

Animal Communities of the Level Sea-bottom in the Waters adjacent to Plymouth.

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With 1 Chart, and 6 Figures in the Text.

FROM May, 1922, onwards the $\frac{1}{10}$ sq. metre bottom-sampler has been used to collect samples of the bottom-deposits with their animals, in the waters off Plymouth. The animals have been removed as soon as possible after capture by passing the samples through a series of sieves, and have been preserved in alcohol, to be identified and counted ashore. The present report deals with the distribution of the species represented, in the light of Petersen's Community investigations in Danish waters.

I express my thanks to Dr. Allen, Dr. Orton, Mr. Hunt, and Mr. Smith, of the Plymouth Laboratory, for their kind help in the identification of the material. I am particularly indebted to my friend, Mr. R. Winckworth, a late member of the staff, who has not only gone over with me the bulk of my collection of lamellibranchs, but has provided me with an excellent type series as complete as the material would allow.

The extensive use of his bottom-sampler in Danish waters and elsewhere has enabled Dr. C. G. Joh. Petersen to advance an opinion that "*as a rule it is best to regard the animals living on the sea-bottom as communities, just as botanists group together the vegetation of the land into plant communities, even though in the present state of our knowledge it is impossible to show how intimate the mutual relations are between the animals of the sea in the single cases.*"

It will probably assist the reader if I commence with a short summary recalling the more important points, concerning the recognition of communities, which have been advanced by Petersen, and in doing so I shall adhere closely to his own words.

When dealing with animal life on the sea-bottom distinction must be made between two classes:—

- (i) The animals of the level sea floor which, with the exception of the predatory species, live as a rule buried in the bottom.—
The Fauna of the Level Bottom or Infauna.
- (ii) The animals which live upon or are attached to other objects.—
The Epifauna.

The animals taken in the bottom-sampler from the Level Bottom are not of equal importance either for characterisation of a community as such, or for characterisation of the outer conditions on which the existence of that community is dependent. Some species are *seasonal*, only occurring in quantity at certain times of the year; others, which may be regarded as *attendant species*, may be found at greatly varying depths and in very different communities, often in considerable numbers; others occur so sparsely in the hauls that they must be considered as being so scarce that they only exceptionally come into the small areas investigated, and no importance can therefore be attached to their absence or presence. *The animals which are not seasonal, and which compose an important part of the whole mass of a community, owing to number or weight, will presumably be best suited for characterising the community and must also be considered as giving a good idea of the outer conditions on which the community is dependent.* It necessarily follows, then, that only by experience gained from different places can these *characteristic species* be determined. A limited number of the characteristic species may be selected quite arbitrarily, and their names, or convenient abbreviations, utilised for the naming of the animal communities for which they are characteristic. By means of some 10–12 such species, Petersen has enumerated 9 communities on the level bottom in Danish waters (6, page 13); but for present purposes attention may be restricted to 5 of these:—

1. The **Macoma** or Baltic community, d.

Macoma baltica, d, *Cardium edule*, *Mya arenaria*, and *Arenicola marina* are the most evenly distributed species.

2. The **Abra** community, b \pm E.

Abra alba, b, is the main characteristic species, but at times *Macoma calcarea*, c, and *Astarte* sp. a, may be present in great numbers. *Echinocardium cordatum*, E., as the signs indicate, may be present or absent.

3. The **Venus** community, v \pm E.

Characterised by *Venus gallina*, v, *Tellina fabula*, and several other allied sand-dwelling lamellibranchs. As in 2, *Echinocardium cordatum* may be present or absent.

4. The **deep Venus** community, (v).

Related to 3, but *Echinocardium cordatum* is replaced by *E. flavescens*, and *Spatangus purpureus*, while *Psammobia faerensis*, *Abra prismatica*, and *Maetra elliptica* occur. This community is only feebly represented in Danish waters, and has not therefore received such detailed attention as the remainder.

5. The **Echinocardium-filiformis** community, E. fil.

Echinocardium cordatum, E., and *Amphiura filiformis* fil., are the leading species, but *Turritella terebra* T, is very often present. Indeed, in the earlier work *Turritella* was utilised instead of *Amphiura filiformis* for the descriptive name of this community.

The occurrence of these communities is dependent on the depth and degree of shelter and enclosure of the water area (5, page 9):—

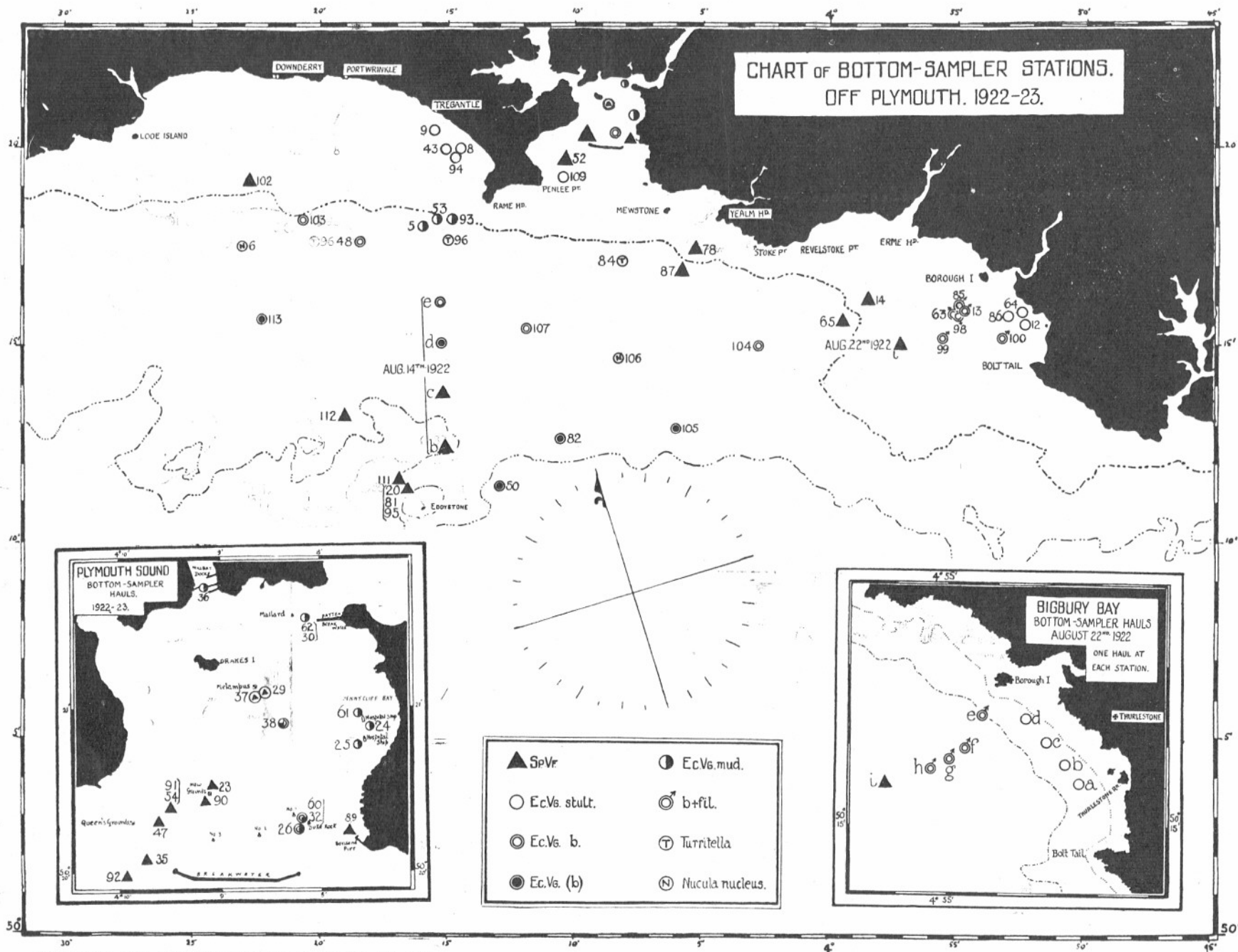
In the MORE SHELTERED waters, d communities occur nearest to land, which may be followed by v, or E.v, although frequently these last-named animals may be outnumbered by *Abra alba* b, or *Macoma calcarea* c, and in the Danish Belts and Western Baltic, by the *Astarte* species a.

In OPEN WATER from the coast out to greater depths, v±E communities are followed by E. fil.

In more CLOSED waters, from the coast outwards, d communities are followed by b ± E, and these by c ± E.

Having identified the communities in Danish and neighbouring waters, Petersen has directed his attention to the consideration of the distribution of animals in other areas, and has arrived at the conclusion that very similar communities to those discovered in Denmark occur in far-distant waters, and in Chart I attached to Appendix to Report XXI from the Danish Biological Station he has given a graphic prediction of the distribution of his animal communities in waters outside the Danish area, which he submits as a rough skeletal basis. In the communities he has utilised, however, he has ignored various subdivisions known to him from Danish waters, and the *Abra*, *Venus* and deep *Venus* communities (above) are in consequence grouped together under one main heading of **Venus Communities** with **Spatangidæ**. More recent work, also, has resulted in the suggested addition of two further communities, one, the E. fil., to be included as the next deepest community to the *Venus* group (6, page 13). Interpreting the chart, then, on the broadest lines, it would indicate that the level bottom in the waters off Plymouth is populated chiefly by *Venus* communities with, however, some representation of E. fil., as well as a possible influence from the little known Lusitanian group. It would also be fair to expect the *Macoma* community to be represented on the shore areas of Plymouth Sound, although the chart does not actually indicate this, probably owing to the limitations imposed by the small scale of the drawing.

I may now conveniently proceed to the study of the results of the actual



REPRODUCED FROM TRACING OF ADMIRALTY CHART NO 442.

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working of the bottom-sampler in the Plymouth area, the extent of which is shown on the accompanying Charts.

In the first place, it will be seen that the Plymouth Breakwater practically shuts off the Sound from the more open Channel waters, so that, in accordance with experience in Danish waters, the effects of this enclosure should be reflected in the constitution of the respective animal communities. It is, therefore, of interest to note that the leading Spatangids, *Echinocardium cordatum*, *Spatangus purpureus*, and *Echinocardium flavescens* do not occur characteristically anywhere in the Sound, whereas they are regularly met with in the open Channel—in the case of *Echinocardium cordatum* from the shore outwards to the limits of the area. Again, outside the Breakwater varying degrees of sheltering are exhibited, so that a corresponding variation in community variation should be evident. With regard to the sea-bottom itself, there is the most important factor that the bottom deposits both in the Sound and outside are far from being uniform either in texture or in the distribution of the various grades of texture. Leaving out of account such questions as to what extent differences in bottom soil in themselves control animal distribution, or to what degree such differences are merely the expression of other influences such as tides and currents, there can be no doubt that this variation and "patchiness" of the bottom deposits add very considerably to the difficulties in determining a satisfactory faunistic picture. Variation in soil involves changes in the efficiency of the bottom-sampler, and on such stony ground as may be met with, for instance, on the Looe-Eddystone fishing grounds, the latter instrument is almost useless. "Patchiness" in ground necessitates many more hauls than would be necessary on a uniform bottom to ensure that nothing of importance is being overlooked; a number of instances could be given from the work now under review, where a slight alteration in the position of the ship has resulted in a most striking change, both in the nature of deposit and the proportion of the animals contained in the successive hauls of the bottom-sampler. With regard to the fauna, it is noticeable that a number of species generally occurring together in one particular kind of soil become split up into smaller groups under other bottom conditions. Thus, then, if one accepts the conception of animal communities, one must be prepared in practice to discover, on uneven ground as regards bottom soil, fewer or more groups of possibly quite different kinds of animals, while the typical community formation may only occur in localised areas. It is just this experience which leads me to suggest that clearly defined information as to the general constitution of a community, as well as its leading characteristic species, is necessary in order that the smaller groups due to "non-typical" conditions may be correctly identified.

From the results so far obtained I am of the opinion that at least two distinct main series of level bottom animals exist alongside one another in Plymouth waters, the one expressing itself in several recognisable forms in deposits in which fine grades predominate, and the other being restricted to coarser soil, with its typical form restricted to clean shell-gravel. Adopting the system of soil-grading utilised by Allen (1, page 378), it may be stated that the first series is found where Grades VI, VII, and VIII predominate; and the second where Grades II, III, and IV are of the greatest importance, and consist largely of shell fragments. That the difference between these series is a real one is shown by the fact that each has its own characteristic spatangids and lamelli-branches, which do not occur in the other. For the reason already given above, Table I has been drawn up purposely to show fairly fully the species which have proved most useful in the recognition of the two series and of the various smaller groups met with in the general survey of the grounds. The selection of the species has been governed by three factors: their facility in identification, their relative abundance, and their observed distribution.

The choice of specific names raised some difficulty, but it was eventually decided to adhere to the name recorded in the published fauna lists of the Marine Biological Association, where references are given to good descriptions of the animals concerned, and supplementing, when necessary, from well-known and accessible works. The names utilised will therefore be found in one or other of the following:—

1. Plymouth Marine Invertebrate Fauna.—*Journ. Mar. Biol. Assoc.*, Vol. VII, No. 2, 1904.
2. Polychaeta of Plymouth and the South Devon Coast, including a list of the Archiannelida.—E. J. Allen, *Journ. Mar. Biol. Assoc.*, Vol. X, No. 4, 1915.
3. List of British Marine Mollusca and Branchiopoda.—*Journal of Conchology*, Vol. 10, No. 1, 1901.
4. Gammaridea.—T. R. R. Stebbing, *Das Tierreich. Lief 21*, 1906.
5. Crustacea of Norway.—G. O. Sars.
6. History of British Stalk-eyed Crustacea.—T. Bell.
7. Faune de France—Échinodermes.—R. Kœhler, 1921.

It is a little unfortunate that the specific names adopted are not in complete agreement with those used by Petersen, and in order to avoid confusion, the following important differences should be noted:—

Names used in present work.	Names used by Petersen.
<i>Syndosmya alba</i> (Wood).	<i>Abra alba</i> .
<i>Syndosmya prismatica</i> (Montagu)	<i>Abra prismatica</i> .
<i>Thyasira flexuosa</i> (Montagu).	<i>Axinus flexuosus</i> .
<i>Tellimya ferruginosa</i> (Montagu)	<i>Montacuta ferruginosa</i> .
<i>Spisula elliptica</i> (Brown).	<i>Mactra elliptica</i> .
<i>Spisula subtruncata</i> (da Costa).	<i>Mactra subtruncata</i> .
<i>Gari ferroensis</i> (Chemnitz).	<i>Psammobia faeroensis</i> .
<i>Cultellus pellucidus</i> (Pennant).	<i>Solen pellucidus</i> .
<i>Ensis ensis</i> (Linnæus).	<i>Solen ensis</i> .
<i>Turritella communis</i> (Lamarck.)	<i>Turritella terebra</i> .

TABLE 1

Series A.	Species occurring in both classes of soil.	Series B.
Typical animals found in bottom deposits in which grades VI, VII, and VIII predominate.		Typical animals found in shelly gravel of grades II, III, and IV predominates.
<i>Nucula nitida</i>		<i>Amphioxus lanceolatus</i> <i>Nucula radiata</i> <i>Glycimeris glycimeris</i> <i>Lima loscombi</i>
<i>Thyasira flexuosa</i> <i>Montacuta bidentata</i> <i>Tellimya ferruginosa</i> SYNDOSMYA ALBA* SYNDOSMYA PRISMATICA* TELLINA FABULA*		<i>Montacuta substriata</i>
<i>Donax vittatus</i> <i>Mactra stultorum</i> SPISULA SUBTRUNCATA* <i>Lutraria elliptica</i>	*SPISULA ELLIPTICA → ← <i>Dosinia lupina</i> <i>Dosinia exoleta</i> →	<i>Tellina crassa</i> <i>Tellina pusilla</i>
<i>Meretrix chione</i> VENUS (CHAMELÆA) GALLINA <i>Tapes pullastra</i>	<i>Venus (Timoclea) ovata</i> <i>Tapes virgineus</i> →	<i>Lutraria oblonga</i>
<i>Cardium echinatum</i>		<i>Venus (Clausinella) fasciata</i> <i>Gouldia minima</i> <i>Cardium (Laevicardium) norvegicum</i>

NOTE.—The arrow-head opposite certain species in middle column indicates the series to which there is a tendency.

* The species in bolder type are characteristic species for certain of Petersen's communities.

TABLE 1—continued.

Series A.	Species occurring in both classes of soil.	Series B.
Typical animals found in bottom deposits in which grades VI, VII, and VIII predominate.		Typical animals found in bottom deposits in which shelly gravel of grades II, III, and IV predominates.
GARI FERROENSIS* <i>Mya truncata</i> <i>Cultellus pellucidus</i>	<i>Corbula gibba</i> ← <i>Solecurtus antiquatus</i> ← <i>Ensis ensis</i>	<i>Gari tellinella</i> <i>Solecurtus scopula</i> <i>Ensis arcuata</i>
TURRITELLA COMMUNIS*		
ECHINOCARDIUM CORDATUM*	<i>Echinocyamus pusillus</i> →	ECHINOCARDIUM* FLAVESCENS SPATANGUS PURPUREUS*
AMPHIURA FILIFORMIS* <i>Cucumaria elongata</i> <i>Leptosynapta inhærens</i> <i>Labidoplax digitata</i>		
<i>Gonoplax rhomboides</i> <i>Alphæus ruber</i> <i>Callianassa subterranea</i> <i>Diastylis</i> sp. <i>Iphinoë trispinosa</i> <i>Bathyporeia pelagica</i> <i>Bathyporeia guilliamsoniana</i>		<i>Polygordius</i> sp.
<i>Sthenelais limicola</i>	<i>Nephtys</i> sp. <i>Lumbriconereis</i> sp.	<i>Onuphis britannica</i>
<i>Goniada maculata</i> <i>Owenia fusiformis</i> <i>Magelona papillicornis</i>	<i>Glycera</i> sp.	
<i>Cirratulidæ</i> <i>Melinna adriatica</i> <i>Pectinaria</i> sp. <i>Notomastus latericeus</i> <i>Scalibregma inflatum</i>	<i>Lanice conchilega</i>	

NOTE.—The arrow-head opposite certain species in middle column indicates the series to which there is a tendency.

* The species in bolder type are characteristic species for certain of Petersen's communities.

Some explanation is necessary with regard to the species which are shown in the table as occurring in both kinds of soil. It is naturally to be expected that some overlapping will occur, and the arrow-heads opposite certain species indicate to which series present experience suggests that the species should be referred. A number of animals, however, appear regularly and commonly in both series, e.g. *Corbula gibba*, which may be reasonably regarded as the equivalent of Petersen's attendant species. Such polychaetes as *Nephtys*, *Lumbriconereis*, and *Glycera* present difficulties in specific identification which detract from their value as possible type forms, so that their prevalence on certain stations cannot be made of as much use as could be desired.

