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THE BIOLOGY OF THE SMALL PLANKTONIC COPEPODS OF PLYMOUTH

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(Text-figs. 1–13)

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Introduction

The following paper describes investigations carried out on the life histories of the smaller plankton copepods in the Plymouth area during 1947. A large number of investigations have been carried out on the life history of *Calanus*, but our knowledge of the other species is meagre. What knowledge exists is mainly due to the work of Fish (1936*a–c*) in the Gulf of Maine, Wiborg (1940, 1944) in Oslo Fjord and the Nordåsvatn, a partly enclosed body of water near Bergen, and Marshall (1949) in Loch Striven. The differences in hydrography and other conditions made it desirable that a similar study should be carried out at Plymouth.

The species considered are: *Paracalanus parvus* (Claus), *Pseudocalanus elongatus* Boeck, *Centropages typicus* Krøyer, *Temora longicornis* (O. F. Müller), *Oithona similis* Claus, *O. nana* Giesbrecht, *Oncaea venusta* Philippi, and *Corycaeus anglicus* Lubbock.

All but the last three (*Oithona nana*, *Oncaea* and *Corycaeus*) were most abundant in the spring and summer; the last three were abundant at the end of the year, accompanied by the harpacticid *Euterpina acutifrons* (Dana). Only very small numbers of species other than the above were taken.

This work was carried out at the Marine Laboratory, Plymouth, during the tenure of a grant from the Development Commission. I wish to record my thanks to Mr F. S. Russell, F.R.S., for his inspiration and encouragement in this work, and for making freely available all the facilities of the laboratory, to Dr H. W. Harvey, F.R.S., for loan of measuring nets, and to Capt. W. H. Creese and the crew of the '*Sabella*' for their care in taking my samples in all weathers.

Material and Methods

Area. The bulk of the samples were taken at the Station L 4, 5 miles from Plymouth breakwater, where there is an average depth of a little over 50 m. A few samples were taken a mile or two outside the breakwater (Table I), and in addition three short cruises were undertaken to investigate the state of the copepod population in the surrounding waters.

Nets used. Most of the samples were taken with Harvey measuring nets fitted with a silk net of 200 meshes to the inch (Harvey, 1934, 1935). Additional hauls were made with various tow nets and with a Clarke-Bumpus plankton sampler (Clarke & Bumpus, 1940). All hauls at L 4 (except those with the plankton sampler) were made vertically, fishing through all but the lower 1 or 2 m. of the water column. Normally between 1 and 3 $m.^3$ of water were passed through the net. In the cruises, the hauls were made vertically from 50 m. to the surface. The quantitative results are based on samples taken with the later model of the Harvey net (Harvey, 1935) until 6 August, when the instrument was unfortunately lost. After that date the earlier net (Harvey, 1934) was used, and later the calibration was checked and found identical to the original calibration made by Harvey (1934). The calibration of the net used first was never checked, but as the meter was in good order it is probable that it had not altered more than a small amount. Two quantitative samples are utilized that were taken with the Clarke-Bumpus sampler. For these, the published calibration was used. Thus all counts for quantitative purposes were based on known volumes of filtered water.

Subsampling. Samples were subsampled by an adaptation of the method described by Russell (1931). During the spring and summer months when the small stages were very numerous it was necessary to divide the samples into coarse and fine fractions by passing through sieves, subsampling to deal with a small amount of the fine fraction and a larger amount of the coarser fraction. The exact degree of subsampling for each catch and each species is given in Table I. The species and stages were counted and measured on a squared slide under a microscope fitted with a mechanical stage and micrometer eyepiece, of which one division represented 17·7 μ. Measurements are comparable with those of Marshall (1949), representing length of cephalothorax.

Identification of stages. Full use was made of the papers by Oberg (1906) and Kraefft (1910) for distinguishing the nauplii and copepodite stages respectively. *Microcalanus* was not present in any number at Plymouth, so the distinction between the nauplii of *Paracalanus* and *Pseudocalanus* was easy to make on size alone.

A certain number of *Centropages hamatus* occurred. No distinction was drawn between the nauplii of these two species, but in view of the numerical superiority of *typicus* all the *Centropages* nauplii are lumped as belonging to that species, whereas some were undoubtedly *hamatus* nauplii.

The nauplii of *Oithona similis* and *O. nana* were confused in the early part of the year, when few *nana* were present, but in the later part of the year the distinction became obvious and the nauplii were separated. The nauplii of *nana* were smaller and altogether more slender than those of *similis*.

There appears to be no account of the stages of *Oncaea* or *Corycaeus*, and here these two species are separated into males, females and juvenile individuals. They were accompanied by large numbers of nauplii which were counted *in toto*: they probably comprised nauplii of these two species together with possibly *Euterpina* and other harpacticids. *Metridia lucens* was encountered in a cruise to the west of Plymouth, although it was not met with at Plymouth. The stages were worked out, and found to agree with the usual pattern.

Presentation of Data

With most of the species under consideration, all stages from nauplii to adults were found throughout the year. Conclusions as to number of generations passed through therefore rest on the comparative abundance of the different stages, the percentage distribution of the stages, and the sizes of the adults. Each of these methods has its disadvantages, and it is necessary to draw conclusions from all three lines of evidence together.

Absolute numbers, presented as abundance graphs, suffer from the disadvantage that if the water is patchy, with rich and poor areas, an abundance of nauplii encountered during one week does not necessarily give rise to the expected abundance of adults a few weeks later. They have the advantage, however, of showing the stock as it actually occurs.

Percentages of stages reveal the state of affairs in patchy water to a much better degree than do abundance figures. However, if the nauplii vary in number from one sample to another over a wide range, the percentage figures of the adults bear little relation to their numbers, but reflect the changes in the numbers of nauplii. Thus a peak of nauplii will apparently be followed by an increase in adults, while in actual fact the numbers of adults may decline, to a lesser extent, with the numbers of nauplii.

Size-groups of adults possibly present the most reliable evidence of separate generations, where such differences in size exist. Size differences do not always occur, however; in the later part of the year successive generations of adults would appear to have arisen, in some species, with little difference in size, generations being separable on other grounds.

Conclusions as to number of generations must therefore be drawn from all these sources. In the diagrams given, the percentage and size-group graphs are mounted beneath the abundance graphs, and the interpretation that appears most probable is placed below them all.

In the abundance graphs, the nauplii are illustrated in a scale which is one-tenth of that of the copepodites. In the percentage figures, the divisions are taken as: nauplii, copepodites I–III, IV–V, and VI. This is the grouping used by Fish (1936 *a*, *b*, *c*) and is sufficient to show the main features.

The size-group graphs are reproduced in such a way that one individual measurement is reproduced as one unit on the figure, the numbers not being reduced to percentages. This has the advantage that use can be made of small numbers, such as occur, for instance, in *Temora* and *Acartia* in winter, which are concrete evidence but are not plentiful enough to make into percentage figures. The vertical scales are varied for convenience according to the species.

The method of suggested interpretation is adapted from Russell (1935). The different levels of the parts of the diagram representing adults of different size; the mid-line of a particular adult block is more or less the average size of the group concerned, and is a very rough replica of the adult figure of the abundance graph. The successive generations of nauplii in the interpretation are a rough replica of the naupliar peaks in the abundance graph.

Hydrography and Phytoplankton

The hydrographic conditions and phytoplankton of the area around L4 have been made the subject of many publications. For phytoplankton conditions, see Harvey, Cooper, Lebour & Russell (1935), and Mare (1940). No phytoplankton counts or pigment assessments have been made in connexion with this study. Temperatures were taken at 1 and 30 m. with an insulated water-bottle, supplemented on occasion by surface temperatures taken by bucket from further in-shore (Table I).

To compare the temperatures for 1947 (Fig. 1) with those in 1934, when the combined study was made on the various aspects of the phyto-zooplankton relationships (Harvey *et al.*, 1935) we may note the following differences. In 1947, the winter minimum temperatures at the beginning of the year were roughly 5·5° C., or two degrees lower; the summer maximum was roughly 16·5° at 30 m., or two and a half degrees higher. Stratification set in towards the end of March, about 2 weeks earlier than in 1934, but broke up at about the same time, at the end of September. In 1947, the temperature at 30 m. had not attained its full value until the end of August; after which a slow decrease occurred until the end of October, when it became more rapid. In 1934, however, the highest values were reached a month earlier.

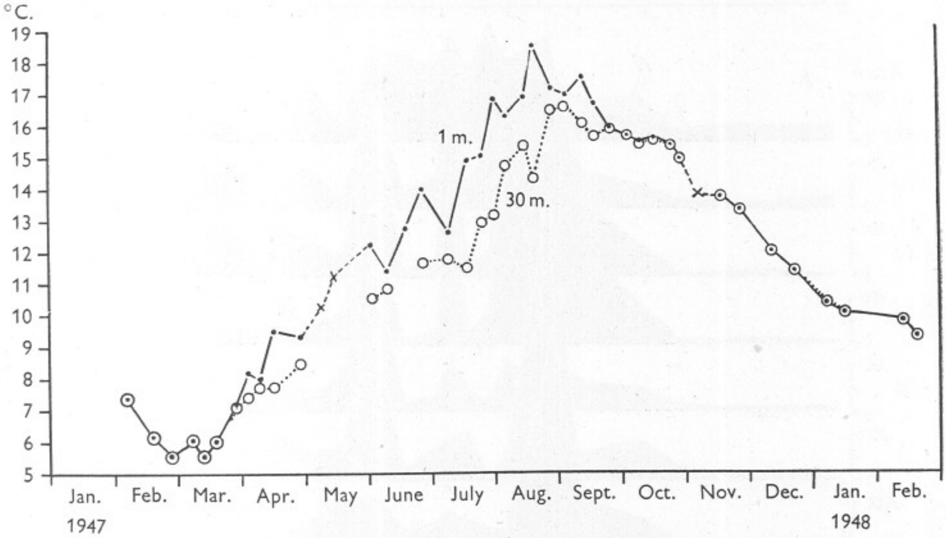

Fig. 1. Temperature of the water at 1 and 30 m. depth at L4 during 1947. ×, surface readings from closer in-shore

Abundance and Reproduction near Plymouth

Pseudocalanus elongatus (Fig. 2, Table II)

Abundant from March to October, greatest numbers from April to August.

The adult *Pseudocalanus* found early in the year (January and February) were of small size. Size-groups reveal that this population persisted until the end of March, when it died out. This population is here called the '0' generation. It was joined at the end of February by a population of adults of larger body size. This population received increments at progressively larger size, the early arrivals at the end of February being small and dying out in early April, the later members appearing in late March and early April and dying out by June. This '1' group appears to have been responsible for the large group of nauplii in May, which can be followed through the later developmental stages to adults in June. These adults were of a clearly different size, smaller than the adults '1' and are called adults '2'. The peaks in the abundance graph at mid-June and at the end of June were composed of individuals similar in size, and together they gave rise to the middle peak of abundance of nauplii at the end of June and beginning of July. It therefore seems most reasonable to consider this as one generation, although the abundance of late stages and percentages present a rather confused picture.

After this the generations became more merged, and large variations occurred in the total stock. It would appear from the percentage graph that

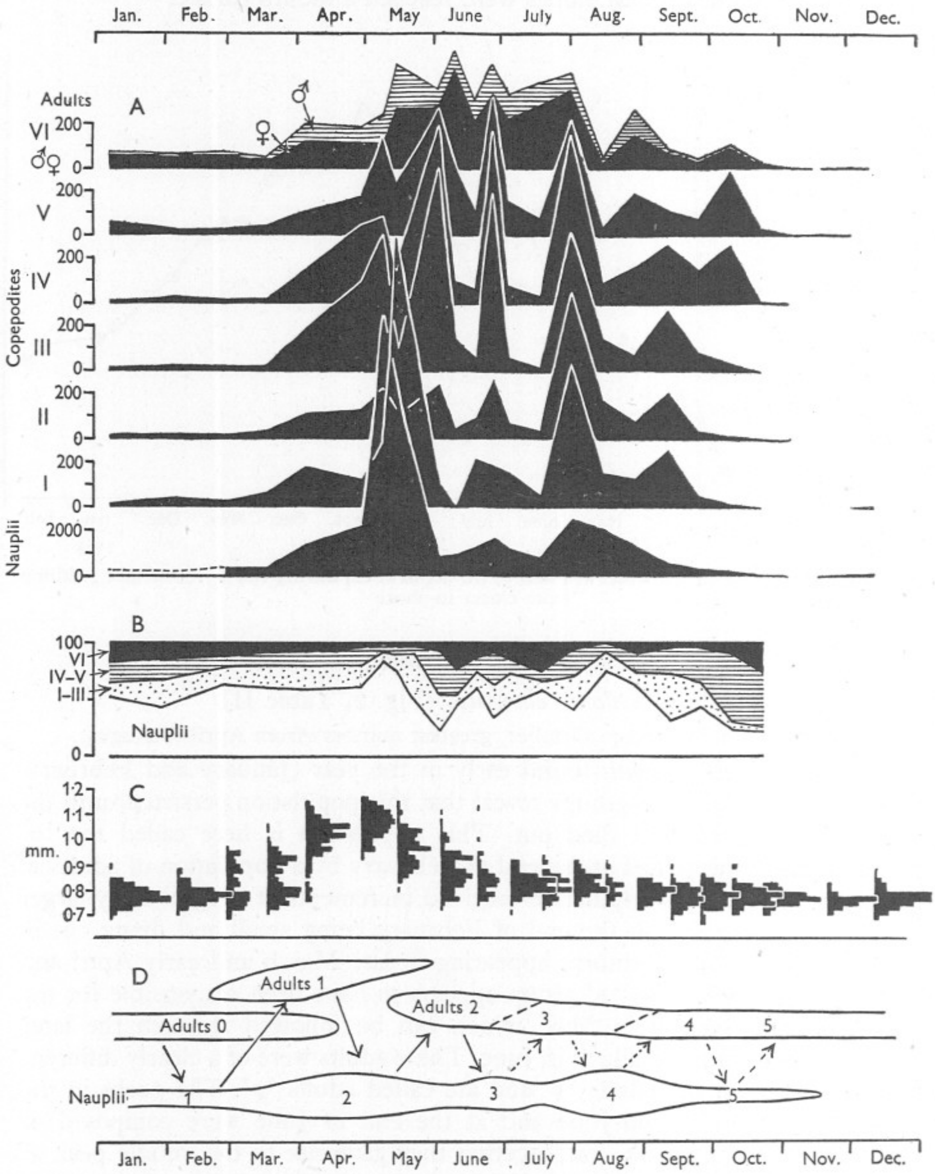

Fig. 2. *Pseudocalanus elongatus.* A, abundance of stages; B, percentage distribution of stages; C, size-groups of adult females; D, suggested interpretation.

these nauplii gave rise to adults '3' in July. These were not separable from the adults '2' on size. These adults were responsible for the third period of abundance of nauplii (nauplii '4' in the interpretation) during July and August, and these nauplii in turn gave rise to adults '4' in late August and September, of slightly smaller size than adults '3'.

Now the abundance figure for nauplii '4' here indicates only one extended period of abundance, but from consideration of the stages from copepodites I to adults, it is obvious that a further group developed from nauplii in early September to adults in October, and these nauplii appeared shortly after the development of adults of group '4'. This would appear therefore to make a fifth and last generation, apparent also from the percentage figure. The adults of this generation, however, are not obviously distinguishable from those of the previous generation by size.

In Loch Striven (Marshall, 1949) the course of generations was similar up to nauplii '2', when in the latter locality breeding became continuous to such an extent that individual generations could not be followed.

Paracalanus parvus (Fig. 3, Table III)

Abundant from end of April to December, greatest numbers from May to June and August to October.

Paracalanus showed a considerable degree of similarity to *Pseudocalanus*, the size-groups revealing populations of adults replacing each other in time with those of *Pseudocalanus*. It differed in that the size differences between adults of groups '2' and '3' were much more clearly marked, and the existence of a fifth group of adults is more certain. It would appear that an extra generation was passed through at the end of the year, when *Pseudocalanus* had ceased breeding. The march of the generations from the '0' group adults as far as nauplii '3' was clear, but after this the broods were less well defined. In the abundance diagram, there is no clear transition from the nauplii '3' to adults of smaller size in August. It may be that the June nauplii did not survive, the eventual adult stock developing from the smaller numbers of nauplii present in July. It may be, on the other hand, that in June a different body of water moved over the station, water in which the development was at a slightly different stage. This delay in production of the next generation, whatever its cause, has been suggested in the interpretation by showing the adults '3' as not developing directly from nauplii '3'. The adults present during August, September and October were the adults '3' and '4', distinguishable in size groups. Adults '3' were smaller than those of generations '2' or '4'. Adults '3' and '4' gave rise to nauplii '4' and '5' in August and September. The nauplii present in November and December constitute yet another brood, the nauplii '6', which arose from an ill-defined group of adults '5'. This group was not distinguishable on size from adults '4', but its development can be traced through the copepodite stages on the abundance graph.

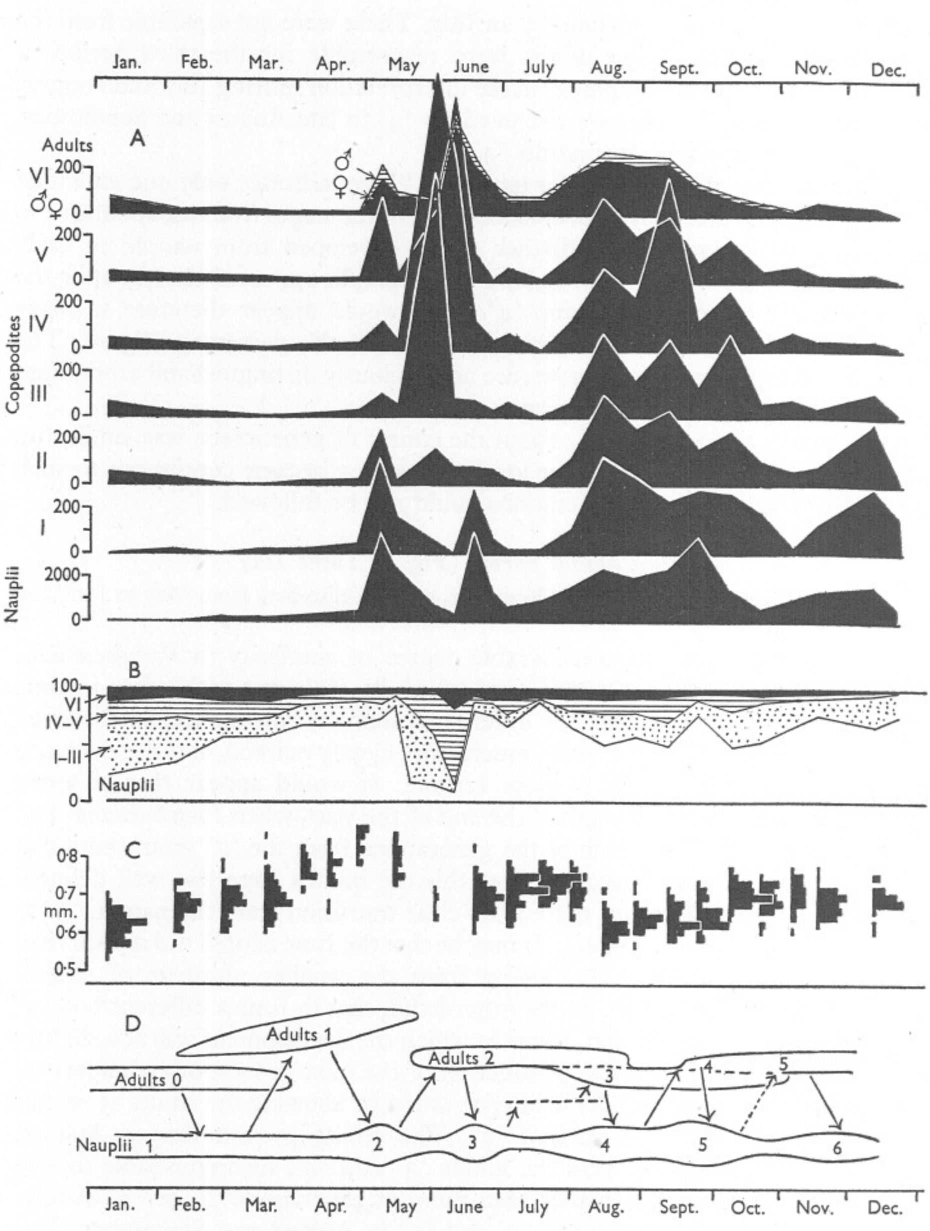

Fig. 3. *Paracalanus parvus*, A, abundance of stages; B, percentage distribution of stages; C, size-groups of adult females; D, suggested interpretation

