

Armstrong College

Dove Marine Laboratory

Cullercoats, Northumberland

Report

For the year ending July 31st, 1936

H. O. B. M.

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NOTES ON THE BRITISH SPECIES OF THE GENUS
GALATHEA FAB.

BY

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I. GENERAL.

Many eminent carcinologists have discussed at length the identity of *Galathea nexa* Embleton and *Galathea dispersa* Spence Bate. In general, older writers separated them, more recent writers united them. The primary object of this paper is the settlement of this dispute. *G. dispersa* is an abundant and widely distributed species constituting an important part of the diet of many food fishes, whilst *G. nexa* is rare and local: the correct settlement of the dispute is therefore of more than academic interest. Of the three remaining British species of the genus, *G. intermedia* Lilljeborg has been described in detail by Selbie (1914), and *G. squamifera* Leach and *G. strigosa* (L.) are so well known as hardly to need detailed treatment; they are, however, incorporated in the general treatment where necessary and in the keys.

Embleton's original description of *G. nexa* is difficult of access and has not been seen by most of the writers discussing it. It is very brief and runs as follows:—(Embleton, 1834, p. 71) "*Galathea nexa*, nova species. Three specimens of this hitherto unnoticed species have only yet been found, two in Berwick Bay, and the other in Embleton Bay. It forms a beautiful link between *G. squamifera* and *G. spinigera*, (sic!), approaching to the first in the shape of the body, and to the latter in the shape and size of the claws. The characters of the three species may be thus expressed: . . . 2. *Gal. nexa*. Arms large, hirsute, the hands without spines, the wrist with a single large one on the inner side, or, when two, the anterior is much the smallest; ligament of the shell brown . . . ". Accompanying the description is a poorly drawn figure showing the characteristic *facies* of *G. nexa* as re-described here. He again refers to it in his annual address to the Berwickshire Naturalists' Club for 1835 (7, p. 65), where he says "it was referred to Mr. J. E. Grey, who agreed that it was a species new to the British Fauna." I have not been able to trace his type specimen and I doubt if it now exists, but in the Hodge collection at the Hancock Museum, Newcastle-upon-Tyne, are a number of specimens which, it seems probable, were likely to have been seen and

named by Embleton, for they are all consistently and correctly named.

It is noteworthy that the much more common *G. dispersa* should not have been noticed until a much later date (1859), nor *G. intermedia* until 1851. Bell's figure (1853, p. 204), is certainly that of *G. nexa*, but many of his records must, with almost equal certainty, be of one or other of the two preceding. As with *G. nexa*, so it is with *G. dispersa*, that the original description—where it is actually first mentioned as "*depressa* (n. sp.)" (misprint)—is very short, but the author's discussion of its characters in its relation to the other four species leaves no room for doubt as to the species being described.

Detailed descriptions of all the species, including *G. nexa* and *G. dispersa* as separate species, were first published by Kinahan (1861), in a paper which has received much adverse criticism for both his wood-cut figures and the text, but he noticed—what many since have failed to do—the characters and specific differences in the rostrum, the chelipeds, and the abdominal segments of both *G. nexa* and *G. dispersa*. The best detailed descriptions purporting to distinguish these two species are generally credited to Bonnier (1888), who has on the contrary, contributed largely to the present confusion. Some confusion already existed at this date, which was due to Heller (1863), mainly because of the unfortunate reversal of the legends to one of the plates (Heller 1863, Tab. VI, Figs. 3 and 4), but also because he was probably dealing with *G. dispersa* instead of with *G. nexa*, as he thought. It is probable, but not certain, that Bonnier (1888), had *Galathea nexa* Embleton before him when he wrote. His description was based on two specimens (not one, as is said by Hansen, Selbie, and others), one from "le banc du Galoper au large de l'embouchure de la Tanoise" and one as he himself says in a footnote, that was sent to him from Newcastle (by Norman). Both were males, and neither was exceptionally large, (one measuring 62 mm. from tip of chelipeds to end of telson), and he particularly notes that the points of the rostral spines were still a bright red after a long time in alcohol. This is an interesting character, not confined to *G. nexa*, but which generally serves to suggest *G. nexa* rather than *G. dispersa*. Bonnier laid the foundations of future misconception, not especially in his actual descriptions of the species, but mainly in his choice of the points chosen for emphasis and in his failure to note more dependable characters. Thus, in his key to the five species, his major character for separating these two, is the relative length of the ischium and merus of the third maxillipede; the ischium being longer than the merus in *G. dispersa*, equal to it in *G. nexa*. This is generally true, but the difference is so slight and the possibilities of error so large, as to render it quite useless as a character for separating the two species. Similarly

with the spines on the merus of the same appendage, of which he says that in *G. nexa* it is "armée d'une épine unique" but does not describe it in *G. dispersa*, contenting himself with figuring it and saying that it is very characteristic and that Heller's figure (1863, tab. VI, fig. 4, not (3) "*nexa*") is rough but quite recognisable. Neither does Bonnier show evidence of being too sure even of *G. dispersa* when he says that it resembles *G. intermedia* and *G. nexa*, for the most inexperienced worker should not confuse it with *G. intermedia*. Further, he figures the third maxillipede of *G. dispersa* in such a way as to make it seriously misleading (see also Milne-Edwards and Bouvier 1899, and Selbie 1914) although it is tolerably correct for some specimens when viewed from the angle at which it is drawn.

Finally, in discussing *G. dispersa* he has the following curious paragraph "Cette espèce a été créée par Spence Bate qui en donne une diagnose incomplète, basée surtout sur des caractères sexuels, En un mot, Spence Bate semble avoir donné le nom de *dispersa*, à une femelle de *G. nexa*," and he then goes on to say that the other points raised are not sufficient to separate them. Selbie (1914, p. 71) says "I am quite convinced with Hansen, that the species *nexa* has been erroneously founded on very large male specimens of *dispersa*." Spence Bate's type specimen which I have examined, still exists in the Norman Collection in the British Museum, and is itself an exceptionally large *male* of the species, considerably larger in fact than the *G. nexa* figured by Embleton! Bonnier therefore not only made it difficult for future workers to differentiate between the two species but said that *G. dispersa* seemed to him to be ♀*G. nexa*, which surely is the same as saying, like Selbie and Hansen, that *G. nexa* is ♂*G. dispersa*.

In 1899 Milne-Edwards and Bouvier (1899) corrected Bonnier on some minor points of *G. dispersa* and, basing their characters on one large ♂*G. nexa* (reputed, and possibly correct), drew up several more points of distinction, most of which are of only slight diagnostic value (for examples of their variability see Selbie 1914, Appellöf 1906, Hansen 1908).