With the two series thus set out it is convenient to make a first comparison with Petersen's communities. It is interesting first to notice that the characteristic species shown in bolder type in Table 1 are those of the *Echinocardium-filiformis* and *Venus* communities; and second, that nine of the total of twelve are included under Series A. A closer analysis shows that the remaining three species which are included under Series B are characteristic for Petersen's (v), although other (v) species occur under A. It is evident, therefore, that the proper significance of the two series requires to be determined before further comparisons with Petersen's communities can be made. If we compare the animals classified in Table 1, we become aware of the somewhat striking way in which genera present different species in the two series, e.g. *Nucula*, *Montacuta*, *Tellina*, *Spisula*, *Venus*, *Cardium*, and *Gari* among the lamellibranchs. Petersen (5, page 17), in a discussion on the factors in the formation of communities, makes mention of a similar circumstance noted by him in earlier days on the cruises of the *Hauch*, and writes:—

“ . . . that closely related species, especially those of the same genus, are scarcely ever found living in one and the same area of a given water; they may meet and fight out their war on a frontier line, but are never found to cover the same area of distribution altogether. *Each has its own region, its own community.** The competition must be greatest between those species which are most closely related.”

This appears to me to provide the key to the proper relationship existing between Series A and B. **They are independent associations largely built up of species of genera which are common to both, and possess equal potentiality for expressing minor associations under certain circumstances.** Each has its own characteristic species, including a Spatangid and a *Venus*. Series A is an *Echinocardium cordatum*—

* The italics are my own.—E. F.

Venus gallina association, EeVg, and Series B a Spatangus purpureus—Venus fasciata association, SpVf. They occur in similar depths of water, but differ in the type of bottom deposit in which they thrive. It will be observed that the symbols EeVg and SpVf have been used here for the first time. While it is admitted that the introduction of new terms makes the reading of papers of this kind more difficult to those unacquainted with previous work, yet such additions seems unavoidable. The following summary of the symbols used herein may therefore prove useful for reference:—

SYMBOLS USED.

Species.	Symbols.	
	As used by Petersen.	As used in present work.
Echinocardium cordatum	E	Ec
Spatangus purpureus	—	Sp
Amphiura filiformis	fil	fil
Venus gallina	v	Vg
Venus fasciata	—	Vf
Syndosmya (Abra) alba	b	b
Syndosmya (Abra) prismatica	—	(b)
Mactra stultorum		<i>stult</i>
Macoma baltica	d	d
Astarte sp.	a	a
Turritella communis	T	T
=Turritella terebra		

Returning now to the consideration of Petersen's (v) it becomes apparent that it is characterised by five species, of which two belong to an Echinocardium cordatum—Venus gallina association, and three to a Spatangus purpureus—Venus fasciata association. This, to my mind, necessitates the discarding of (v), on account of its composite structure, and the substitution of deeper water formations for each of the two Spatangid-Venus associations.

It has been shown above that the three species utilised by Petersen for characterising his E-fil. community are included under Series A. No ground has yet been located, however, where *Amphiura filiformis* and *Turritella communis* occur together characteristically, although fil. has been taken regularly and in numbers at Bigbury, and T. occurs in dense

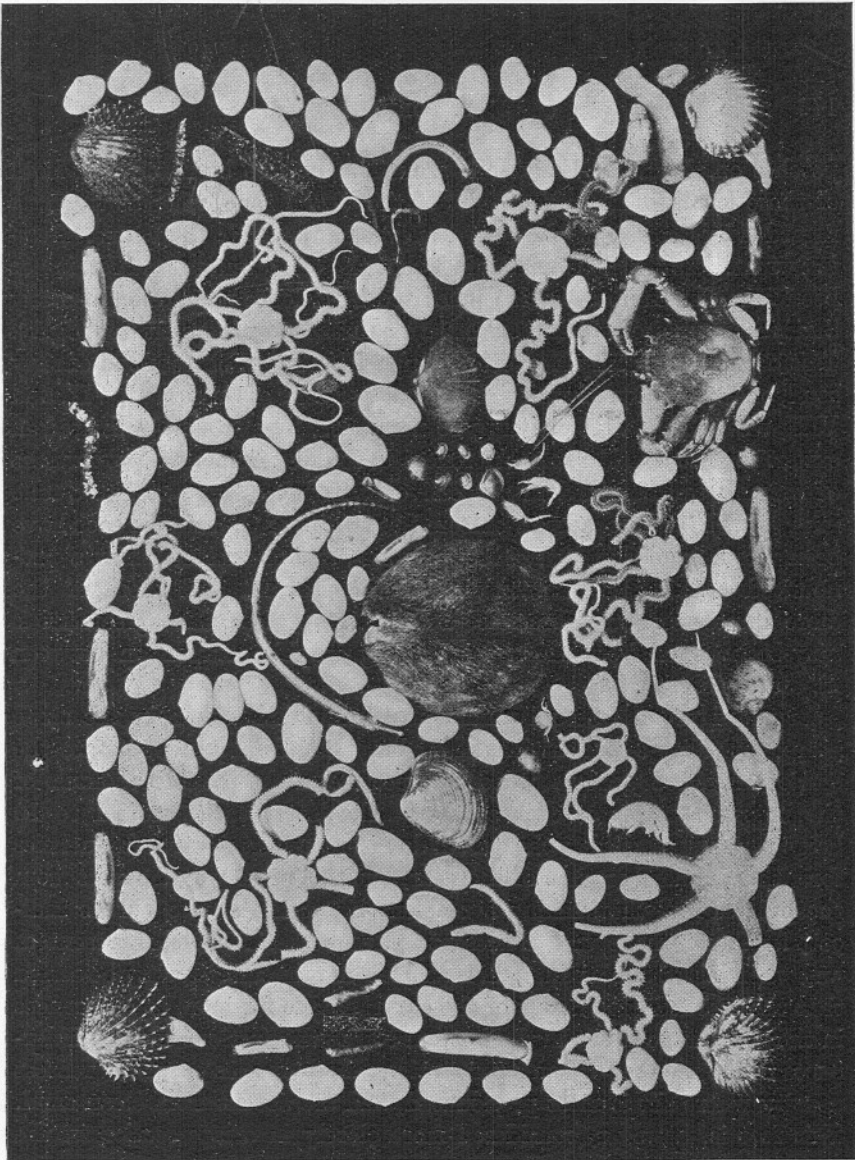


FIG. 1. EcVg COMMUNITY. b + Ec. + fil.

Number of animals per $\frac{1}{10}$ sq. metre ($\frac{7}{10}$ natural size).

	No.		No.
<i>Nucula nitida</i>	4	<i>Portunus</i> sp. (juv.)	1
<i>Montacuta bidentata</i>	4	Schizopoda	1
<i>Syndosmya alba</i>	188	<i>Nika edulis</i>	1
<i>Syndosmya prismatica</i>	1	<i>Diastylis</i> sp.	1
<i>Mactra stultorum</i>	1	<i>Ampelisca</i> sp.	1
<i>Venus gallina</i>	1	<i>Nephtys</i> sp.	1
<i>Venus ovata</i>	1	<i>Sthenelais limicola</i>	1
<i>Cardium echinatum</i>	4	<i>Owenia fusiformis</i>	1
<i>Corbula gibba</i>	1	<i>Goniada maculata</i>	1
<i>Cultellus pellucidus</i>	8	<i>Lumbriconereis</i> sp.	1
<i>Natica alderi</i>	1	<i>Ammotrypane aulogaster</i>	1
<i>Bullinella cylindracea</i>	1	<i>Pectinaria</i> sp.	3
<i>Echinocardium cordatum</i>	1	Polychaeta, sandy tubes	fragments
<i>Amphiura filiformis</i>	1	<i>Nemertinea</i>	1
<i>Ophiura ciliaris</i>	1	<i>Syngnathus</i> sp. (juv.)	1
<i>Corystes cassivelaunus</i>	1		

Station 63. Bigbury Bay { Borough Island, N.E. by E. } October 31st, 1922. Silty sand. { Bolt Tail, S.E. $\frac{1}{2}$ S. }

patches on the Rame-Eddystone grounds. It is to be noted that both of these localities lie in the heart of the Venus zone, whereas E. fil. is regarded by Petersen as the next deepest community to the Venus. Dealing with fil. first, it is a striking fact that the one ground on which it has been found in numbers is also inhabited by a dense population of many Series A animals, of which *Syndosmya alba* is the most frequent (see Fig. 1). This occurs in Bigbury Bay off Borough Island in a bottom soil of silty sand, one estimation of which showed 98 per cent of Grades VI, VII, and VIII, with Grade VIII claiming 18 per cent. The ground is limited in extent so that considerable differences in soil and numerical proportions of animals are obtained in successive hauls taken, say, at half-a-mile intervals. Frequent samples of from 1 to 10 dips of the sampler each have been taken from June 9th, 1922, onwards, and the results show a pronounced correlation between the numbers of fil. and those of the more important lamellibranchs present. How close this agreement is may be gathered from the accompanying graphic comparison between fil. and b (Fig. 2).

In the figure the actual numbers of individuals taken in the same sample at thirty-seven stations in Bigbury Bay from June, 1922, to the end of May, 1923, are recorded, irrespective of the number of hauls of the bottom-sampler at each station. The latter varies from 1 to 10 hauls per sample, so that the curves do not represent relative frequencies for either stations or time of the year, but this in no way detracts from the evidence of the striking agreement between the two curves indicated. Thus, whenever b is present in numbers, fil. is well represented, and when b is at a minimum, fil. is also low in numbers. It may be added that the marked irregularity of the curves is due far more to differences in the percentage of silt in the bottom soil at the stations than to differences in the number of hauls per station; both species occur in greatest density where silt is most pronounced, and are absent from clean sand. This fact is, however, considered more closely in a late section of the paper, and need not be enlarged upon here.

We are, therefore, faced by the important fact that here are two species, fil. and b, occurring regularly together in the same area, in corresponding intensity, which are defined as characteristic for different communities. What does this mean? According to Blegvad (2, pages 54 and 62), both species are essentially detritus feeders, so that their frequency in and restriction to a soil at Bigbury in which the finest deposits are well represented, would not be inconsistent with this mode of feeding. On the other hand, Petersen says (4, page 26):—

“ At places where the *Amphiuræ* live in such quantities that they form a dense net over the sea-bottom . . . but little of the tiny

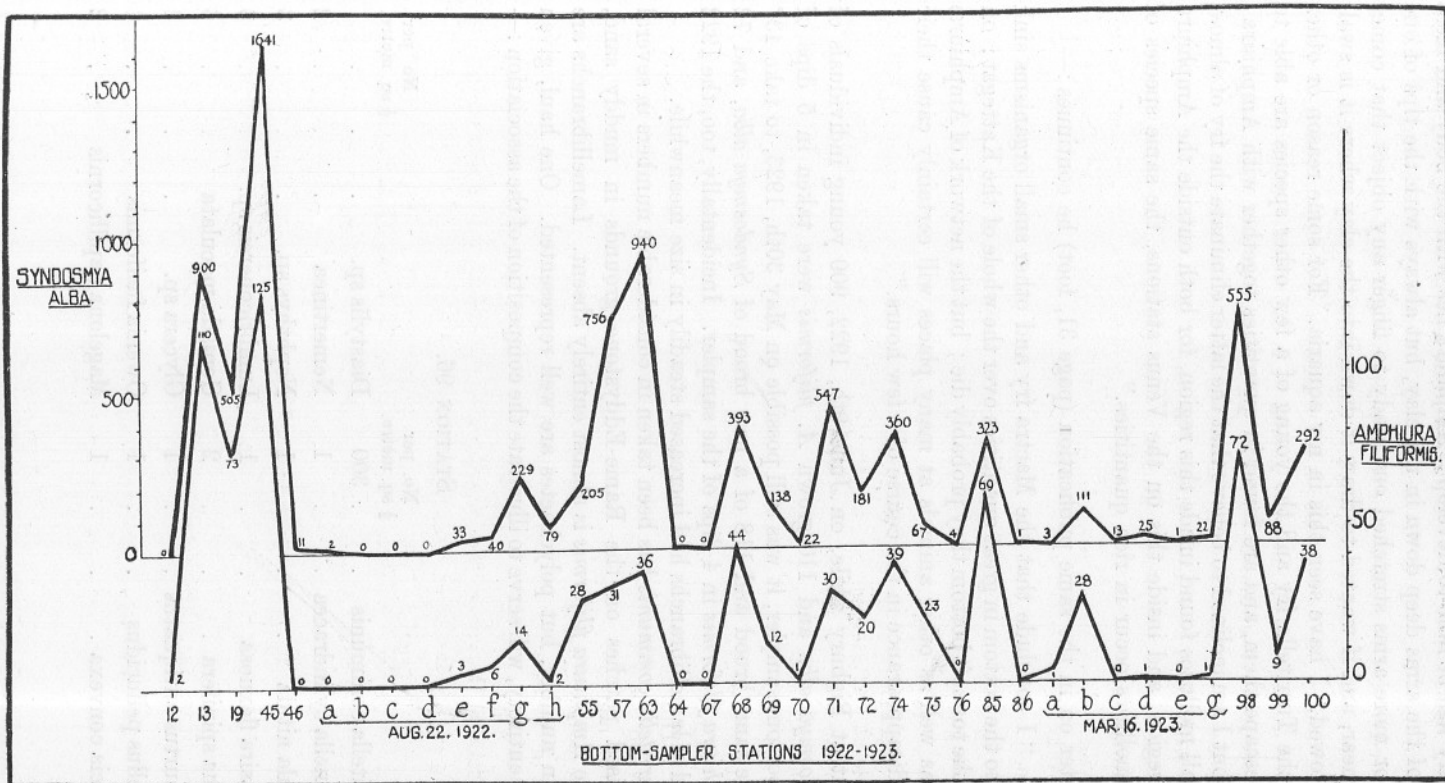


FIG. 2.—Number of individuals of *Syndosmya alba* and *Amphiura filiformis* in the same sample of from 1 to 10 hauls of the $\frac{1}{10}$ m² bottom sampler, at each of 37 stations in Bigbury Bay, from June 9th, 1922, to May 30th, 1923.

fry will be able to develop ; *Amphiura* lies with the body and most of the arms deep down in the clay, but always with the tips of one or more arms stretched out ready to finger any object that comes near, and if wanted to draw it down into the clay where it is swallowed. I have seen this in my aquaria. For some reason or other the *Turritella* fry and the young of a few other species are able to escape them, and are found in quantities together with *Amphiura* ; but I am inclined to believe that the latter eliminate the fry of almost all molluscs found inside this region, for both outside the *Amphiura* region, and inside this on the Venus stations, the same species of molluscs occur in rich quantities."

Later on in the same publication (page 31, foot) he continues :—

"I conclude that the *Mactra* fry and other small organisms sink to the bottom in great quantities over the whole of the Kattgat ; on the too soft bottom they probably die ; but the network of *Amphiura* as well as other animals at many places will certainly cause their disappearance in the course of a few hours."

But at Bigbury while, on June 9th, 1922, 900 young individuals of *Syndosmya alba* and 110 grown *A. filiformis* were taken in 5 dips of the bottom-sampler, it was still possible on May 30th, 1923, to take 437 of the same brood and 118 of a new brood of *Syndosmya alba*, and 72 *Amphiura filiformis* in 4 dips of the sampler. Incidentally, too, the 1922 brood of lamellibranchs had increased steadily in size meanwhile.

Turritella communis has been taken in considerable numbers in several localised patches on the Rame-Eddystone grounds in muddy sand, where *Amphiura filiformis* is almost entirely absent. Lamellibranchs are few in number, but polychaetes are well represented. One haul, given in its entirety, will serve to illustrate the composition of the association :—

STATION 96.

	No. per $\frac{1}{2}$ sq. metre.		No. per $\frac{1}{2}$ sq. metre.
<i>Turritella communis</i>	300	<i>Diastylis</i> sp.	1
<i>Bullinella cylindracea</i>	1	<i>Nemertinea</i>	2
<i>Nucula nitida</i>	1	<i>Nephtys</i> sp.	3
<i>Thyasira flexuosa</i>	1	<i>Lumbriconereis</i> sp.	3
<i>Lucina spinifera</i>	2	<i>Goniada maculata</i>	6
<i>Solecurtus antiquatus</i>	1	<i>Glycera</i> sp.	2
<i>Cultellus pellucidus</i>	1	<i>Owenia fusiformis</i>	1
<i>Thracia convexa</i>	1	<i>Magelona papillicornis</i>	2

	No. per $\frac{1}{2}$ sq. metre.		No. per $\frac{1}{2}$ sq. metre.
<i>Cucumaria elongata</i>	4	<i>Notomastus latericeus</i>	fragments
<i>Cucumaria</i> sp.	1	<i>Melinna adriatica</i>	1
<i>Amphiura filiformis</i>	1	<i>Ammotrypane aulogaster</i>	1
<i>Gonoplax rhomboides</i>	1	<i>Aricia</i> sp.	1
<i>Alphæus ruber</i>	1	Cirratulidæ	1
<i>Ampelisca</i> sp.	7	Terebellidæ.	3

In a later section of this paper, a subdivision of the EcVg community designated as EcVg *mud* will be described, and without entering into the question of its composition, it may here be pointed out that this haul 96 includes its essential animals. Thus, as with *A. filiformis*, *T. communis* occurs in association with Venus animals (see Fig. 3). It is also of interest to note that large numbers of the shells of *T. communis* are frequently met with on the Rame-Eddystone grounds at Venus stations. In some cases, the shells are quite empty, but in others they may be occupied by either *Anapagurus laevis* and *Eupagurus* sp. juv., or *Phascobion strombi*, and form the most important item in the fauna. Frequently, also, individuals of *Sagartia* sp. are to be found attached to the shells.

From the results of present work then, matters must rest in the position that although the two leading species of E. fil. both occur in the Plymouth district, they are not in association, but appear to live separately in localised areas, which are not only surrounded by Venus formations, but are themselves populated by Venus animals.