Centropages typicus (Fig. 4, Table IV)

Few specimens of the genus *Centropages* were taken, most of them being *C. typicus*. Specific distinction between the nauplii of *typicus* and *hamatus* was not made, and because of its numerical superiority all the nauplii are included here as *typicus*. Although the numbers are small, the data are sufficient

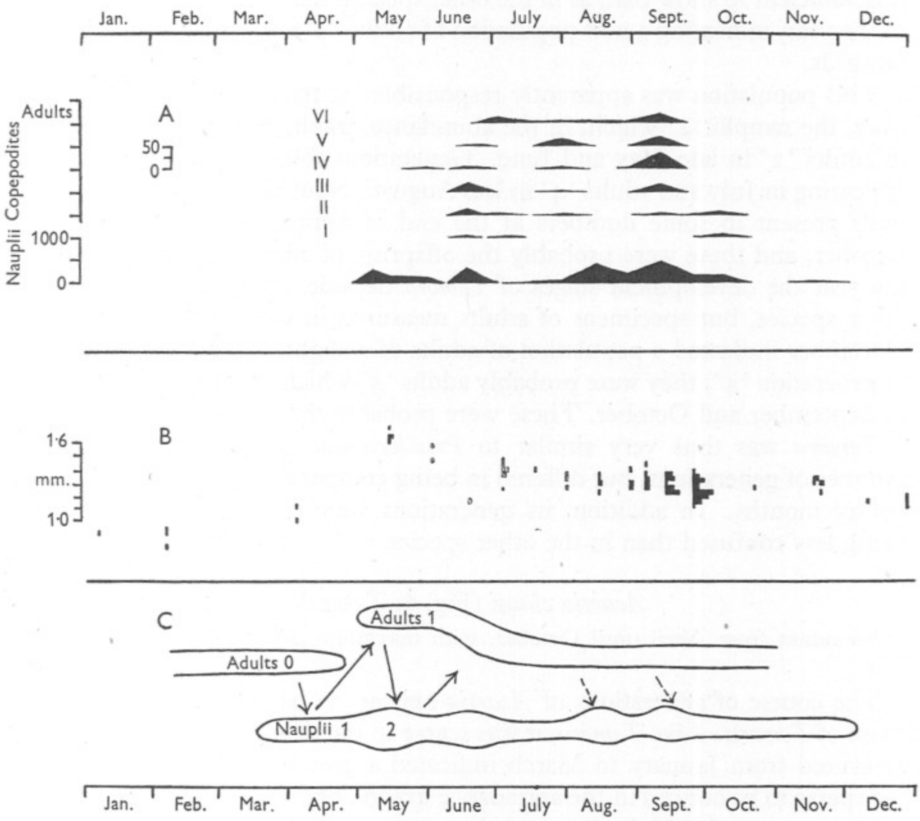

Fig. 4. *Centropages typicus*. A, abundance of stages; B, size-groups of adult females; C, suggested interpretation.

to show that *Centropages* nauplii were present from April to November, and the copepodite stages and adults were most abundant from June to September. The seasonal change in size was, so far as can be seen, similar to that in the other species, and groups of adults '0', '1' and '2' are suggested. The data are not sufficient to separate other generations, but the general similarity between the fragmentary picture obtained in this manner and the clearer pictures for *Temora* and *Acartia*, suggest the occurrence and course of generations to be somewhat similar.

Temora longicornis (Fig. 5, Table V)

Abundant from April until September, with a first maximum in May and June and a second in August and September.

The adult and copepodite stages of *Temora* were very scarce early in the year. Nauplii, however, were found in the plankton from February onwards. Because of the scarcity, the evidence as to size early in the year is scanty, but it is sufficient to show that, as in the other species, the size-groups change early in the year, indicating a new population of adults '1' appearing from February onwards.

This population was apparently responsible for the large peak of nauplii in May, the nauplii '2' which, in the abundance graph, can be seen developing to adults '2' in late May and June. Generations followed clearly, adults '3' appearing in July and adults '4' in late August. Nauplii and early copepodites were present in some numbers at the end of September and beginning of October, and these were probably the offspring of adults '4'. At this time of the year the development stages of *Temora* became swamped in numbers by other species, but specimens of adults measured in October, November and December indicated a population of adults of a slightly larger size than those of generation '4'; they were probably adults '5' which developed from nauplii in September and October. These were probably the overwintering adults.

Temora was thus very similar to *Pseudocalanus* and *Paracalanus* in the number of generations, but differed in being comparatively more scarce in the winter months. In addition, its generations were more clear-cut, breeding being less confused than in the other species.

Acartia clausi (Fig. 6, Table VI)

Abundant from April until October, with maximum numbers in May, June and July.

The course of generations of *Acartia* appears to have been very similar to those of *Temora*. Like *Temora*, it was scarce in the winter months. Specimens measured from January to March indicated a group of adults of small size, too sparse to be noticed in the abundance graph. These were joined in April by a larger group, the adults '1', and these latter were responsible for the large group of nauplii, the nauplii '2', at the end of April and beginning of May. These developed to adults '2' early in June. Generation '3' followed, with nauplii in June and adults in July and August. Generation '4', with nauplii in early August, developed to adults, distinguishable by size from those of '3', in late August and September. A further period of abundance of nauplii in September, the nauplii '5', cannot be seen to develop. All stages were present in small numbers in late November and December, and although there is no evidence for it here, it would appear possible, by comparison with *Temora*, that adults '5' arising from nauplii '5' might give rise to nauplii '6' in November.

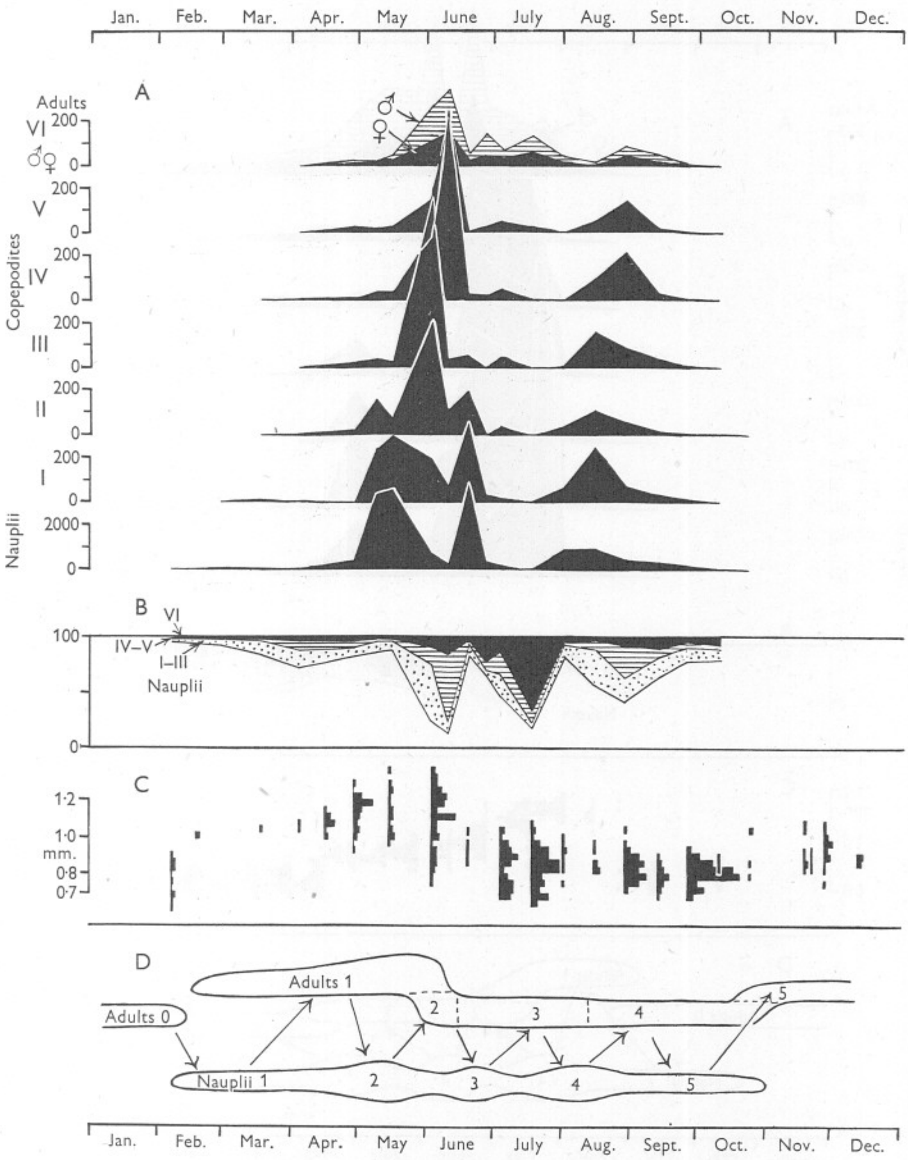

Fig. 5. *Temora longicornis*. A, abundance of stages; B, percentage distribution of stages; C, size-groups of adult females; D, interpretation.

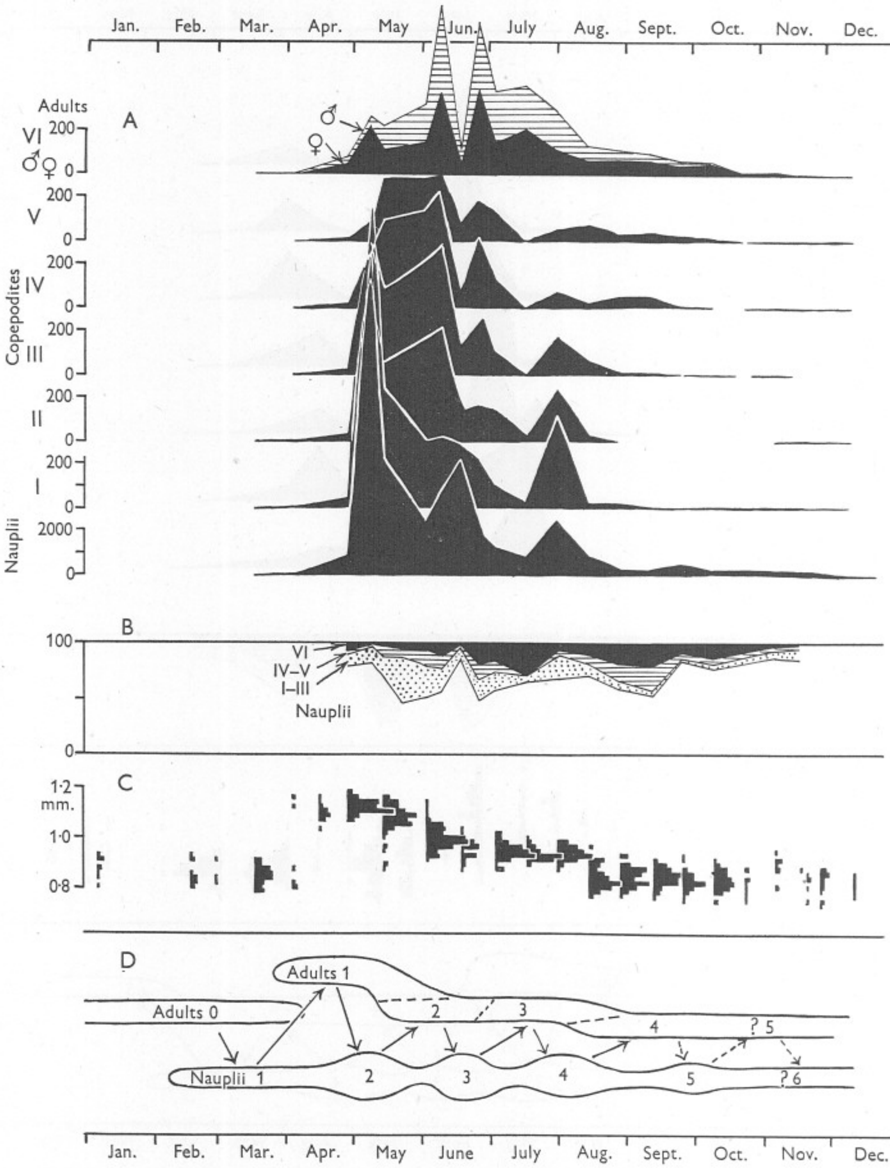

Fig. 6. *Acartia clausi*. A, abundance of stages; B, percentage distribution of stages; C, size-groups of adult females; D, interpretation.

Oithona similis (Fig 7, Table VII)

Abundant from April until October, with maxima in early May, late July and mid September.

There was again striking similarity to *Pseudocalanus*, but breeding was more diffuse. Generations can be traced as follows. Small adults '0' early in the year gave rise to nauplii, which developed to larger adults '1' in March, April and May. The nauplii '2' developed to adults '2', of smaller size, in June. The next group, adults '3', appeared in August and were smaller still. From here, the picture is obscure owing to continuous breeding with subsequent broods of adults appearing at the same size, but on the basis of the abundance and percentage graphs, together with comparison with other species, it would appear that adults occurring in September and October were adults '4' and those in November and December might be adults '5'.

Oithona nana (Fig. 8, Table VIII)

Abundant from September until December.

A few appeared early in the year, but were not counted. Those appearing after July were recorded and the nauplii counted. Nauplii appeared in August, and the first adults in considerable numbers in September. Inspection of the graphs reveals that probably a succession of generations occurred with adults in August, September, October, November and, it seems, in January when observations had ceased.

Oncaea venusta (Fig. 9, Table IX)

Abundant from September until December.

Oncaea was separated into copepodites and adults. As with *Oithona nana*, this species did not appear in numbers until August, after which it became plentiful. Separate generations were indicated coming to maturity in early September, September to October, November and possibly January. The numbers measured, although small, suggest size distinction between the generations.

Corycaeus anglicus (Fig. 10, Table IX)

Abundant from September until December.

Corycaeus anglicus was treated like *Oncaea* for similar reasons. It was similar to *Oithona nana* and *Oncaea* in its occurrence. Generations came to maturity in early September, and October to November. Another generation probably came to maturity in January, while the '0' group was possibly present in very small numbers in July. Separation of generations '2' and '3' was not possible on size.

Other Species

Calanus finmarchicus (Gunnerus) occurred in the samples, but in small numbers. As the last stages no doubt escaped the net, it was not counted.

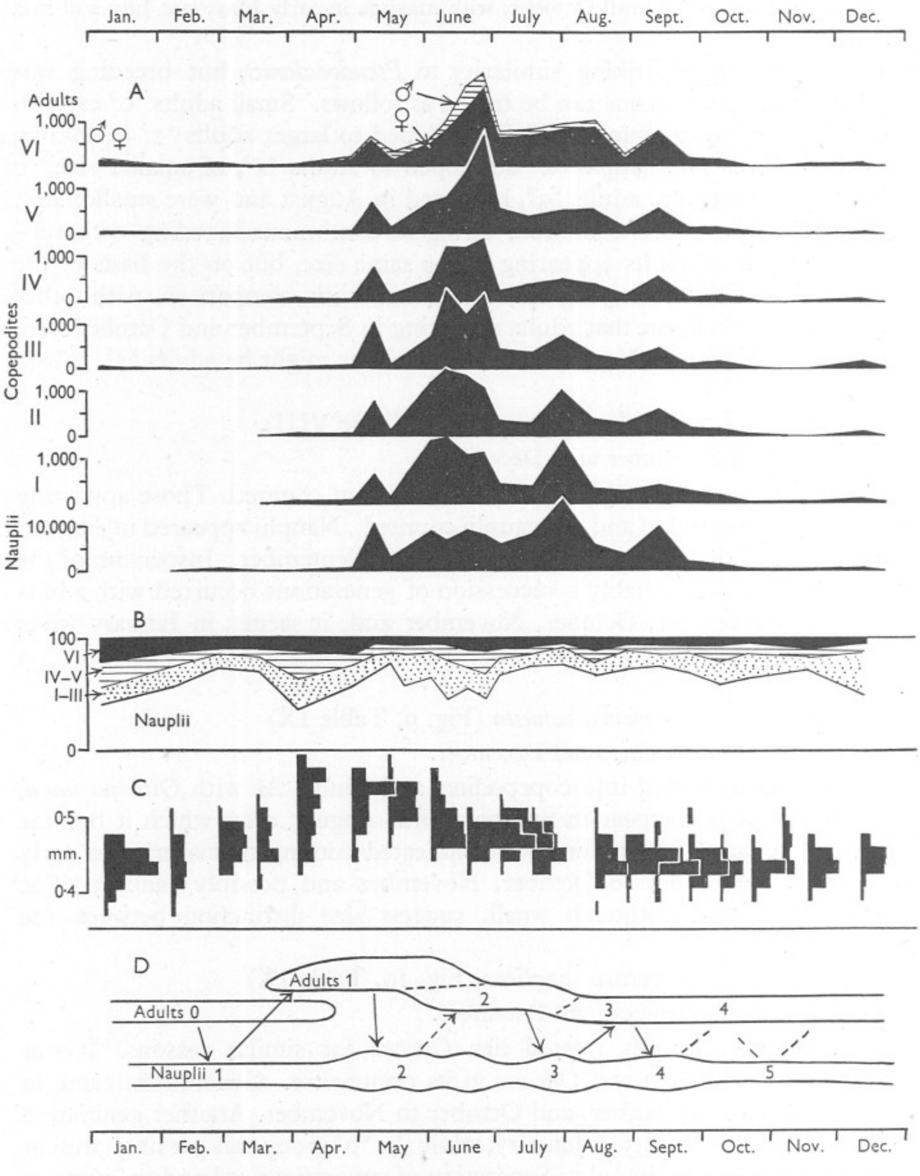

Fig. 7. *Oithona similis*. A, abundance of stages; B, percentage distribution of stages; C, size-groups of adult females; D, interpretation.

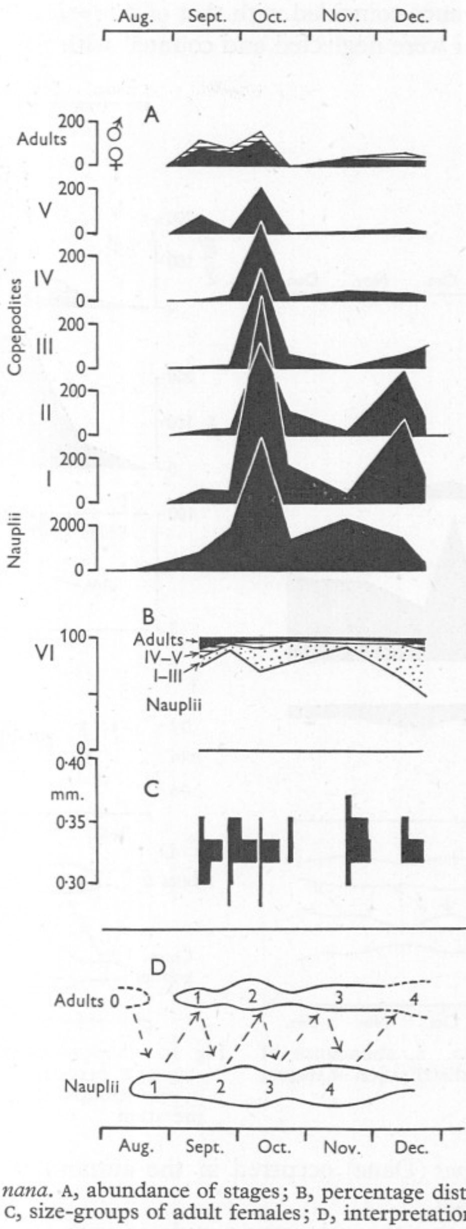

Fig. 8. *Oithona nana.* A, abundance of stages; B, percentage distribution of stages; C, size-groups of adult females; D, interpretation.

Centropages hamatus (Lilljeborg) occurred in small numbers in the summer months. Its appearance coincided with that of *C. typicus*. Owing to its small numbers, its nauplii were neglected and counted with those of *C. typicus*.