Appellöf (1906) examined a large amount of material which he ascribed to *G. nexa* Embleton as an older synonym of *G. dispersa* Sp. Bate. Basing his conclusions on the lists of distinctive characters as given by Bonnier (1888) and Milne-Edwards and Bouvier (1899), i.e. the relative lengths of the segments of the third maxillipedes, the number of spines on the rostro-gastral groove, the lengths of the teeth of the rostrum, and whether the right or the left cheliped was the larger, he concluded that this material showed every possible variation in these characters, and that therefore they must be ascribed to *G. nexa* Emble-

ton. All these characters are useless as distinguishing characters. He was unable (as he says) to see Embleton's original description, and he states clearly that he had never seen any specimen with the combination of a smooth rostrum and very hairy chelipeds as described in *G. nexa* by Kinahan. It is therefore practically certain that all his material was *G. dispersa* Sp. Bate, since the combination of these two characters is strictly specific for *G. nexa*.

Hansen (1908) likewise says he was unable to see Embleton's paper and then continues to analyse a large amount of material on similar lines to Appellöf (and it appears, independently) but as he also says that he saw no examples with the *G. nexa* rostrum (p. 32) it is again highly probable that he too was dealing with a collection solely of *G. dispersa*.

Crawshay (1912), alone of recent authors dealing with the systematics of the adult, definitely recognised the two species, for he says, "The peculiar *facies* of *G. nexa* is remarkable to the naked eye owing to the much stronger spination and hispidation of the first peraeopods especially, and also in the generally shorter form of these appendages than in *G. dispersa*. These distinctions cannot be sexual in character . . ." Anyone who was really familiar with the two species would, I think, write about them like this. I have examined the only purported *G. nexa* in the Plymouth Laboratory collection, probably named by Crawshay; also three specimens given by him to the British Museum from his English Channel collections: they are all labelled *G. nexa* and agree with *G. nexa* as described here. Crawshay (1912) considered the spinulation of the third maxillipedes as of more importance than the relative lengths of the joints, without giving further detail, and goes on to suggest that the microscopic character of certain setae close to the large spine on the merus may be of value, but this too is a slight and variable character and is unreliable. (See also Selbie 1914).

Selbie (1914), p. 71, closely followed Appellöf and Hansen for similar reasons to theirs and was even strengthened in his views by Crawshay's remarks. Through the kindness of the National Museum of Ireland I have examined the larger part of Selbie's material and find it to be mainly *G. dispersa*, with a few small *G. nexa* amongst them.

Pesta (1918), and Balss (1926), both deal solely with *G. nexa*, as a synonym of *dispersa*. The characters of *G. nexa* as given by Pesta and Balss refer equally well to either species, so that it is impossible to say how far their records of distribution refer to the one or the other, but again it is highly probable they refer almost solely to *G. dispersa*.

It is to be seen then that these two species have attracted an unusually large amount of attention on very peculiar lines and no satis-

factory case has been made out for their respective identities. That they are totally distinct is shown by the characters of their larval stages. Lebour (1930), who *thinks* the species distinct as adults, has already described the larvae of *G. dispersa* and the larvae of *G. intermedia*, *G. strigosa*, and *G. squamifera*. I have been able to confirm her description of the larvae of *G. dispersa* by hatching from the egg and from the plankton, and have also hatched out the larva of *G. nexa* from the egg and taken it living in the Northumberland plankton. It is readily distinguishable from that of *G. dispersa* and the other species, as shown below.

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II. DESCRIPTION OF SPECIES.

1. *Galathea nexa* Embleton 1834*

(Pl. 1, figs. 1-3; Pl. 2, figs. 1-6; Pl. 3, fig. 1; Pl. 4, figs. 2, 5; Pl. 5, figs. 1-4; Pl. 6, figs. 1, 4, 5).

- Galathea nexa* Embleton, 1834, p. 71.
 " " Bell, 1853, p. 204.
 " " Bate, 1859, p. 3.
 " " Kinahan, 1861, p. 102.
 " " Henderson, 1887, p. 339.
 " " Bonnier, 1888, p. 63.
 " " Norman and Brady, 1909, p. 265.
 " " Crawshay, 1912, p. 353.
 " " (in part). Selbie, 1914, p. 70.**
 " " Lebour, 1930, p. 175.
 " " Plymouth Marine Fauna, 1931, p. 210.

* In the synonymy I have given only those references of whose correctness I can feel reasonably sure.

** An examination of Selbie's material showed it to be mainly *G. dispersa* with a few small *G. nexa*.

Not

- Galathea nexa* Heller, 1863, p. 191.
,, ,, Milne-Edwards and Bouvier, 1894 (a), p. 250.
,, ,, Appellöf, 1906, pp. 136-138.
,, ,, Hansen, 1908, pp. 31-32.
,, ,, Kemp, 1910, p. 415.
,, ,, Selbie, 1914, pp. 70-72.*
,, ,, Pesta, 1918, p. 256.
,, ,, Balss, 1926, pp. 28-29.
,, ,, Hunt, 1925.

The *carapace* (Pl. 5, fig. 4) is only a little longer than broad, narrowing slightly anteriorly. When dry, the surface is glossy. The lateral spines are of a fairly uniform size, directed upwards and forwards, and are sharp and prominent throughout. The fine setae fringing the transverse grooves are closely but not thickly set (as they are in *G. dispersa*), and do not generally exceed in length one fourth of the distance to the next major anterior transverse groove. The spines on the rostro-gastral groove vary from none to six. The rostrum is shorter relative to the length of the carapace in *G. nexa* than in *G. dispersa*, and when held so that it is viewed in sharp lateral profile (Pl. 4, fig. 2), shows a reliable specific difference, which is one of the easiest to use when sorting a large amount of material. I have seen hundreds of *G. nexa* and many thousands of *G. dispersa* and have not seen any specimen that could not be placed with this character. The rostrum has the usual terminal spine and four lateral ones tipped with red, and is markedly concave. Each of the lateral spines bears a single seta on its inner margin a short way below the tip; the terminal spine has one or two minute tubercles close to its base (not visible to the naked eye). The surface of the rostrum has only the merest suggestion of "scales" and only scattered setae. Its appearance to the naked eye may be described as "clean cut" and smooth.

The abdominal *terga* (Pl. 4, fig. 5) have a single transverse groove, fringed anteriorly with fine setae. The general appearance of the surface of the abdomen is smooth and glossy. The inner ramus of the *uropods* (Pl. 6, fig. 5) is distinctly longer in proportion to its width than in *G. dispersa* (fig. 6), and has the extero-posterior angle rounded and very obtuse. (The figure omits the bristles etc., of the surface).

The basal joint of the *antennules* has three strong spinous processes; as with the other British species there are no "soies antennulaires accessoires" (Milne-Edwards and Bouvier, 1894 (a), p. 250). The basal

* An examination of Selbie's material showed it to be mainly *G. dispersa* with a few small *G. nexa*.

joint of the *antenna* (Pl. 2, fig. 1) has a pronounced spine standing out at right angles to the antero-interior border which is as long as the second joint; it has also a strong forward-pointing spine on the antero-exterior border reaching to at least three-quarters of the length of the succeeding segment. The second joint of the antennal peduncle has a well-marked forward-pointing spine on the antero-interior angle (dist. from *G. dispersa* which has no spine here).