Of the ten species selected by Petersen for characterising his Venus associations, we have already seen that seven are included under our Series A or EcVg association, and three under Series B or SpVf association:—

Series A (EcVg)	Series B (SpVf)
<i>Echinocardium cordatum.</i>	<i>Spatangus purpureus.</i>
<i>Venus gallina.</i>	<i>Echinocardium flavescens.</i>
<i>Tellina fabula.</i>	<i>Mactra elliptica.</i>
<i>Spisula subtruncata.</i>	
<i>Syndosmya alba.</i>	
<i>Syndosmya prismatica.</i>	
<i>Gari ferroensis.</i>	

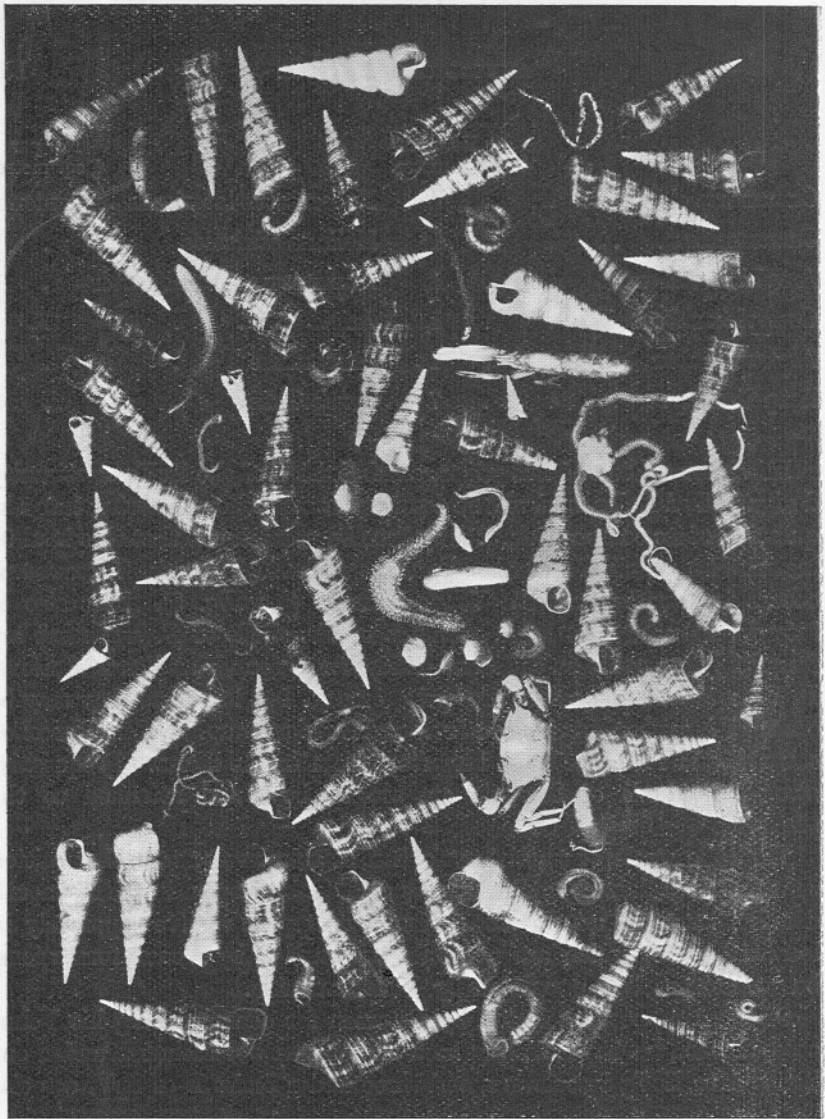


FIG. 3. VG + TURRITELLA COMMUNIS.

Number of animals per $\frac{1}{10}$ sq. metre ($\frac{6}{10}$ natural size).

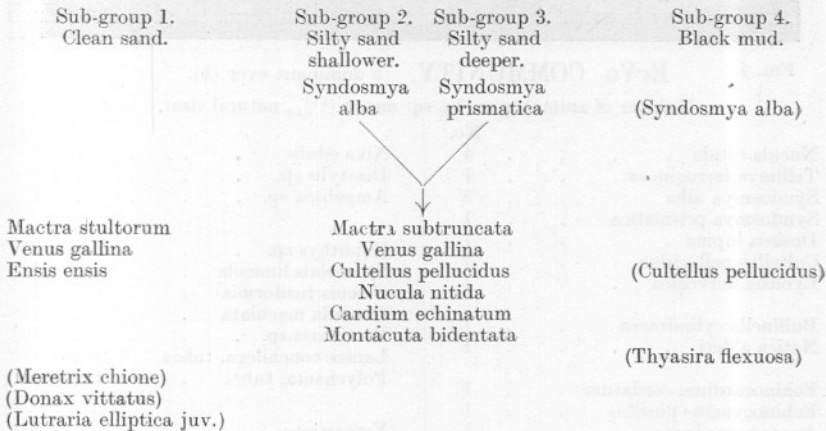
		No.			No.
Nucula nitida	.	1	Diastylis sp.	.	1
Lucina spinifera	.	1	Ampelisca sp.	.	1
Thyasira flexuosa	.	1	Melinna adriatica	.	1
Solecortus antiquatus	.	1	Notomastus latericeus	fragments	
Cultellus pellucidus	.	1	Nephtys sp.	.	1
Thracia convexa	.	1	Glycera sp.	.	1
			Goniada maculata	.	1
Bullinella cylindracea	.	1	Magelona papillicornis	.	1
Turritella communis	.	60	Owenia fusiformis	.	1
			Ammotrypane aulogaster	.	1
Cucumaria elongata	.	1	Cirratulidæ	.	1
Amphiura filiformis	.	1	Lumbriconereis sp.	.	1
			Aricia sp.	fragments	
Gonoplax rhomboides	.	1	Terebellidæ	.	1
Alphæus ruber	.	1			
			Nemertinea	.	1

Station 96. Rame Head, N.E. by E. $\frac{1}{2}$ E. $1\frac{1}{2}$ miles. May 9th, 1923. Muddy coarse sand with some shell fragments.

Of the seven species included under EcVg, *Tellina fabula*, *Spisula subtruncata*, and *Gari ferroensis* have not been taken in sufficient numbers to warrant their use as leading species; but the fact remains that when they are present, they occur under EcVg conditions. *E. cordatum* occurs quite generally on the sandy grounds outside the Breakwater from the shore outwards to the limits of the area, but not within Plymouth Sound. *Venus gallina* is likely to be met with both inside and outside the Breakwater on any of the EcVg stations, although it has never been taken in numbers comparable to those experienced in Danish waters. Its general distribution, however, is significant in the consideration of the Venus communities, for its presence in Series A and absence from B affords evidence of the distinction between the series. *Syndosmya alba* and *S. prismatica* are both well represented in outside waters, and the former also within the Sound, and there is a good indication that *S. prismatica* is more typical of deeper water, thereby confirming the reasonableness of its use by Petersen for the characterisation of a deeper Venus formation.

Owing to the varied nature of the bottom in Plymouth waters, and to the corresponding patchiness in fauna resulting from it, it will be realised that the fullest expression of EcVg will not be generally distributed. Examination of the results suggests, however, that silty sand is most favourable for the most typical expression of EcVg, and that a change to either fine clean sand, or in the opposite direction to black mud, produces a more specialised association. Remembering the "depth" distinction between the two species of *Syndosmya*, also, we may therefore refer to four distinct sub-groupings of the EcVg series:—

SUB-GROUPS OF SERIES A (EcVg).



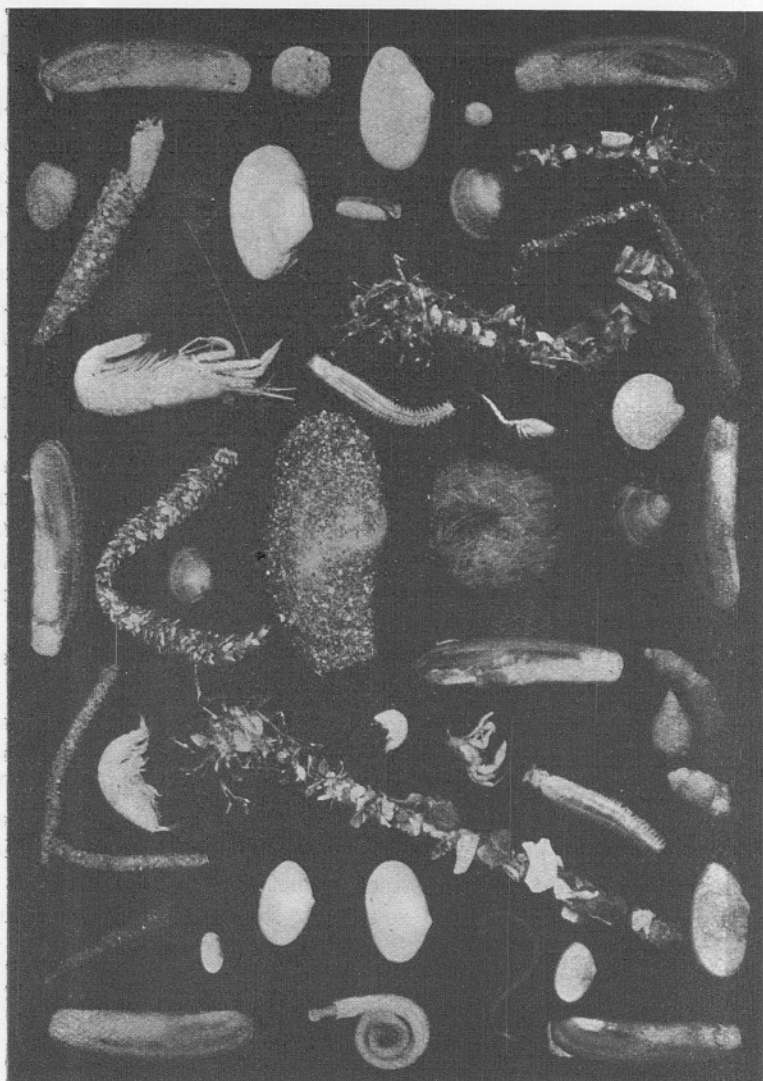
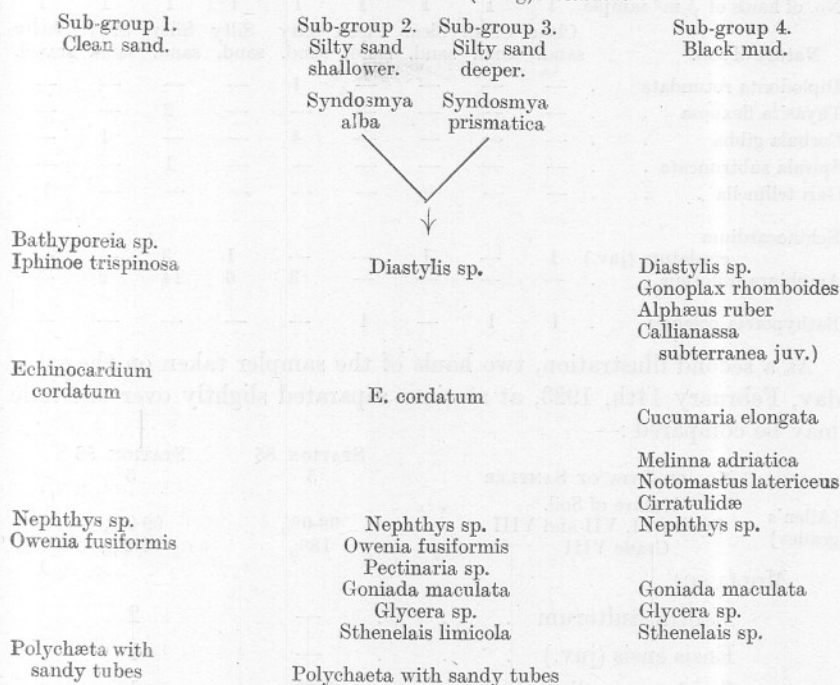


FIG. 4. ECVG COMMUNITY. b dominant over (b).

Number of animals per $\frac{1}{10}$ sq. meter ($\frac{11}{10}$ natural size).

	No.		No.
<i>Nucula nitida</i>	4	<i>Nika edulis</i>	1
<i>Tellinomya ferruginosa</i>	1	<i>Diastylis</i> sp.	1
<i>Syndosmya alba</i>	5	<i>Ampelisca</i> sp.	1
<i>Syndosmya prismatica</i>	1		
<i>Dosinia lupina</i>	1	<i>Nephtys</i> sp.	2
<i>Cultellus pellucidus</i>	7	<i>Sthenelais limicola</i>	1
<i>Lyonsia norvegica</i>	1	<i>Owenia fusiformis</i>	1
		<i>Goniada maculata</i>	1
<i>Bullinella cylindracea</i>	1	<i>Pectinaria</i> sp.	1
<i>Natica alderi</i>	1	<i>Lanice conchilega</i> , tubes	frequent
		<i>Polychaeta</i> , tubes	frequent
<i>Echinocardium cordatum</i>	1		
<i>Echinocyamus pusillus</i>	1		
<i>Anapagurus levis</i>	1	<i>Nemertinea</i>	1

Station 104. Borough Island E., Revelstoke Point N.E. by N. June 12th, 1923. Silty sand with some flaky shell fragments.

SUB-GROUPS OF SERIES A (EcVg)—*continued*.

The importance of the nature of the bottom deposits in determining the fauna is thoroughly well illustrated by the results of a series of hauls taken in Bigbury Bay, passing from the clean sand inshore across the silty b fil. patch to relatively clean shell gravel. On August 22nd, 1922, nine separate single dips of the sampler were taken at short distances apart (see Chart facing page 167) and the numbers of certain species are given below which show quite distinctly the passage from animals of Sub-group 1 (above) to those of Sub-group 2:—

August 22nd, 1922. No. of hauls of $\frac{1}{16}$ m ² sample	a	b	c	d	e	f	g	h	i
	Clean sand.	Clean sand.	Clean sand.	Clean sand.	Silty sand.	Silty sand.	Silty sand.	Silty sand.	Shelly gravel.
<i>Mactra stultorum</i> . . .	—	—	1	—	—	—	—	—	—
<i>Ensis ensis</i> (juv.) . . .	2	8	1	—	—	—	—	—	—
<i>Lutraria elliptica</i> . . .	—	—	—	1	1	2	—	—	—
<i>Syndosmya prismatica</i> . . .	—	2	1	—	2	—	—	—	—
<i>Syndosmya alba</i> . . .	2	—	—	—	33	40	229	79	—
<i>Cultellus pellucidus</i> . . .	1	3	—	2	5	6	23	18	—
<i>Cardium echinatum</i> . . .	—	—	1	1	2	1	4	3	—
<i>Venus gallina</i> . . .	—	—	—	1	—	—	—	—	—
<i>Nucula nitida</i> . . .	—	—	—	2	6	1	1	—	—
<i>Montacuta bidentata</i> . . .	—	—	—	—	1	4	14	—	—

August 22nd, 1922.									
No. of hauls of $\frac{1}{10}$ m ² sample	a	b	c	d	e	f	g	h	i
Nature of soil.	Clean sand.	Clean sand.	Clean sand.	Clean sand.	Silty sand.	Silty sand.	Silty sand.	Silty sand.	Shelly gravel.
<i>Diplodonta rotundata</i>	—	—	—	—	1	—	—	—	—
<i>Thyasira flexuosa</i>	—	—	—	—	—	—	2	—	—
<i>Corbula gibba</i>	—	—	—	—	4	—	—	1	—
<i>Spisula subtruncata</i>	—	—	—	—	—	—	1	—	—
<i>Gari tellinella</i>	—	—	—	—	—	—	—	—	1
<i>Echinocardium</i>									
<i>cordatum</i> (juv.)	1	—	1	—	—	1	3	—	—
<i>Amphiura filiformis</i>	—	—	—	—	3	6	14	2	—
<i>Bathyporeia pelagica</i>	1	1	—	1	—	—	—	—	—

As a second illustration, two hauls of the sampler taken on the same day, February 14th, 1923, at stations separated slightly over one mile may be compared :—

[Allen's grades]	NO. OF DIPS OF SAMPLER		STATION 85	STATION 86
	Nature of Soil.		5	5
	Grades VI, VII and VIII	Grade VIII	98.0%	99.0%
			18%	0.2%

MOLLUSCA.

<i>Mactra stultorum</i>	—	2
<i>Ensis ensis</i> (juv.)	—	1
<i>Syndosmya alba</i>	323	1
<i>Syndosmya prismatica</i>	3	1
<i>Spisula subtruncata</i>	1	—
<i>Venus gallina</i>	—	2
<i>Venus ovata</i>	—	1
<i>Cultellus pellucidus</i>	24	—
<i>Nucula nitida</i>	49	1
<i>Cardium echinatum</i>	10	—
<i>Montacuta bidentata</i>	22	—
<i>Thyasira flexuosa</i>	10	—
<i>Diplodonta rotundata</i>	1	—
<i>Corbula gibba</i>	—	1
<i>Bullinella cylindracea</i>	1	—
<i>Nassa reticulata</i>	1	—

ECHINODERMA.

<i>Echinocardium cordatum</i>	1	—
<i>Amphiura filiformis</i>	69	—
<i>Ophiura ciliaris</i>	10	—

NO. OF DIPS OF SAMPLER Nature of Soil. Grades VI, VII and VII Grade VII.	STATION 85	STATION 86
	5	5
	38.0%	99.0%
	18%	0.2%
CRUSTACEA.		
Decapoda	1	—
Monoculodes carinatus	2	1
Bathyporeia sp.	—	3
Diastylis	3	1
Iphinoe trispinosa	—	4
POLYCHAETA.		
Nephtys sp.	2	6
Owenia fusiformis	12	—
Pectinaria sp.	1	—
Goniada maculata	2	—
Sthenelais limicola	4	1
Phyllodocidæ	1	—
Polynoidæ	1	—
Lumbriconereis sp.	1	—
Sandy tubes	—	sev.

Sub-group 1, typical of clean sand, shows a marked reduction in the number of commonly occurring lamellibranchs; but those which persist are distinctive, *Maetra stultorum* being probably the one most generally met with. *Venus gallina* here assumes relative importance, although possibly more on account of the scarcity of other species than on its own increased intensity. *Ensis ensis* frequently occurs in place of *Cultellus pellucidus*, which is so frequent in Sub-groups 2 and 3. Two species of *Bathyporeia* and the Cumacean *Iphinoe trispinosa* have only as yet been taken regularly and in numbers in clean sand, and would therefore appear to be of use in defining the sub-group. Among the polychaetes, individuals of *Nephtys* sp. are always taken in numbers, and sandy-tube dwellers are prevalent.

In Sub-group 4, typical of black mud (see Fig. 5), the reduction in lamellibranchs is still more apparent, while *Echinocardium cordatum* is for all practical purposes absent. Polychaetes are very abundant, however, and the most obvious feature of the hauls is the presence of large numbers of the ampharetid *Melinna adriatica* and its muddy tubes. The capitellid *Notomastus latericeus* is also common, and Cirratulids, Glycera, Goniada, *Nephtys*, *Scalibregma*, *Magelona*, and *Lumbriconereis* are well repre-

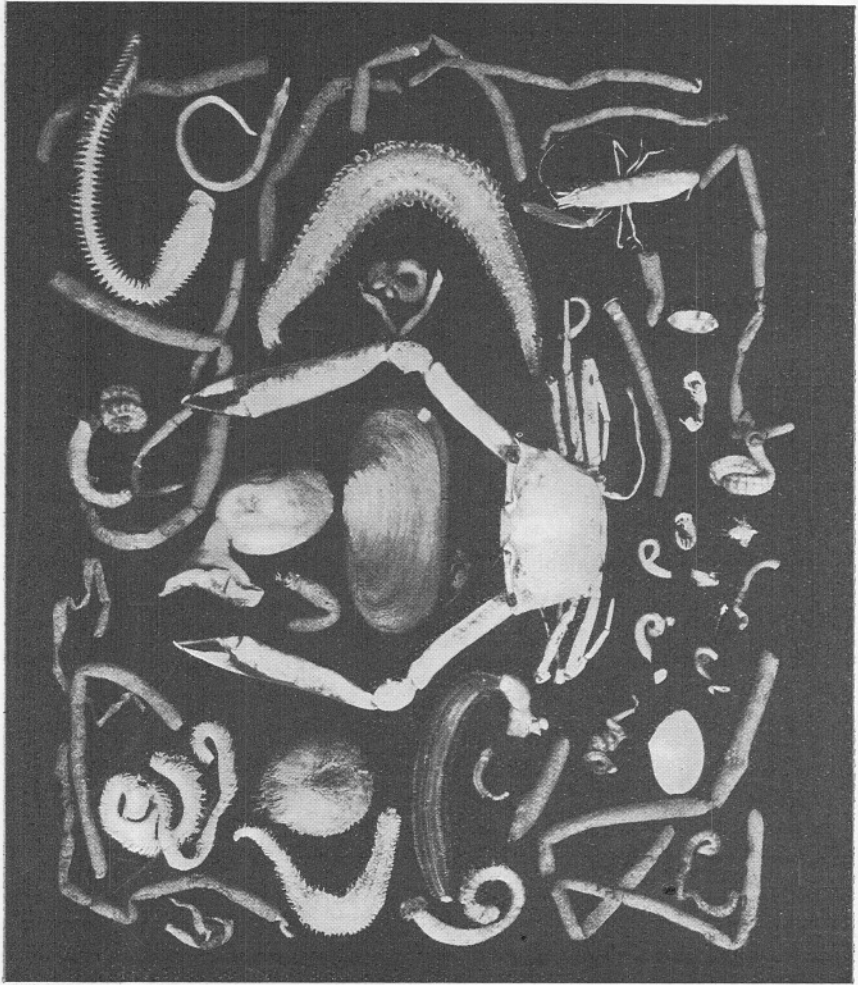


FIG. 5. EcVg COMMUNITY. EcVg MUD.