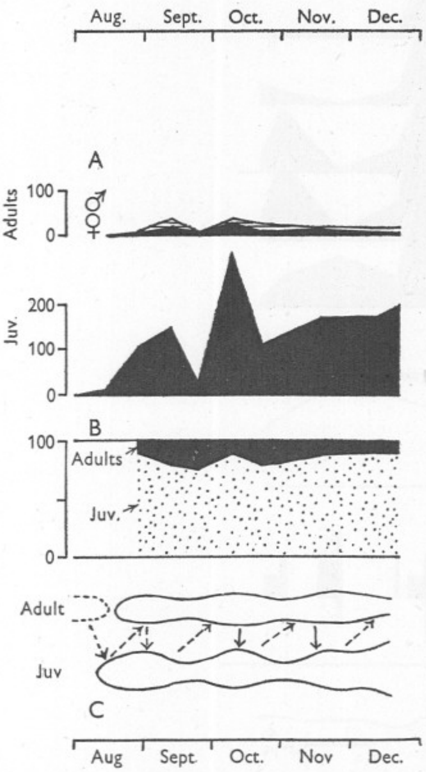

Fig. 9. *Oncaea venusta*. A, abundance of stages; B, percentage distribution of stages; C, interpretation.

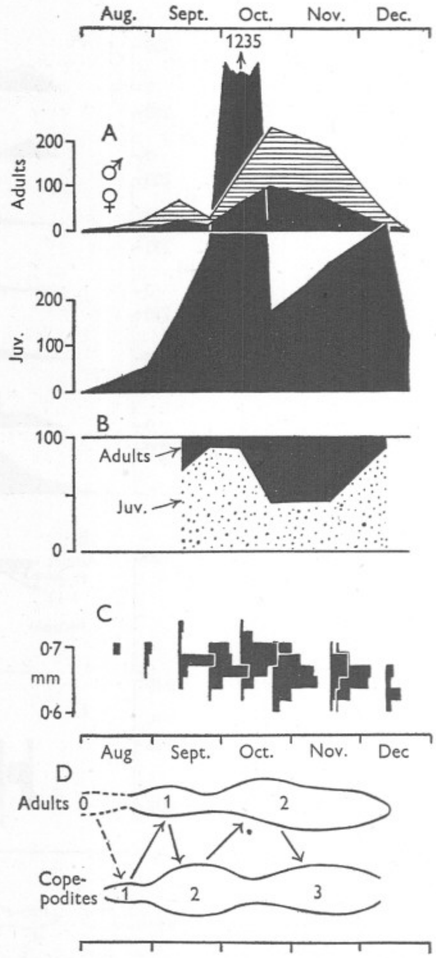

Fig. 10. *Corycaeus anglicus*. A, abundance of stages; B, percentage distribution of stages; C, size-groups of adult females; D, interpretation.

Euterpina acutifrons (Dana) occurred in the autumn at the same time as *Corycaeus* and *Oncaea*.

At the same time that the water was populated with *Oncaea*, *Corycaeus* and *Euterpina*, there appeared large numbers of nauplii of a type not previously encountered. These presumably belonged to these three species, and have been indicated as such in Fig. 13 (p. 414).

SIZE NEAR PLYMOUTH

Pseudocalanus (Fig. 11, Table X) was present throughout the whole year. Sizes as a whole rose to a peak in April and then declined towards the end of the year. As in Loch Striven (Marshall, 1949) the adult female was larger than the adult male, and the Stage V female larger than the Stage V male, Stage IV being more nearly equal, with the female slightly larger until May, after which both sexes were about the same size.

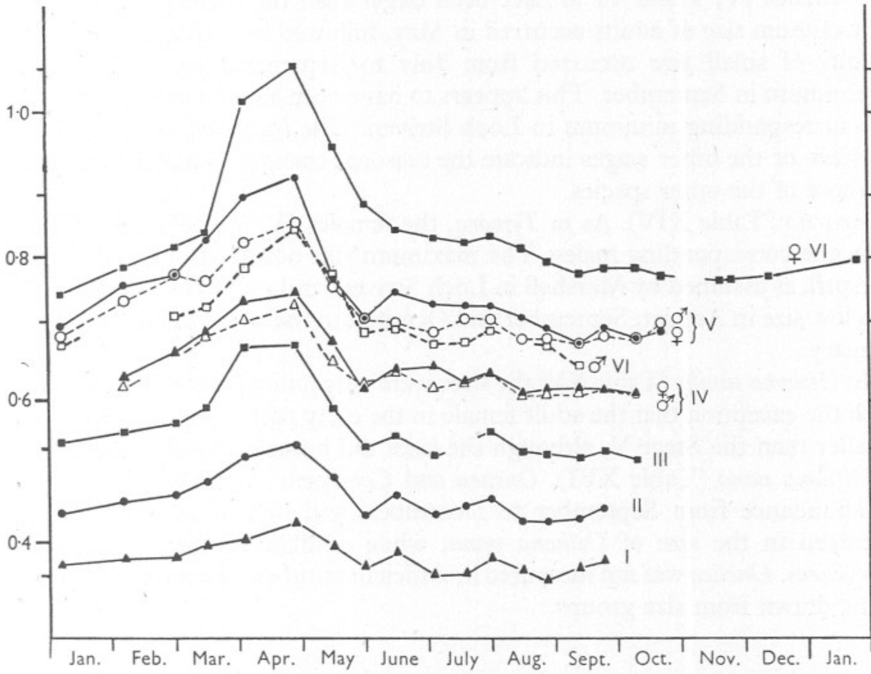

Fig. 11. *Pseudocalanus elongatus*. Median sizes of copepodites throughout the year

In Loch Striven, Marshall found that after May the male IV was slightly but distinctly larger than the female IV, while at Plymouth there appears to have been little difference. The only striking differences between the sizes at Plymouth and Loch Striven are that at Plymouth the median sizes of the IV, V and adult females were more widely separated than they were at Loch Striven, and no large variations in size of the Stage V occurred as did at Loch Striven. The changes in size of the adults were inadequate for separating broods at the end of the year.

Paracalanus was present (Table XI) throughout the whole year, and behaved in a similar manner to *Pseudocalanus*. Marshall found it present in numbers in Loch Striven only in the later part of the year. The relative sizes of the stages were similar to those found by Kraefft (1910) and Marshall (1949) in that the males of Stages IV, V and VI were larger than the corresponding female, the male V being as large or larger than the adult female. The seasonal changes of size were similar to those of *Pseudocalanus*, but the adults differed in that the fluctuations in size from June to December were greater than those in *Pseudocalanus* and can be used with greater confidence for distinguishing the different generations. The increase in size of *Paracalanus* in October appears to have had no counterpart in *Pseudocalanus*.

In *Temora* (Table XIII), although few were measured, the sizes indicate the females IV, V and VI to have been larger than the corresponding males. A maximum size of adults occurred in May, followed by a sharp drop in size. Adults of small size occurred from July to September or October, with a minimum in September. This appears to have been about a month later than the corresponding minimum in Loch Striven. The fragmentary observations on sizes of the other stages indicate the seasonal changes to have been similar to those of the other species.

Acartia (Table XIV). As in *Temora*, the females IV, V and VI were larger than the corresponding males. The maximum size occurred in the latter half of April, as assumed by Marshall in Loch Striven, and thereafter sizes declined to a low size in August, September and October, to rise again in December and January.

In *Oithona similis* (Table XV) the sizes were very much as found by Marshall, with the exception that the adult female in the early part of the year was never smaller than the Stage V, although the sizes did become closely similar.

Oithona nana (Table XVI), *Oncaea* and *Corycaeus* (Table XVII) appeared in abundance from September to December, and in that time no changes occurred in the size of *Oithona nana*, while a slight decrease occurred in *Corycaeus*. *Oncaea* was not measured in sufficient numbers to enable conclusions to be drawn from size groups.

Distribution and Size in Adjacent Waters

The interpretation as to generations which has been placed on the changes observed at L4 depends upon the changes being true changes with time, and not changes due to sampling different populations of copepods distributed in a localized manner in the water which passed Plymouth in the course of the year. In order to obtain information on the populations of copepods in adjacent waters, a few cruises were accomplished as follows:

January 1947—to the south-west of Plymouth and west of Penzance (Table XVIII).

June 1947—to the south-west of Plymouth (Table XIX).

August 1947—south and south-east of Plymouth (Table XX).

Hauls were made with a measuring net at the various stations and the samples were analysed to give numbers per cubic metre, and median sizes of adults.

In the January cruise, the noteworthy points were the existence of numbers of *Calanus finmarchicus* and *Metridia lucens*, at the stations off the coast of France and off Land's End, and the great increase in size of *Oithona* and *Pseudocalanus* off Land's End. The increased size might be suspected to have been due to a burst of phytoplankton during the previous November or December in this region. *Pseudocalanus* and *Paracalanus* were most abundant off the English coast and *Oithona* off the French coast.

In the June cruise, all species, with the exception of *Centropages hamatus* and *Calanus finmarchicus*, were most plentiful at stations 1–3. The size of *Pseudocalanus* was particularly great at station 4, at which it was least abundant. The figures for *Calanus* are probably low, as the large individuals no doubt escaped the net.

In the August cruise, the English side of the Channel seemed to be richer in all species except *Centropages typicus*, which was most common on the French side. The sizes of *Pseudocalanus* were similar with the exception of one station, no. 4, off Ushant, in which the median size was much higher than in the others. Again, it might be suspected that this marked the site of a transitory flowering of phytoplankton just at the time when these were coming to maturity.

In considering the significance of these regional variations, it would appear that, as far as these somewhat inadequate samples tell us, at most times a drift of water from 40 miles offshore over L4 would not unduly affect the general picture given of the total abundance of stock at these times. In some species such as *Temora*, however, the results might be seriously disturbed.

Discussion

Examination of the size-groups of adults has shown that a given group, appearing at a certain size, can be traced in subsequent samples until the members disappear. Meanwhile they are often replaced by other groups of adults appearing at a larger or smaller size. Thus while the median size can show a steady rise or fall, the size-groups can indicate a bimodal group with one population replacing another. When, as often, a new population, separable in the adults as being of different size, can be traced from the nauplii through the preceding samples, proof is offered that a new generation has arisen and that the change in size is not due to the sampling of different bodies of water. If the old brood of adults dies out slowly while the new brood is appearing, as in *Oithona*, the resulting median curve exhibits a gradual rise or fall, while if the new brood is produced suddenly in superior numbers, as in *Temora*, the curve will be step-like in form. The size-groups for *Pseudocalanus*, Stages I–III and females IV–VI, are given in Fig. 12. These show that although the adults may form bimodal groups, the younger stages rarely do so. This is because, although the adults may survive for a considerable time at a given

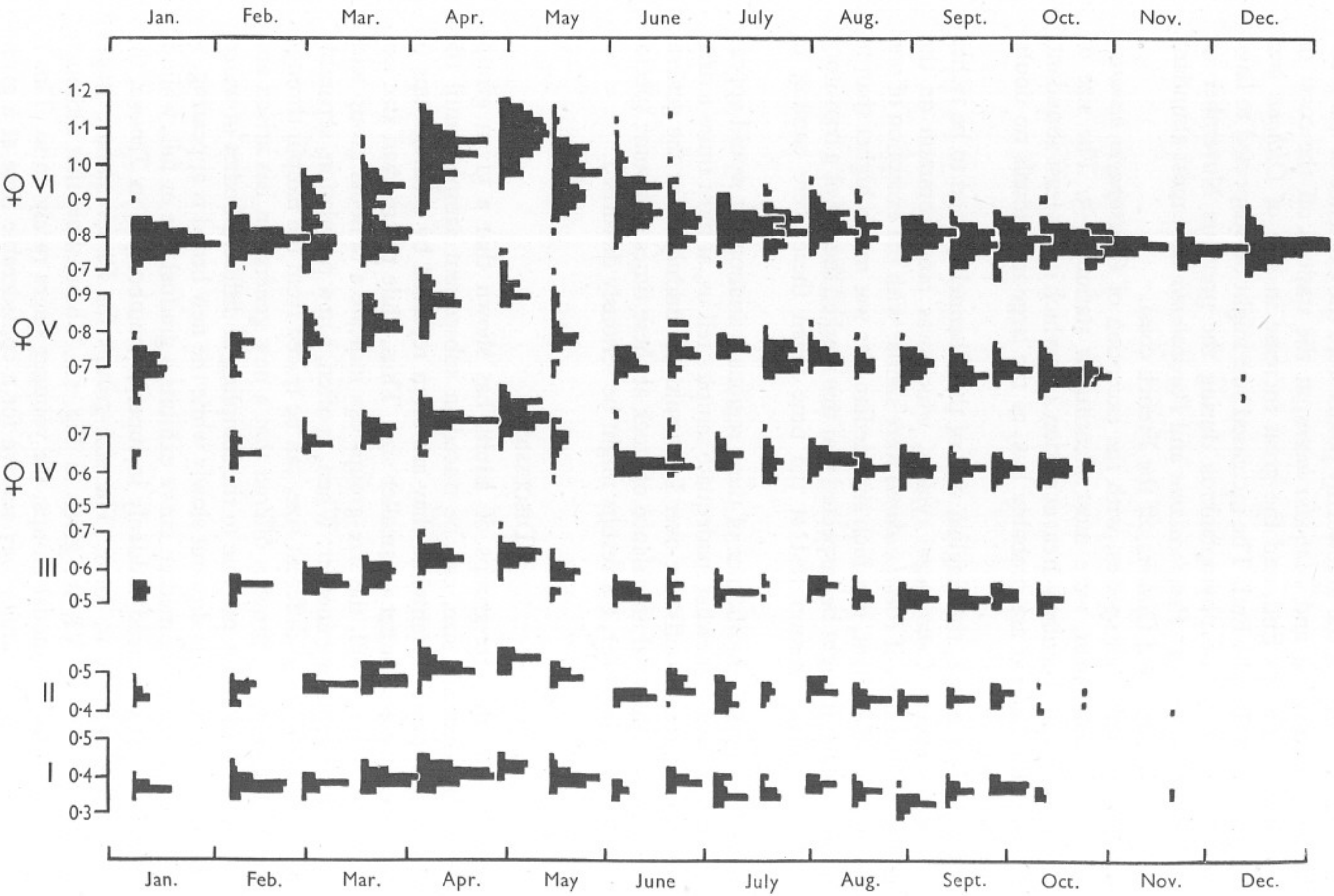

Fig. 12. *Pseudocalanus elongatus*. Size-groups of copepodites I–III and females IV–VI.

size, the developmental stages are transitory. The sizes of the adults are the result of the varied conditions for possibly some weeks preceding sampling; not to exclude the effect of the size of the previous stages, as suggested by Ussing (1938). The sizes of the younger developmental stages are a reflexion of conditions immediately preceding sampling, and bimodal groups exist only if conditions change very rapidly. It is noteworthy that all the stages change size in unison. Ussing (1938) obtained evidence to show that in Greenland the size of *Calanus* was partly dependent upon the size of the preceding stage, and partly on the state of nutrition before moulting. If that were so at Plymouth it would be evident from a rise in size, of, say, Stages I or II being followed by a rise of Stages IV or V in the next sample 2 weeks later. The absence of this effect may be due to the surplus of food which we know to be available (Harvey *et al.*, 1935) in Plymouth waters. The total densities per cubic metre of the various species of copepods throughout the year are illustrated in Fig. 13. All have been drawn to the same scale. Copepods are marked solid black, the nauplii are added as a continuous line and the eggs as dotted line. No nauplii are indicated for *Oncaea* and *Corycaeus*, but the group of nauplii belonging to these two species and to *Euterpina* is figured separately.

The totals indicated here represent the majority of specimens present in the plankton off Plymouth, for *Calanus finmarchicus*, although representing on occasions a large part of the plankton by bulk, was numerically poor compared with these smaller species.

The appearance of the graphs for *Paracalanus* indicates a delay of about 3 weeks in the development of the generation at the end of June. Attention was drawn to it in the interpretation for *Paracalanus* (Fig. 3). It can also be seen in *Temora*. It would be expected that if this was due to poor phytoplankton, this effect would be visible in all the species. But this was not so. In *Pseudocalanus*, *Acartia* and *Oithona*, there was a repetition at the end of June of the conditions 2½ weeks earlier, evident as a bimodal peak of abundance of adults and late stages in *Pseudocalanus* and *Acartia*, and of early stages in *Oithona*, and as a lengthened peak of abundance of adults in *Oithona*. Fish (1936*a*, *b*), found a difference in the stage of development of a population according to the time of flowering of the spring phytoplankton. It might be expected that a similar phenomenon might be encountered in these waters. The effects noted above would be entirely in accord with the drifting over L4 in mid-June of water in which the spring increases had set in some 2½ weeks earlier. Over the whole year, the water was characterized by *Sagitta setosa* (Mr. P. G. Corbin, personal communication).

The occurrence of the various species has been summarized by Marshall (1949) and reference may be made to that paper for comparison. The course of generations in Loch Striven and at Plymouth would appear to be similar in very broad outline. The time of development from nauplius to adult in the different species can be seen to range from about 4 to 6 weeks, while the periods

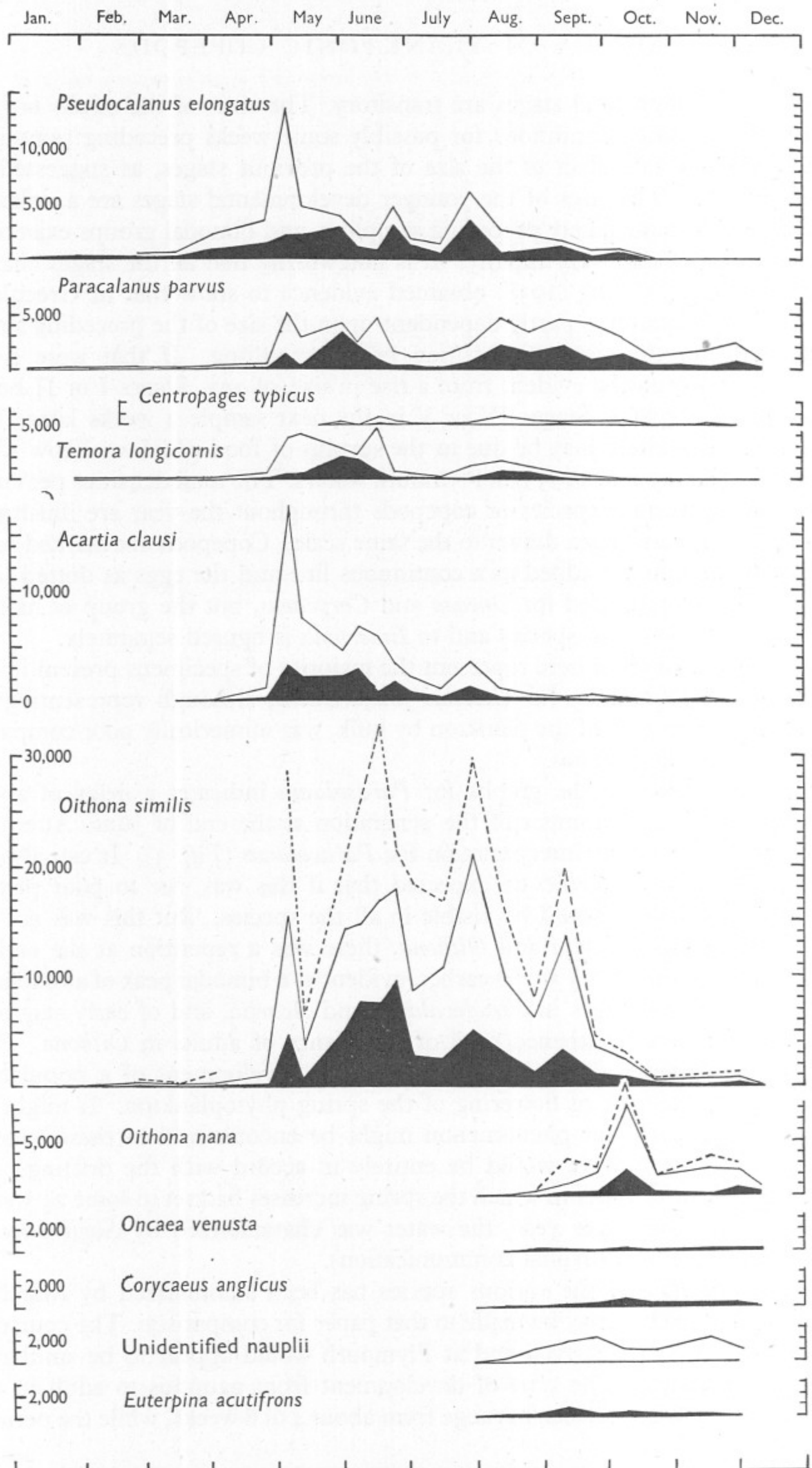

Fig. 13. Numbers per cubic metre of the smaller copepods throughout the year, all to same scale. Solid black, copepodites and adults. Continuous line, all stages including nauplii. Dotted line, total plus eggs.

between successive broods of adults were from 6 weeks to 2 months. These results are therefore closely comparable to those of Fish (1936*a*, *b*) who found generations of *Pseudocalanus* and *Oithona* in the Gulf of Maine to occur with the same developmental periods.