The *mandibles* have a 3-jointed palp (Pl. 2, fig. 2) in which the proximal exterior edge of the terminal segment forms a more pronounced elbow than in *G. dispersa* (Pl. 6, fig. 3); the inner edge of this segment does not bear the two large plumose setae near its base as in *G. dispersa*. The *first* and *second maxillae*, and the *first* and *second maxillipedes* (Pl. 2, figs. 3-6) do not differ greatly from those of *G. intermedia* as figured by Selbie (1914), but the posterior angle of the exopodite of the second maxilla is less acute than in that species. The *third maxillipede* (Pl. 3, fig. 1) has always a single very large spine about the middle of the inner margin of the merus, and whilst it is not usually followed distally by any pronounced spines, there is frequently a second spine and there is a considerable degree of variation in "toothing" or "spining" along this edge. It is very unusual for this species to show as many pronounced spines in this position as in typical *G. dispersa* (Pl. 3, fig. 3), but there are all degrees of overlapping in the two species in this character. The median large spine is always more prominent in *G. nexa* than in *G. dispersa*, but the possible specific character of the absence of pinnae to the setae close to the base of this spine (as suggested by Crawshay) is not reliable and is very variable. It is generally almost impossible to say whether the merus or the ischium is the longer of the two in this appendage.

The *first peraeopods* (Pl. 1, figs. 1-3) show, as in all the members of the genus, considerable variation with age and sex, but they are always quite distinct from those of *G. dispersa*. In no circumstances does *G. dispersa* ever show the characteristic hairiness of the *G. nexa* chelipeds, although in the young *G. nexa* this is a less well-marked character than in the adult. The length of the dactylus is generally *more than half* the length of the propus; this changes slightly with age, being less constant for young specimens than old, but it is a very variable character and has little diagnostic value. The spines on the outer edge of the propus are strong, sharply pointed, directed upwards and forwards, and are regularly gradated along the whole edge from the proximal end of the joint to the very tip of the fixed chela. There are no spines on the upper or lower surface of the propus. Its surface, together with the merus and ischium of the same limb, is thickly covered with long plumose setae ri-

sing from, as Spence Bate says, obsolete scales. These setae give the chelipeds the characteristic "furry" appearance belonging only to *G. nexa*. They are very many fewer in young stages than in adults, and confusion with *G. dispersa* is then more likely, especially in dried specimens. I have noticed that long immersion in alcohol tends to result in the loss of the characteristic "furry" appearance which is of course quite absent in dried specimens.

The dactylus and propus of the chelipeds have the exterior superior edge generally more perceptibly rounded than in *G. dispersa*. In young specimens the chelae are almost straight, though there is generally a distinct outward curvature in the fixed chela even in very small specimens. This curvature increases with age in both males and females but is only developed strongly in males. The right and left chelipeds are usually nearly equal in size and there is definitely no constancy with which either the right or left becomes the larger in the rare cases in which it has been noticed.

The succeeding thoracic appendages differ little from those of the other species, but they generally show a sharper, stronger, and more uniform spinulation of their anterior borders than *G. dispersa*.

The branchial formula is the same in *G. nexa* as in *G. dispersa* and *G. squamifera*:—

	VII	VIII	IX	X	XI	XII	XIII	XIV
Podobranchs	ep.	—	ep.	ep.	ep.	ep.	—	—
Arthrobranchs	—	—	2	2	2	2	2	—
Pleurobranchs	—	—	—	—	1	1	1	1

The first and second pair of *pleopods* in the male do not differ greatly from those of *G. intermedia* (Selbie, 1914); the third, fourth, and fifth also greatly resemble those of *G. intermedia*. The endopodite becomes relatively longer from the third to the fifth and is 2-jointed. The endopodites of the third to the fifth pleopods of the male *G. nexa* are generally longer than those of the male of *G. dispersa* (Pl. 5, figs. 1-3; 5-7 respectively).

The colour of *Galathea nexa* is remarkably constant, being generally a distinctly greenish-red, with no well-defined patches or marks of any other colour, with the exception of a small amount of brilliant blue or bluish-white pigment of limited distribution. This is confined to the labrum and the pterygostomial region of the pleural fold. On the labrum it shows as a brilliant blue bead; on the pleural fold as shown in Pl. 6, fig. 4, but it may be reduced here to the central linear marking. I have seen no examples, of any size, without this colouration.

The distribution of this bright blue pigment is probably the easiest

reliable specific character for the identification of this species alive or in the dried state, in which it persists for upwards of a century for it is still clearly visible on the specimens in the Hodge collection in the Hancock Museum, Newcastle-upon-Tyne. Whilst it does not last in alcohol, the patches where it has been can generally be recognised.

Size.—There is a remarkable disparity in the sizes reached by adult males and females. The largest male seen measures 40 mm. from the tip of the rostrum to the end of the telson, 80 mm. from the tip of the outstretched chelipeds; the same measurements in the largest ovigerous female seen being 29 mm. and 48 mm. respectively. Usual sizes for adult males are 30-38 mm. from the tip of the rostrum to end of telson, 50-76 mm. including chelipeds; for ovigerous females 16-20 mm. and 26-30 mm. respectively.

Distribution.—British Isles. Very local. In 15-20 fathoms off the Coast of Northumberland, occurring most frequently about 1 mile S.E. of St. Mary's Island; also recorded from Embleton Bay: Firth of Forth, 20 faths., (single specimen, Norm. Coll.); Shetland Isles, (4 specimens in British Museum donated by E. M. Nelson); Firth of Clyde, (single specimen, Norm. Coll.); Aberlady Bay, (single specimen, Henderson); English Channel, 39 miles S. 22° W. of Eddystone Light, (6 specimens, Crawshay): Killeany Bay, Aran, (Nat. Mus. Ireland, single specimen).

Examination of the material labelled *G. dispersa* in the British Museum has given the following additional localities for *G. nexa*:—Teneriffe, ("Challenger", 1888); Valentia, ("Osprey", 1870); apart from these, it is unwise at this stage to attempt any further statement of its distribution.

2. *Galathea dispersa* Bate 1859.

(Pl. 1, figs. 4-6; Pl. 3, fig. 3; Pl. 4, figs. 1, 4; Pl. 5, figs. 5-8; Pl. 6, figs. 2, 3, 6.)

Galathea dispersa. Bate, 1859, p. 3.

———— *dispersa*. Kinahan, 1861, p. 99.

———— *nexa*. Heller, 1863, p. 191.

———— *dispersa*. Henderson, 1887, p. 340.

———— *dispersa*. Bonnier, 1888, p. 68.

———— *nexa*. Milne-Edwards and Bouvier, 1894 (a), p. 250.

? ——— *nexa*. Milne-Edwards and Bouvier, 1899, p. 72.

———— *dispersa*. Milne-Edwards and Bouvier, 1899, p. 72.

———— *dispersa*. Milne-Edwards and Bouvier, 1900, p. 278.

———— *nexa*. Appellöf, 1906, pp. 136-138.