Number of animals per $\frac{1}{10}$ sq. metre ($\frac{8}{10}$ natural size).

	No.		No.
<i>Syndosmya alba</i>	1	<i>Melinna adriatica</i>	frequent
<i>Solecurtus antiquatus</i>	1	<i>Notomastus latericeus</i>	frequent
<i>Corbula gibba</i>	1	<i>Nephtys</i> sp.	2
<i>Echinocardium cordatum</i>	1	<i>Glycera</i> sp.	1
<i>Cucumaria elongata</i>	2	<i>Magelona papillicornis</i>	1
<i>Gonoplax rhomboides</i>	1	<i>Aricia</i> sp.	1
<i>Alpheus ruber</i>	1	<i>Nemertinea</i>	1
<i>Callinassa subterranea</i> (juv.)	2	<i>Sagartia</i> sp.	1
<i>Corystes cassevelaunus</i> (juv.)	1	<i>Clupea</i> sp., post-larva	1
<i>Porcellana longicornis</i> (juv.)	1	<i>Pleuronectes limanda</i> , post-larva	1
<i>Diastylis</i> sp.	1		

Station 5. Rame Head E. $\frac{1}{4}$ N. $1\frac{3}{4}$ miles. May 31st, 1922. Black mud.

sented. The chief echinoderm is *Cucumaria elongata*, which is of regular occurrence, while *Leptosynapta* and *Labidoplax* are not uncommon. The three decapods, *Gonoplax rhomboides*, *Alphæus ruber*, and *Callianassa subterranea*, are generally taken, thereby adding to the distinctive character of this sub-group. This mud formation is obviously different from the others, although it is still composed of EcVg animals. It provides an example of a community expression in which the defined characteristic species of the main community are not typically represented, and demonstrates the need for a full description of the general composition of all defined animal communities, in order that such specialised expressions may be recognised.

The naming of these four sub-groups requires some consideration.* The more typical, Nos. 2 and 3, are to be regarded merely as depth formations of the full EcVg expression. It is to be anticipated that at intermediate depths, *Syndosmya alba* and *S. prismatica* may occur in equal and not necessarily large numbers, when the formation may be termed Vg+Ec as the equivalent of Petersen's v+E. In shallower or sheltered waters, when Sub-group 2 is exhibited, the formation may rightly be termed b+Ec; while in deeper waters (b) seems an appropriate abbreviation, for it indicates the importance of *Syndosmya (Abra) prismatica* (b), but at the same time avoids any possible confusion with the composite (v) of Petersen. Sub-group 1 merits a distinctive term, for it is a recognisable formation both in Bigbury Bay and Whitsand Bay, and Vg *stult.*+Ec may be utilised, although it is clearly a reduced form of Vg+Ec. The naming of Sub-group 4 raises a peculiar difficulty, for *Echinocardium* and lamellibranchs generally are not sufficiently regular in occurrence to be used for characterisation. EcVg *mud* may, however, suffice for distinctive abbreviation.

With regard to the SpVf series (see Fig. 6) it must be admitted that no definite sub-community groupings equivalent to those of EcVg have as yet been attempted. The grounds are much more localised, and differ considerably in the number of species which they contain. The distribution of the typical community species is evidently influenced by the degree of coarseness of gravel, the relative amount of shell fragments, and the amount of silt. For instance, *Amphioxus* and *Polygordius* may be associated in being restricted to a clean soil almost entirely made up of broken shell fragments of medium and fine grades, whereas *Venus fasciata* is not so restricted. The important fact remains that the fullest community expression of SpVf occurs only where the soil is relatively clean, and consists of gravels with a big proportion of shell, whereas that of EcVg is restricted to deposits of silty sand.

* The composition of Petersen's communities is shown on page 165 of this paper; and on page 172 a summary of abbreviations used herein will be found.

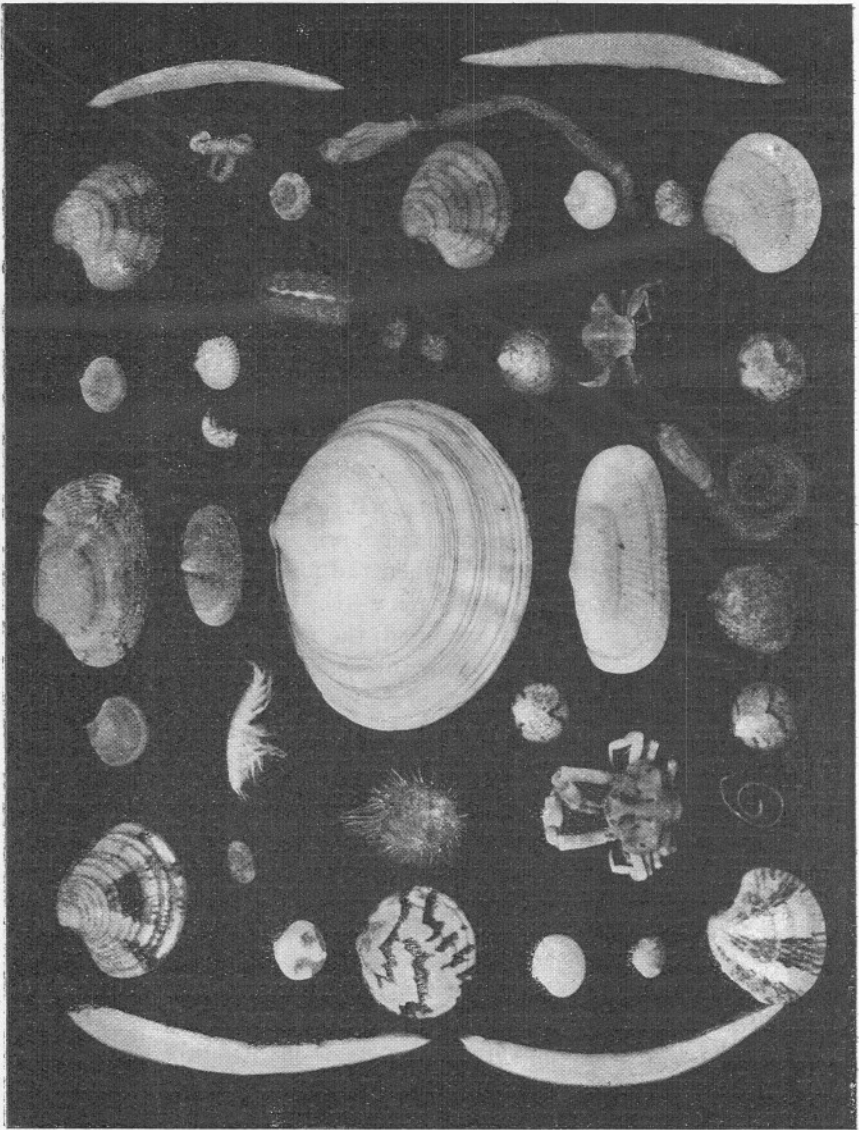


FIG. 6.

SPVF COMMUNITY.

Number of animals per $\frac{1}{10}$ sq. metre ($\frac{1}{10}$ natural size).

	No.		No.
<i>Glycimeris glycimeris</i>	5	<i>Echinocyamus pusillus</i>	2
<i>Tellina crassa</i>	1	<i>Portunus pusillus</i>	1
<i>Tellina pusilla</i>	1	<i>Ebalia tuberosa</i>	1
<i>Venus fasciata</i>	5	<i>Ampelisca typica</i>	1
<i>Venus ovata</i>	2	<i>Maera</i> sp.	1
<i>Tapes virgineus</i>	1	<i>Polygordius</i> sp.	fragments
<i>Gouldia minima</i>	6	<i>Glycera</i> sp.	2
<i>Cardium nodosum</i>	1	<i>Polynoïne</i>	1
<i>Cardium norvegicum</i>	1	<i>Lumbriconereis</i> sp.	1
<i>Gari tellinella</i>	1	<i>Amphioxus lanceolatus</i>	4
<i>Echinocardium flavescens</i> (juv.)	1		

Station 81. Eddystone S.S.E. $\frac{1}{2}$ E. $\frac{1}{2}$ mile. January 25th, 1923. Clean shell gravel.

Owing, again, to the general irregularity in bottom deposits over the area, a large part of the whole must be regarded as unsuitable for the full expression of either EcVg or SpVf. In some cases the conditions will permit of some of the species from both communities living together, and "mixed" hauls will be the result. It is also possible that on the rough and stony grounds, where good sampling with the bottom-sampler is practically impossible, there may be another series of animals. In this connection it is worth noting that on two occasions only *Nucula nucleus* has been taken in fair numbers (Stations 6 and 106), and both from deposits of muddy coarse materials. In haul 6, *Astarte sulcata* also occurred—the solitary record of this species.

In Plymouth Sound both EcVg and SpVf are well represented, although, as already stated, without their leading Spatangids. SpVf occurs in its most typical form on Queen's Ground, with a dense growth of young *Spisula elliptica* outnumbering everything else during the summer of 1922. The association (with the exception of the *Spisula* growth) bears a close resemblance to that of the Eddystone shell-gravel (cf. Stations 23, 35, etc., with Stations 20 and 81, etc.), with certain exceptions of the relative frequency of a few species in the two localities. On July 24th, 1922, a dense growth of young *Mytilus edulis* was located on the shallower more inshore part of this ground. This provides an interesting instance of the invasion, possibly only temporarily, of a Venus community by an Epifaunal species of the inshore *Macoma* community.

SpVf is also represented on two other grounds, though in reduced form—off Bovisand Pier, where *Macra elliptica* (juv.) also occurred in numbers in 1922; and off Melampus Buōy, but here, to some extent, mixed with a sandy EcVg fauna.

The bottom of the greater part of the Sound is covered with either black mud, or sand, or a mixture of the two in varying proportions, and it is populated essentially by EcVg animals. The sub-community associations b and EcVg mud are undoubtedly the most pronounced, the hauls of the bottom-sampler showing varying degrees of mixing corresponding to the changes in proportion of mud to sand. In Jennycliff Bay, where the deposits are almost wholly black mud, *Melinna* and other polychaetes occur in abundance, and *Syndosmya alba* is well represented. There is in addition a rich growth of *Thyasira flexuosa*. As one leaves the mud and enters muddy sand, such as may occur in moving to the neighbourhood of the anchorage buoys, b becomes more pronounced, until, in sandy mud, it is dominant over the EcVg mud species, and the fauna may be compared quite fairly with that of the outside b+Ec stations, with, of course, the exception of Ec.

Two other mud grounds are worthy of mention. In the enclosed Millbay Docks, in addition to the typical mud forms, tiny cirratulids

(*Heterocirrus* (?) sp.) were in enormous abundance on the occasion of a sampling on July 10th, 1922. Between Batten Breakwater and the Mallard Buoy, *Tapes pullastra* and *Mya truncata* occur. These two species are reminiscent of Petersen's *Macoma* community d, although the station is mainly EcVg. Other d animals, e.g. *Arenicola marina*, *Mytilus edulis* live on the shores, and the characteristic species *Macoma baltica* has been recorded from the river off Saltash, which is sufficient evidence of the presence of this complex community in the district.

Petersen's prediction for the Plymouth area may now be reviewed in light of the foregoing account. Without doubt, the grounds are populated chiefly by Venus communities with Spatangidæ, but by TWO VENUS COMMUNITIES, each with a characteristic Venus and a characteristic spatangid, and of equal potentiality for expressing sub-associations. Several of the sub-communities of Petersen's v are recognisable in the district, but (v) cannot be accepted as it is made up of species of both main communities. There is, however, a distinct deeper sub-association of one of the communities which is comparable to (v), and it is suggested that there may also be a deeper sub-association of the other. The characteristic species of Petersen's E. fil. are both represented, but never associated, and they are found separately with Venus animals.

The composition of the two Plymouth Venus communities may be set out as under:—

VENUS COMMUNITIES WITH SPATANGIDÆ.

A. In bottom deposits of fine grades.—*Echinocardium cordatum*—*Venus gallina* community EcVg.*

A1. In clean sand . . . Vg stult ± Ec.

A2. In silty sand . . . Vg ± Ec.

A2a. In shallower and sheltered waters b ± Ec.

A2β. In deeper waters . . . (b).

A3. In black mud . . . EcVg mud.

B. In bottom deposits of shelly gravel.—*Spatangus purpureus*—*Venus fasciata* community SpVf.

N.B.—Fil. and T. may occur separately with sub-associations of A.

In the photographs which accompany the text the number of animals per one haul of the $\frac{1}{10}$ sq. metre bottom-sampler, calculated from the results of the hauls at certain stations, is shown. In the case of many species the actual density is considerably less than 1 per $\frac{1}{10}$ sq. metre,

* See footnote to page 185.

but one individual has been included in the photograph to indicate that the species may occur. It should also be noted that in the preparation of the photographs no attempt has been made to represent the actual size of the piece of ground ($\frac{1}{10}$ sq. metre), and the animals have been arranged to exhibit clearly the general composition of the particular community formation.

During the summer of the year 1921, Mr. J. R. Baker carried out quantitative estimations of the animals found in samples of black mud, fine sand, and shell gravel, taken from certain grounds in the Plymouth district. His samples were collected with an ordinary conical dredge provided with a canvas bag, and either ten, twenty, or thirty litres of bottom deposit, according to the amount brought up, were passed through sieves similar in mesh to those utilised by Petersen. His results, when tabulated on a uniform basic sample of twenty litres, are interesting for comparison with those obtained with Petersen's bottom-sampler and recorded above, with regard both to the community formations and the working efficiency of the two collecting instruments. In Table 2 (page 190) I have arranged a number of selected species in a manner conveniently to show at a glance their frequency of occurrence in the three types of deposit.

It is to be noticed that my SpVf species are confined to the shell gravel, and my EcVg species shared by the fine sand and mud, with *Venus fasciata* and *Venus gallina* regularly occurring. In the fine sand EcVg *stult.* species are well represented (although *Mactra stultorum* itself does not appear). This is to be expected, for three of the five samples were taken from Whitsand Bay and Bigbury Bay. The two remaining samples were collected from the offshore Eddystone Grounds, and include *Syndosmya prismatica*, and thus afford confirmation for the existence of my (b) :—

FINE SAND SAMPLES.

Species.	WHITSAND	BIGBURY	EDDYSTONE W.
	BAY.	BAY.	ca 6 miles.
	No. of samples in which present	No. of samples in which present	No. of samples in which present
<i>Donax vittatus</i>	1	—	—
<i>Meretrix chione</i>	1	—	—
<i>Ensis ensis</i>	1	1	—
<i>Venus gallina</i>	2	1	1
<i>Cultellus pellucidus</i>	—	1	2
<i>Syndosmya prismatica</i>	—	—	1
<i>Echinocardium cordatum</i>	1	1	1
<i>Iphinoe trispinosa</i>	2	1	—
<i>Bathyporeia</i> sp.	1	—	—

TABLE 2.

MR. BAKER'S CONICAL DREDGE SAMPLES. (SUMMER, 1921.) PLYMOUTH.

Species.	Number of samples in which present		
	Shell gravel.	Fine sand.	Mud.
	Total Samples.	Total Samples.	Total Samples.
	4	5	4
<i>Nucula</i> sp.	2	—	—
<i>Tellina pusilla</i>	1	—	—
<i>Venus fasciata</i>	3	—	—
<i>Gouldia minima</i>	1	—	—
<i>Gari tellinella</i>	3	—	—
<i>Echinocyamus pusillus</i>	3	—	—
<i>Amphioxus lanceolatus</i>	2	—	—
<i>Donax vittatus</i>	—	1	—
<i>Syndosmya prismatica</i>	—	1	—
<i>Meretrix chione</i>	—	1	—
<i>Ensis ensis</i>	—	2	—
<i>Echinocardium cordatum</i>	—	3	—
<i>Amphiura filiformis</i>	—	1	—
<i>Iphinoe trispinosa</i>	—	3	—
<i>Bathyporeia</i> sp.	—	1	—
<i>Owenia fusiformis</i>	—	1	—
<i>Lanice conchilega</i>	—	2	—
<i>Nucula nitida</i>	—	—	2
<i>Thyasira flexuosa</i>	—	—	4
<i>Syndosmya alba</i>	—	—	3
<i>Melinna adriatica</i>	—	—	4
<i>Goniada maculata</i>	—	—	3
<i>Magelona papillicornis</i>	—	—	2
<i>Cirratulus cirratus</i>	—	—	1
<i>Venus gallina</i>	—	4	3
<i>Cultellus pellucidus</i>	—	3	3
<i>Dosinia lupina</i>	2	2	1
<i>Corbula gibba</i>	1	1	1
<i>Nephtys</i> sp.	1	5	2
<i>Glycera</i> sp.	3	2	2
<i>Lumbriconereis</i> sp.	1	1	4

The samples of black mud were obtained exclusively from Plymouth Sound, and compare most favourably with the bottom-sampler hauls in the same localities, the leading EcVg mud polychaetes and *Thyasira flexuosa* being well represented :—

BLACK MUD SAMPLES.