There was a great similarity in the behaviour of the different species, as found also by Marshall (1949) in Loch Striven.

It may be possible that the dynamic relationships which exist between the phytoplankton and the zooplankton serve to keep the generations of the different species more or less in step, as the conditions which cause the production of a good brood of nauplii in general appear to affect all the species alike. Thus it may well be that these species may have quite different development times if reared in the laboratory, whereas in the sea their generations appear to keep in step. Laboratory work on the factors relating phytoplankton and copepod populations is needed to elucidate these processes, and to give the final answer concerning the development time in species which breed continuously in the sea.

Summary

The life histories of the small planktonic copepods of Plymouth were studied during 1947. The samples were taken at Station L4 with Harvey measuring nets, and are thus truly quantitative.

The main species concerned were *Pseudocalanus elongatus*, *Paracalanus parvus*, *Centropages typicus*, *Temora longicornis*, *Acartia clausi*, *Oithona similis*, *O. nana*, *Oncaea venusta* and *Corycaeus anglicus*.

The species common in summer—all but the last three of the above—behaved in a very similar way, producing probably five generations in the course of the year, but differing from each other in the relative and absolute abundance of the different stages at different times of the year.

The species restricted to autumn and winter—*Oithona nana*, *Oncaea* and *Corycaeus*—resembled each other in appearing in countable numbers as nauplii in August and producing three broods in the late months of the year.

The Stages I–VI of the various species were measured throughout the year, and the variations in size found to be similar to those of the copepods of Loch Striven as found by Marshall.

The distribution of copepods in adjacent waters during January, June and August were investigated. It is concluded that a drift of water from the south-west of up to 40 miles would be unlikely to disturb severely the picture of the seasonal variations in total numbers of the copepod population as obtained from samples taken at L4.

The observed changes in size and abundance are discussed, with reference to possible water movements.

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APPENDIX

Table I. Stations, Temperature and Degree of Subsampling

Date	Station	Temperatures		Water fished	Volumes examined for various stages (litres)										
		1 m.	30 m.	(litres)	*Pseudocalanus*	*Paracalanus*	*Centropages*	*Temora*	*Acartia*	*Oithona similis*	*O. nana*	*Oncaea*	*Corycaeus*	*Euterpina*	Unidentified nauplii
6. i. 47	L 4	..	..	437	437 with all species										
5. ii	L 4	7·4	7·4	2760	1000 with all species										
17. ii	L 4	6·0	6·2	..											
27. ii	L 4	5·57	5·59	2350	1000 with all species										
7. iii	L 4	6·10	6·12	..											
12. iii	L 4	5·55	5·55	..											
17. iii	L 4	6·04	6·00	1900	N. 1000, I–IV 1500. All species										
28. iii	L 4	7·2	7·2	..											
3. iv	L 4	8·2	7·4	1950	N. 400 I–III 1000 IV–VI 1500	N. 400 I–III 1000 IV–VI 2000	N. 400 I–VI 1000	N. 400 I–III 1000 IV–VI 2000	..	..	..	..	..	..	..
8. iv	L 4	8·0	7·7	..											
15. iv	L 4	9·51	7·76	..											
28. iv	L 4	9·35 (surface)	8·43	2250	N. 200 I–VI 400 } with all species										
8. v	3½ miles outside breakwater	10·3	..	604	N. 25 I–VI 50 } with all species										
14. v	2 miles outside breakwater	11·2	..	332	N. 50 I–VI 300 } with all species										
2. vi	L 4	(1 m.) 12·27	10·52	2250	N. 100 I–VI 100 } with all species except adults of *Temora*, *Centropages*, *Acartia* (600)										
9. vi	L 4	11·40	10·81	2030	501 with all species										
18. vi	L 4	12·75	..	625	N. 50 I–V 250 VI 500	N. 50 I–V 250 VI 500	N. 50 I–III 250 IV–VI 500	N. 50 I–IV 250 V–VI 500	N. 50 I–IV 250 V–VI 500	50	50	..	..	..	..
26. vi	L 4	14·00	11·64	1800	N. 50 I–VI 100	N. 50 I–VI 100	N. 50 I–VI 100	N. 50 I–III IV–VI 250	N. 50 I–VI 100	50	..	..	..	..	..
3. vii	L 4	16·62	11·79	1650	N. 100 I–VI 500 } with all except *Oithona* (100)										
17. vii	L 4	14·90	11·50	1300	N. 100 I–III 250 IV–VI 1050	N. 100 I–IV 250 V–VI 1050	N. 100 I–III 250 IV–VI 1050	N. 100 I–II 250 III–VI 1050	N. 100 I–II 250 III–V 1050 VI 450	N. 50 I–II 100 III–VI 250	400	200	..	..	..
24. vii	L 4	15·00	12·95	..											
31. vii	L 4	16·82	13·13	900	N. 50 I–VI 200	N. 50 I–VI 200	N. 50 I–II 200 III–VI 500	N. 50 I–III 200 IV–VI 500	N. 50 I–III 200 IV–VI 500	N. 50 I–III 50 IV–VI 200	50	..	..	..	..

5. viii	L 4	16·33	14·70	..	..	..	..	..	..	..	..	..	..	..	..
14. viii	L 4	16·86	15·39	1480	N. 100 I–II 200 III–VI 1000	N. 100 I–III 200 IV–VI 1000	N. 100 I–III 200 IV–VI 1000	N. 100 I–III 200 IV–VI 1000	N. 100 I–VI 200	N. 100 I–VI 200	100	Juv. 200	Juv. 200 Adults 1000	1000	100
19. viii	L 4	18·43	14·30	..	..	..	..	..	..	..	..	..	..	..	..
28. viii	L 4	17·14	16·42	1800	N. 200 I–II 200 III 500 IV–VI 1000	N. 200 I–III 200 IV 500 V, VI 1000	N. 200 I–II 200 III–VI 1000	N. 200 I–II 200 III 500 IV–VI 1000	N. 200 I–II 200 III–VI 1000	N. 200 I–IV 200 V–VI 500	200	Juv. 200	500	200	200
4. ix	L 4	16·99	16·60	..											
12. ix	L 4	17·50	16·01	1550	N. 100 I–III 200 IV–VI 1000	N. 100 I–IV 200 V–VI 1000	N. 100 I–III 200 IV–VI 1000	N. 100 I–III 200 IV–VI 1000	N. 100 I–III 200 IV–VI 1000	N. 100 I–VI 200	N. 100 I–IV 200	200	Juv. 200 Adults 1000	200	100
17. ix	L 4	16·70	15·65	..	..	..	..	..	..	..	..	..	..	..	..
25. ix	L 4	15·90	15·85	1210	N. 200 I–III 500 IV–VI 1000	N. 200 I–IV 500 V–VI 1000	N. 200 I–IV 500 V–VI 1000	N. 200 I–VI 1000	N. 200 I–II 500 III–VI 1000	N. 150 I 200 II–VI 500	N. 200 I–II 200 III–VI 500	Juv. 500 Adults 1000	Juv. 200 Adults 1000	500	50 50
2. x	L 4	15·65	15·10	..	..	..	..	..	..	..	..	..	..	..	..
9. x	L 4	15·45	15·39	1520	N. 200 I–II 200 III–VI 1000	N. 200 I–II 200 III–IV 500 V–VI 1000	N. 200 I–II 500 III–VI 1000	N. 200 I–II 200 III–VI 1000	N. 200 I 200 II–III 500 IV–VI 1000	N. 200 I–IV 200 V–VI 500	N. 150 I–VI 200	200	Juv. 200 Adults 1000	200	50
15. x	L 4	15·59	15·54	..	..	..	..	..	..	..	..	..	..	..	..
23. x	L 4	15·35	15·38	1400	N. 250 I–III 500 IV–VI 1000	N. 250 I–III 500 IV–VI 1000	N. 250 I–III 500 IV–VI 1000	N. 500 I–III 500 IV–VI 500	N. 250 I–III 500 IV–VI 1000	N. 250 I–III 500 IV–VI 1000	N. 100 I–III 500 IV–VI 1000	500	Juv. 500 Adults 1000	500	50
28. x	L 4	14·89	14·90	..	..	..	..	..	..	..	..	..	..	..	..
6. xi	1 mile outside breakwater	13·8 (surface)	..	..	..	..	..	..	..	..	..	..	..	..	..
17. xi	L 4	13·78 (1 m.)	13·79	3140	N. 500 I–III 500 IV–VI 1000	N. 500 I–IV 500 V–VI 1000	N. 500	N. 500	N. 500 I–III 500 IV–VI 1000	N. 500 I–VI 500	N. 500 I–VI 500	500	Juv. 500 Adults 1000	500	500
26. xi	L 4	13·35	13·36	..	..	..	..	..	..	..	..	..	..	..	..
11. xii	L 4	11·97	12·00	2740	N. 200 IV–VI 2500	N. 200 IV–VI 1000	N. 200	N. 200	N. 200 I–VI 1000	N. 200 I–VI 200	N. 200 I–VI 200	Juv. 200 Adults 1000	Juv. 200 Adults 1000	200	200
22. xii	L 4	11·40	11·65	2540	N. 200 I–III 200 IV–VI 1000	N. 200 I–III 200 IV–VI 1000	N. 200	N. 200	N. 200	N. 200 I–VI 200	N. 200 I–VI 200	200	200		
7. i. 48	L 4	10·32	10·40	..	..	..	..	..	..	..	..	..	..	..	..
16. i	L 4	10·00	10·62	..	..	..	..	..	..	..	..	..	..	..	..
13. ii	L 4	9·80	9·82	..	..	..	..	..	..	..	..	..	..	..	..
19. ii	L 4	9·29	9·29	..	..	..	..	..	..	..	..	..	..	..	..

Note. N. is used as abbreviation for nauplii; and Roman numerals for copepodite stages.

TABLE II. *PSEUDOCALANUS ELONGATUS*. ABUNDANCE

Date	Number per cubic metre									Percentages			
	Nauplii	I	II	III	IV	V	VI♀	VI♂	Total	N.	I–III	IV–V	VI
6. i	220	18	16	14	14	62	66	7	417	53·8	9·0	12·3	24·9
5. ii	166	47	20	23	36	30	57	3	382	71·3	12·8	9·4	6·5
27. ii	349	34	21	23	19	34	63	8	551	62·6	15·0	9·6	12·8
17. iii	357	69	38	22	20	43	35	15	601	59·4	21·4	10·8	8·3
3. iv	1,348	182	112	181	147	108	126	76	2280	59·0	20·8	11·2	8·8
28. iv	2,145	125	130	398	341	178	120	68	3,505	61·5	18·7	14·8	5·3
8. v	11,440	280	220	600	380	440	120	120	13,600	83·8	8·1	6·0	1·8
14. v	7,720	1,180	110	93	144	230	270	193	9,940	77·5	14·0	3·8	4·6
22. v	..	..	..	..	..	..	..	..	..	49·7	39·8	6·4	4·0
2. vi	858	102	249	895	784	572	277	74	3,811	22·5	32·7	35·6	9·2
9. vi	940	..	40	140	100	320	440	80	2,060	45·6	8·7	20·4	25·2
18. vi	1,260	212	92	60	64	108	218	80	2,094	62·2	17·4	8·2	14·4
26. vi	1,680	180	260	780	750	610	330	130	4,720	35·6	25·8	28·8	9·1
3. vii	1,150	152	70	60	80	156	224	98	1,990	57·7	14·2	11·9	16·3
7. vii	830	56	36	16	33	80	287	91	1,429	58·2	7·6	7·9	26·5
31. vii	2,500	620	635	600	740	495	350	70	6,010	41·7	30·9	20·5	7·0
14. viii	2,060	155	175	139	94	42	32	8	2,705	76·1	17·7	5·0	1·5
28. viii	1,325	130	80	70	163	195	155	89	2,184	60·7	12·8	15·3	11·2
12. ix	570	255	205	270	262	115	75	11	1,773	32·1	41·2	21·8	4·8
25. ix	340	54	34	84	148	74	34	4	772	44·0	22·3	28·7	4·9
9. x	215	15	15	39	257	287	94	8	930	23·1	7·4	58·5	11·0
23. x	20	..	4	..	10	31	23	2	90	22·2	4·4	45·5	27·8
17. xi	10	..	..	..	1	5	1	..	17	..	..	..	..
11. xii	100	..	..	..	1	4	10	1	115	..	..	..	..
22. xii	130	10	..	..	..	..	..	..	140	..	..	..	..

TABLE III. *PARACALANUS PARVUS*. ABUNDANCE.

Date	Number per cubic metre									Percentages			
	Nauplii	I	II	III	IV	V	VI♀	VI♂	Total	N.	I–III	IV–V	VI
6. i	..	2	55	62	41	41	69	7	121	24·1	43·6	20·6	11·7
5. ii	..	26	33	24	30	28	22	..	173	35·4	38·6	20·7	5·2
27. ii	128	7	3	16	21	21	25	1	222	57·7	12·0	19·0	11·3
17. iii	95	18	4	2	4	20	18	..	161	59·0	14·9	14·9	11·2
3. iv	208	25	18	12	18	8	12	2	303	68·6	18·1	8·6	4·6
28. iv	345	48	23	28	28	13	15	..	500	69·0	19·8	8·2	3·0
8. v	3760	400	240	100	120	360	160	40	5180	72·5	14·3	9·3	3·9
14. v	2460	170	37	57	47	30	83	17	2901	84·9	9·1	2·6	3·5
22. v	..	..	..	..	..	..	..	..	..	19·5	64·8	12·8	2·8
2. vi	636	55	166	1540	1226	332	74	..	4029	15·8	43·6	38·6	1·8
9. vi	240	..	80	80	840	820	400	20	2480	9·7	6·4	66·9	16·9
18. vi	3840	276	80	72	124	120	218	28	4758	80·6	9·0	5·1	5·2
26. vi	1300	70	70	30	40	10	140	..	1660	78·3	10·2	3·0	8·4
3. vii	700	18	26	66	70	60	62	22	1024	68·3	10·7	12·7	8·2
7. vii	940	24	4	..	..	12	65	13	1058	89·0	2·6	1·1	7·4
31. vii	1540	110	120	65	135	125	180	..	2275	67·7	13·0	11·4	7·9
14. viii	2360	415	390	370	354	372	232	53	4546	51·9	25·8	16·0	6·3
28. viii	2025	335	240	160	230	201	227	42	3460	58·5	21·2	12·4	7·8
12. ix	2350	230	320	355	760	300	236	19	4570	51·4	19·8	23·2	5·6
25. ix	3270	276	160	136	124	89	125	6	4186	78·1	13·7	5·1	3·1
9. x	1460	270	235	372	260	195	77	18	2887	50·6	30·4	15·8	3·3
23. x	544	180	106	56	30	43	43	4	1006	54·1	34·0	7·3	4·7
17. xi	1294	130	82	32	42	29	58	2	1669	77·5	14·6	4·3	3·6
11. xii	1570	285	275	105	44	39	34	2	2354	66·7	28·2	3·5	1·5
22. xii	645	160	20	15	8	3	2	..	853	75·6	22·8	1·3	0·2

TABLE IV. *CENTROPAGES TYPICUS*. ABUNDANCE

Date	Number per cubic metre								
	Nauplii	I	II	III	IV	V	VI♀	VI♂	Total
6. i	..	..	..	..	..	..	2	..	2
5. ii	8	..	..	..	..	..	..	..	8
27. ii	7	..	..	..	..	..	..	..	7
17. iii	7	..	..	..	1	..	..	..	8
3. iv	14	..	1	..	..	..	2	..	17
28. iv	10	..	..	..	..	..	..	..	10
8. v	..	..	..	..	..	..	..	..	..
14. v	..	..	..	..	..	3	3	..	6
2. vi	230	10	..	..	10	..	2	1	253
9. vi	20	..	..	..	..	..	..	..	20
18. vi	640	16	32	44	14	10	..	2	758
26. vi	220	..	10	20	10	10	..	10	280
3. vii	40	8	10	2	2	4	12	12	90
7. vii	80	5	..	..	2	3	1	6	97
31. vii	220	..	5	6	18	36	6	6	297
14. viii	830	..	..	..	3	3	5	4	845
28. viii	440	..	..	4	7	5	5	2	463
12. ix	920	..	10	35	79	46	18	24	1132
25. ix	360	..	2	2	..	3	1	1	368
9. x	315	22	18	2	5	2	..	..	364
23. x	12	..	..	..	1	..	..	..	13
17. xi	90	..	..	..	..	..	..	..	90
11. xii	10	..	..	..	..	..	..	..	10
22. xii	..	..	..	..	..	..	..	..	..

TABLE V. *TEMORA LONGICORNIS*. ABUNDANCE

Date	Number per cubic metre									Percentages			
	Nauplii	I	I	III	IV	V	VI♀	VI♂	Total	N.	I–III	IV–V	VI
6. i	16	..	2	2	..	..	..	..	20	..	..	..	..
5. ii	54	2	..	1	..	1	..	..	58	96·4	2·4	0·6	0·6
27. ii	74	2	1	1	..	..	1	..	79	93·4	5·7	..	0·9
17. iii	82	11	2	..	2	..	1	..	98	83·8	13·3	2·0	1·0
3. iv	68	6	6	3	5	4	1	2	95	71·5	15·8	9·5	3·2
28. iv	455	3	23	25	10	23	13	5	557	81·6	9·2	5·9	3·2
8. v	3400	240	160	40	40	20	20	..	3920	86·7	11·2	1·5	0·5
14. v	3600	300	77	23	37	27	27	17	4108	87·7	9·7	1·6	1·1
22. v	..	..	..	..	..	..	..	..	..	36·2	56·9	5·8	1·0
2. vi	729	194	507	747	295	147	115	158	2892	25·2	50·0	15·3	9·5
9. vi	320	80	120	40	860	520	160	180	2280	14·0	10·5	60·5	14·9
18. vi	3840	356	196	56	32	6	24	32	4542	84·6	13·4	0·8	1·2
26. vi	440	30	..	..	24	28	48	96	666	66·1	4·5	7·8	21·6
3. vii	260	22	38	48	54	54	40	36	552	47·1	19·6	19·6	13·8
7. vii	40	4	..	1	1	21	65	75	207	19·6	2·4	10·6	67·6
31. vii	940	70	40	10	..	8	18	24	1110	84·7	10·8	0·7	3·8
14. viii	980	250	115	165	97	57	7	10	1681	58·3	31·5	9·2	1·0
28. viii	505	80	60	88	214	144	48	42	1181	42·8	19·3	30·3	7·6
12. ix	340	40	15	35	25	21	17	34	527	64·5	17·1	8·7	9·7
25. ix	185	15	10	6	6	4	3	5	234	79·0	13·2	4·3	3·4
9. x	60	..	5	2	1	2	3	3	76	78·9	9·2	3·9	7·9
23. x	16	4	..	..	..	..	1	..	21	..	..	..	..
17. xi	32	..	..	..	..	..	..	..	32	..	..	..	..
11. xii	45	..	..	..	..	..	..	..	45	..	..	..	..
22. xii	10	..	..	..	..	..	..	..	10	..	..	..	..