———— *nexa*. Hansen, 1908, p. 31.

———— *dispersa*. Norman and Brady, 1909, p. 265.

- Galathea nexa*. Kemp, 1910, p. 415.
 ———— *dispersa*. Crawshay, 1912, p. 352.
 ———— *nexa*. Selbie, 1914, pp. 70-72.
 ———— *nexa*. Pesta, 1918, p. 256.
 ———— *nexa*. Balss, 1926, pp. 28, 29.
 ———— *nexa*. Hunt, 1925, p. 592.
 ———— *dispersa*. Lebour, 1930, p. 175.
 ———— *dispersa*. Plymouth Marine Fauna, 1931, p. 210.

Most of the features suggested for the separation of *G. dispersa* from *G. nexa* by previous writers are variable and unreliable as diagnostic characters. Spence Bate's own character—that of the appearance of the scales on the surface—is really quite dependable, but almost incapable of exact definition.

The *carapace* (Pl. 5, fig. 8) is relatively narrower than in *G. nexa*, tapers more noticeably and is less depressed than in that species. When dry, the surface appears dull to the naked eye, due to the presence of approximately twice as many transverse grooves as there are in *G. nexa*, and to the much larger setae bordering these grooves. The fine hairs fringing the anterior edges of the transverse grooves are very thickly set and about twice as long as those of *G. nexa*. The lateral spines of the carapace are perceptibly less regular in size, less sharp and more flattened than in *G. nexa*. The spines on the rostro-gastral groove are as variable as in *G. nexa*. The rostrum (Pl. 4, fig. 1) is almost flat, and is longer in proportion to the carapace than in *G. nexa*. Viewed in profile it presents an untidy appearance, and appears almost straight, partly because the spines are actually flatter and less sharp than in *G. nexa*, but also because a thick covering of scales and hairs tends to conceal the true outline both of the rostrum and the spines. The terminal spine generally has one or two minute tubercles near the base as in *G. nexa*, but they are usually concealed by the hairs.

The abdominal *terga* (Pl. 4, fig. 4) have each one main transverse furrow, and the two halves thus formed are again sub-divided; the three grooves are fringed anteriorly with long, very closely-set setae. The general appearance is much rougher and duller than in *G. nexa*. The inner ramus of the *uropods* (Pl. 6, fig. 6) differs distinctly though slightly from that of *G. nexa*, being broader and having the extero-posterior angle more pronounced and less obtuse.

The *antennules* are similar to those of *G. nexa*. The spine on the antero-interior border of the basal joint of the *antennal peduncle* (Pl. 6, fig. 2) is not usually more than half as long as the second joint; the spine on the exterior angle is similarly not more than the same length, whilst

there is *no* spine on the antero-interior angle of the second joint. The *mandibular palp* (Pl. 6, fig. 3) has the proximal exterior angle of the terminal segment more rounded than in *G. nexa*; the inner edge of this segment bears two large plumose setae near its base, which are absent in *G. nexa*.

The central spine on the inner margin of the merus of the *third maxillipede* is always relatively less important than in *G. nexa*, and is usually followed by a number of smaller spines as in Pl. 3, fig. 3. As already stated in *G. nexa* the appearance of these spines is very variable, and whilst the experienced eye will rarely be deceived the differences between the two species are difficult of exact definition. As with *G. nexa* it is generally impossible to say precisely that the ischium and merus differ in length.

The *first pereopods* are generally longer in proportion to the total body length than in *G. nexa*; the length of the dactylus is generally *less than half* the length of the propus. The spines on the outer edges of the dactylus and propus are generally irregular, and more flattened than those of *G. nexa*. There are no spines on the upper and lower surfaces of the propus, both of which are thickly covered with scales beset on their anterior edge with a fringe of closely-set setae. Old males and berried females frequently develop a large number of plumose setae on this limb, but these never merge to make the typical *G. nexa* fur-like appearance.

The exterior superior edge of the propus is sharper and more angular in *G. dispersa* than in *G. nexa*, giving a more generally flattened appearance to the joint.

Old males develop, as in *G. nexa*, a strong curvature of the chelae, but in females and young stages the two chelae are almost straight.

For the *branchial formula* see p. 45.

The endopodites of the third to the fifth *pleopods* of the male are shorter in proportion to the length of the lamellar peduncles than in *G. nexa*, but the number of joints is the same (Pl. 5, figs. 5-7).

The *colour* of *Galathea dispersa* is very variable in shades of red, yellow, orange, blotched with white, or in uniform colouring; it is extremely rare to find a specimen even approaching the distinctive greenish-red hue of *G. nexa*. The brilliant blue pigment of *G. nexa* is totally absent.

Size.—The largest male seen measures 35 mm. from the tip of the rostrum to the end of the telson, 72 mm. from the outstretched chelipeds; the largest ovigerous female 28 mm. and 49 mm. respectively. The usual size for both males and females is slightly less than for *G. nexa*; the smallest ovigerous female seen was only 12 mm. in body length.

Distribution.—Common in depths of 20-200 fathoms all round

the coasts of the British Isles, most abundant in depths of between 25 and 50 fathoms.

As with *G. nexa*, it is considered unwise to attempt a statement of its distribution abroad, but it is probably generally distributed and abundant off all European Coasts, and off the coasts of Norway as far North as Hardangerfjord.

III. KEY TO THE BRITISH SPECIES.

1. Basal joint of antennules with two strong spinous processes *G. intermedia*, Lilljeborg
Basal joint of antennules with three strong spinous processes 2.

2. Propus of chelipeds with spines on the dorsal surface; peraeopods 1 to 5 without epipodites *G. strigosa* (L.).
Propus of chelipeds without spines on the dorsal surface; epipodites on peraeopods one to three 3.

3. Merus of third maxillipede much longer than ischium; the chelipeds covered with scaly tubercles *G. squamifera* Leach.
Merus of third maxillipede of almost the same length as the ischium, or slightly shorter; the chelipeds covered with hairs or with scales fringed anteriorly with fine setae 4.

4. Abdominal segments with single transverse furrow; chelipeds "furry"; rostrum clear-cut and concave, almost free from setae; when living or dried, with a blue labrum and a blue line on the pleural fold *G. nexa* Embleton.
Abdominal segments with three transverse furrows; chelipeds not "furry"; rostrum almost straight and thickly covered with scales and setae; no blue labrum or blue on pleural fold.... *G. dispersa* Bate.

IV. THE LARVA OF *Galathea nexa* EMBLETON.

(Pl. 6, fig. 1).

The average size of the eggs of *Galathea nexa* Embleton when newly extruded is 0.52 mm. × 0.44 mm. (female of 20 mm. total body length, rostrum to telson); when just ready to liberate the larva, 0.66 mm. × 0.51 mm.