Species.	OFF MALLARD BUOY. No. of samples in which present	RUM BAY No. of samples in which present	JENNYCLIFFE BAY. No. of samples in which present	Average No. of specimens per 1 sample of 20 litres.
<i>Thyasira flexuosa</i>	2	1	1	9
<i>Syndosmya alba</i>	1	1	1	5
<i>Venus gallina</i>	2	1	—	4
<i>Cultellus pellucidus</i>	2	1	—	3
<i>Melinna adriatica</i>	2	1	1	114
<i>Goniada maculata</i>	1	1	1	11
<i>Lumbriconereis</i> sp.	2	1	1	14
<i>Magelona papillicornis</i>	1	1	—	2

It is a little difficult to know how to compare the working efficiency of the conical dredge as used by Mr. Baker with that of the bottom-sampler, for the instruments work on fundamentally different principles. It cannot be denied, however, after the examination of the results of the comparatively few hauls made during the summer of 1921 (see Valuation Lists, p. 221), that the conical dredge was able not only to capture the majority of the more important community species on the grounds investigated, but also to indicate in some degree the relative frequency of certain forms. The great disadvantage of the necessity for towing, whereby exactness in determination of position and of area covered is most seriously reduced, can never be overlooked, especially when working in localities where slight changes in position are of vital importance; but in spite of this, it is evident that much good work may be accomplished with this instrument. It may be of interest to include here the results of an experiment conducted at Bigbury Bay on May 30th, 1923, when one haul of the conical dredge of about two minutes' duration was taken as nearly as possible in the same place as four dips of the bottom-sampler. The ground chosen was inhabited by a flourishing growth of b. fil., with a good variety in animal life in a soft silty soil at a depth of 15 fathoms. The amount of deposit brought up by the dredge had a volume of two and half times that of the four bottom-sampler hauls put together, or, in other words, one dredge haul was equal in

volume to ten of the bottom samples. The numbers of the various animals captured were as follows :—

	CONICAL DREDGE.		BOTTOM SAMPLER.
	No. per 1 haul.	No. per 2/5 haul. (calculated).	No. per 4 dips.
<i>Nucula nitida</i>	91	36.4	35
<i>Thyasira flexuosa</i>	14	5.6	17
<i>Montacuta bidentata</i>	35	14	22
<i>Syndosmya alba</i>	1130	452	555
<i>Mactra stultorum</i>	14	5.6	4
<i>Cardium echinatum</i>	42	16.8	13
<i>Cultellus pellucidus</i>	29	11.6	14
<i>Gari costulata</i>	6	2.4	1
<i>Tellimya ferruginosa</i>	—	—	4
<i>Syndosmya prismatica</i>	5	2	—
<i>Spisula subtruncata</i>	1	.4	—
<i>Venus gallina</i>	5	2	—
<i>Venus ovata</i>	3	1.2	—
<i>Dosinia lupina</i>	5	2	—
<i>Corbula gibba</i>	2	.8	—
<i>Bullinella cylindracea</i>	8	3.4	1
<i>Buccinum undatum</i>	1	.4	—
<i>Actæon tornatilis</i>	—	—	1
<i>Nassa reticulata</i>	—	—	1
<i>Echinocardium cordatum</i>	2	.8	6
<i>Amphiura filiformis</i>	144	57.6	72
<i>Ophiura ciliaris</i>	12	4.8	—
<i>Ophiothrix fragilis</i>	—	—	1
<i>Cucumaria</i> sp.	—	—	1
Decapoda larvæ	3	1.4	6
Amphipoda	10	4	3
<i>Diastylis</i> sp.	10	4	2
<i>Iphinoe trispinosa</i>	1	.4	—
Caprellidæ	1	.4	—
<i>Pycnogonida</i>	1	.4	—

	CONICAL DREDGE,		BOTTOM SAMPLER.
	No. per 1 haul.	No. per 2/5 haul. (calculated).	No. per 4 dips.
<i>Corystes cassivelaunus</i>	1	.4	—
<i>Portunus</i> sp.	4	1.6	—
<i>Owenia fusiformis</i>	16	6.4	8
<i>Nephtys</i> sp.	10	4	4
<i>Sthenelais limicola</i>	4	1.6	2
Polynoinæ	10	4	4
Polychaeta sandy tubes	←—	fragments.	—→
<i>Ophriodromus flexuosus</i>	—	—	1
Phyllodocidæ	—	—	2
<i>Pectinaria</i> sp.	—	—	1
Polychaeta indet.	←—	fragments.	—→
<i>Cryptocœlis alba</i>	2	.8	2
Nemertinea	—	—	1

It would probably be unwise to pass too critical a judgment with the data of a single experiment of this kind, but the figures do show that the conical dredge is capable of taking a good sample under favourable circumstances, and will give a good idea of the general community formation. In this particular instance it has captured more species than the bottom-sampler, while none which are important items in the bottom-sampler hauls are missing. Two interesting facts were observed which are not obvious from the tables. If age, as revealed by size, is taken into account, then a greater proportion of "O" group, *Syndosmya alba*, was taken by the conical dredge than by the bottom-sampler. This may indicate that the scraping action of the dredge when in tow may result in the capture of a relatively too high number of the surface animals? In the second place, the specimens of *Amphiura filiformis* obtained by the dredge were all badly broken, much more so than one would have expected notwithstanding the extreme ease with which these animals break up ordinarily. This may also be explained by the method of working, and serves to illustrate the advantage held by the bottom-sampler that it will bring up in excellent condition delicate organisms which would almost certainly be smashed by the dredge. Specimens of *Corymorpha nutans*, *Virgularia mirabilis*, and *Cryptocœlis alba* have been obtained in splendid condition during recent months.

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VALUATION LISTS.

A. HAULS OF 1/10 SQ. METRE BOTTOM-SAMPLER AT SELECTED STATIONS, 1922-23

<i>Plymouth Sound</i>		PAGE
Vf stations		195
Mixed Vf and Vg stations		197
Vg stations		198
1. EcVg mud dominant		198
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3. Vg		202
<i>Outside waters</i>		
SpVf stations		202
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5. EcVg mud		218
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B. MR. J. R. BAKER'S HAULS WITH CONICAL DREDGE, JULY-SEPTEMBER, 1921

1. Mud	221
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PLYMOUTH SOUND. V_F STATIONS.

No. 23.	Per $\frac{1}{2}$ m ² .	No.	No. 35.	Per $\frac{1}{2}$ m ² .	No.
<i>Nucula radiata</i>	.	1	<i>Nucula radiata</i>	.	1
<i>Tellina pusilla</i>	.	16	<i>Barbatia lactea</i>	.	1
<i>Lutraria oblonga</i> (juv.)	.	2	<i>Lima loscombi</i>	.	1
<i>Spisula elliptica</i> (juv.)	.	5	<i>Lutraria oblonga</i> (juv.)	.	57
<i>Dosinia exoleta</i>	.	3	<i>Tellina pusilla</i>	.	2
<i>Dosinia lupina</i>	.	8	<i>Tellina crassa</i>	.	1
<i>Venus fasciata</i>	.	3	<i>Spisula elliptica</i> (juv.)	.	287
<i>Venus ovata</i>	.	5	<i>Dosinia exoleta</i>	.	3
<i>Tapes virgineus</i>	.	1	<i>Venus fasciata</i>	.	20
<i>Gari tellinella</i>	.	1	<i>Venus casina</i>	.	1
<i>Ensis arcuata</i> (juv.)	.	1	<i>Cardium nodosum</i>	.	2
<i>Saxicava arctica</i>	.	1	<i>Gari tellinella</i>	.	1
			<i>Corbula gibba</i>	.	1
<i>Echinocyamus pusillus</i>	.	1	<i>Solecurtus antiquatus</i>	.	1
			<i>Ensis arcuata</i> (juv.)	.	9
<i>Urothoe marina</i>	.	6	<i>Natica alderi</i>	.	1
<i>Hippomedon</i> sp.	.	1	<i>Echinocyamus pusillus</i>	.	3
<i>Nototropis vedlomensis</i>	.	1	<i>Asterias</i> sp. (juv.)	.	1
<i>Leucothoe spinicarpa</i>	.	1			
<i>Schizopoda</i>	.	2	<i>Corystes cassivelaunus</i> (juv.)	.	1
			<i>Eupagurus</i> sp. (juv.)	.	2
<i>Nephtys</i> sp.	.	3	<i>Glycera</i> sp.	.	3
<i>Lanice conchilega</i>	.	1	<i>Lumbriconereis</i> sp.	.	1
<i>Terebellidæ</i>	.	1	<i>Terebellidæ</i>	.	1
<i>Polychaete</i> tubes	.	several	<i>Ampharetidæ</i>	.	1
<i>Ascididæ</i> with hydroids	.	2	<i>Ammodytes lanceolatus</i> (juv.)	.	1
			<i>Actinia</i>	.	1
			West Channel off Breakwater		
Off New Grounds Buoy. Shelly			Lighthouse. Coarse shelly gravel		
gravel. June 22nd, 1922.			with some stones. July 5th, 1922.		

PLYMOUTH SOUND. V_F STATIONS—*continued*.

No. 47.	Per $\frac{1}{2}$ m ² .	No.	No. 54.	Per $\frac{1}{2}$ m ² .	No.
Glycimeris glycimeris		2	Nucula radiata		4
Lutraria oblonga (juv.)		9	Glycimeris glycimeris		1
Tellina pusilla		38	Lutraria oblonga (juv.)		2
Tellina crassa		1	Tellina pusilla		21
Spisula elliptica (juv.)		425	Spisula elliptica (juv.)		83
Dosinia exoleta		8	Dosinia exoleta		5
Venus fasciata		23	Venus fasciata		9
Venus ovata		11	Venus ovata		21
Tapes virgineus		4	Tapes virgineus		1
Cardium nodosum		3	Cardium nodosum		3
Gari tellinella		2	Gari tellinella		4
Solecortus antiquatus		1	Corbula gibba		2
Ensis arcuata (juv.)		15	Solecortus scopula		2
Thracia villosiuscula		1	Ensis arcuata (juv.)		1
Echinocyamus pusillus		3	Echinocyamus pusillus		3
Leptocheirus hirsutimanus		1	Portunus pusillus		1
Palæmonid		1	Leptocheirus hirsutimanus		1
Glycera sp.		2	Conilera cylindracea		1
Lumbriconereis sp.		1	Glycera sp.		1
Sabellid		1	Polychaete tube		1
Aphroditidæ		1			

Between New Grounds and Queen's Grounds Buoys. Coarse shelly gravel. July 25th, 1922.

Midway between New Grounds and Queen's Grounds Buoys. Coarse shelly gravel. September 19th, 1922.

No. 89.	Per $\frac{1}{2}$ m ² .	No.	No. 90.	Per $\frac{1}{2}$ m ² .	No.
Tellina pusilla		1	Nucula radiata		1
Tellina donacina		1	Tellina crassa		1
Spisula elliptica (juv.)		17	Spisula elliptica (juv.)		5
Gari tellinella		1	Venus fasciata		2
Ensis sp.		1	Ensis arcuata (juv.)		1
Pontocrates arenarius		1	Urothoe marina		3
Nepthys sp.		2	Hippomedon sp.		1
			Pontocrates arenarius		1
			Glycera sp.		2
			Polychaete tubes		3

Off Bovisand Pier. Fine shell gravel. February 20th, 1923.

Off New Grounds Buoy. Shelly gravel. February 20th, 1923.

PLYMOUTH SOUND. V_F STATIONS—*continued.*

No. 91.	Per $\frac{1}{2}$ m ² .	No.	No. 92.	Per $\frac{1}{2}$ m ² .	No.
<i>Spisula elliptica</i> (juv.) . . .		10	<i>Nucula radiata</i>		1
<i>Venus fasciata</i>		3	<i>Lutraria oblonga</i> (juv.) . . .		2
<i>Venus ovata</i>		1	<i>Spisula elliptica</i> (juv.) . . .		42
<i>Gari tellinella</i>		1	<i>Dosinia exoleta</i>		1
<i>Urothoe marina</i>		1	<i>Venus fasciata</i>		6
<i>Glycera</i> sp.		2	<i>Gari tellinella</i>		1
			<i>Leptocheirus hirsutimanus</i> . .		1
			<i>Polychaete</i> indet.		1

Midway between New Grounds and Queen's Grounds Buoy. Shelly gravel. February 20th, 1923.

West Channel. Coarse shelly gravel. February 20th, 1923.

PLYMOUTH SOUND. MIXED V_F AND V_G STATIONS.

No. 29.	Per $\frac{1}{2}$ m ² .	No.	No. 37.	Per $\frac{1}{2}$ m ² .	No.
<i>Nucula nitida</i>		1	<i>Lucina borealis</i> (juv.)		1
<i>Syndosmya alba</i>		1	<i>Spisula elliptica</i> (juv.) . . .		13
<i>Tellina pusilla</i>		1	<i>Spisula subtruncata</i>		1
<i>Lutraria elliptica</i> (juv.) . . .		14	<i>Dosinia lupina</i>		1
<i>Spisula elliptica</i> (juv.)		5	<i>Dosinia exoleta</i>		1
<i>Spisula subtruncata</i>		2	<i>Venus fasciata</i>		1
<i>Venus ovata</i>		1	<i>Venus casina</i>		1
<i>Tapes virgineus</i>		1	<i>Venus ovata</i>		1
<i>Cardium echinatum</i> (juv.) . . .		1	<i>Tapes virgineus</i>		3
<i>Cardium nodosum</i>		1	<i>Cardium echinatum</i>		1
<i>Cultellus pellucidus</i> (et juv.) .		11	<i>Corbula gibba</i>		1
<i>Ensis ensis</i> (juv.)		14	<i>Cultellus pellucidus</i> (et juv.)		13
<i>Ensis arcuata</i> (juv.)		23	<i>Ensis ensis</i> (juv.)		2
<i>Schizopoda</i>		1	<i>Ensis arcuata</i> (juv.)		10
<i>Nephtys</i> sp.		2	<i>Leptocheirus hirsutimanus</i> . .		1
<i>Lumbriconereis</i> sp.		3	<i>Nephtys</i> sp.		3
<i>Goniada maculata</i>		2	<i>Lumbriconereis</i> sp.		2
<i>Lanice conchilega</i> (small) . . .		4	<i>Polynoid</i>		1
<i>Melinna adriatica</i> (tubes) . . .		4	<i>Polychaete</i> tubes		3
<i>Cirratulids</i> (small)		2	<i>Nemertini</i>		1

Off Melampus Buoy. Mixed gravel, sand, and mud. June 26th, 1922.

Off Melampus Buoy. Mixed shelly gravel and sand. July 10th, 1922.

PLYMOUTH SOUND. STATIONS WHERE ECVG MUD
IS DOMINANT.

No. 24. Per $\frac{1}{2}$ m².

	No.		No.
<i>Nucula nitida</i>	6	Synaptidæ	3
<i>Lucina spinifera</i>	2		
<i>Thyasira flexuosa</i>	83		
<i>Montacuta bidentata</i>	5		
<i>Syndosmya alba</i>	13	<i>Melinna adriatica</i>	many
<i>Syndosmya nitida</i>	4	<i>Lumbriconereis</i> sp.	many
<i>Tellina donacina</i>	1	Cirratulidæ (small)	frequent
<i>Lutraria elliptica</i> (juv.)	1	<i>Notomastus latericeus</i>	fragments
<i>Venus gallina</i>	1	<i>Goniada maculata</i>	15
<i>Corbula gibba</i>	1	<i>Nephtys</i> sp.	2
<i>Solecurtus antiquatus</i>	1	<i>Glycera</i> sp.	2
<i>Cultellus pellucidus</i>	3	<i>Marphysa</i> sp. (juv.)	1
		Polynoïnæ	1
<i>Philine aperta</i>	1	Chlorhæmidæ	1

Jennycliff Bay. Off Inner Hospital Ship. Black mud.
June 22nd, 1922.

No. 25. Per $\frac{1}{2}$ m².

	No.		No.
<i>Nucula nitida</i>	25	<i>Galathea</i> sp. (juv.)	1
<i>Thyasira flexuosa</i>	43		
<i>Montacuta bidentata</i>	2	<i>Melinna adriatica</i>	many
<i>Syndosmya alba</i>	12	<i>Lumbriconereis</i> sp.	many
<i>Spisula subtruncata</i>	1	Cirratulidæ	5
<i>Venus gallina</i>	1	<i>Notomastus latericeus</i>	fragments
<i>Venus ovata</i>	1	<i>Goniada maculata</i>	8
<i>Cardium echinatum</i> (juv.)	1	<i>Nephtys</i> sp.	2
<i>Cardium nodosum</i>	1	<i>Glycera</i> sp.	3
<i>Corbula gibba</i>	1	<i>Marphysa</i> sp. (juv.)	4
<i>Cultellus pellucidus</i>	3	<i>Nereis</i> sp.	2
		<i>Magelona papillicornis</i>	6
		Maldanidæ	5
<i>Philine aperta</i>	2	<i>Polychaetes</i> indet.	fragments
Synaptidæ	2	Nemertini	1

Jennycliff Bay. Off Outer Hospital Ship. Black mud with some sand.
June 26th, 1922.

PLYMOUTH SOUND. STATIONS WHERE ECGE MUD IS DOMINANT—*contd.*

No. 30.	Per $\frac{1}{2}$ m ² .	No.	No. 62.	Per $\frac{1}{2}$ m ² .	No.
<i>Lucina borealis</i>	.	2	<i>Nucula nitida</i>	.	3
<i>Thyasira flexuosa</i>	.	3	<i>Modiolaria marmorata</i>	.	1
<i>Montacuta bidentata</i>	.	5	<i>Lucina borealis</i>	.	10
<i>Syndosmya alba</i>	.	25	<i>Thyasira flexuosa</i>	.	10
<i>Lutraria elliptica</i> (juv.)	.	13	<i>Montacuta bidentata</i>	.	1
<i>Venus gallina</i>	.	4	<i>Syndosmya alba</i>	.	17
<i>Venus verrucosa</i>	.	1	<i>Dosinia lupina</i>	.	2
<i>Tapes virgineus</i>	.	4	<i>Tapes virgineus</i>	.	3
<i>Tapes pullastra</i>	.	32	<i>Tapes pullastra</i>	.	35
<i>Cardium fasciatum</i>	.	1	<i>Tapes perforans</i>	.	1
<i>Gari ferroensis</i>	.	1	<i>Cardium fasciatum</i>	.	3
<i>Mya truncata</i>	.	7	<i>Corbula gibba</i>	.	34
<i>Corbula gibba</i>	.	8	<i>Mya truncata</i> (juv.)	.	20
<i>Cultellus pellucidus</i>	.	4	<i>Solecurtus antiquatus</i>	.	2
			<i>Saxicava rugosa</i>	.	1
<i>Calyptræa chinensis</i>	.	7			
			<i>Goniodoris castanea</i>	.	1
<i>Antedon bifida</i>	.	1	<i>Antedon bifida</i> (juv.)	.	8
<i>Eupagurus</i> sp. (juv.)	.	1	<i>Ophiura</i> sp.	.	1
<i>Portunus</i> sp. (juv.)	.	1	<i>Cucumaria elongata</i>	.	1
<i>Melinna adriatica</i>	.	many	<i>Portunus</i> sp. (juv.)	.	2
Cirratulidæ (small)	.	many	<i>Carcinus maenas</i>	.	1
<i>Nephtys</i> sp.	.	14	<i>Lysianassa ceratina</i>	.	9
<i>Lumbriconereis</i> sp.	.	6			
<i>Goniada maculata</i>	.	3	<i>Melinna adriatica</i>	.	6
<i>Magelona papillicornis</i>	.	1	Cirratulidæ	.	1
<i>Nereis</i> sp.	.	5	<i>Nephtys</i> sp.	.	14
<i>Marphysa</i> sp.	.	2	<i>Lumbriconereis</i> sp.	.	3
<i>Sthenelais</i> sp.	.	1	<i>Goniada maculata</i>	.	5
Polynoinæ	.	1	<i>Nereis</i> sp.	.	7
<i>Notomastus latericeus</i>	.	1	Polynoinæ	.	2
			<i>Sthenelais</i> sp.	.	2
			<i>Notomastus latericeus</i>	.	1
<i>Nemertini</i>	.	1			
			<i>Nemertini</i>	.	1
<i>Cereus pedunculatus</i>	.	4			
<i>Sagartia</i> sp.	.	2	Ascididæ	.	several

Midway between Mallard Buoy and Batten Breakwater. Black mud with clinker. June 26th, 1922.