TABLE VI. *ACARTIA CLAUSI*. ABUNDANCE

Date	Number per cubic metre									Percentages			
	Nauplii	I	II	III	IV	V	VI♀	VI♂	Total	N.	I–III	IV–V	VI
6. i	..	..	..	..	..	..	5	..	5	..	..	..	..
5. ii	..	..	..	1	2	2	1	..	6	..	..	..	..
27. ii	25	..	..	..	..	..	..	..	25	..	..	..	..
17. iii	23	..	1	1	1	1	3	..	30	..	..	..	..
3. iv	45	7	8	2	3	3	3	1	72	..	..	..	..
28. iv	875	48	40	28	23	18	45	33	1,110	79·0	10·4	3·7	7·0
8. v	14,280	1,340	740	580	240	100	220	40	17,540	81·2	15·2	1·9	1·5
14. v	5,320	547	353	390	394	287	110	107	7,508	70·7	17·2	9·1	2·9
22. v	..	..	..	..	..	..	..	..	..	45·9	38·4	9·8	5·9
2. vi	2,350	304	461	516	434	286	141	173	4,665	50·4	27·5	15·4	6·7
9. vi	3,800	320	520	580	520	300	360	400	6,800	55·9	20·9	12·0	11·2
18. vi	5,060	288	144	136	72	84	44	70	5,898	86·9	9·6	2·6	1·9
26. vi	1,740	230	170	260	310	100	380	310	3,508	48·6	18·4	13·7	19·3
3. vii	1,290	108	146	108	132	82	142	230	2,238	57·7	16·4	9·6	16·6
7. vii	880	28	28	6	5	2	204	193	1,346	65·5	4·6	0·5	29·5
31. vii	2,460	410	240	170	78	56	180	174	3,696	66·9	21·6	3·6	7·7
14. viii	830	25	35	70	25	75	60	65	1,185	70·0	11·0	8·4	10·5
28. viii	335	25	..	19	56	31	62	46	574	58·4	7·7	15·1	18·9
12. ix	230	5	..	15	57	39	58	32	436	52·6	4·6	22·0	20·6
25. ix	505	6	2	2	12	25	34	18	604	83·6	1·6	6·1	8·6
9. x	285	10	6	2	7	12	46	5	373	76·4	4·8	5·1	13·7
23. x	..	8	4	..	..	..	4	..	16	..	..	..	..
17. xi	218	12	10	2	7	3	1	3	256	85·1	9·4	3·9	1·6
11. xii	10	2	4	1	..	..	..	..	17	..	..	..	..
22. xii	..	..	..	..	..	..	..	..	..	..	..	..	..

Table VII. *Oithona similis*. Abundance

Date	Number per cubic metre: Eggs	Nauplii	I	II	III	IV	V	VI ♀	VI ♂	Total excl. eggs	Percentages: N.	I–III	IV–V	VI	Eggs per egg-sac
6. i	Lost through	net mesh	9	16	30	18	66	156	27	..	40·9	15·9	22·6	20·9	..
5. ii	Lost through	net mesh	9	15	27	27	24	29	3	..	57·1	17·9	12·2	12·8	..
27. ii	272	254	19	9	12	6	11	28	52	451	74·0	11·5	5·0	9·5	6·3
17. iii	80	156	16	8	4	8	8	22	2	224	69·7	12·5	7·1	10·7	8·9
3. iv	835	183	39	48	43	57	64	45	14	493	37·2	26·4	24·6	12·0	12·8
28. iv	?	630	80	63	63	45	55	140	25	1,101	57·0	18·7	9·1	14·9	..
8. v	13,240	10,560	700	800	1,040	740	720	580	130	15,320	68·8	16·6	9·5	5·0	13·8
14. v	2,780	3,000	130	130	103	130	157	147	50	3,847	78·0	9·4	7·4	5·1	13·9
22. v	..	..	..	..	..	..	..	..	..	..	58·0	28·2	7·9	5·8	..
2. vi	5,750	8,990	1,410	1,190	728	434	701	508	101	14,062	64·0	23·8	8·1	4·9	9·7
9. vi	10,280	6,960	1,500	1,480	1,760	1,200	820	780	180	14,680	47·4	32·3	13·8	6·5	10·1
18 vi	15,920	9,320	1,100	1,340	720	1,200	1,380	1,320	480	16,860	55·4	18·7	15·3	10·7	11·7
26. vi	3,720	8,280	1,140	1,040	1,680	1,400	2,180	1,760	340	17,820	46·5	21·7	20·1	11·8	8·8
3. vii	9,650	5,840	440	360	430	260	550	630	140	8,650	67·5	14·2	9·4	8·9	11·8
7. vii	6,240	8,040	390	300	344	408	408	672	128	10,690	75·2	9·7	7·6	7·5	7·4
31. vii	8,540	16,040	1,400	1,020	740	525	510	865	82	21,182	76·2	14·9	4·9	4·4	8·4
14. viii	7,460	6,050	355	370	305	395	525	895	155	9,050	66·8	11·4	10·2	11·6	6·7
28. viii	2,900	3,850	295	295	225	155	164	218	40	5,242	73·4	15·5	6·1	4·9	7·4
12. ix	6,230	10,170	450	605	470	540	545	735	35	13,550	75·0	11·2	8·0	5·7	6·8
25. ix	1,060	2,454	285	198	124	102	142	206	14	3,529	69·5	17·2	6·9	6·3	7·1
9. x	680	1,400	170	155	145	165	162	138	13	2,348	59·6	20·0	13·9	6·4	8·0
23. x	128	396	54	48	32	24	35	24	1	614	64·4	31·8	9·6	4·1	6·4
17. xi	398	460	36	18	22	28	20	56	10	650	70·7	11·7	7·4	10·2	8·0
11. xii	485	480	115	95	145	55	30	55	..	975	49·2	36·4	8·7	5·6	6 9
22. xii	..	50	30	20	30	5	10	10	..	155	..	..	..	..	..

Table VIII. *Oithona nana*. Abundance

Date	Number per cubic metre: Eggs	Nauplii	I	II	III	IV	V	VI ♀	VI ♂	Total excl. eggs	Percentages: N.	I–III	IV–V	VI	Eggs per per egg-sac
31. vii	..	..	40	..	..	..	..	..	..	40	..	..	..	..	..
14. viii	..	40	20	10	..	..	..	10	..	80	..	..	..	..	..
28. viii	..	415	..	..	..	..	..	..	..	415	..	..	..	..	..
12. ix	2120	910	65	25	10	10	85	80	35	1220	74·6	8·2	7·8	9·4	15·1
25. ix	410	1910	60	35	20	30	22	60	14	2137	89·5	5·4	2·4	2·8	13·7
9. x	1900	5870	915	410	435	345	210	120	35	8310	70·6	21·2	6·7	1·5	15·2
23. x	..	1480	174	118	66	24	11	4	..	1887	78·8	19·1	1·9	0·2	..
17. xi	1144	2318	48	20	14	50	12	32	2	2506	92·5	3·3	2·9	1·4	16·8
11. xii	375	1555	370	295	70	40	30	30	30	2420	64·2	30·4	2·9	2·5	10·7
22. xii	..	415	140	90	105	30	15	25	15	835	49·6	40·1	5·4	4·8	..

Table IX. *Oncaea venusta*, *Corycaeus anglicus*, *Euterpina acutifrons* and Unidentified Nauplii. Abundance

Date	*Oncaea venusta* No. per cu.m.: Juv.	♀	♂	Total	*Oncaea venusta* Percentage: Juv.	Adult	*Corycaeus anglicus* No. per cu.m.: Juv.	♀	♂	Total	*Euterpina acutifrons* Percentage: Juv.	Adult	*Euterpina acutifrons* No. per cu.m.	Unidentified nauplii No. per cu.m.
31. vii	..	..	..	..	..	..	..	..	..	..	..	..	20	..
14. viii	15	..	..	15	..	..	25	3	3	31	..	..	119	340
28. viii	105	..	10	115	91·2	8·8	55	6	20	81	..	..	278	1115
12. ix	150	20	20	190	79·0	21·0	180	25	44	249	72·3	27·7	905	1640
25. ix	28	3	5	36	77·8	22·2	325	13	15	353	92·3	7·9	292	2140
9. x	315	30	10	355	88·8	11·2	1235	63	73	1371	90·1	9·9	490	1220
23. x	114	10	18	142	80·2	19·8	176	98	133	407	43·2	56·7	232	1080
17. xi	172	16	6	194	88·5	11·4	284	69	115	326	43·5	56·5	234	2200
11. xii	175	7	15	197	88·5	11·4	365	12	26	403	90·6	9·4	18	1040
22. xii	200	5	15	220	90·8	9·2	110	..	..	110	100·0	..	..	..

Table X. *Pseudocalanus elongatus*. Size in mm.

Stage	Date	No.	0·442–0·495	0·495–0·548	0·548–0·602	0·602–0·655	0·655–0·708	0·708–0·761	0·761–0·813	0·813–0·867	0·867–0·920	0·920–0·973	0·973–1·03	1·03–1·08	1·08–1·13	1·13–1·18	Median size
VI ♂	6. i	16	..	..	..	4	9	1	2	..	..	..	..	..	..	..	0·673
	5. ii	3	..	..	..	2	1	..	..	..	..	..	..	..	..	..	..
	27. ii	10	..	..	..	..	3	5	2	..	..	..	..	..	..	..	0·717
	17. iii	48	..	..	..	1	11	30	6	..	..	..	..	..	..	..	0·728
	3. iv	78	..	..	..	..	3	18	52	5	..	..	..	..	..	..	0·786
	28. iv	26	..	..	..	..	..	..	5	18	3	..	..	..	..	..	0·837
	14. v	64	..	..	..	..	3	22	32	6	1	..	..	..	..	..	0·773
	2. vi	17	..	..	..	1	11	4	..	..	1	..	..	..	..	..	0·692
	18. vi	27	..	..	..	..	20	4	3	..	..	..	..	..	..	..	0·699
	3. vii	47	..	..	..	11	25	11	..	..	..	..	..	..	..	..	0·678
	17. vii	95	..	..	..	11	73	10	1	..	..	..	..	..	..	..	0·679
	31. vii	14	..	..	..	..	10	4	..	..	..	..	..	..	..	..	0·697
	14. viii	8	..	..	..	3	4	1	..	..	..	..	..	..	..	..	..
	28. viii	89	..	..	..	13	71	5	..	..	..	..	..	..	..	..	0·674
	12. ix	11	..	..	2	5	4	..	..	..	..	..	..	..	..	..	0·646
	25. ix	2	..	..	..	1	1	..	..	..	..	..	..	..	..		..
	9. x	8	..	..	..	2	6	..	..	..	..	..	..	..	..		..
	23. x	2	..	..	..		2	..	..	..	..	..	..	..	..		..
	11. xii	2	..	..	..	1	1	..	..	..	..	..	..	..	..	..	..
	28. i	4	..	..	..	1	1	2	..	..	..	..	..	..	..	..	..
VI ♀	6. i	112	..	..	..	..	1	27	66	17	1	..	..	..	..	..	0·745
	5. ii	92	..	..	..	..	..	20	57	13	2	..	..	..	..	..	0·785
	27. ii	85	..	..	..	..	2	19	23	14	17	10	..	..	..	..	0·812
	17. iii	120	..	..	..	..	..	16	37	15	20	24	6	2	..	..	0·832
	15. iv	137	..	..	..	..	..	1	5	3	9	23	36	43	15	2	1·017
	28. iv	115	..	..	..	..	..	..	..	..	..	8	20	40	37	10	1·062
	14. v	131	..	..	..	..	..	..	1	8	34	41	25	16	5	1	0·953
	2. vi	119	..	..	..	..	..	3	20	35	23	25	9	3	1	..	0·870
	18. vi	100	..	..	..	..	..	1	24	50	17	6	1	..	1	..	0·836
	3. vii	97	..	..	..	..	..	2	35	48	12	..	..	..	..	..	0·827
	17. vii	64	..	..	..	..	..	5	26	27	5	1	..	..	..	..	0·817
	31. vii	70	..	..	..	..	..	2	25	32	10	1	..	..	..	..	0·827
	14. viii	32	..	..	..	..	..	2	15	12	3	..	..	..	..	..	0·810
	28. viii	154	..	..	..	..	..	22	95	37	..	..	..	..	..	..	0·794
	12. ix	76	..	..	..	..	1	24	39	11	1	..	..	..	..	..	0·776
	25. ix	85	..	..	..	..	4	23	39	19	..	..	..	..	..	..	0·781
	9. x	94	..	..	..	..	..	27	54	11	2	..	..	..	..	..	0·784
	23. x	82	..	..	..	..	..	24	52	6	..	..	..	..	..	..	0·774
	17. xi	55	..	..	..	..	..	24	29	2	..	..	..	..	..	..	0·764
	26. xi	124	..	..	..	..	5	49	66	4	..	..	..	..	..	..	0·769
	11. xii	101	..	..	..	..	2	34	55	9	1	..	..	..	..	..	0·772
	28. i	92	..	..	..	..	..	17	40	20	13	1	1	..	..	..	0·794
V ♂	6. i	25	..	..	..	..	22	3	..	..	..	..	..	..	..	..	0·685
	5. ii	9	..	..	..	..	3	6	..	..	..	..	..	..	..	..	0·736
	27. ii	20	..	..	..	..	..	4	14	2	..	..	..	..	..	..	0·776
	17. iii	74	..	..	..	1	3	28	41	1	..	..	..	..	..	..	0·766
	3. iv	49	..	..	..	..	..	..	23	23	2	1	..	..	..	..	0·816
	28. iv	37	..	..	..	..	..	..	6	24	6	1	..	..	..	..	0·847

	14. v	31	..	..	..	1	3	12	10	2	3	..	..	..	..	..	0·758
	2. vi	29	..	..	..	..	12	14	2	1	..	..	..	..	..	..	0·714
	18. vi	19	..	..	..	1	9	6	2	1	..	..	..	..	..	..	0·706
	3. vii	36	..	..	..	1	24	8	3	..	..	..	..	..	..	..	0·695
	17. vii	32	..	..	..	1	12	19	..	..	..	..	..	..	..	..	0·714
	31. vii	64	..	..	..	..	28	35	1	..	..	..	..	..	..	..	0·711
	14. viii	23	..	..	..	..	22	1	..	..	..	..	..	..	..	..	0·684
	28. viii	102	..	..	..	12	77	12	1	..	..	..	..	..	..	..	0·686
	12. ix	63	..	..	..	9	46	8	..	..	..	..	..	..	..	..	0·676
	25. ix	36	..	..	..	2	25	9	..	..	..	..	..	..	..	..	0·688
	9. x	159	..	..	..	18	128	13	..	..	..	..	..	..	..	..	0·679
	23. x	20	..	..	..	2	15	3	..	..	..	..	..	..	..	..	0·687
	17. xi	3	..	..	..	..	3	..	..	..	..	..	..	..	..	..	..
	11. xii	4	..	..	..	..	3	1	..	..	..	..	..	..	..	..	..
V ♀	6. i	48	..	..	..	6	22	19	1	..	..	..	..	..	..	..	0·700
	5. ii	23	..	..	..	..	5	8	10	..	..	..	..	..	..	..	0·758
	27. ii	26	..	..	..	..	..	4	14	7	1	..	..	..	..	..	0·772
	17. iii	47	..	..	..	..	..	1	18	20	7	1	..	..	..	..	0·819
	3. iv	56	..	..	..	..	..	..	6	12	28	10	..	..	..	..	0·882
	28. iv	34	..	..	..	..	..	..	..	3	17	10	4	..	..	..	0·908
	14. v	36	..	..	..	..	2	6	18	4	5	1	..	..	..	..	0·767
	2. vi	33	..	..	..	..	15	18	..	..	..	..	..	..	..	..	0·712
	18. vi	42	..	..	..	..	6	20	10	6	..	..	..	..	..	..	0·750
	3. vii	38	..	..	..	..	4	28	6	..	..	..	..	..	..	..	0·735
	17. vii	54	..	..	..	..	14	29	11	..	..	..	..	..	..	..	0·729
	31. vii	31	..	..	..	..	1	25	4	1	..	..	..	..	..	..	0·731
	14. viii	18	..	..	..	..	7	10	1	..	..	..	..	..	..	..	0·714
	28. viii	93	..	..	..	7	49	36	1	..	..	..	..	..	..	..	0·699
	12. ix	52	..	..	..	11	31	10	..	..	..	..	..	..	..	..	0·677
	25. ix	38	..	..	..	2	23	12	1	..	..	..	..	..	..	..	0·699
	9. x	128	..	..	..	6	104	17	1	..	..	..	..	..	..	..	0·690
	23. x	11	..	..	..	1	8	2	..	..	..	..	..	..	..	..	0·693
	20. xi	2	..	..	..	1	1	..	..	..	..	..	..	..	..	..	..
	11. xii	5	..	..	..	4	..	1	..	..	..	..	..	..	..	..	..
IV ♂	6. i	5	..	1	2	2	..	..	..	..	..	..	..	..	..	..	..
	5. ii	15	..	3	1	8	3	..	..	..	..	..	..	..	..	..	0·614
	27. ii	8	..	..	..	5	1	2	..	..	..	..	..	..	..	..	..
	17. iii	33	..	..	..	13	20	..	..	..	..	..	..	..	..	..	0·660
	3. iv	76	..	..	..	..	38	34	4	..	..	..	..	..	..	..	0·708
	28. iv	61	..	..	..	..	14	39	8	..	..	..	..	..	..	..	0·730
	14. v	16	..	..	3	5	8	..	..	..	..	..	..	..	..	..	0·655
	2. vi	30	..	..	5	25	..	..	..	..	..	..	..	..	..	..	0·622
	18. vi	10	..	..	1	5	4	..	..	..	..	..	..	..	..	..	0·638
	3. vii	11	..	..	..	9	2	..	..	..	..	..	..	..	..	..	0·615
	17. vii	17	..	..	4	13	..	..	..	..	..	..	..	..	..	..	0·625
	31. vii	67	..	..	4	55	8	..	..	..	..	..	..	..	..	..	0·639
	14. viii	34	..	..	15	19	..	..	..	..	..	..	..	..	..	..	0·606
	28. viii	81	..	..	30	50	1	..	..	..	..	..	..	..	..	..	0·608
	12. ix	135	..	1	61	71	2	..	..	..	..	..	..	..	..	..	0·604
	25. ix	66	..	..	15	48	3	..	..	..	..	..	..	..	..	..	0·610
	9. x	122	..	1	56	64	1	..	..	..	..	..	..	..	..	..	0·604
	23. x	2	..	..	1	1	..	..	..	..	..	..	..	..	..	..	..
	11. xii	1	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..

TABLE X (*continued*)

Stage	Date	No.	0·442–0·495	0·495–0·548	0·548–0·602	0·602–0·655	0·655–0·708	0·708–0·761	0·761–0·813	0·813–0·867	Median size
IV ♀	6. i	4	..	..	..	4	..	..	..	..	..
	5. ii	21	..	..	1	13	7	..	..	..	..
	27. ii	18	..	..	..	2	14	2	..	..	0·630
	17. iii	47	..	..	..	6	25	16	..	..	0·668
	3. iv	69	..	..	..	3	8	49	9	..	0·693
	28. iv	73	..	..	..	..	6	41	24	2	0·735
	14. v	24	..	..	2	5	13	4	..	..	0·750
	2. vi	55	..	..	8	45	1	1	..	..	0·680
	18. vi	23	..	..	1	14	5	3	..	..	0·615
	3. vii	25	..	..	..	18	7	..	..	..	0·640
	17. vii	19	..	..	5	10	3	1	..	..	0·646
	31. vii	78	..	..	6	58	14	..	..	..	0·625
	14. viii	48	..	..	14	34	..	..	..	..	0·637
	28. viii	82	..	..	27	53	2	..	..	..	0·610
	12. ix	107	..	..	45	61	1	..	..	..	0·614
	25. ix	87	..	..	23	64	..	..	..	..	0·614
	9. x	132	..	..	51	81	..	..	..	..	0·614
	23. x	8	..	..	2	5	1	..	..	..	0·608
III	6. i	13	..	9	4	..	..	..	..	..	0·540
	5. ii	23	..	7	16	..	..	..	..	..	0·555
	27. ii	38	..	5	32	1	..	..	..	..	0·566
	17. iii	70	..	3	46	21	..	..	..	..	0·589
	3. iv	81	..	..	4	62	15	..	..	..	0·634
	28. iv	67	..	..	2	55	9	1	..	..	0·638
	14. v	26	..	4	16	6	..	..	..	..	0·587
	2. vi	51	..	38	13	..	..	..	..	..	0·534
	18. vi	15	1	6	8	..	..	..	..	..	0·550
	3. vii	23	2	17	4	..	..	..	..	..	0·522
	17. vii	4	..	1	3	..	..	..	..	..	..
	31. vii	82	..	24	58	..	..	..	..	..	0·558
	14. viii	28	..	26	2	..	..	..	..	..	0·528
	28. viii	61	5	53	3	..	..	..	..	..	0·523
	12. ix	54	2	51	1	..	..	..	..	..	0·518
	25. ix	42	..	36	6	..	..	..	..	..	0·532
	9. x	17	2	14	1	..	..	..	..	..	0·516

Stage	Date	No.	0·283–0·336	0·336–0·389	0·389–0·442	0·442–0·495	0·495–0·548	0·548–0·602	Median size
II	6. i	11	..	..	6	5	..	..	0·441
	5. ii	20	..	..	5	15	..	..	0·458
	27. ii	14	..	..	..	28	..	..	0·467
	17. iii	50	..	..	..	33	17	..	0·487
	3. iv	49	..	..	..	6	38	5	0·519
	28. iv	26	..	..	..	..	21	5	0·537
	14. v	21	..	..	..	12	9	..	0·493
	2. vi	26	..	..	16	10	..	..	0·438
	18. vi	24	..	..	1	20	3	..	0·467
	3. vii	30	..	..	16	14	..	..	0·439
	17. vii	10	..	..	3	7	..	..	0·452
	31. vii	41	..	..	2	39	..	..	0·463
	14. viii	35	..	..	27	8	..	..	0·432
	28. viii	17	..	..	15	2	..	..	0·431
	12. ix	41	..	..	34	7	..	..	0·435
	25. ix	16	..	..	6	10	..	..	0·448
	9. x	4	..	..	3	1	..	..	..
	23. x	2	..	..	1	1	..	..	..
I	6. i	19	..	18	1	..	..	..	0·366
	5. ii	46	..	36	10	..	..	..	0·376
	27. ii	46	..	38	8	..	..	..	0·380
	17. iii	90	..	34	56	..	..	..	0·394
	3. iv	78	..	16	58	4	..	..	0·406
	28. iv	21	..	..	19	2	..	..	0·426
	14. v	68	..	25	42	1	..	..	0·395
	2. vi	10	..	10	..	..	..	..	0·364
	18. vi	25	..	14	11	..	..	..	0·388
	3. vii	46	6	30	10	..	..	..	0·353
	17. vii	14	..	12	2	..	..	..	0·358
	31. vii	32	..	25	7	..	..	..	0·380
	14. viii	32	3	28	1	..	..	..	0·360
	28. viii	26	6	19	1	..	..	..	0·346
	12. ix	44	1	43	1	..	..	..	0·363
	25. ix	26	..	23	3	..	..	..	0·374
	9. x	5	..	5	..	..	..	..	..	..