The eggs are bright orange and similar to those of *G. dispersa*. Larvae were hatched in the laboratory from an ovigerous female on

March 8th, 1936, the average size of the first larva being 2.84 mm., rather larger than *G. dispersa*. The rostrum is about the same relative length as in *G. dispersa*, and has minute denticles along its whole length. The larva is readily separated from *G. dispersa* by the presence of a small tooth at the hinder end of the fourth abdominal segment, in addition to the tooth at the hinder end of the fifth abdominal segment. The pigment distribution is also different. There is one linear bright orange-red chromatophore on the base of the antennules but none on the eyes; one large chromatophore at the base of the rostrum, (not two as in *G. dispersa*), one in the cardiac region similar to *G. dispersa* but rather smaller; and only one on the first abdominal segment (not two as in *G. dispersa*). There is no pigment on the second and third abdominal segments, but there is a transverse band on the hinder end of the fifth segment as in *G. dispersa*, and the base of the telson has one large chromatophore (instead of two as in *G. dispersa*). The second maxillipedes only have two chromatophores.

First and second larvae were taken at the same time in the plankton, but owing to illness I was prevented from following the series through.

The larvae of the other four British species have been reared and described by Lebour (1930 (a), 1930 (b), who has also given a key for their identification (1930 (b), p. 388).

Dr. Lebour's valuable key to the larvae may now be expanded to include all five species as follows:—

1. Spines on the fifth abdominal segment only2.
 Spines on the fourth and fifth abdominal segments.....3.
2. No pigment on angles of telson. [Larva of moderate size, first larva ca. 2.6 mm., last larva ca. 5 to 6.5 mm., (fourth and fifth)].
 *G. dispersa*.
 Orange red-pigment on angles of telson. (Larvae small, first larva ca. 2 mm. or less, last larva ca. 3.8 mm.)..... *G. intermedia*.
3. Spines on the fourth and fifth abdominal segments both equal and both large (Larvae large, first larva ca. 3.5 mm. rostrum long, smooth) *G. strigosa*.
 Spines on the fourth abdominal segment much smaller than those on the fifth which is only of moderate length.....4.
4. One large chromatophore, orange-red, at base of telson, with no brown. (Larvae of moderate size, first larva ca. 2.8 mm., rostrum fairly long, prickly)..... *G. nexa*.

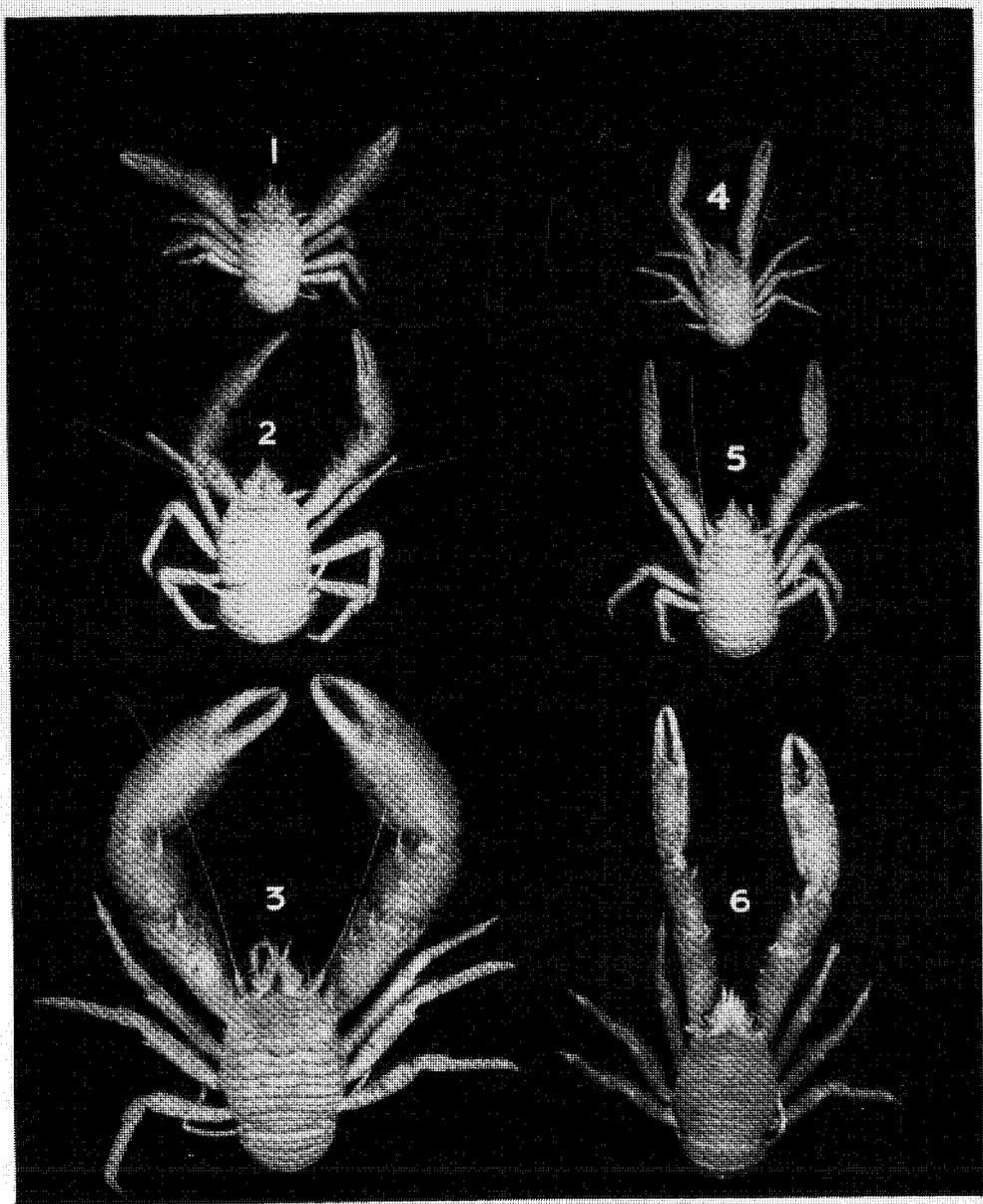
Three (usually) chromatophores at base of telson, with brown pigment. (Larvae of moderate size, first larva ca. 2.2-2.5 mm., rostrum fairly long, prickly.) *G. squamifera*.

