abundance of granules falls off towards furrows and they are absent in deepest part of axial furrow, preglabellar furrow, lateral and posterior border furrows, and occipital furrow. Granules are closely packed and more uniform in size on outer side of anterior border, lateral border, rostral plate, central part of pygidial axis, distal posterior margins of pleurae, outer pleural region, and border roll of pygidium; on posterior part of lateral border roll they are more elongate and scale-like, on cephalic and pygidial borders more flattened. Much more widely scattered fine- to medium-sized granules on thorax, except for pleural, axial, and articulating furrows. Pleural facets have very fine granules. Granules are scarce on inner part of pygidial pleural region and abaxial part of pygidial axis.

Discussion. The description above is of the three trilobites figured herein, but it can be applied to other specimens of the species. In the lectotype of *C. tuberculata* the glabellar and cephalic width to length ratio and convex outline of the frontal glabellar lobe is slightly greater than that of the *C. blumenbachii* lectotype (cf. Pl. 90, fig. 1; Pl. 91, fig. 6), and the paralectotype of *tuberculata* has an extra, very weak eighth pygidial axial ring furrow compared with the *blumenbachii* lectotype (cf. Pl. 90, fig. 5; Pl. 91, fig. 4), but such variation is considered to be intraspecific. A description of the hypostoma and a comparison with other closely related taxa, for example *C. clavacula* Campbell, 1968 from the Silurian of Oklahoma or *C. neotuberculata* Schrank, 1970 from the Wenlock of the Baltic, is in preparation by me for publication elsewhere. *C. ceratophthalma* Woodward, 1868 and *C. lata* Shirley, 1936, both from the Much Wenlock Limestone Formation of Dudley, I consider to be junior synonyms of *C. blumenbachii*.

Occurrence. Much Wenlock Limestone Formation, West Midlands inliers, England; late Wenlock mudstones and siltstones, Penylan, Rumney inlier, Cardiff area, South Wales.

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