TABLE XI. *PARACALANUS PARVUS*. SIZE IN MM.

Stage	Date	No.	0·442–0·495	0·495–0·548	0·548–0·602	0·602–0·655	0·655–0·708	0·708–0·761	0·761–0·813	0·813–0·867	0·867–9·020	Median size
VI ♂	6. i	3	..	..	1	2	..	..	..	..	..	..
	27. ii	1	..	..	..	..	..	1	..	..	..	..
	17. iii	6	..	..	..	..	1	4	1	..	..	..
	3. iv	3	..	..	..	..	..	2	1	..	..	..
	14. v	5	..	..	..	..	..	2	..	3	..	..
	17. vi	13	..	..	..	..	..	7	6	..	..	0·757
	3. vii	11	..	..	..	..	..	1	9	1	..	0·790
	17. vii	14	..	..	..	..	..	3	10	1	..	0·784
	14. viii	53	..	..	..	4	44	5	..	..	..	0·683
	28. viii	42	..	..	..	5	24	12	..	..	..	0·695
	12. ix	19	..	..	..	4	10	5	..	..	..	0·692
	25. ix	10	..	..	..	2	5	3	..	..	..	0·699
	9. x	16	..	..	..	4	6	6	..	..	..	0·705
	23. x	9	..	..	..	..	5	4	..	..	..	..
	17. xi	2	..	..	..	..	1	1	..	..	..	..
	20. xi	38	..	..	..	..	24	14	..	..	..	0·701
VI ♀	6. i	64	..	1	19	35	9	..	..	..	..	0·622
	5. ii	46	..	..	1	11	29	5	..	..	..	0·675
	27. ii	45	..	..	..	10	25	10	2	..	..	0·686
	17. iii	56	..	..	..	10	25	17	3	1	..	0·694
	3. iv	22	..	..	..	..	..	9	11	2	..	0·770
	15. iv	21	..	..	..	..	2	7	10	2	..	0·774
	28. iv	15	..	..	..	..	..	..	3	7	5	0·852
	14. v	25	..	..	..	..	..	7	10	8	..	0·777
	2. vi	7	..	..	..	2	4	1	..	..	..	..
	18. vi	60	..	..	..	4	33	20	2	1	..	0·699
	3. vii	70	..	..	..	7	17	41	5	..	..	0·719
	17. vii	67	..	..	..	..	13	45	..	9	..	0·739
	31. vii	36	..	..	..	2	12	19	3	..	..	0·720
	14. viii	234	..	..	44	143	40	7	..	..	..	0·628
	28. viii	227	..	..	12	152	56	7	..	..	..	0·643
	12. ix	220	..	..	14	134	57	15	..	..	..	0·640
	25. ix	153	..	..	10	72	51	18	2	..	..	0·651
	9. x	80	..	..	4	9	36	28	3	..	..	0·700
	23. x	81	..	..	..	7	49	25	..	..	..	0·695
	17. xi	60	..	..	..	2	44	14	..	..	..	0·692
	11. xii	80	..	..	3	15	49	13	..	..	..	0·680
V ♂	6. i	8	..	..	1	2	5	..	..	..	..	..
	5. ii	9	..	..	..	3	6	..	..	..	..	..
	27. ii	18	..	..	..	1	7	10	..	..	..	0·711
	17. iii	21	..	..	..	..	5	13	3	..	..	0·715
	3. iv	7	..	..	..	1	1	1	4	..	..	..
	14. v	2	..	..	..	..	..	..	2	..	..	..
	2. vi	8	..	..	1	1	5	1	..	..	..	..
	18. vi	13	..	..	..	..	6	6	1	..	..	0·710
	3. vii	18	..	..	..	..	3	15	..	..	..	0·729
	17. vii	8	..	..	..	1	..	6	1	..	..	..
	31. vii	16	..	..	..	2	7	7	..	..	..	0·704
	14. viii	5	..	..	12	93	51	..	..	..	..	0·647
	28. viii	..	..	..	1	26	39	..	..	..	..	0·660
	12. ix	114	..	..	2	63	46	3	..	..	..	0·650
	25. ix	37	..	..	..	15	20	2	..	..	..	0·663
	9. x	42	..	..	..	15	22	5	..	..	..	0·667
	23. x	13	..	..	..	2	10	1	..	..	..	0·678
	17. xi	16	..	..	..	5	10	1	..	..	..	0·664
	20. xi	18	..	..	1	9	8	..	..	..	..	0·651
V ♀	6. i	10	..	2	8	..	..	..	..	..	..	0·559
	5. ii	18	..	2	11	4	1	..	..	..	..	0·596
	27. ii	26	..	1	4	15	6	..	..	..	..	0·628
	17. iii	33	..	..	5	17	11	..	..	..	..	0·633
	3. iv	8	..	..	..	1	6	1	..	..	..	..
	28. iv	5	..	..	..	2	3	..	..	..	..	..
	14. v	7	..	..	..	3	3	1	..	..	..	..
	2. vi	28	..	4	22	2	..	..	..	..	..	0·576
	18. vi	16	..	..	8	7	1	..	..	..	..	0·602
	3. vii	12	..	..	1	10	1	..	..	..	..	0·629
	17. vii	4	..	..	..	2	2	..	..	..	..	..
	31. vii	9	..	..	1	8	..	..	..	..	..	..
	14. viii	216	3	109	96	8	..	..	..	..	..	0·548
	28. viii	135	..	30	94	10	1	..	..	..	..	0·568
	12. ix	186	..	43	128	14	1	..	..	..	..	0·565
	25. ix	56	..	13	32	11	..	..	..	..	..	0·569
	9. x	149	1	35	72	41	..	..	..	..	..	0·577
	23. x	33	..	7	17	14	..	..	..	..	..	0·591
	17. xi	13	..	3	10	..	..	..	..	..	..	0·561
	20. xi	20	1	7	2	..	..	..	..	..	..	0·553
IV ♂	6. i	6	..	6	..	..	..	..	..	..	..	..
	5. ii	8	..	2	6	..	..	..	..	..	..	..
	27. ii	18	..	2	16	..	..	..	..	..	..	0·575
	17. iii	12	..	3	7	2	..	..	..	..	..	0·588
	3. iv	6	..	..	..	5	1	..	..	..	..	..
	28. iv	3	..	..	..	3	..	..	..	..	..	..
	14. v	3	..	..	3	..	..	..	..	..	..	..
	2. vi	41	2	31	8	..	..	..	..	..	..	0·535
	18. vi	8	..	..	7	1	..	..	..	..	..	..
	3. vii	16	..	1	13	2	..	..	..	..	..	0·584

TABLE XI (*continued*)

Stage	Date	No.	0·336–0·389	0·389–0·442	0·442–0·495	0·495–0·548	0·548–0·602	0·602–0·655	Median size
IV ♂ (cont.)	17. vii	..	..	..	..	..	..	..	..
	31. vii	12	..	..	..	3	9	..	0·562
	14. viii	164	..	..	18	136	10	..	0·520
	28. viii	65	..	..	6	40	18	1	0·535
	12. ix	61	..	..	5	52	4	..	0·522
	25. ix	29	..	..	..	15	12	2	0·547
	9. x	25	..	..	1	17	7	..	0·533
	23. x	7	..	..	1	4	2	..	..
	17. xi	10	..	..	..	10	..	..	0·515
	20. xi	7	..	..	2	5	..	..	..
IV ♀	6. i	12	..	..	8	4	..	..	0·484
	5. ii	22	..	..	11	11	..	..	0·496
	27. ii	18	..	..	..	16	2	..	0·522
	17. iii	17	..	..	2	12	2	1	0·530
	3. iv	12	..	..	..	4	6	2	0·561
	28. iv	7	..	..	..	4	3	..	..
	14. v	11	..	..	..	10	1	..	0·529
	2. vi	71	..	..	57	14	..	..	0·475
	18. vi	22	..	..	1	20	1	..	0·517
	3. vii	15	..	..	..	15	..	..	0·519
	31. vii	15	..	..	5	10	..	..	0·505
	14. viii	203	..	19	177	7	..	..	0·460
	28. viii	97	..	4	84	9	..	..	0·477
	12. ix	83	..	8	65	10	..	..	0·469
	25. ix	34	..	1	16	16	1	..	0·495
	9. x	41	..	1	24	16	..	..	0·490
	23. x	24	..	2	10	10	2	..	0·459
	17. xi	17	..	..	16	1	..	..	0·473
	20. xi	13	..	4	9	..	..	..	0·457
III	6. i	27	..	23	4	..	..	..	0·417
	5. ii	25	7	16	2	..	..	..	0·413
	27. ii	33	..	16	17	..	..	..	0·444
	17. iii	12	..	3	9	..	..	..	0·451
	3. iv	12	..	2	5	5	..	..	0·487
	28. iv	9	..	..	8	1	..	..	..
	14. iv	17	..	7	8	2	..	..	0·455
	2. vi	91	2	73	16	..	..	..	0·421
	18. vi	18	..	9	9	..	..	..	0·443
	3. vii	21	..	15	6	..	..	..	0·431
	31. vii	13	..	11	2	..	..	..	0·423
	14. viii	82	16	66	..	..	..	..	0·403
	28. viii	35	2	31	2	..	..	..	0·412
	12. ix	76	15	58	3	..	..	..	0·402
	25. ix	32	1	25	6	..	..	..	0·423
	9. x	67	11	54	2	..	..	..	0·408
	23. x	50	2	45	3	..	..	..	0·418
	17. xi	21	5	16	..	..	..	..	0·398
	20. xi	22	14	8	..	..	..	..	0·385

Stage	Date	No.	0·177–0·230	0·230–0·283	0·283–0·336	0·336–0·389	0·389–0·442	0·442–0·495	Median size
II	6. i	24	..	..	13	11	..	..	0·334
	5. ii	33	..	..	6	27	..	..	0·353
	27. ii	9	..	..	1	8	..	..	..
	17. iii	18	..	..	4	13	1	..	0·380
	3. iv	18	..	..	1	13	4	..	0·377
	28. iv	8	..	..	..	6	2	..	..
	14. v	11	..	..	1	8	2	..	0·356
	2. vi	18	..	..	9	9	..	..	0·336
	18. vi	20	..	..	2	18	..	..	0·356
	3. vii	10	..	..	4	6	..	..	0·340
	17. vii	1	..	..	1	..	..	..	..
	31. vii	24	..	..	5	19	..	..	0·342
	14. viii	78	..	..	64	14	..	..	0·327
	28. viii	47	..	..	37	10	..	..	0·327
	12. ix	66	..	..	51	15	..	..	0·323
	25. ix	39	..	..	16	23	..	..	0·340
	9. x	48	..	..	31	17	..	..	0·331
	23. x	51	..	..	23	28	..	..	0·338
	17. xi	41	..	..	39	2	..	..	0·318
	20. x	35	..	..	1	34	..	..	0·304
I	6. i	1	..	1	..	..	..	..	..
	5. ii	27	..	17	10	..	..	..	0·275
	27. ii	30	..	22	7	1	..	..	0·276
	17. iii	43	..	27	16	..	..	..	0·279
	3. iv	20	..	8	12	..	..	..	0·287
	28. iv	15	..	2	13	..	..	..	0·297
	14. v	37	..	31	6	..	..	..	0·268
	2. vi	6	..	5	1	..	..	..	..
	18. vi	35	..	28	7	..	..	..	0·274
	3. vii	5	..	5	..	..	..	..	..
	17. vii	6	..	6	..	..	..	..	..
	31. vii	22	..	20	2	..	..	..	0·270
	14. viii	82	1	80	..	..	..	..	0·256
	28. viii	67	..	67	..	..	..	..	0·251
	12. ix	46	..	46	..	..	..	..	0·252
	25. ix	55	..	46	9	..	..	..	0·271
	9. x	54	..	54	..	..	..	..	0·255
	23. x	90	..	88	2	..	..	..	0·263
	17. xi	93	4	8	9	..	..	..	0·246
	20. xi	12	2	10	..	..	..	..	0·240

TABLE XII. *CENTROPAGES TYPICUS*. SIZES IN MM.

Stage	Date	No.	0·761–0·813	0·813–0·867	0·867–0·920	0·920–0·973	0·973–1·03	1·03–1·08	1·08–1·13	1·13–1·18	1·18–1·24	1·24–1·29	1·29–1·35	1·35–1·40	1·40–1·45	1·45–1·51	1·51–1·56	1·56–1·61	1·61–1·67	1·67–1·72
VI ♀	6. i	1	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	5. ii	3	1	..	1	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	3. iv	2	..	..	..	..	1	..	1	..	..	..	..	..	..	..	..	..	..	..
	14. v	4	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	2	1
	2. vi	2	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	1	..	..
	18. vi	1	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..
	3. vii	11	..	..	..	..	..	..	..	..	..	1	..	5	3	2	..	..	..	..
	17. vii	1	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..
	31. vii	3	..	..	..	..	..	..	..	..	..	1	1	1	..	..	..	..	..	..
	14. viii	5	..	..	..	..	..	..	..	..	1	1	2	1	..	..	..	..	..	..
	28. viii	5	..	..	..	..	..	..	..	..	..	2	2	1	..	..	..	..	..	..
	4. ix	8	..	..	..	..	..	..	..	..	..	4	3	1	..	..	..	..	..	..
	25. ix	33	..	..	..	..	..	..	1	6	14	5	6	1	..	..	..	..	..	..
	23. x	1	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..
	17. xi	4	..	..	..	..	..	..	..	..	..	..	4	..	..	..	..	..	..	..
	20. xi	3	..	..	..	..	..	..	..	..	1	1	1	..	..	..	..	..	..	..
	11. xii	1	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..
	28. i	3		..	..	..	..	..	1	1	1	..	..	..	..	..	..	..	..	..

Table XIII. *Temora longicornis*. Size in mm.

Stage	Date	No.	0·548–0·602	0·602–0·655	0·655–0·708	0·708–0·761	0·761–0·813	0·813–0·867	0·867–0·920	0·920–0·973	0·973–1·03	1·03–1·08	1·08–1·13	1·13–1·18	1·18–1·24	1·24–1·29	1·29–1·35	1·35–1·40	1·40–1·45	Median size
VI ♂	6. i	3	..	..	..	..	..	..	..	2	1	..	..	..	..	..	..	..	..	..
	14. ii	3	..	..	..	..	..	1	..	1	1	..	..	..	..	..	..	..	..	..
	3. iv	4	..	..	..	..	..	..	1	2	..	1	..	..	..	..	..	..	..	..
	15. iv	8	..	..	..	..	..	..	1	3	3	1	..	..	..	..	..	..	..	..
	28. iv	2	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..	..	..
	14. v	6	..	..	..	..	..	..	2	2	1	1	..	..	..	..	..	..	..	..
	2. vi	102	..	..	..	1	..	4	7	10	17	18	29	10	4	2	..	..	..	1·07
	18. vi	19	..	..	..	1	6	5	2	2	..	1	1	..	1	..	..	..	..	0·852
	3. vii	46	..	3	6	5	7	9	11	4	..	1	..	..	..	..	..	..	..	0·820
	17. vii	79	..	5	10	4	22	17	15	5	1	..	..	..	..	..	..	..	..	0·811
	31. vii	12	..	..	1	2	3	3	1	2	..	..	..	..	..	..	..	..	..	0·815
	14. viii	10	..	..	2	2	3	3	..	..	..	..	..	..	..	..	..	..	..	0·779
	28. viii	38	..	1	3	7	8	13	6	..	..	..	..	..	..	..	..	..	..	0·815
	12. ix	34	..	..	1	18	11	4	..	..	..	..	..	..	..	..	..	..	..	0·756
	25. ix	106	..	..	1	42	61	2	..	..	..	..	..	..	..	..	..	..	..	0·772
	9. x	2	..	..	..	..	1	1	..	..	..	..	..	..	..	..	..	..	..	..
	23. x	2	..	..	..	..	..	..	1	1	..	..	..	..	..	..	..	..	..	..
	17. xi	7	..	..	..	..	1	4	1	1	..	..	..	..	..	..	..	..	..	..
	26. xi	6	..	..	..	..	2	1	2	1	..	..	..	..	..	..	..	..	..	..
	11. xii	2	..	..	..	..	..	..	1	1	..	..	..	..	..	..	..	..	..	..
VI ♀	5. ii	9	..	..	..	..	1	2	1	1	2	2	..	..	..	..	..	..	..	..
	14. ii	2	..	..	..	..	..	..	..	..	2	..	..	..	..	..	..	..	..	..
	27. ii	1	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..
	17. iii	1	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..
	3. iv	2	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..	..	..	..
	15. iv	12	..	..	..	..	..	..	..	..	2	4	5	1	..	..	..	..	..	1·08
	28. iv	30	..	..	..	..	..	..	..	1	2	4	4	7	11	1	..	..	..	1·17
	14. v	17	..	..	..	..	..	..	..	..	4	3	2	3	1	2	1	1	..	1·11
	2. vi	75	..	..	..	..	2	3	5	4	5	7	11	8	14	8	4	3	1	1·14
	18. vi	14	..	..	..	..	..	1	1	4	5	2	..	..	1	..	..	..	..	0·983
	3. vii	48	..	..	5	6	10	7	8	7	3	2	..	..	..	..	..	..	..	0·851
	17. vii	68	..	..	10	8	8	16	11	9	4	2	..	..	..	..	..	..	..	0·839
	31. vii	9	..	..	..	1	1	1	2	2	2	..	..	..	..	..	..	..	..	..
	14. viii	7	..	..	..	..	..	4	1	1	1	..	..	..	..	..	..	..	..	..
	28. viii	47	..	..	..	5	13	12	12	4	..	1	..	..	..	..	..	..	..	0·840
	12. ix	18	..	..	1	5	6	3	3	..	..	..	..	..	..	..	..	..	..	0·797
	25. ix	120	..	..	5	14	36	48	15	2	..	..	..	..	..	..	..	..	..	0·819
	9. x	3	..	..	..	..	..	1	2	..	..	..	..	..	..	..	..	..	..	..
	23. x	4	..	..	..	..	1	1	..	..	..	2	..	..	..	..	..	..	..	..
	17. xi	11	..	..	..	..	..	4	3	2	..	1	1	..	..	..	..	..	..	0·894
	26. xi	16	..	..	..	..	1	2	3	5	3	2	..	..	..	..	..	..	..	0·956
	11. xii	5	..	..	..	..	..	1	4	..	..	..	..	..	..	..	..	..	..	..
V ♂	5. ii	3	..	..	..	..	1	2	..	..	..	..	..	..	..	..	..	..	..	..
	17. iii	1	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	3. iv	2	..	..	..	..	1	1	..	..	..	..	..	..	..	..	..	..	..	..
	15. iv	2	..	..	..	..	..	1	1	..	..	..	..	..	..	..	..	..	..	..
	28. iv	1	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..
	14. v	3	..	..	..	..	1	2	..	..	..	..	..	..	..	..	..	..	..	..
	2. vi	31	2	1	4	14	9	1	..	..	..	..	..	..	..	..	..	..	..	..
	18. vi	1	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	0·735