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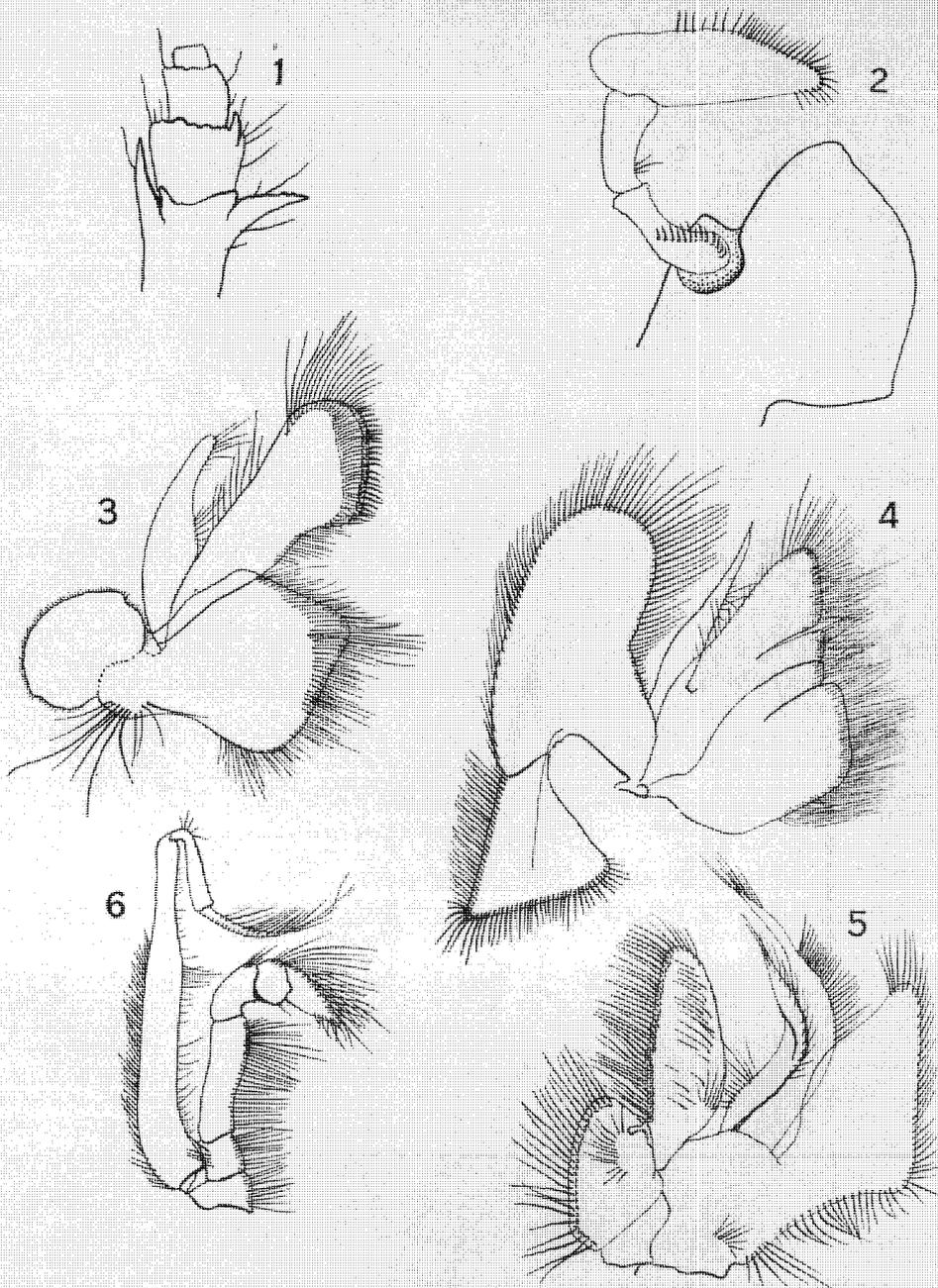
PLATE I.



Photographs of *Galathea nexa* Embleton and *G. dispersa* Bate taken under water.
Slightly enlarged.

- Fig. 1. *Galathea nexa* Embleton. ♂ juv.
- Fig. 2. *Galathea nexa* Embleton. ♀ ovigerous.
- Fig. 3. *Galathea nexa* Embleton. ♂ adult.
- Fig. 4. *Galathea dispersa* Bate. ♂ juv.
- Fig. 5. *Galathea dispersa* Bate. ♀ ovigerous.
- Fig. 6. *Galathea dispersa* Bate. ♂ adult.

PLATE II



Galathea nexa Embleton.

- | | |
|------------------------------|---------|
| Fig. 1. Peduncle of Antenna. | x 14.75 |
| Fig. 2. Mandibular palp. | x 18.6 |
| Fig. 3. First Maxilla. | x 14.75 |
| Fig. 4. Second Maxilla. | x 14.75 |
| Fig. 5. First Maxillipede. | x 12.2 |
| Fig. 6. Second Maxillipede. | x 7.7 |

PLATE III.