Midway between Mallard Buoy and Batten Breakwater. Black mud with clinker. October 26th, 1922.

PLYMOUTH SOUND. STATIONS WHERE EcVg MUD IS DOMINANT—*contd.*

No. 36. Per $\frac{1}{2}$ m ² .		No.	
Thyasira flexuosa	1	Cirratulidæ (small)	many
Syndosmya alba	34	Nephtys sp.	7
Lutraria elliptica (juv.)	2	Lumbriconereis sp.	many
Cultellus pellucidus	1	Goniada maculata	3
Nassa reticulata	1	Nereis sp.	6
Synaptidæ	1	Phyllodocidæ	1
Carcinus maenas (juv.)	2	Polychaete sp. (indet.)	1
Melinna adriatica	many	Nemertine	1
		Zoantharia	2

Millbay Docks. Black mud. July 10th, 1922.

No. 61. Per 1 m ² .		No.	
Nucula nitida	1	Melinna adriatica	many
Lucina borealis	1	Lumbriconereis sp.	10
Thyasira flexuosa	23	Cirratulidæ	2
Syndosmya alba	1	Notomastus latericeus	fragments
Dosinia lupina	1	Goniada maculata	5
Cultellus pellucidus	2	Nephtys sp.	1
Philine aperta	1	Owenia fusiformis (tube)	1
Pycnogonida	1	Maldanidæ	3
Porcellana longicornis	1	Myxicola (tube)	1
		Nemertini	1

Jennycliff Bay. Off Inner Hospital Ship. Black mud.
October 26th, 1922.

PLYMOUTH SOUND. MIXED EcVg MUD AND b STATIONS.

No. 60. Per $\frac{1}{2}$ m ² .		No.	
Nucula nitida	1	Venus ovata	1
Lucina borealis	1	Solecurtus antiquatus	3
Thyasira flexuosa	13	Cultellus pellucidus	9
Syndosmya alba	1	Melinna adriatica	frequent
Spisula subtruncata	1	Lumbriconereis sp.	frequent
Dosinia lupina	7	Notomastus latericeus	fragments.

Midway between Duke Rock Buoy and No. 1 Anchorage Buoy.
Sandy mud. October 26th, 1922.

PLYMOUTH SOUND. MIXED ECG MUD AND b STATIONS—*continued.*

No. 26. Per $\frac{1}{2}$ m ² .		No.	
	No.		No.
<i>Nucula nitida</i>	11	<i>Schizopoda</i>	1
<i>Lucina borealis</i>	3	<i>Isopoda</i>	1
<i>Thyasira flexuosa</i>	28		
<i>Montacuta bidentata</i>	2	<i>Melinna adriatica</i>	many
<i>Syndosmya alba</i>	14	<i>Lumbriconereis</i> sp.	ca. 10
<i>Tellina fabula</i>	2	<i>Nephtys</i> sp.	3
<i>Spisula subtruncata</i>	1	<i>Glycera</i> sp.	3
<i>Lutraria elliptica</i> (juv.)	6	<i>Magelona papillicornis</i>	1
<i>Dosinia lupina</i> (et juv.)	8	<i>Nereis longissima</i>	1
<i>Venus ovata</i>	12	<i>Myxicola</i> (tube)	1
<i>Tapes virgineus</i>	1	<i>Polychaete</i> tubes (sp. indet.)	fragments
<i>Corbula gibba</i>	24		
<i>Mya truncata</i> (juv.)	1		
<i>Cultellus pellucidus</i>	10	<i>Nemertini</i>	1
<i>Portunus</i> sp. (juv.)	1	<i>Virgularia mirabilis</i>	1

Off Duke Rock Buoy. Muddy sand. June 26th, 1922.

No. 32. Per $\frac{1}{2}$ m ² .		No.	
	No.		No.
<i>Nucula nitida</i>	8	<i>Ensis ensis</i> (juv.)	3
<i>Modiolaria marmorata</i>	1		
<i>Lucina spinifera</i>	1	<i>Helcion pellucida</i>	1
<i>Thyasira flexuosa</i>	55		
<i>Montacuta bidentata</i>	1	<i>Synaptidæ</i>	2
<i>Diplodonta rotundata</i>	1		
<i>Syndosmya alba</i>	54	<i>Melinna adriatica</i>	many
<i>Syndosmya nitida</i>	6	<i>Lumbriconereis</i> sp.	many
<i>Spisula subtruncata</i>	1	<i>Nephtys</i> sp.	17
<i>Lutraria elliptica</i> (juv.)	14	<i>Glycera</i> sp.	2
<i>Dosinia lupina</i>	3	<i>Goniada maculata</i>	1
<i>Venus gallina</i>	1	<i>Owenia fusiformis</i>	2
<i>Venus ovata</i>	23	<i>Pectinaria</i> sp.	1
<i>Tapes virgineus</i>	4	<i>Notomastus latericeus</i>	6
<i>Cardium echinatum</i>	1	<i>Polychaete</i> sandy tubes	frequent
<i>Mya truncata</i> (juv.)	2		
<i>Corbula gibba</i>	13	<i>Nemertinea</i>	1
<i>Solecurtus antiquatus</i>	8	<i>Cryptocelis alba</i>	1
<i>Cultellus pellucidus</i>	37	<i>Virgularia mirabilis</i>	1

Midway between Duke Rock Buoy and No. 1 Anchorage Buoy.

Sandy mud. July 5th, 1922.

PLYMOUTH SOUND. V_G STATION.

No. 38. Per $\frac{1}{2}$ m ² .			
No.			No.
Nucula nitida	5	Synaptidæ	1
Lucina borealis	1		
Thyasira flexuosa	28	Nika edulis	1
Syndosmya alba	42		
Lutraria elliptica (juv.)	2	Melinna adriatica	frequent
Spisula elliptica (juv.)	2	Lumbriconereis sp.	frequent
Macra stultorum	1	Nephtys sp.	5
Venus ovata	1	Goniada maculata	2
Cardium exiguum	1	Magelona papillicornis	2
Corbula gibba	1	Sthenelais sp.	1
Cultellus pellucidus	72	Polynoinæ	2
Ensis ensis (juv.)	1	Notomastus latericeus	fragments
Philine aperta	2	Sagartia coccinea	1

Middle of Sound. Muddy sand. July 10th, 1922.

OUTSIDE WATERS. SP_VF STATIONS.

No. 111. Per $\frac{1}{3}$ m ² .			
No.			No.
Tellina crassa	1	Ampelisca sp.	1
Tellina pusilla	2	Lysianassidæ	1
Venus fasciata	1	Nephtys sp.	1
Venus ovata	3	Lumbriconereis sp.	1
Tapes virgineus	2	Chaetopterus variopedatus	
Gouldia minima	1	(tube)	1
Echinocyamus pusillus	1	Terebellidæ	2
		Polynoinæ	1
Portunus pusillus	1	Cryptocoelis alba	1

Eddystone, S.S.E. $\frac{1}{2}$ E., 1 mile. Broken shells. June 26th, 1923.

No. 112. Per $\frac{1}{3}$ m ² .			
No.			No.
Nucula radiata	1	Decapoda larvæ	1
Tellina pusilla	2	Schizopoda	1
Venus ovata	1		
		Lanice conchilega (tubes)	2
Echinocyamus pusillus	1	Hyalinœcia sicula	1
Upogebia sp. (juv.)	1	Amphioxus lanceolatus	2

Eddystone, S.S.E. $\frac{1}{2}$ E., 3 miles. Shelly gravel. June 26th, 1923.

OUTSIDE WATERS. SPVF STATIONS—*continued.*No. 14. Per $\frac{1}{2}$ m².

	No.		No.
Venus ovata	1	Urothoe marina	1
Solecurtus scopula	1	Monoculodes carinatus	1
Echinocyamus pusillus	2	Polygordius sp.	1
Ophiothrix fragilis	1	Lanice conchilega (tubes) fragments	
Ophiocoma nigra	1		
Asterias rubens	1	Amphioxus lanceolatus	1

Erme Head, N.E. by E., 2 miles. Clean shell gravel.

June 9th, 1922.

No. 20. Per 1 m².

	No.		No.
Nucula radiata	4	Pontocrates arenarius	1
Glycimeris glycimeris	7	Ampelisca typica	4
Lima loscombi	4	Ampelisca brevicornis	1
Tellina crassa	1	Nototropis vedlomensis	1
Spisula elliptica (juv.)	2		
Venus fasciata	21	Polygordius sp.	fragments
Venus ovata	13	Chaetopterus variopedatus	
Tapes virgineus	18	(tubes)	4
Gouldia minima	11	Glycera sp.	13
Cardium fasciatum	2	Lumbriconereis sp.	4
Gari tellinella	4	Polynoinæ	6
Cultellus pellucidus	1	Pectinaria sp.	2
Thracia villosiuscula	1	Lanice conchilega	4
		Onuphis brittanica	1
Natica alderi	1	Nerine sp.	1
		Notomastus latericeus	1
Spatangus purpureus (juv.)	1		
Echinocyamus pusillus	10	Cryptocœlis alba	1
		Nemertini	2
Porcellana longicornis	4		
Portunus pusillus	4	Aphroceras sp.	1
Eurynome aspersa	1	Cellaria sp.	fragments
Galathea sp. (juv.)	2	Corymorpha nutans	1
Ebalia sp.	2		
Decapoda postlarvæ	4	Amphioxus lanceolatus	9

Eddystone, S.S.E. $\frac{1}{2}$ E. $\frac{1}{2}$ mile. Clean shell gravel.

June 20th, 1922.

OUTSIDE WATERS. SPVF STATIONS—*continued*.

No. 81.	Per $\frac{1}{2}$ m ²	No.	No. 95.	Per $\frac{1}{2}$ m ² .	No.
Glycimeris glycimeris	.	24	Nucula radiata	.	1
Tellina crassa	.	3	Glycimeris glycimeris	.	7
Tellina pusilla	.	1	Tellina crassa	.	4
Venus fasciata	.	23	Tellina pusilla	.	4
Venus ovata	.	7	Spisula elliptica (juv.)	.	2
Tapes virgineus	.	3	Venus fasciata	.	7
Gouldia minima	.	29	Venus ovata	.	4
Cardium nodosum	.	2	Tapes virgineus	.	4
Cardium norvegicum	.	1	Gouldia minima	.	5
Gari tellinella	.	2	Gari tellinella	.	11
Solecurtus scopula	.	1	Echinocardium flavescens	.	1
Thracia villosiuscula	.	1	Echinocyamus pusillus	.	8
Echinocardium flavescens			Cucumaria sp.	.	1
(juv.)	.	1	Ophiuroid (juv.)	.	1
Echinocyamus pusillus	.	3	Atelocyclus (juv.)	.	1
Portunus pusillus	.	2	Zoæa	.	1
Ebalia tuberosa	.	1	Isopoda	.	1
Ampelisca typica	.	1	Ampelisca spinipes	.	2
Maera sp.	.	2	Ampelisca sp.	.	1
Polygordius sp.	fragments		Maera sp.	.	3
Glycera sp.	.	8	Gammaridae	.	2
Polynoïnæ	.	1	Glycera sp.	.	4
Lumbriconereis sp.	.	1	Lumbriconereis sp.	.	1
Aphroceras sp.	.	1	Chlorhæmids	.	2
Amphioxus lanceolatus	.	18	Polynoïnæ	.	1
			Polygordius sp.	.	1
			Corymorpha nutans	.	8
			Amphioxus lanceolatus	.	9

Eddystone, S.S.E. $\frac{1}{2}$ E. $\frac{1}{2}$ mile.
Clean shell gravel. January 25th,
1923.

Eddystone, S.S.E. $\frac{1}{2}$ E. $\frac{1}{2}$ mile.
Clean shelly gravel. May 9th, 1923.

OUTSIDE WATERS.			SPVF STATIONS— <i>continued</i> .		
No. 102.	Per $\frac{1}{10}$ m ² .	No.	No. 52.	Per $\frac{1}{2}$ m ² .	No.
Glycimeris glycimeris	.	1	Tellina pusilla	.	3
Tellina donacina	.	1	Tellina crassa	.	1
Venus fasciata	.	9	Lutraria oblonga (juv.)	.	2
Venus ovata	.	7	Spisula elliptica (juv.)	.	47
Tapes virgineus	.	2	Dosinia sp. (juv.)	.	8
Cardium nodosum	.	7	Venus fasciata	.	3
Gari tellinella	.	1	Venus ovata	.	1
Solecortus scopula	.	1	Gari tellinella	.	1
			Ensis arcuata (juv.)	.	2
Echinocyamus pusillus	.	2			
Ophiura sp.	.	1	Echinocyamus pusillus	.	1
Ampelisca sp.	.	1	Eupagurus sp. (juv.)	.	1
Maera sp.	.	1	Cirolana gallica	.	1
			Pontocrates arenarius	.	1
Polynoïnæ	.	1			
Nephtys sp.	.	1	Glycera sp.	.	1
Owenia fusiformis	.	1			
Polychaetes indet.		fragments			

Knight Errant Buoy, N.N.W. $\frac{1}{4}$ mile. Coarse shell gravel with some silt. June 5th, 1923.

Breakwater Light, E. by N. $\frac{1}{2}$ N., $\frac{3}{4}$ mile. Small gravel with shell fragments and pieces of shale. July 31st, 1922.

August 14th, 1922. Per $\frac{1}{10}$ m ² .			August 14th, 1922. Per $\frac{1}{10}$ m ² .		
(b)		No.	(c)		No.
Glycimeris glycimeris	.	3	Glycimeris glycimeris	.	1
Tellina pusilla	.	1	Venus ovata	.	1
Venus fasciata	.	4	Cultellus pellucidus	.	3
Venus ovata	.	1			
Venus casina	.	1	Ampelisca spinipes	.	1
Echinocyamus pusillus	.	1			
		(many dead)			
Ampelisca spinipes	.	1	Nephtys sp.	.	1
Nephtys sp.	.	1	Lanice conchilega (tube)	.	1
Syllidæ	.	1			
Amphioxus lanceolatus	.	1			

Eddystone, S.W. $\frac{3}{4}$ S., $1\frac{1}{2}$ miles. Muddy coarse shell gravel. August 14th, 1922.

Mewstone, E.N.E. Tregantle, N. by E. $\frac{1}{4}$ E. Mixed sand, shells, and coarse material. August 14th, 1922.

OUTSIDE WATERS. SPVF STATIONS—*continued.*

No. 65. Per $\frac{1}{2}$ m ² .			
	No.		No.
<i>Nucula radiata</i>	3	<i>Ampelisca typica</i>	1
<i>Syndosmya alba</i>	30	<i>Ampelisca brevicornis</i>	1
<i>Tellina pusilla</i>	2	<i>Urothoe marina</i>	2
<i>Venus ovata</i>	2		
<i>Cultellus pellucidus</i>	9		
		<i>Nephtys</i> sp.	3
<i>Natica alderi</i>	1	<i>Glycera</i> sp.	2
		<i>Goniada maculata</i>	1
<i>Echinocyamus pusillus</i>	1	<i>Lumbriconereis</i> sp.	1
		<i>Owenia fusiformis</i>	2
<i>Nika edulis</i>	1	Cirratulidæ	2
<i>Diastylis</i> sp.	1	<i>Lanice conchilega</i> (tubes)	2
<i>Iphinoe</i> sp.	1	<i>Cryptocœlis alba</i>	1

Erme Coast Guard Station, N.E. northerly. Borough Island, E.
Fine shell gravel. October 31st, 1922.

No. 78. Per $\frac{1}{3}$ m ² .		No. 87. Per $\frac{1}{2}$ m ² .	
	No.		No.
<i>Nucula radiata</i>	1	<i>Nucula radiata</i>	2
<i>Venus fasciata</i>	1	<i>Venus ovata</i>	1
<i>Cardium norvegicum</i>	1	<i>Gari tellinella</i>	1
		<i>Spatangus purpureus</i>	1
<i>Natica alderi</i>	1	Synaptidæ	1
		<i>Portunus pusillus</i>	2
<i>Spatangus purpureus</i>	1	<i>Polygordius</i> sp.	fragments
		<i>Glycera</i> sp.	1
<i>Lumbriconereis</i> sp.	2	<i>Polynoïnæ</i>	1
		<i>Amphioxus lanceolatus</i>	2

Mewstone, N.N.W. $1\frac{1}{3}$ miles.
Shelly gravel with some mud.
January 18th, 1923.

Mewstone, S. $1\frac{1}{2}$ miles. Shelly
gravel. February 14th, 1923.

OUTSIDE WATERS. V_G STULT + Ec STATIONS.

No. 12. Per 1 m ² .		No.	
Mactra stultorum	2	Iphinoe trispinosa	2
Lutraria elliptica (juv.)	30	Pseudocuma similis	1
Venus gallina	1	Diastylis sp.	6
Gari ferroensis	1	Bathyporeia pelagica	9
Corbula gibba	1	Bathyporeia guilliamsoniana	1
Cultellus pellucidus	1	Leucothoe sp.	1
		Siphonocoetes dellavallei	1
Natica alderi	1		
		Nephtys sp.	14
Ophiothrix fragilis	2	Cirratulidæ	1
Amphiura filiformis	2	Lumbriconereis sp.	2
		Polychaeta (sandy tubes) frequent	
Corystes cassivelaunus (juv.)	2		
Portunus sp. (juv.)	1		
Schizopoda	1	Corymorpha nutans	7
Haplostylis normani	1	Zoantharia	3

Bigbury Bay. Clean sand. June 9th, 1922.

No. 64. Per ½ m ² .		No. 86. Per ½ m ²	
Mactra stultorum	1	Nucula nitida	1
Venus gallina	1	Syndosmya alba	1
		Syndosmya prismatica	1
Echinocardium cordatum	1	Mactra stultorum	2
		Venus gallina	2
		Venus ovata	1
Iphinoe trispinosa	15	Corbula gibba	1
Diastylis sp.	6	Cultellus pellucidus	1
Bathyporeia pelagica	1	Ensis ensis (juv.)	1
Bathyporeia guilliamsoniana	2		
Hippomedon denticulatus	3	Iphinoe trispinosa	4
		Diastylis sp.	1
Nephtys sp.	13	Bathyporeia pelagica	3
Lanice chonilega	1	Monoculodes sp.	1
Magelona papillicornis	1		
Owenia fusiformis	1	Nephtys sp.	6
Phyllodocid	1	Sthenelais limicola	1
Polychaeta (sandy tubes)		Magelona papillicornis	1
fragments		Polychaeta (sandy tubes) frequent	

Bigbury Bay. Clean sand. October 31st, 1922.

Bigbury Bay. Clean sand. February 14th, 1923.

OUTSIDE WATERS. V_G STULT+Ec STATIONS—*continued.*No. 8. Per 1 m².

		No.			No.
Donax vittatus (juv.)	.	12	Bathyporeia pelagica	.	3
Mactra stultorum (juv.)	.	6	Siphonocœtes dellavallei	.	1
Lutraria elliptica (juv.)	.	4	Leucothoe	.	1
Dosinia lupina	.	3			
Venus gallina	.	1	Nephtys sp.	.	23
			Cirratulidæ	.	2
Portunus sp. (juv.)	.	2	Lanice conchilega	} fragments of tubes	
Corystes cassivelaunus (juv.)	.	1	Owenia fusiformis		
Schizopoda	.	3			
Iphinoe trispinosa	.	2	Corymorpha nutans	.	1

Whitsand Bay. Clean sand. June 7th, 1922.