Stage	Date	No.	0·177–0·230	0·230–0·283	0·283–0·336	0·336–0·389	0·389–0·442	0·442–0·449	0·495–0·548	0·548–0·602	0·602–0·655	0·655–0·708	0·708–0·761	0·761–0·813	0·813–0·816	0·816–0·920	0·920–0·973	Median size
V ♂	3. vii	20	..	..	..	..	..	..	..	1	1	6	10	2	..	..	..	0·729
	17. vii	8	..	..	..	..	..	..	..	..	..	5	2	1	..	..	..	..
	31. vii	3	..	..	..	..	..	..	..	..	1	1	1	..	..	..	..	..
	14. viii	17	..	..	..	..	..	..	..	..	6	6	5	..	..	..	..	0·680
	28. viii	80	..	..	..	..	..	..	..	..	12	52	16	..	..	..	..	0·686
	12. ix	9	..	..	..	..	..	..	..	1	6	1	1	..	..	..	..	..
	25. ix	30	..	..	..	..	..	..	..	1	6	17	5	1	..	..	..	0·673
	9. x	1	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..
V ♀	5. ii	5	..	..	..	..	..	..	..	..	..	..	3	1	..	1	..	..
	3. iv	6	..	..	..	..	..	..	..	..	..	..	..	1	3	2	..	..
	15. iv	3	..	..	..	..	..	..	..	..	..	..	..	..	2	1	..	..
	28. iv	7	..	..	..	..	..	..	..	..	..	..	1	..	1	2	3	..
	14. v	8	..	..	..	..	..	..	..	..	..	1	1	3	2	..	1	..
	2. vi	21	..	..	..	..	..	..	..	1	..	2	5	12	1	..	..	0·770
	18. vi	3	..	..	..	..	..	..	..	..	..	..	1	2	..	..	..	..
	3. vii	35	..	..	..	..	..	..	..	..	2	3	17	13	..	..	..	0·750
	17. vii	14	..	..	..	..	..	..	..	..	..	3	8	2	1	..	..	0·725
	31. vii	1	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..
	14. viii	40	..	..	..	..	..	..	..	..	1	23	14	2	..	..	..	0·699
	28. viii	64	..	..	..	..	..	..	..	..	9	27	28	..	..	..	..	0·700
	12. ix	12	..	..	..	..	..	..	..	..	8	2	2	..	..	..	..	0·650
	25. ix	16	..	..	..	..	..	..	..	..	4	16	6	..	..	..	..	0·688
	9. x	1	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..
	23. x	1	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..
	26. x	1	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..
IV ♂	5. ii	1	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..
	17. iii	1	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..
	3. iv	1	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..
	15. iv	1	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..
	14. v	2	..	..	..	..	..	..	..	..	1	..	..	1	..	..	..	..
	2. vi	9	..	..	..	..	..	..	1	7	1	..	..	..	..	..	..	..
	3. vii	1	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..
	31. vii	2	..	..	..	..	..	..	..	..	2	..	..	..	..	..	..	..
	14. viii	19	..	..	..	..	..	1	10	8	..	..	..	..	..	..	..	0·545
	28. viii	19	..	..	..	..	..	..	5	14	..	..	..	..	..	..	..	0·557
	12. ix	3	..	..	..	..	..	..	..	3	..	..	..	..	..	..	..	..
	25. ix	11	..	..	..	..	..	..	3	7	1	..	..	..	..	..	..	0·568
IV ♀	14. ii	1	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..
	17. iii	2	..	..	..	..	..	..	..	..	1	1	..	..	..	..	..	..
	3. iv	7	..	..	..	..	..	..	..	..	1	4	2	..	..	..	..	..
	15. iv	2	..	..	..	..	..	..	..	..	2	..	..	..	..	..	..	..
	28. iv	4	..	..	..	..	..	..	..	..	..	2	2	..	..	..	..	..
	14. v	9	..	..	..	..	..	..	..	3	3	3	..	..	..	..	..	..
	2. vi	34	..	..	..	..	..	2	5	14	10	3	..	..	..	..	..	0·590
	18. vi	15	..	..	..	..	..	..	..	3	8	4	..	..	..	..	..	0·622
	3. vi	36	..	..	..	..	..	..	..	17	17	2	..	..	..	..	..	0·604
	17. vii	1	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..
	14. viii	79	..	..	..	..	..	..	27	50	2	..	..	..	..	..	..	0·562
	28. viii	198	..	..	..	..	..	..	63	122	13	..	..	..	..	..	..	0·560
	12. ix	24	..	..	..	..	..	..	16	6	2	..	..	..	..	..	..	0·542
	25. ix	27	..	..	..	..	..	..	7	15	5	..	..	..	..	..	..	0·525
	9. x	1	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..

Table XIII (*continued*)

Stage	Date	No.	0·177–0·230	0·230–0·283	0·283–0·336	0·336–0·389	0·389–0·442	0·442–0·495	0·495–0·548	0·548–0·602	0·602–0·655	0·655–0·708	0·708–0·761	0·761–0·813	0·813–0·867	0·867–0·920	0·920–0·973	Median size
III	5. ii	1	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..
	27. ii	1	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..
	3. iv	..	..	..	..	..	..	..	1	2	..	..	..	..	..	..	..	..
	28. iv	10	..	..	..	..	..	..	5	4	1	..	..	..	..	..	..	0·557
	14. v	6	..	..	..	..	..	1	3	2	..	..	..	..	..	..	..	..
	2. vi	40	..	..	..	..	4	33	3	..	..	..	..	..	..	..	..	0·466
	18. vi	15	..	..	..	..	..	7	8	..	..	..	..	..	..	..	..	0·497
	3. vii	21	..	..	..	..	1	13	6	1	..	..	..	..	..	..	..	0·485
	17. vii	1	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..
	31. vii	2	..	..	..	..	..	1	1	..	..	..	..	..	..	..	..	..
	14. viii	97	..	..	..	..	21	74	2	..	..	..	..	..	..	..	..	0·455
	28. viii	78	..	..	..	..	22	55	1	..	..	..	..	..	..	..	..	0·452
	12. ix	17	..	..	..	..	4	12	1	..	..	..	..	..	..	..	..	0·459
	25. ix	8	..	..	..	..	..	4	4	..	..	..	..	..	..	..	..	..
	9. x	2	..	..	..	..	..	..	2	..	..	..	..	..	..	..	..	..
	23. x	1	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..
II	27. ii	2	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..
	17. iii	10	..	..	..	..	10	..	..	..	..	..	..	..	..	..	..	0·412
	3. iv	6	..	..	..	..	5	1	..	..	..	..	..	..	..	..	..	..
	28. iv	9	..	..	..	..	3	6	..	..	..	..	..	..	..	..	..	..
	14. v	21	..	..	..	..	20	1	..	..	..	..	..	..	..	..	..	0·417
	2. vi	25	..	..	..	18	7	..	..	..	..	..	..	..	..	..	..	0·382
	18. vi	25	..	..	..	2	23	..	..	..	..	..	..	..	..	..	..	0·418
	3. vii	15	..	..	..	6	9	..	..	..	..	..	..	..	..	..	..	0·395
	31. vii	8	..	..	..	3	5	..	..	..	..	..	..	..	..	..	..	..
	14. viii	38	..	..	1	37	..	..	..	..	..	..	..	..	..	..	..	0·366
	28. viii	47	..	..	..	33	14	..	..	..	..	..	..	..	..	..	..	0·374
	12. ix	7	..	..	..	5	2	..	..	..	..	..	..	..	..	..	..	..
	25. ix	11	..	..	..	5	6	..	..	..	..	..	..	..	..	..	..	0·396
	9. x	1	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..
I	5. ii	2	..	..	1	1	..	..	..	..	..	..	..	..	..	..	..	..
	27. ii	3	..	1	2	..	..	..	..	..	..	..	..	..	..	..	..	0·325
	17. iii	42	..	..	36	6	..	..	..	..	..	..	..	..	..	..	..	..
	3. iv	6	..	..	4	2	..	..	..	..	..	..	..	..	..	..	..	0·344
	28. iv	1	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..
	14. v	37	..	..	9	28	..	..	..	..	..	..	..	..	..	..	..	0·302
	2. vi	21	..	..	21	..	..	..	..	..	..	..	..	..	..	..	..	0·338
	18. vi	23	..	..	10	13	..	..	..	..	..	..	..	..	..	..	..	..
	3. vii	5	..	..	4	1	..	..	..	..	..	..	..	..	..	..	..	..
	17. vii	1	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..
	31. vii	14	..	..	14	..	..	..	..	..	..	..	..	..	..	..	..	0·309
	14. viii	52	..	10	42	..	..	..	..	..	..	..	..	..	..	..	..	0·294
	28. viii	23	..	3	20	..	..	..	..	..	..	..	..	..	..	..	..	0·294
	12. ix	8	..	8	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	25. ix	14	..	..	13	1	..	..	..	..	..	..	..	..	..	..	..	0·295

Table XIV. *Acartia clausi*. Size in mm.

Stage	Date	No.	0·602–0·655	0·655–0·708	0·708–0·761	0·761–0·814	0·814–0·867	0·867–0·920	0·920–0·973	0·973–1·03	1·03–1·08	1·08–1·13	1·13–1·18	Median size
VI ♂	14. ii	2	..	..	..	1	1	..	..	..	..	..	..	..
	3. iv	2	..	..	..	..	2	..	..	..	..	..	..	..
	15. iv	37	..	..	..	..	..	..	23	14	..	..	..	0·966
	28. iv	16	..	..	..	..	..	..	13	3	..	..	..	0·965
	14. v	36	..	..	..	..	..	6	28	2	..	..	..	0·943
	2. vi	88	..	..	..	..	7	74	7	..	..	..	..	0·894
	18. vi	35	..	..	..	..	18	16	1	..	..	..	..	0·866
	3. vii	96	..	..	..	1	56	37	2	..	..	..	..	0·860
	17. vii	122	..	..	1	6	81	31	3	..	..	..	..	0·852
	31. vii	87	..	..	..	1	67	19	..	..	..	..	..	0·847
	14. viii	65	..	..	4	44	16	1	..	..	..	..	..	0·798
	28. viii	46	..	..	1	30	15	..	..	..	..	..	..	0·807
	12. ix	30	..	..	1	17	12	..	..	..	..	..	..	0·810
	25. ix	29	..	..	..	25	4	..	..	..	..	..	..	0·802
	9. x	5	..	..	..	2	3	..	..	..	..	..	..	..
	17. xi	3	..	..	..	..	3	..	..	..	..	..	..	..
	26. xi	17	..	..	..	2	15	..	..	..	..	..	..	0·836
	11. xii	2	..	..	..	..	2	..	..	..	..	..	..	..
	7. i	6	..	..	..	1	3	2	..	..	..	..	..	..
	28. i	1	..	..	..	..	1	..	..	..	..	..	..	..
VI ♀	6. i	9	..	..	..	1	2	5	1	..	..	..	..	..
	5. ii	3	..	..	..	2	..	1	..	..	..	..	..	..
	14. ii	12	..	..	..	2	7	2	1	..	..	..	..	0·838
	27. ii	3	..	..	..	..	2	1	..	..	..	..	..	..
	17. iii	41	..	..	..	7	21	18	..	..	..	..	..	0·851
	3. iv	6	..	..	..	2	1	1	..	..	..	1	1	..
	15. iv	17	..	..	..	..	..	..	..	..	4	11	2	1·10
	28. iv	63	..	..	..	..	..	..	..	..	2	40	21	1·12
	14. v	80	..	..	..	..	..	3	3	3	29	32	10	1·08
	2. vi	92	..	..	..	..	..	2	22	45	19	3	1	0·992
	18. vi	31	..	..	..	..	..	5	16	9	1	..	..	0·960
	3. vii	76	..	..	..	..	..	14	49	13	..	..	..	0·944
	17. vii	138	..	..	..	..	1	34	84	17	1	1	..	0·936
	31. vii	54	..	..	..	..	..	13	35	6	..	..	..	0·936
	14. viii	69	..	..	..	17	32	16	4	..	..	..	..	0·836
	28. viii	62	..	..	..	13	29	17	3	..	..	..	..	0·845
	12. ix	59	..	..	..	9	35	15	..	..	..	..	..	0·845
	25. ix	105	..	..	1	30	61	13	..	..	..	..	..	0·834
	9. x	46	..	..	2	11	23	10	..	..	..	..	..	0·834
	23. x	8	..	..	1	2	3	2	..	..	..	..	..	..
	17. xi	9	..	..	1	2	4	2	..	..	..	..	..	..
	26. xi	21	..	1	4	4	9	3	..	..	..	..	..	0·824
	11. xii	6	..	..	..	3	3	..	..	..	..	..	..	..
	7. i	12	..	..	..	1	3	6	2	..	..	..	..	0·876
	28. i	15	..	..	1	1	6	4	3	..	..	..	..	0·865
V ♂	17. ii	1	..	..	1	..	..	..	..	..	..	..	..	..
	3. iv	4	..	..	4	..	..	..	..	..	..	..	..	..
	15. iv	15	..	..	..	..	12	3	..	..	..	..	..	0·851
	28. iv	2	..	..	..	..	1	1	..	..	..	..	..	..
	14. v	50	..	..	1	23	26	..	..	..	..	..	..	0·815
	2. vi	51	..	..	11	40	..	..	..	..	..	..	..	0·773
	18. vi	24	..	..	3	19	2	..	..	..	..	..	..	0·787
	3. vii	20	..	1	14	5	..	..	..	..	..	..	..	0·750
	17. vii	1	..	..	1	..	..	..	..	..	..	..	..	..
	31. vii	12	..	..	8	4	..	..	..	..	..	..	..	0·755
	14. viii	25	2	17	6	..	..	..	..	..	..	..	..	0·700
	28. viii	12	..	3	9	..	..	..	..	..	..	..	..	0·714
	12. ix	9	..	6	3	..	..	..	..	..	..	..	..	..
	25. ix	10	1	4	5	..	..	..	..	..	..	..	..	..
	9. x	1	..	..	1	..	..	..	..	..	..	..	..	0·707
V ♀	17. xi	3	..	..	3	..	..	..	..	..	..	..	..	..
	5. ii	2	..	..	..	..	..	2	..	..	..	..	..	..
	14. ii	2	..	..	..	..	..	1	1	..	..	..	..	..
	17. iii	1	..	..	..	..	..	1	..	..	..	..	..	..
	3. iv	1	..	..	..	..	..	..	1	..	..	..	..	..
	15. iv	8	..	..	..	..	..	3	4	1	..	..	..	..
	28. iv	6	..	..	..	..	..	4	2	..	..	..	..	..
	14. v	35	..	..	..	2	18	15	..	..	..	..	..	0·859
	2. vi	44	..	..	3	31	10	..	..	..	..	..	..	0·792
	18. vi	25	..	..	..	5	13	7	..	..	..	..	..	0·845
	3. vii	15	..	..	5	8	2	..	..	..	..	..	..	0·776
	17. vii	7	..	..	2	5	..	..	..	..	..	..	..	..
	31. vii	16	..	..	3	13	..	..	..	..	..	..	..	0·784
	14. viii	42	..	27	15	..	..	..	..	..	..	..	..	0·700
	28. viii	20	..	6	14	..	..	..	..	..	..	..	..	0·715
	12. ix	29	..	20	9	..	..	..	..	..	..	..	..	0·693
	25. ix	26	..	11	14	1	..	..	..	..	..	..	..	0·714
	9. x	10	1	9	..	..	..	..	..	..	..	..	..	0·672

Table XIV (*continued*)

Stage	Date	No.	0·283–0·336	0·336–0·389	0·389–0·442	0·442–0·495	0·495–0·548	0·548–0·602	0·602–0·655	0·655–0·708	0·708–0·761	0·761–0·813	Median size
IV ♂	17. iii	1	..	..	..	..	..	..	1	..	..	..	..
	3. iv	4	..	..	..	..	..	..	..	..	4	..	..
	15. iv	15	..	..	..	..	..	..	..	2	13	..	0·729
	28. iv	3	..	..	..	..	..	..	..	..	3	..	..
	14. v	53	..	..	..	..	..	..	9	33	11	..	0·689
	2. vi	26	..	..	..	..	..	..	22	4	..	..	0·640
	18. vi	16	..	..	..	..	..	..	14	2	..	..	0·664
	3. vii	25	..	..	..	..	..	1	21	3	..	..	0·638
	17. vii	2	..	..	..	..	..	1	1	..	..	..	..
	31. vii	17	..	..	..	..	..	..	15	2	..	..	0·645
	14. viii	26	..	..	..	..	..	13	13	..	..	..	0·602
	28. viii	10	..	..	..	..	..	4	6	..	..	..	0·605
	12. ix	22	..	..	..	..	..	13	9	..	..	..	0·596
	25. ix	4	..	..	..	..	..	2	2	..	..	..	..
	9. x	4	..	..	..	..	..	1	3	..	..	..	..
	17. xi	2	..	..	..	..	..	..	2	..	..	..	..
IV ♀	5. ii	2	..	..	..	..	..	1	1	..	..	..	..
	17. iii	1	..	..	..	..	..	..	1	..	..	..	..
	3. iv	1	..	..	..	..	..	..	..	..	..	1	..
	15. iv	14	..	..	..	..	..	..	..	..	8	6	0·758
	28. iv	7	..	..	..	..	..	..	..	..	4	3	..
	14. v	65	..	..	..	..	..	1	2	29	33	..	0·710
	2. vi	34	..	..	..	..	..	1	19	14	..	..	0·650
	18. vi	15	..	..	..	..	..	..	..	13	2	..	0·685
	3. vii	17	..	..	..	..	..	1	10	6	..	..	0·648
	17. vii	2	..	..	..	..	..	..	1	1	..	..	0·650
	31. vii	22	..	..	..	..	..	..	13	9	..	..	0·595
	14. viii	23	..	..	..	..	..	16	6	1	..	..	0·595
	28. viii	45	..	..	..	..	..	30	15	..	..	..	0·590
	12. ix	37	..	..	..	..	2	21	14	..	..	..	..
	25. ix	9	..	..	..	..	..	6	3	..	..	..	..
	9. x	3	..	..	..	..	..	2	1	..	..	..	..
	17. xi	6	..	..	..	..	..	2	4	..	..	..	..
III	5. ii	1	..	..	..	..	..	1	..	..	..	..	..
	17. iii	1	..	..	..	..	..	1	..	..	..	..	..
	3. iv	4	..	..	..	..	2	2	..	..	..	..	..
	15. iv	5	..	..	..	..	..	..	4	1	..	..	..
	28. iv	8	..	..	..	..	..	..	7	1	..	..	..
	14. v	31	..	..	..	..	..	17	14	..	..	..	0·600
	2. vi	56	..	..	..	1	43	12	..	..	..	..	0·536
	18. vi	34	..	..	..	..	7	26	1	..	..	..	0·569
III	3. vii	28	..	..	..	1	22	5	..	..	..	..	..
	17. vii	6	..	..	..	..	5	1	..	..	..	..	..
	31. vii	36	..	..	..	..	25	11	..	..	..	..	0·529
	14. viii	44	..	..	..	15	28	1	..	..	..	..	0·542
	28. viii	18	..	..	..	4	13	1	..	..	..	..	0·502
	12. ix	9	..	..	..	6	3	..	..	..	..	..	0·505
	25. ix	3	..	..	..	1	2	..	..	..	..	..	..
	9. x	2	..	..	..	..	2	..	..	..	..	..	..
	17. xi	3	..	..	..	..	3	..	..	..	..	..	..
	11. xii	1	..	..	..	..	1	..	..	..	..	..	..
II	17. iii	1	..	..	1	..	..	..	..	..	..	..	..
	3. iv	6	..	..	..	2	2	2	..	..	..	..	..
	28. iv	13	..	..	..	3	10	..	..	..	..	..	0·516
	14. v	38	..	..	..	16	22	..	..	..	..	..	0·498
	2. vi	48	..	..	34	14	..	..	..	..	..	..	0·434
	18. vi	36	..	..	..	35	1	..	..	..	..	..	0·455
	3. vii	20	..	..	4	16	..	..	..	..	..	..	0·453
	17. vii	7	..	..	6	1	..	..	..	..	..	..	0·443
	31. vii	49	..	..	24	25	..	..	..	..	..	..	..
	14. viii	8	..	1	7	..	..	..	..	..	..	..	..
	28. viii	3	..	..	3	..	..	..	..	..	..	..	..
	12. ix	2	..	..	2	..	..	..	..	..	..	..	..
	25. ix	1	..	..	1	..	..	..	..	..	..	..	..
	9. x	2	..	1	1	..	..	..	..	..	..	..	..
	23. x	3	..	..	3	..	..	..	..	..	..	..	..
	17. xi	8	..	..	7	1	..	..	..	..	..	..	..
	11. xii	4	..	..	3	1	..	..	..	..	..	..	..
I	17. iii	1	..	1	..	..	..	..	..	..	..	..	..
	3. iv	10	..	..	10	..	..	..	..	..	..	..	0·415
	28. iv	17	..	1	15	1	..	..	..	..	..	..	0·427
	14. v	35	..	15	20	..	..	..	..	..	..	..	0·392
	2. vi	23	2	21	..	..	..	..	..	..	..	..	0·356
	18. vi	34	..	29	5	..	..	..	..	..	..	..	0·369
	3. vii	19	1	17	1	..	..	..	..	..	..	..	0·356
	17. vii	7	1	6	..	..	..	..	..	..	..	..	..
	31. vii	82	5	77	..	..	..	..	..	..	..	..	0·331
	14. viii	6	6	..	..	..	..	..	..	..	..	..	..
	28. viii	10	7	3	..	..	..	..	..	..	..	..	0·338
	12. ix	1	1	..	..	..	..	..	..	..	..	..	..
	25. ix	5	..	5	..	..	..	..	..	..	..	..	..
	9. x	3	2	1	..	..	..	..	..	..	..	..	..
	23. x	4	3	1	..	..	..	..	..	..	..	..	..
	17. xi	7	1	5	1	..	..	..	..	..	..	..	..
	11. xii	2	..	2	..	..	..	..	..	..	..	..	..