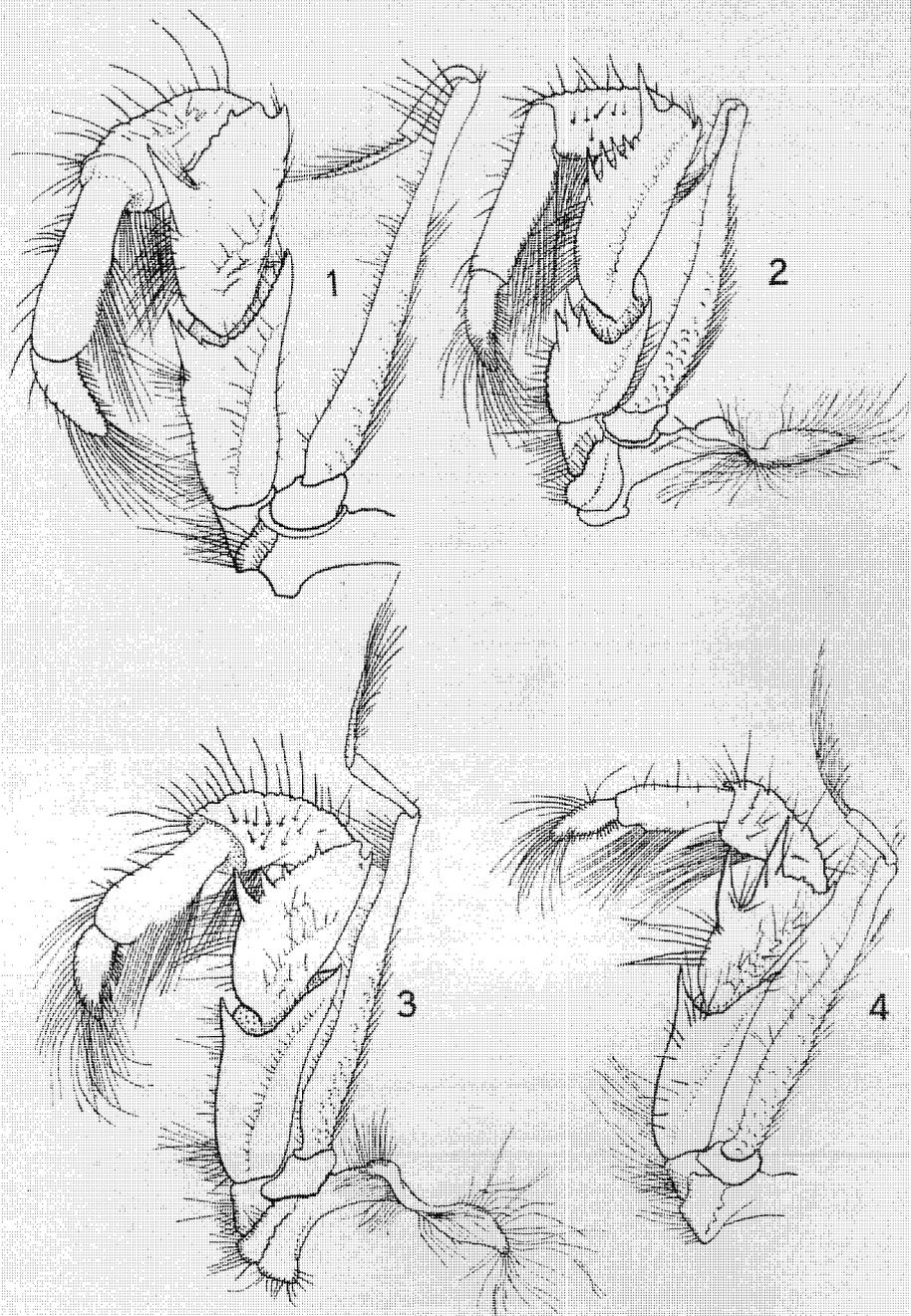


Fig. 1. Third maxillipede of <i>Galathea nexa</i> Embleton.	x 10.1
Fig. 2. Third maxillipede of <i>G. squamifera</i> Leach.	x 6.4
Fig. 3. Third maxillipede of <i>G. dispersa</i> Bate.	x 8.5
Fig. 4. Third maxillipede of <i>G. strigosa</i> (L).	x 6.4

PLATE IV.

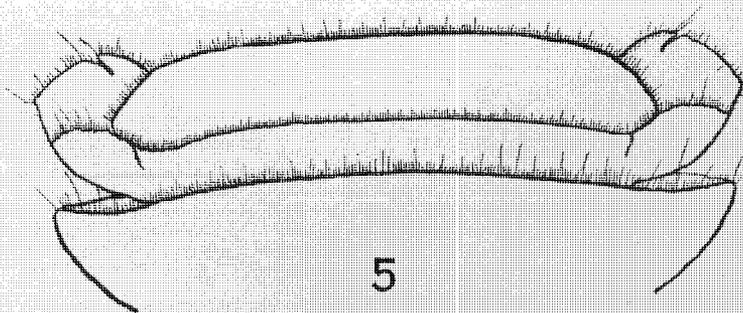
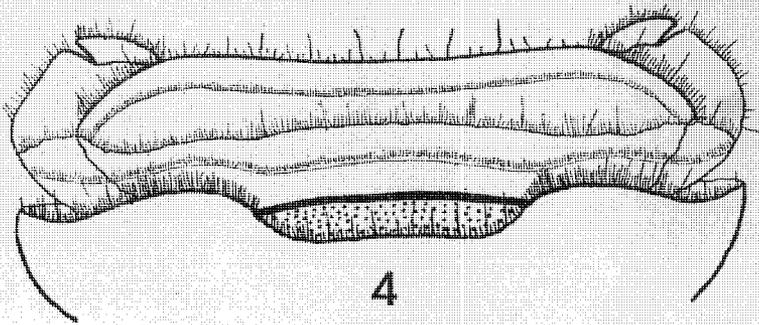
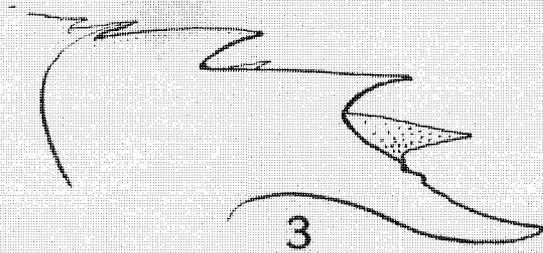
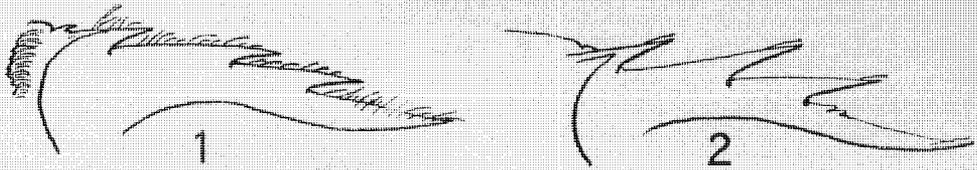


Fig. 1. Rostrum of <i>Galathea dispersa</i> Bate.	Profile.	x	10.0
Fig. 2. Rostrum of <i>G. nexa</i> Embleton.	Profile.	x	10.0
Fig. 3. Rostrum of <i>G. squamifera</i> Leach.	Profile.	x	10.0
Fig. 4. Dorsal view of first abdominal segment of <i>G. dispersa</i> .	x	10.0	
Fig. 5. Dorsal view of first abdominal segment of <i>G. nexa</i> .	x	10.0	

PLATE V.