No. 43.	Per ½ m ² .	No.	No. 94.	Per ½ m ² .	No.
Donax vittatus	.	3	Nucula nitida	.	2
Mactra stultorum	.	5	Mactra stultorum	.	5
Lutraria elliptica (juv.)	.	35	Spisula subtruncata	.	3
Dosinia lupina	.	1	Lutraria elliptica	.	3
Venus gallina	.	1	Venus gallina	.	5
Cardium echinatum	.	1	Meretrix chione (juv.)	.	5
Cultellus pellucidus	.	1	Corbula gibba	.	1
Ensis ensis (juv.)	.	38			
			Echinocardium cordatum	.	2
Echinocardium cordatum (et juv.)	.	43	Echinocyamus pusillus	.	1
			Ophiura sp. (juv.)	.	5
Decapoda larvæ	.	3	Schizopoda	.	3
Iphinoe trispinosa	.	2	Iphinoe trispinosa	.	1
Diastylis sp.	.	3	Bathyporeia pelagica	.	5
Bathyporeia guilliamsoniana	.	6	Bathyporeia guilliamsoniana	.	4
Acidostoma sp.	.	1	Pontocrates sp.	.	1
			Nototropis vedlomensis	.	1
			Ceradocus semiserratus	.	1
Nephtys sp.	.	11			
Owenia fusiformis	.	1	Nephtys sp.	.	9
			Owenia fusiformis	.	1
Halcampa crysanthellum	.	3	Polychaeta (sandy tubes)	.	2

Whitsand Bay. Clean sand.
July 20th, 1922.Whitsand Bay. Clean sand.
February 20th, 1923.

OUTSIDE WATERS. V_G STULT+Ec STATIONS—*continued.*No. 9. Per 1 m².

	No.		No.
<i>Donax vittatus</i>	2	<i>Corystes cassivelaunus</i> (juv.)	1
<i>Mactra stultorum</i> (juv.)	8	<i>Bathyporeia pelagica</i>	4
<i>Lutraria elliptica</i> (juv.)	14	<i>Bathyporeia guilliamsoniana</i>	4
<i>Dosinia lupina</i>	3	<i>Leucothoe</i> sp.	1
<i>Venus gallina</i>	7	<i>Urothoe</i> sp.	1
<i>Ensis ensis</i> (juv.)	3	<i>Hippomedon denticulatus</i>	1
<i>Natica alderi</i>	1	<i>Nephtys</i> sp.	24
		<i>Magelona papillicornis</i>	1
<i>Astropecten irregularis</i>	1	<i>Polychaeta</i> sp. indet. fragments	
		<i>Polychaeta</i> , sandy tubes fragments	
<i>Portunus</i> sp. (juv.)	1	<i>Corymorpha nutans</i>	4
<i>Galathea</i> sp. (juv.)	1	<i>Zoantharia</i>	2

Whitsand Bay. Clean sand. June 7th, 1922.

No. 109. Per $\frac{1}{2}$ m².

	No.		No.
<i>Nucula nitida</i>	2	<i>Corystes cassivelaunus</i> (juv.)	1
<i>Mactra stultorum</i>	3	<i>Portunus</i> sp. (juv.)	1
<i>Tellina fabula</i>	2	Decapoda larvæ	2
<i>Lucinopsis undata</i> (?) (juv.)	10	<i>Diastylis</i> sp.	1
<i>Dosinia lupina</i> (juv.)	27	<i>Bathyporeia pelagica</i>	1
<i>Venus gallina</i> (juv.)	23		
<i>Venus ovata</i>	1	<i>Nephtys</i> sp.	8
<i>Corbula gibba</i> (juv.)	27	<i>Magelona papillicornis</i>	2
<i>Gari costulata</i>	1	Terebellidæ	1
<i>Ensis ensis</i> (juv.)	4	<i>Lumbriconereis</i> sp.	1
<i>Natica alderi</i> (juv.)	1	<i>Corymorpha nutans</i>	1
<i>Coryphellia rufibranchialis</i>	1	<i>Zoantharia</i>	1
<i>Echinocyamus pusillus</i>	1	<i>Callionymus lyra</i> (post-larva)	1

Off Penlee Point. Clean sand. June 12th, 1923.

OUTSIDE WATERS. b + Ec + FIL. STATIONS.

No. 13.	Per $\frac{1}{2}$ m ² .	No.	No. 63.	Per $\frac{1}{2}$ m ² .	No.
<i>Nucula nitida</i>	.	24	<i>Nucula nitida</i>	.	20
<i>Thyasira flexuosa</i>	.	6	<i>Lucina borealis</i>	.	1
<i>Montacuta bidentata</i>	.	24	<i>Montacuta bidentata</i>	.	22
<i>Diplodonta rotundata</i>	.	1	<i>Syndosmya alba</i>	.	940
<i>Syndosmya alba</i>	.	900	<i>Syndosmya prismatica</i>	.	3
<i>Spisula subtruncata</i>	.	2	<i>Mactra stultorum</i>	.	1
<i>Venus gallina</i>	.	2	<i>Venus gallina</i>	.	1
<i>Venus ovata</i>	.	1	<i>Venus ovata</i>	.	3
<i>Cardium echinatum</i>	.	3	<i>Cardium echinatum</i>	.	15
<i>Gari ferroensis</i>	.	1	<i>Corbula gibba</i>	.	3
<i>Corbula gibba</i>	.	3	<i>Cultellus pellucidus</i>	.	39
<i>Cultellus pellucidus</i>	.	14			
			<i>Natica alderi</i>	.	2
			<i>Bullinella cylindracea</i>	.	2
<i>Echinocardium cordatum</i>	.	3			
<i>Amphiura filiformis</i>	.	110	<i>Echinocardium cordatum</i>	.	6
<i>Ophiura ciliaris</i>	.	12	<i>Amphiura filiformis</i>	.	36
<i>Ophiothrix fragilis</i>	.	2	<i>Ophiura ciliaris</i>	.	2
<i>Synaptidæ</i>	.	3			
			<i>Corystes cassivelaunus</i>	.	1
<i>Corystes cassivelaunus</i>	.	3	<i>Portunus</i> sp. (juv.)	.	1
<i>Portunus</i> sp. (juv.)	.	3	<i>Nika edulis</i>	.	1
<i>Nika edulis</i>	.	1	<i>Schizopoda</i>	.	1
<i>Ampelisca</i> sp.	.	1	<i>Diastylis</i> sp.	.	2
<i>Apherusa</i> sp.	.	1	<i>Ampelisca</i> sp.	.	1
<i>Nephtys</i> sp.	.	10	<i>Nephtys</i> sp.	.	6
<i>Sthenelais limicola</i>	.	2	<i>Sthenelais limicola</i>	.	5
<i>Owenia fusiformis</i>	.	2	<i>Owenia fusiformis</i>	.	7
<i>Glycera</i> sp.	.	1	<i>Goniada maculata</i>	.	1
<i>Lumbriconereis</i> sp.	.	1	<i>Lumbriconereis</i> sp.	.	2
<i>Polynoïnæ</i>	.	1	<i>Ammotrypane aulogaster</i>	.	1
<i>Polychaeta</i> (sandy tubes)	.	1	<i>Pectinaria</i> sp.	.	13
			<i>Phyllodocidæ</i>	.	1
			<i>Polynoïnæ</i>	.	1
			<i>Polychaeta</i> (sandy tubes)	.	1
<i>Corymorpha nutans</i>	.	3			
<i>Zoantharia</i>	.	1			
			<i>Nemertinea</i>	.	2
			<i>Syngnathus</i> sp. (juv.)	.	1

Bigbury Bay. Borough Island,
N.E. Bolt Tail, S.E. by S. Silty
sand. June 9th, 1922.

Bigbury Bay. Borough Island,
N.E. by E. Bolt Tail, S.E. $\frac{1}{2}$ S.
Silty sand. October 31st, 1922.

OUTSIDE WATERS. b+Ec+FIL. STATIONS—*continued*.

No. 85. Per $\frac{1}{2}$ m ² .			
	No.		No.
<i>Nucula nitida</i>	49	<i>Ophiura ciliaris</i>	10
<i>Thyasira flexuosa</i>	10		
<i>Montacuta bidentata</i>	22	Decapoda (juv.)	1
<i>Diplodonta rotundata</i>	1	Gammaridea	2
<i>Syndosmya alba</i>	323	<i>Diastylis</i> sp.	3
<i>Syndosmya prismatica</i>	6		
<i>Spisula subtruncata</i>	1	<i>Nephtys</i> sp.	2
<i>Cardium echinatum</i>	10	<i>Sthenelais limicola</i>	4
		<i>Owenia fusiformis</i>	12
<i>Bullinella cylindracea</i>	1	<i>Goniada maculata</i>	2
<i>Nassa reticulata</i>	1	<i>Lumbriconereis</i> sp.	1
		<i>Pectinaria</i> sp.	1
<i>Echinocardium cordatum</i>	1	Phyllodocidæ	1
<i>Amphiura filiformis</i>	69	Polynoïnæ	2

Bigbury Bay. Borough Island, N.E. by E. Bolt Tail, S.E. by S.
Silty sand. February 14th, 1923.

No. 98. Per $\frac{2}{3}$ m ² .			
	No.		No.
<i>Nucula nitida</i>	35	<i>Diastylis</i> sp.	2
<i>Thyasira flexuosa</i>	17	Zoæa	6
<i>Montacuta bidentata</i>	22	<i>Bathyporeia pelagica</i>	2
<i>Tellimyia ferruginosa</i>	4	<i>Ampelisca</i> sp.	1
<i>Syndosmya alba</i>	555		
<i>Mactra stultorum</i> (juv.)	4	<i>Nephtys</i> sp.	4
<i>Cardium echinatum</i>	13	<i>Sthenelais limicola</i>	2
<i>Gari costulata</i>	1	<i>Owenia fusiformis</i>	8
<i>Cultellus pellucidus</i>	15	<i>Ophiodromus flexuosus</i>	1
		<i>Pectinaria</i> sp. (juv.)	1
<i>Actæon tornatilis</i>	1	Polynoïnæ	4
<i>Bullinella cylindracea</i>	1	Phyllodocidæ	2
<i>Nassa reticulata</i>	1	Polychaeta (sandy tubes)	
		fragments	
<i>Echinocardium cordatum</i>	6	Polychaeta (indet.)	fragments
<i>Cucumaria</i> sp.	1		
<i>Amphiura filiformis</i>	72	Nemertinea	1
<i>Ophiothrix fragilis</i>	3	<i>Cryptocoelis alba</i>	2

Bigbury Bay. Borough Island, N.E. $\frac{1}{2}$ E. Bolt Tail, S.E. by E.
Silty sand. May 30th, 1923.

OUTSIDE WATERS. b+Ec+FIL. STATIONS—*continued.*

No. 99.	Per $\frac{1}{2}$ m ² .	No.	No. 100.	Per $\frac{1}{2}$ m ² .	No.
<i>Nucula nitida</i>	.	6	<i>Nucula nitida</i>	.	195
<i>Thyasira flexuosa</i>	.	1	<i>Diplodonta rotundata</i> (juv.)	.	2
<i>Diplodonta rotundata</i>	.	1	<i>Montacuta bidentata</i>	.	10
<i>Syndosmya alba</i>	.	88	<i>Syndosmya alba</i>	.	292
<i>Venus ovata</i>	.	1	<i>Spisula subtruncata</i>	.	4
<i>Cardium echinatum</i>	.	2	<i>Mactra stultorum</i> (juv.)	.	5
<i>Cultellus pellucidus</i>	.	9	<i>Tellina fabula</i>	.	2
<i>Ensis ensis</i> (juv.)	.	1	<i>Dosinia lupina</i> (juv.)	.	1
			<i>Venus gallina</i> (et juv.)	.	15
			<i>Venus ovata</i>	.	1
<i>Nudibranchiata</i>	.	1	<i>Cardium echinatum</i>	.	10
			<i>Gari costulata</i> (juv.)	.	7
			<i>Corbula gibba</i> (juv.)	.	3
<i>Echinocardium cordatum</i>	.	2	<i>Cultellus pellucidus</i>	.	17
<i>Cucumaria</i> sp.	.	1	<i>Ensis ensis</i> (juv.)	.	3
<i>Amphiura filiformis</i>	.	9			
			<i>Echinocardium cordatum</i>	.	4
			<i>Amphiura filiformis</i>	.	38
<i>Corystes cassivelaunus</i> (juv.)	.	1	<i>Ophiura</i> sp. (juv.)	.	7
<i>Eupagurus</i> sp. (juv.)	.	1	<i>Ophiothrix fragilis</i>	.	1
Decapoda larvæ	.	1			
<i>Ampelisca</i> sp.	.	1	<i>Portunus</i> sp. (juv.)	.	2
			<i>Inachus</i> sp. (juv.)	.	1
			Decapoda larvæ	.	3
			<i>Diastylis</i> sp.	.	2
<i>Nephtys</i> sp.	.	4	<i>Bathyporeia pelagica</i>	.	4
<i>Owenia fusiformis</i>	.	6	<i>Hippomedon denticulata</i>	.	1
Polynoïnæ	.	1			
Polychaeta (sandy tubes)			<i>Nephtys</i> sp.	.	2
	fragments		<i>Sthenelais limicola</i>	.	1
Polychaeta (indet.)	fragments		Cirratulidæ	.	1
			Polynoïnæ	.	1
			<i>Aricia</i> sp.	.	1
<i>Nemertinea</i>	.	1	Polychaeta (sandy tubes)		
				fragments	

Bigbury Bay. Borough Island,
N.E. $\frac{1}{2}$ E. Bolt Tail, S.E. by S.
Silty sand. May 30th, 1923.

Bigbury Bay. Borough Island,
N. Bolt Tail, S.E. by S. $\frac{1}{4}$ S. May
30th, 1923.

OUTSIDE WATERS. b + Ec STATIONS.

No. 48. Per $\frac{1}{2}$ m².

	No.		No.
Thyasira flexuosa	19	Nereis Domerellii	1
Syndosmya alba	45	Melinna adriatica	2
Tellina pusilla	1	Nephtys sp.	3
Cardium echinatum	8	Glycera sp.	2
Cyprina islandica (juv.)	4	Goniada maculata	2
Cultellus pellucidus	11	Notomastus latericeus	
Echinocardium cordatum (et juv.)	42	frequent fragments	
Cucumaria elongata	2	Pectinaria sp.	52
Synaptidæ	3	Scalibregma inflatum	3
Porcellana longicornis (juv.)	1	Terebellidæ	7
Schizopoda	1	Polychaeta (sandy tubes) fragments	
Decapoda (juv.)	2	Nemertinea	1
Diastylis sp.	1	Cryptocoelis alba	2
Ampelisca sp.	1	Gobius sp. post larva	1

Rame Head, E. Portwrinkle, N. by E. Muddy sand.
July 25th, 1922.

No. 104. Per $\frac{1}{2}$ m².

	No.		No.
Nucula nitida	20	Diastylis sp.	1
Tellimya ferruginosa	1	Ampelisca sp.	7
Syndosmya alba	24	Nephtys sp.	7
Syndosmya prismatica	5	Sthenelais limicola	3
Dósinia lupina	1	Owenis fusiformis	3
Cultellus pellucidus	33	Goniada maculata	3
Lyonsia norvegica	1	Pectinaria sp.	2
Bullinella cylindracea	1	Lanice conchilega (tubes) frequent	
Natica alderi	1	Terebellidæ	1
Echinocardium cordatum	4	Maldanidæ (tubes)	frequent
Echinocyamus pusillus	1	Polychaeta (sandy tubes) frequent	
Thione sp.	1	Nemertinea	1
Anapagurus lævis	1	Raia clavata (dead egg capsule)	1
Nika edulis	1		

Borough Island, E. Revelstoke Pt., N.E. by N. Silty sand with
some flaky shell fragments. June 12th, 1923.

OUTSIDE WATERS. b+Ec STATIONS—*continued*,No. 107. Per $\frac{1}{2}$ m².

	No.		No.
<i>Nucula nitida</i>	1	<i>Maera</i> sp.	3
<i>Lucina spinifera</i>	1	<i>Nephtys</i> sp.	4
<i>Thyasira flexuosa</i>	1	<i>Owenia fusiformis</i>	27
<i>Syndosmya alba</i>	3	<i>Goniada maculata</i>	3
<i>Venus gallina</i>	2	<i>Glycera</i> sp.	5
<i>Gari</i> sp. (juv.)	1	<i>Notomastus latericeus</i>	fragments
<i>Corbula gibba</i>	4	<i>Pectinaria</i> sp.	5
<i>Cultellus pellucidus</i>	5	Chlorhæmidæ	1
		Cirratulidæ	1
<i>Echinocardium cordatum</i>	1	<i>Aricia</i> sp.	1
<i>Echinocyamus pusillus</i>	2	<i>Lumbriconereis</i> sp.	1
<i>Ophiura</i> sp.	1	<i>Amphicteis gunneri</i>	1
<i>Ophiuroidea</i> (juv.)	4	<i>Lanice conchilega</i> (tubes)	several
<i>Synaptidæ</i>	1	<i>Maldanidæ</i>	fragments and tubes
		<i>Terebellidæ</i>	4
<i>Anapagurus lævis</i>	1	Tubes of <i>Phyllochaetopterus</i>	
<i>Galathea</i> sp.	1	<i>anglica</i> with <i>Sertularella</i> sp.	
<i>Schizopoda</i>	1	and sandy tubes were very	
<i>Decapoda</i> larvæ	2	frequent.	
<i>Diastylis</i> sp.	10	<i>Nemertini</i>	1
<i>Ampelisca</i> sp.	28	<i>Crystallogobius Nilssoni</i>	1

Rame, N. Mewstone, E.N.E. Mixed mud and sand, with some shale and shell. June 12th, 1922.

August 14th, 1922 (e) Per $\frac{1}{10}$ m².

	No.		No.
<i>Syndosmya alba</i>	1	<i>Eupagurus</i> sp. (juv.)	1
<i>Syndosmya prismatica</i>	1	<i>Nephtys</i> sp.	1
<i>Lutraria</i> sp. (juv.)	1	<i>Glycera</i> sp.	1
<i>Cultellus pellucidus</i>	2	<i>Notomastus latericeus</i>	fragments
		<i>Pectinaria</i> sp.	1
		<i>Lanice conchilega</i>	1
<i>Echinocardium cordatum</i> (juv.)	11	Cirratulidæ	1

Tregantle, N. by E. $\frac{1}{4}$ E. Mewstone, E. $\frac{1}{2}$ N. Silty sand with gravel and shell in fair amount. August 14th, 1922.