TABLE XV. *OITHONA SIMILIS*. SIZE IN MM.

Stage	Date	No.	0·301–0·336	0·336–0·372	0·372–0·407	0·407–0·442	0·442–0·477	0·477–0·513	0·513–0·548	0·548–0·584	Median size
VI ♂	6. i	12	..	..	4	6	2	..	..	..	0·428
	5. ii	9	..	..	..	3	5	1	..	..	..
	27. ii	7	..	..	..	1	6	..	..	..	..
	17. iii	6	..	..	..	2	1	3	..	..	..
	3. iv	14	..	..	..	..	1	12	1	..	0·493
	28. iv	9	..	..	..	..	..	9	..	..	..
	14. v	16	..	..	..	..	9	4	2	1	0·475
	2. vi	12	..	..	..	1	6	5	..	..	0·474
	18. vi	23	..	..	..	3	17	3	..	..	0·461
	3. vii	16	..	..	..	2	14	..	..	..	0·453
	17. vii	33	..	..	2	21	10	..	..	..	0·435
	31. vii	41	..	..	3	20	18	..	..	..	0·440
	14. viii	31	..	..	2	26	3	..	..	..	0·427
	28. viii	19	..	..	1	17	1	..	..	..	0·430
	12. ix	7	..	..	..	6	1	..	..	..	..
	25. ix	11	..	..	1	9	1	..	..	..	0·433
	9. x	6	..	..	1	5	..	..	..	..	..
	23. x	2	..	..	2	..	..	..	..	..	..
	17. xi	9	..	..	3	6	..	..	..	..	..
	11. xii	3	..	..	1	2	..	..	..	..	..
VI ♀	6. i	68	..	..	6	33	29	..	..	..	0·438
	5. ii	31	..	..	4	13	12	2	..	..	0·438
	27. ii	41	..	..	..	6	22	13	..	..	0·467
	17. iii	102	..	..	..	11	47	36	8	..	0·473
	3. iv	64	..	..	..	2	13	15	17	17	0·517
	28. iv	47	..	..	..	..	3	13	25	6	0·533
	14. v	43	..	..	..	..	1	15	25	3	0·523
	2. vi	54	..	..	..	..	17	24	10	3	0·491
	18. vi	66	..	..	..	1	40	25	..	..	0·474
	3. vii	63	..	..	..	1	32	29	1	..	0·477
	17. vii	186	..	..	..	49	121	15	1	..	0·453
	31. vii	173	..	..	..	13	129	25	5	1	0·465
	14. viii	179	..	..	4	100	72	3	..	..	0·439
	28. viii	109	..	..	2	37	51	17	2	..	0·448
	12. ix	148	..	..	4	88	53	3	..	..	0·438
	25. ix	116	..	..	1	69	45	1	..	..	0·438
	9. x	61	..	..	4	45	12	..	..	..	0·430
	23. x	31	..	..	2	23	5	..	..	..	0·430
	17. xi	38	..	..	2	23	13	..	..	..	0·435
	11. xii	28	..	..	1	12	15	..	..	..	0·444
V ♂	6. i	29	..	..	9	12	8	..	..	..	0·417
	5. ii	22	..	1	9	5	7	..	..	..	0·428
	27. ii	20	..	..	..	1	12	7	..	..	0·460
	17. iii	38	..	..	2	11	22	3	..	..	0·457
	3. iv	64	..	..	..	..	7	47	10	..	0·498
	28. iv	20	..	..	..	..	3	14	3	..	0·494
	14. v	46	..	..	..	13	18	15	..	..	0·460
	2. vi	15	..	..	..	33	39	3	..	..	0·447
	18. vi	69	..	..	2	37	29	1	..	..	0·440
	3. vii	55	..	..	1	24	30	..	..	..	0·445
	17. vii	104	..	..	40	57	7	..	..	..	0·414
	31. vii	102	..	..	6	54	42	..	..	..	0·437
	14. viii	104	..	1	46	52	2	..	..	..	0·409
	28. viii	82	..	1	30	42	8	..	..	..	0·419
	12. ix	108	..	..	33	71	4	..	..	..	0·419
	25. ix	70	..	..	16	44	10	..	..	..	0·426
	9. x	58	..	1	29	27	1	..	..	..	0·406
	23. x	47	..	4	25	18	..	..	..	..	0·402
	17. xi	18	..	..	6	12	..	..	..	..	0·418
	11. xii	28	..	..	3	17	8	..	..	..	0·434
IV	6. i	8	..	4	4	..	..	..	..	..	..
	5. ii	28	7	9	10	2	..	..	..	..	0·354
	27. ii	10	..	2	6	1	1	..	..	..	0·389
	17. iii	25	..	7	5	13	..	..	..	..	0·401
	3. iv	56	..	..	5	32	18	1	..	..	0·417
	28. iv	16	..	..	1	9	6	..	..	..	0·438
	14. v	36	..	5	12	19	..	..	..	..	0·423
	2. vi	44	..	3	29	12	..	..	..	..	0·397
	18. vi	60	..	9	46	5	..	..	..	..	0·388
	3. vii	26	..	5	20	1	..	..	..	..	0·388
	17. vii	103	..	80	23	..	..	..	..	..	0·360
	31. vii	103	..	20	82	1	..	..	..	..	0·384
	14. viii	79	3	63	13	..	..	..	..	..	0·358

Table XV (*continued*)

Stage	Date	No.	0·301–0·336	0·336–0·372	0·372–0·407	0·407–0·442	0·442–0·477	0·477–0·513	0·513–0·548	0·458–0·584	Median size
IV	28. viii	35	..	20	15	..	..	..	..	..	0·369
	12. ix	108	2	70	36	..	..	..	..	..	0·365
	25. ix	21	..	5	16	..	..	..	..	..	0·380
	9. x	36	2	29	5	..	..	..	..	..	0·353
	23. x	29	1	22	6	..	..	..	..	..	0·358
	17. xi	14	..	8	6	..	..	..	..	..	0·379
	11. xii	28	..	11	14	3	..	..	..	..	0·378

Stage	Date	No.	0·159–0·195	0·195–0·230	0·230–0·265	0·265–0·301	0·301–0·336	0·336–0·372	0·372–0·407	0·407–0·442	Median size
III	6. i	13	..	..	..	..	7	6	..	..	0·334
	5. ii	26	..	..	..	3	19	4	..	..	0·321
	27. ii	19	..	..	..	..	5	13	1	..	0·343
	17. iii	23	..	..	..	..	1	11	11	..	0·371
	3. iv	43	..	..	..	..	..	7	36	..	0·382
	28. iv	24	..	..	..	..	..	1	23	..	0·384
	14. v	25	..	..	..	..	12	10	3	..	0·339
	2. vi	42	..	..	..	1	11	30	..	..	0·346
	18. vi	36	..	..	..	..	11	25	..	..	0·344
	3. vii	42	..	..	..	..	8	34	..	..	0·346
	17. vii	87	..	..	..	6	78	3	..	..	0·314
	31. vii	37	..	..	..	..	15	22	..	..	0·339
	14. viii	61	..	..	..	5	56	..	..	..	0·313
	28. viii	44	..	..	..	..	37	7	..	..	0·328
	12. ix	96	..	..	..	7	80	9	..	..	0·321
	25. ix	33	..	..	..	..	16	17	..	..	0·337
	9. x	29	..	..	..	1	28	..	..	..	0·318
	23. x	27	..	..	..	..	22	5	..	..	0·326
	17. xi	13	..	..	..	..	10	3	..	..	0·328
	11. xii	24	..	..	..	..	5	19	..	..	0·346
II	6. i	7	..	..	..	7	..	..	..	..	..
	5. ii	15	..	..	7	7	1	..	..	..	0·274
	27. ii	12	..	..	1	11	..	..	..	..	0·277
	17. iii	38	..	..	..	18	20	..	..	..	0·302
	3. iv	45	..	..	..	13	31	1	..	..	0·307
	28. iv	20	..	..	..	7	13	..	..	..	0·305
	14. v	35	..	..	9	15	11	..	..	..	0·291
	2. vi	66	..	..	..	65	1	..	..	..	0·282
	18. vi	67	..	..	14	53	..	..	..	..	0·274
	3. vii	36	..	..	1	34	1	..	..	..	0·284
	17. vii	30	..	1	26	3	..	..	..	..	0·255
	31. vii	51	..	..	10	41	..	..	..	..	0·274
	14. viii	42	..	..	35	7	..	..	..	..	0·257
	28. viii	59	..	..	32	27	..	..	..	..	0·264
	12. ix	121	..	..	78	43	..	..	..	..	0·261
	25. ix	37	..	..	6	31	..	..	..	..	0·275
	9. x	30	..	..	27	3	..	..	..	..	0·254
	23. x	27	..	..	2	25	..	..	..	..	0·276
	17. xi	9	..	..	3	6	..	..	..	..	..
	11. xii	19	..	..	4	15	..	..	..	..	0·280
I	6. i	4	..	1	3	..	..	..	..	..	..
	5. ii	9	..	4	4	1	..	..	..	..	..
	27. ii	24	..	16	8	..	..	..	..	..	0·225
	17. iii	39	..	18	21	..	..	..	..	..	0·231
	3. iv	35	..	10	25	..	..	..	..	..	0·236
	28. iv	15	..	5	10	..	..	..	..	..	0·235
	14. v	27	1	11	15	..	..	..	..	..	0·232
	2. vi	78	..	55	23	..	..	..	..	..	0·225
	18. vi	55	..	49	6	..	..	..	..	..	0·219
	3. vii	43	..	35	8	..	..	..	..	..	0·222
	17. vii	39	7	31	1	..	..	..	..	..	0·204
	31. vii	70	..	69	1	..	..	..	..	..	0·215
	14. viii	71	14	57	..	..	..	..	..	..	0·202
	28. viii	59	2	57	..	..	..	..	..	..	0·204
	12. ix	90	..	90	..	..	..	..	..	..	0·208
	25. ix	57	..	46	11	..	..	..	..	..	0·222
	9. x	33	1	32	..	..	..	..	..	..	0·204
	23. x	28	..	28	..	..	..	..	..	..	0·219
	17. xi	19	..	19	..	..	..	..	..	..	0·213
	11. xii	..	..	8	..	..	..	..	..	..	..

Table XVI. *Oithona nana*. Size in mm.

Stage	Date	No.	0·124–0·159	0·159–0·195	0·195–0·230	0·230–0·265	0·265–0·301	0·301–0·336	0·336–0·372	0·372–0·407	Median size
VI ♂	12. ix	8	..	..	..	..	1	7	..	..	..
	25. ix	6	..	..	..	..	..	6	..	..	..
	9. x	7	..	..	..	..	..	7	..	..	..
	23. x	..	..	..	..	..	..	..	..	..	..
	17. xi	2	..	..	..	..	..	2	..	..	..
	20. xi	6	..	..	..	..	..	6	..	..	..
	11. xii	6	..	..	..	..	3	3	..	..	..
VI ♀	12. ix	17	..	..	..	..	..	15	2	..	0·325
	25. ix	22	..	..	..	..	1	15	6	..	0·330
	9. x	23	..	..	..	..	..	21	2	..	0·328
	23. x	4	..	..	..	..	..	2	2	..	..
	17. xi	25	..	..	..	..	..	13	12	..	0·335
	20. xi	41	..	..	..	..	8	31	2	..	0·310
	11. xii	14	..	..	..	..	..	11	3	..	0·330
V	12. ix	17	..	..	..	..	9	7	1	..	0·300
	25. ix	3	..	..	..	..	..	3	..	..	..
	9. x	42	..	..	..	..	28	14	..	..	0·296
	23. x	13	..	..	..	..	9	4	..	..	0·294
	17. xi	8	..	..	..	..	4	4	..	..	..
	20. xi	27	..	..	..	..	26	1	..	..	0·282
	11. xii	10	..	..	..	..	..	10	..	..	0·310
IV	12. ix	2	..	..	..	2	..	..	..	..	..
	25. ix	6	..	..	..	..	6	..	..	..	..
	9. x	68	..	..	..	52	16	..	..	..	0·259
	23. x	24	..	..	..	12	12	..	..	..	0·265
	17. xi	25	..	..	..	15	10	..	..	..	0·262
	20. xi	28	..	..	..	24	4	..	..	..	0·254
	11. xii	8	..	..	..	..	8	..	..	..	..
III	12. ix	2	..	..	1	1	..	..	..	..	..
	25. ix	..	..	..	..	6	..	..	..	..	..
	9. x	87	..	..	28	59	..	..	..	..	0·234
	23. x	36	..	..	7	29	..	..	..	..	0·238
	17. xi	7	..	..	3	4	..	..	..	..	..
	20. xi	6	..	..	3	3	..	..	..	..	..
	11. xii	14	..	..	..	14	..	..	..	..	0·244
II	12. ix	5	..	5	..	..	..	..	..	..	..
	25. ix	7	..	1	6	..	..	..	..	..	..
	9. x	58	..	37	21	..	..	..	..	..	0·191
	23. x	58	..	27	31	..	..	..	..	..	0·196
	17. xi	10	..	8	2	..	..	..	..	..	0·188
	20. xi	5	..	5	..	..	..	..	..	..	..
	11. xii	30	..	17	13	..	..	..	..	..	0·194
I	12. ix	13	12	1	..	..	..	..	..	..	0·151
	25. ix	12	11	1	..	..	..	..	..	..	0·151
	9. x	183	183	..	..	..	..	..	..	..	0·151
	23. x	89	88	1	..	..	..	..	..	..	0·151
	17. xi	24	24	..	..	..	..	..	..	..	0·151
	20. xi	1	1	..	..	..	..	..	..	..	..
	11. xii	74	74	..	..	..	..	..	..	..	0·151

Table XVII. *Corycaeus anglicus*. Size in mm.

Stage	Date	No.	0·442–0·495	0·495–0·548	0·548–0·602	0·602–0·655	0·655–0·708	0·708–0·761	Median size
VI ♂	14. viii	3	..	2	1	..	..	..	..
	28. viii	20	..	14	6	..	..	..	0·535
	12. ix	59	..	26	33	..	..	..	0·552
	25. ix	15	..	7	8	..	..	..	0·550
	9. x	72	..	44	28	..	..	..	0·544
	23. x	126	1	84	41	..	..	..	0·539
	17. xi	60	..	33	27	..	..	..	0·546
	20. xi	100	..	78	22	..	..	..	0·537
	11. xii	26	1	21	4	..	..	..	0·536
VI ♀	14. viii	3	..	..	..	..	3	..	..
	28. viii	6	..	..	..	..	6	..	..
	12. ix	25	..	..	..	2	20	3	0·681
	25. ix	13	..	..	..	3	10	..	0·666
	9. x	63	..	..	..	7	50	6	0·686
	23. x	96	..	..	..	47	49	..	0·655
	17. xi	45	..	..	..	21	24	..	0·656
	20. xi	29	..	..	..	18	11	..	0·649
	11. xii	15	..	..	..	11	4	..	0·633

Table XVIII. Cruises of January 1947.

(Numbers of copepods per m.³)

	Cruise A (6–8 January)			Cruise C (17–18 January)	
Station No. ..	1	6	7	2	4
Position ..	50° 02′ N., 4° 22′ W. (= E 1)	48° 34′ N., 5° 13′ W.	48° 49′ N., 5° 23′ W.	49° 46′ N., 6° 00′ W.	49° 46′ N., 6° 34′ W.
Calanus finmarchicus	..	27	15	11	20
Pseudocalanus elongatus	86	52	29	87	42
Paracalanus parvus	121	34	53	66	71
Centropages typicus	2	..	..	..	..
C. hamatus	..	..	..	..	..
Temora longicornis	4	..	..	..	..
Metrida lucens	..	2	11	14	71
Acartia clausi	5	..	..	..	..
Oithona similis	141	263	229	95	144
Median size of *Oithona* VI, ♀ (mm.)	3·438	0·434	..	0·479	0·475
Median size of *Paracalanus* VI, ♀ (mm.)	0·772	0·810	..	0·890	0·875

Table XIX. Cruise of 26–27 June 1947

(Numbers of copepods per m.³)

	L 4	1	2	3	4	5	6
Position ..	50° 15′ N., 4° 13′ W.	50° 03′ N., 4° 30′ W.	49° 56′ N., 4° 45′ W.	49° 30′ N., 5° 03′ W.	49° 14′ N., 5° 20′ W.	49° 14′ N., 5° 53′ W.	49° 14′ N., 6° 12′ W.
Calanus finmarchicus	30	30	53	960	180	70	130
Pseudocalanus elongatus	3040	2060	2454	3780	1225	1250	965
Paracalanus parvus	360	130	134	1380	90	175	360
Centropages typicus	60	70	59	100	30	45	80
C. hamatus	10	..	7	600	110	40	90
Temora longicornis	226	740	440	800	40	20	15
Acartia clausi	1840	850	693	220	25	30	..
Oithona similis	9540	3700	3834	4020	900	1140	2150
O. nana	10	10	13	..	5	..	..
Median size of *Pseudocalanus* VI, ♀ (mm.)	0·847	0·815	0·830	0·826	0·895	0·844	0·850

Table XX. Cruise of 5–7 August 1947

(Numbers of copepods per m.³)

Station no. ..	1	2	3	4	5
Position ..	L 4	Eddystone	49° 30′ N., 4° 17′ W.	49° 3′ N., 4° 58′ W.	48° 40′ N., 5° 32′ W.
Pseudocalanus elongatus	3345	3780	565	3500	1865
Paracalanus parvus	1965	1320	270	1100	830
Centropages typicus	160	220	175	400	605
C. hamatus	95	20	25	..	..
Temora longicornis	590	40	10	..	10
Acartia clausi	2760	1280	80	140	65
Oithona similis	9040	9040	2915	4440	3840
Median size of *Pseudocalanus* VI, ♀ (mm.)	0·805	0·810	0·783	0·853	0·804

Station no. ..	7	8	11	12	13
Position ..	49° 5′ N., 3° 33′ W.	49° 35′ N., 2° 54′ W.	50° 4′ N., 2° 11′ W.	50° 4′ N., 2° 58′ W.	50° 4′ N., 3° 46′ W.
Median size of *Pseudocalanus* VI, ♀ (mm.)	0·802	0·805	0·805	0·810	0·812