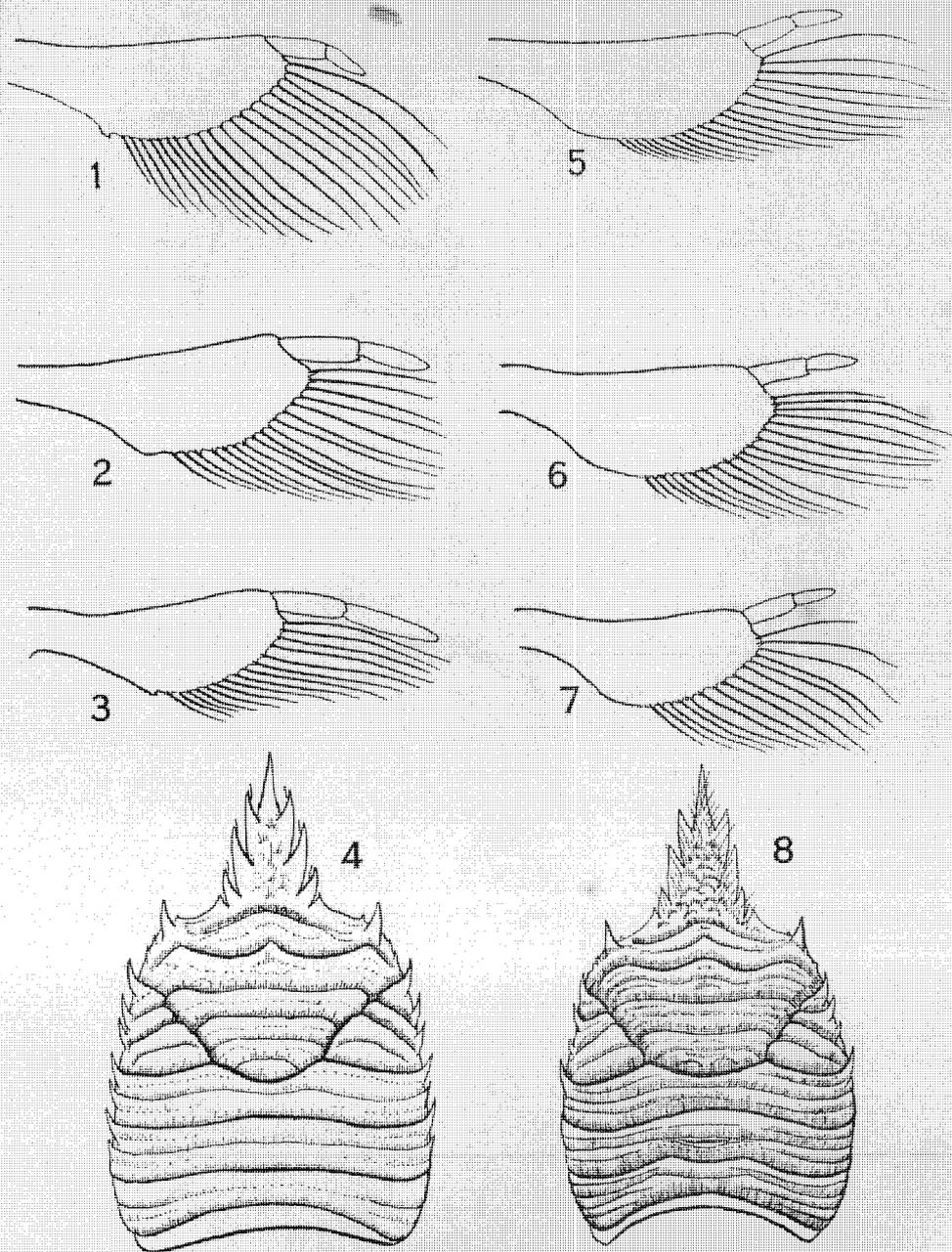
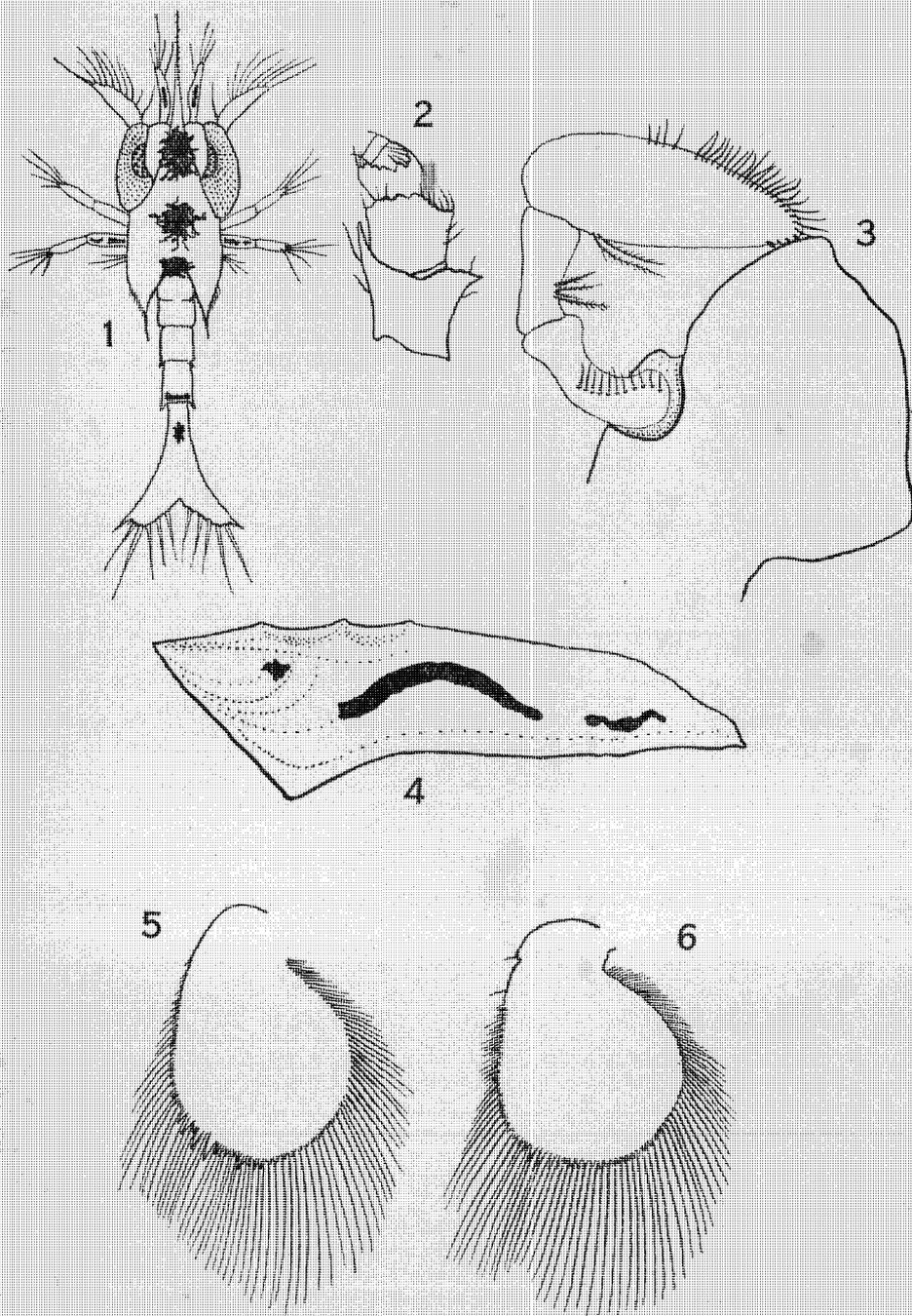


Fig. 1. *Galathea nexa* Embleton. Third pleopod of male. x 16.9
 Fig. 2. *Galathea nexa* Embleton. Fourth pleopod of male. x 16.9
 Fig. 3. *Galathea nexa* Embleton. Fifth pleopod of male. x 16.9
 Fig. 4. *Galathea nexa* Embleton. Dorsal view of carapace. x 3.3
 Fig. 5. *Galathea dispersa* Bate. Third pleopod of male. x 16.9
 Fig. 6. *Galathea dispersa* Bate. Fourth pleopod of male. x 16.9
 Fig. 7. *Galathea dispersa* Bate. Fifth pleopod of male. x 16.9
 Fig. 8. *Galathea dispersa* Bate. Dorsal view of carapace. x 3.3

PLATE VI.



- | | | |
|---|---|------|
| Fig. 1. <i>Galathea nexa</i> Embleton. Newly-hatched larva. | x | 25.0 |
| Fig. 2. <i>Galathea dispersa</i> Bate. Basal joint of antenna. | x | 12.2 |
| Fig. 3. <i>Galathea dispersa</i> Bate. Mandibular palp. | x | 15.4 |
| Fig. 4. <i>Galathea nexa</i> Embleton. Pleural fold. | x | 6.4 |
| Fig. 5. <i>Galathea nexa</i> Embleton. Inner ramus of uropod. ♂ | x | 6.4 |
| Fig. 6. <i>Galathea dispersa</i> Bate. Inner ramus of uropod. ♂ | x | 6.4 |
- (in figs. 5 and 6 sculpture of surface omitted).