OUTSIDE WATERS. b+Ec STATIONS—*continued.*

No. 103.		Per $\frac{1}{2}$ m ² .	
	No.		No.
<i>Nucula nitida</i>	1	<i>Diastylis</i> sp.	1
<i>Syndosmya alba</i>	36	<i>Ampelisca</i> sp.	1
<i>Cardium fasciatum</i>	1	<i>Maera</i> sp.	2
<i>Cultellus pellucidus</i>	1		
		<i>Melinna adriatica</i>	1
<i>Turritella communis</i>		<i>Notomastus latericeus</i>	fragments
Many dead shells		<i>Nephtys</i> sp.	1
		Polynoinæ	1
		Terebellidæ	2
<i>Echinocardium cordatum</i>	6	<i>Polychaeta</i> indet.	fragments
<i>Callianassa subterranea</i> (juv.)	1	<i>Zeugopterus punctatus</i> (post-	
<i>Ebalia tuberosa</i>	1	larva)	1

Downerry, N. Portwrinkle, N.E. by N. Coarse sandy mud with some shell fragments, particularly *Turritella*. June 5th, 1923.

OUTSIDE WATERS. (b) STATIONS.

No. 50.		Per $\frac{1}{2}$ m ² .	
	No.		No.
<i>Nucula nitida</i>	4	Schizopoda	3
<i>Syndosmya alba</i>	4	Decapoda larvæ	1
<i>Syndosmya prismatica</i>	6	<i>Protella phasma</i>	3
<i>Spisula elliptica</i>	3	<i>Ampelisca tenuicornis</i>	1
<i>Dosinia</i> sp. (juv.)	1		
<i>Venus gallina</i>	1	<i>Cellaria</i>	fragments
<i>Cardium echinatum</i>	7		
<i>Diplodonta rotundata</i>	1	<i>Polychaeta</i> (sandy tubes).	
<i>Cyprina islandica</i>	1	Most common, including	
<i>Corbula gibba</i>	1	<i>Lanice conchilega</i> (juv.)	
<i>Cultellus pellucidus</i> (et juv.)	70	and <i>Owenia fusiformis</i> .	
		<i>Sthenelais limicola</i>	2
<i>Echinocardium cordatum</i> (juv.)	68	<i>Pectinaria korenyi</i>	2
<i>Echinocyamus pusillus</i>	8	<i>Glycera</i> sp.	1
<i>Cucumaria</i> sp.	1	<i>Lumbriconereis</i> sp.	1
		<i>Phyllochaetopterus</i>	<i>anglica</i>
		(tubes)	fragments
<i>Porcellana longicornis</i>	2	<i>Polychaeta</i> indet.	fragments
<i>Galathea</i> sp.	1		
<i>Nika edulis</i>	1	<i>Clupea</i> sp. (post-larva)	1

Eddystone, W., 2 miles. Fine silty sand. July 31st, 1922.

OUTSIDE WATERS. (b) STATIONS—*continued*.

No. 82.	Per $\frac{1}{2}$ m ² .	No.	August 14th, 1922 (d)	Per $\frac{1}{10}$ m ² .	No.
<i>Nucula nitida</i>	.	27	<i>Nucula nitida</i>	.	1
<i>Syndosmya alba</i>	.	2	<i>Syndosmya alba</i>	.	1
<i>Syndosmya prismatica</i>	.	7	<i>Syndosmya prismatica</i>	.	6
<i>Montacuta bidentata</i>	.	1	<i>Cardium echinatum</i>	.	4
<i>Dosinia</i> sp. (juv.)	.	1	<i>Cultellus pellucidus</i>	.	43
<i>Venus gallina</i>	.	2			
<i>Cardium echinatum</i>	.	1	<i>Echinocardium cordatum</i> (juv.)	27	
<i>Corbula gibba</i>	.	1	<i>Echinocyamus pusillus</i>	.	4
<i>Cultellus pellucidus</i>	.	6			
<i>Echinocardium cordatum</i> (juv.)	3		<i>Portunus</i> sp. (juv.)	.	1
<i>Echinocyamus pusillus</i>	.	3	Schizopoda	.	1
<i>Amphiura filiformis</i>	.	1	Decapoda (juv.)	.	1
<i>Ophiura</i> sp. (juv.)	.	2	<i>Ampelisca</i> sp.	.	1
<i>Asterias rubens</i> (juv.)	.	1			
<i>Diastylis</i> sp.	.	2	<i>Cellaria</i>	.	fragments
<i>Ampelisca</i> sp.	.	1			
<i>Cellaria</i>	.	fragments	<i>Glycera</i> sp.	.	2
<i>Nephtys</i> sp.	.	5	<i>Pectinaria</i> sp.	.	6
<i>Sthenelais limicola</i>	.	3	<i>Owenia fusiformis</i>	.	10
<i>Pectinaria</i> sp.	.	1	Cirratulidæ	.	1
<i>Owenia fusiformis</i>	.	6	<i>Phyllochaetopterus</i> <i>anglica</i>		
<i>Polynoïnae</i>	.	1	(tubes)	.	fragments
<i>Polychaeta</i> (sandy tubes)			<i>Polychaeta</i> (sandy tubes)		many fragments

Eddystone, W. by S., $3\frac{1}{2}$ miles.
 Fine silty sand. January 25th,
 1923.

Tregantle, N. by E., $\frac{1}{4}$ E. Mew-
 stone, E. by N., $\frac{1}{4}$ N. Silty sand.
 August 14th, 1922.

OUTSIDE WATERS. (b) STATIONS—*continued*.

No. 105. Per $\frac{1}{2}$ m ² .			
	No.		No.
<i>Nucula nitida</i>	1	<i>Bathyporeia pelagica</i>	3
<i>Lucina spinifera</i>	1	<i>Monoculodes</i> sp.	2
<i>Syndosmya alba</i>	1	<i>Melphidipella macra</i>	1
<i>Syndosmya prismatica</i>	2	<i>Nototropis vedlomensis</i>	1
<i>Cultellus pellucidus</i>	1	<i>Monoculodes</i> sp.	1
<i>Echinocardium cordatum</i>	2	<i>Nephtys</i> sp.	2
<i>Echinocyamus pusillus</i>	1	<i>Sthenelais limicola</i>	1
<i>Luidia sarsi</i>	1	<i>Lumbriconereis</i> sp.	1
<i>Ophiothrix fragilis</i>	1	<i>Owenia fusiformis</i>	1
		<i>Polynoinæ</i>	1
<i>Portunus</i> sp.	1	<i>Polychaeta</i> , tubes (mostly	
<i>Anapagurus lævis</i>	1	<i>Lanice conchilega</i>)	many
<i>Ebalia</i> sp.	1		
Schizopoda	2	<i>Nemertinea</i>	1
Decapoda larvæ	2	<i>Cellaria</i> with hydroids	fragments
<i>Diastylis</i> sp.	5	<i>Pleuronectes limanda</i> (post-	
Caprellidæ	1	larva)	1
<i>Ampelisca</i> sp.	6	<i>Clupea</i> sp. (post-larva)	1

Rame Head, N.N.W. Eddystone, W. Silty sand with flaky shell fragments. June 12th, 1923.

No. 113. Per $\frac{1}{2}$ m ² .			
	No.		No.
<i>Nucula nucleus</i>	1	<i>Eurysthius</i> sp.	3
<i>Syndosmya alba</i>	4		
<i>Syndosmya nitida</i>	2	<i>Sertularella</i> with <i>Scalpellum</i> ,	
<i>Syndosmya prismatica</i>	15	and young <i>Pecten</i> sp.	
<i>Venus gallina</i>	2		
<i>Gari</i> sp. (juv.)	2	<i>Lanice conchilega</i> (tubes)	4
		<i>Owenia fusiformis</i>	8
<i>Echinocyamus pusillus</i>	5	<i>Nephtys</i> sp.	5
		<i>Glycera</i> sp.	1
Schizopoda	7	<i>Ophiodromus flexuosus</i>	1
Caprellidæ	1	<i>Sthenelais limicola</i>	1
<i>Ampelisca</i> sp.	2	<i>Polychaeta</i> (sandy tubes)	ca.6

Eddystone, S.S.E. Rame, E. by N. Fine muddy sand. June 26th, 1923.

OUTSIDE WATERS. ECVG MUD STATIONS.

No. 5.	Per 1 m ² .	No.	No. 53.	Per $\frac{1}{10}$ m ² .	No.
<i>Syndosmya alba</i>	.	2	<i>Syndosmya alba</i>	.	2
<i>Solecurtus antiquatus</i>	.	1			
<i>Corbula gibba</i>	.	1	<i>Cucumaria elongata</i>	.	3
<i>Echinocardium cordatum</i>	.	1	Synaptidæ	.	1
<i>Cucumaria elongata</i>	.	7			
<i>Gonoplax rhomboides</i>	.	1	<i>Alphæus ruber</i>	.	1
<i>Alphæus ruber</i>	.	1	<i>Callianassa subterranea</i> (juv.)	.	3
<i>Callianassa subterranea</i> (juv.)	.	6	<i>Nika edulis</i>	.	1
<i>Corystes cassivelaunus</i> (juv.)	.	4	<i>Galathea</i> sp. (juv.)	.	1
<i>Porcellana longicornis</i> (juv.)	.	2	<i>Diastylis</i> sp.	.	1
<i>Diastylis</i> sp.	.	2			
<i>Melinna adriatica</i>	.	many	<i>Melinna adriatica</i>	.	many
<i>Notomastus latericeus</i>	.	many	<i>Notomastus latericeus</i>	.	many
<i>Nephtys</i> sp.	.	8	<i>Nephtys</i> sp.	.	1
<i>Glycera</i> sp.	.	7	<i>Goniada maculata</i>	.	1
<i>Magelona papillicornis</i>	.	4	<i>Magelona papillicornis</i>	.	13
<i>Aricia</i> sp.	.	1	<i>Scalibregma inflatum</i>	.	13
<i>Polychaeta</i> indet.	fragments		<i>Ophiodromus flexuosus</i>	.	2
<i>Nemertinea</i>	.	2	Cirratulidæ	.	1
<i>Sagartia</i> sp.	.	1	<i>Sthenelais</i> sp.	.	2
<i>Clupea</i> sp. (post-larvæ)	.	3	Polynoinæ	.	1
<i>Pleuronectes limanda</i> (post-larvæ)	.	2	<i>Nemertinea</i>	.	1
Rame Head, E. $\frac{1}{4}$ N., $1\frac{3}{4}$ miles.			Rame Head, E., $1\frac{1}{2}$ miles. Black mud.		
Black mud. May 31st, 1922.			Black mud. August 11th, 1922.		

No. 93.	Per $\frac{1}{3}$ m ² .	No.	No.		
<i>Turritella communis</i>	.	2	<i>Melinna adriatica</i>	.	many
			<i>Notomastus latericeus</i>	.	frequent
<i>Cucumaria elongata</i>	.	2	<i>Nephtys</i> sp.	.	3
Synaptidæ	.	2	<i>Glycera</i> sp.	.	1
			<i>Goniada maculata</i>	.	3
<i>Gonoplax rhomboides</i>	.	2	<i>Magelona papillicornis</i>	.	4
<i>Alphæus ruber</i>	.	1	<i>Ophiodromus flexuosus</i>	.	1
<i>Callianassa subterranea</i> (juv.)	.	8	Cirratulidæ	.	1
<i>Diastylis</i> sp.	.	4	<i>Lumbriconereis</i> sp. (?)	.	2
<i>Ampelisca tenuicornis</i>	.	2	<i>Nemertinea</i>	.	1

Rame Head, E. $\frac{1}{2}$ N. Tregantle, N. $\frac{1}{2}$ E. February 20th, 1923.

OUTSIDE WATERS. V_G+TURRITELLA COMMUNIS STATIONS.No. 96. Per $\frac{1}{2}$ m².

No.	No.
Nucula nitida 1	Diastylis sp. 1
Lucina spinifera 2	Ampelisca sp. 7
Thyasira flexuosa 1	
Solecortus antiquatus 1	
Cultellus pellucidus 1	Melinna adriatica 1
Thracia convexa 1	Notomastus latericeus cal 5
	Nephtys sp. 3
	Glycera sp. 2
Bullinella cylindracea 1	Goniada maculata 6
Turritella communis (many living) 300	Magelona papillicornis 2
	Owenia fusiformis 1
	Ammotrypane aulogaster 1
Cucumaria elongata 4	Aricia sp. fragments
Cucumaria sp. 1	Lumbriconereis sp. 1
Amphiura filiformis 1	Cirratulidæ 1
	Terebellidæ 3
Gonoplax rhomboides 1	
Alphæus ruber 1	Nemertinea 2

Rame Head, N.E. by E., $\frac{1}{2}$ E., $1\frac{1}{2}$ miles. Muddy coarse sand with some shell fragments. May 9th, 1923.

No. 84. Per $\frac{1}{2}$ m².

No.	No.
Thyasira flexuosa 1	Melinna adriatica 1
Syndosmya alba 1	Notomastus latericeus fragments
Venus gallina 1	Nephtys sp. 10
Cultellus pellucidus 5	Glycera sp. 2
	Goniada maculata 1
Turritella communis 29	Pectinaria sp. 1
	Owenia fusiformis 1
Alphæus ruber 3	Ammotrypane aulogaster 1
Ebalia sp. 1	Terebellidæ 2
Callianassa subterranea (juv.). 1	Phyllochaetopterus anglica
Ampelisca sp. 2	(tubes) fragments

Rame Head, N.W., $\frac{1}{2}$ W. Mewstone, N.E. by E. Muddy sand with some fragments of shale and shell. January 25th, 1923.

OUTSIDE WATERS. V_G + NUCULA NUCLEUS STATIONS.

No. 106.		Per $\frac{1}{2}$ m ² .	
	No.		No.
<i>Nucula nucleus</i>	16	Decapoda larvæ	10
<i>Modiolaria marmorata</i>	1	Schizopoda	6
<i>Syndosmya alba</i>	52	<i>Diastylis</i> sp.	1
<i>Venus ovata</i>	4	<i>Gnathia maxillaris</i>	2
<i>Cultellus pellucidus</i>	2	<i>Melphidipella macra</i>	1
		<i>Ampelisca</i> sp.	11
<i>Echinozcyamus pusillus</i>	2	<i>Nephtys</i> sp.	5
<i>Ophiura</i> sp. (juv.)	2	<i>Glycera</i> sp.	5
		<i>Goniada maculata</i>	3
<i>Turritella communis</i> (shells) many		<i>Owenia fusiformis</i>	2
(a) Many empty.		<i>Lanice conchilega</i>	3
(b) Some with <i>Phascolion strombi</i> .		<i>Notomastus latericeus</i>	fragments
(c) Some with <i>Anapagurus lævis</i> .		<i>Sthenelais</i> sp.	1
(d) Some carrying <i>Sagartia</i> sp.		Cirratulidæ	1
		Polynoïnæ	2
		<i>Aricia</i> sp.	1
		Terebellidæ	3
<i>Ebalia</i> sp.	1	<i>Lumbriconereis</i>	fragments
<i>Portunus</i> sp. (juv.)	1	Polychaeta (tubes)	several
<i>Galathea</i> sp. (juv.)	1	Some <i>Cellaria</i> present with	
<i>Upogebia</i> sp. (juv.)	1	Phyllochaetopterus tubes.	

Rame Head, N.N.W. Mewstone, N.E. by N. Muddy sand with broken shells and coarse materials well represented. Dead *Turritella* shells most numerous. June 12th, 1923.

No. 6.		Per 1 m ² .	
	No.		No.
<i>Nucula nucleus</i>	14	<i>Galathea</i> sp. (juv.)	3
<i>Astarte sulcata</i>	5	<i>Upogebia deltura</i>	1
<i>Syndosmya alba</i>	2	<i>Diastylis</i> sp.	1
<i>Tellina donacina</i>	1	<i>Eurystheus maculatus</i>	1
<i>Venus fasciata</i>	1	<i>Ampelisca diadema</i>	1
<i>Venus ovata</i>	9	<i>Melinna adriatica</i>	3
<i>Echinus</i> sp. (juv.)	1	<i>Notomastus latericeus</i>	4
<i>Ophiactis balli</i>	1	<i>Owenia fusiformis</i>	2
<i>Ophiocoma nigra</i>	4	<i>Glycera</i> sp.	6
		Maldanidæ	fragments
<i>Eurynome aspersa</i>	1	<i>Pallasia murata</i> (tube)	1
<i>Porcellana longicornis</i>	1	Phyllodocidæ	1
<i>Ebalia tumefacta</i>	1	Polychaeta indet.	2

Downderry, N.N.E. Looe, N. by W., $\frac{1}{2}$ W. Muddy shingle. Difficult ground for bottom-sampler. May 31st, 1922.

MR. J. R. BAKER'S HAULS WITH CONICAL DREDGE.

July-September, 1921.

LIST OF ALL SPECIES FOUND IN DEPOSITS OF MUD, with tables of the number of individuals of each species, per sample of 20 litres, in each locality.

	Near Mallard Buoy.	100 yards East of Mallard Buoy	Rum Bay.	Jennycliffe Bay.
COELENTERATA.				
<i>Cerianthus Lloydii</i>	3	2	—	—
POLYCHAETA.				
<i>Phyllodoce maculata</i>	8	2	4	—
<i>Nereis</i> sp.	—	2	—	—
<i>Nephtys</i> sp.	6	12	—	—
<i>Lumbriconereis</i> sp.	24	20	5	8
<i>Marphysa Belli</i>	6	—	1	—
<i>Goniada maculata</i>	8	—	17	18
<i>Glycera</i> sp.	—	—	1	2
<i>Magelona papillicornis</i>	4	—	2	—
<i>Cirratulus cirratus</i>	—	4	—	—
<i>Melinna adriatica</i>	119	96	c. 130	110
<i>Capitella capitata</i>	—	—	—	4
CRUSTACEA.				
<i>Orchomene batei</i>	—	2	—	—
<i>Galathea</i> sp.	—	—	1	—
<i>Porcellana longicornis</i>	1	—	—	—
<i>Macropodia rostratus</i>	—	—	1	—
<i>Portunus marmoreus</i>	—	—	1	—
<i>Pilumnus hirtellus</i>	—	2	—	—
GASTROPODA.				
<i>Philine aperta</i>	—	6	22	—
LAMELLIBRANCHIATA.				
<i>Nucula nitida</i>	2	—	—	2
<i>Glycimeris glycimeris</i>	—	2	—	—
<i>Astarte</i> sp.	1	—	—	—

MR. J. R. BAKER'S HAULS WITH CONICAL DREDGE—*continued.*

	Near Mollard Buoy	100 yards East of Mollard Buoy	Rum Bay.	Jennycliffe Bay.
LAMELLIBRANCHIATA (contd.).				
<i>Lucina borealis</i>	—	2	1	—
<i>Thyasira flexuosa</i>	12	2	2	20
<i>Syndosmya nitida</i>	2	16	4	6
<i>Syndosmya alba</i>	—	18	1	2
<i>Spisula elliptica</i>	—	4	—	—
<i>Dosinia lupina</i>	—	2	—	—
<i>Venus gallina</i>	5	8	4	—
Tapes sp.	2	6	—	—
Cardium sp.	—	2	1	—
<i>Corbula gibba</i>	—	2	—	—
<i>Solecirtus antiquatus</i>	—	2	—	2
<i>Cutellus pellucidus</i>	1	4	5	—
OPHIUROIDEA.				
<i>Ophiura albida</i>	—	—	1	—

LIST OF ALL SPECIES FOUND IN DEPOSITS OF SAND, with tables of the number of individuals of each species, per sample of 20 litres, in each locality.

	Whitsand Bay.	Whitsand Bay.	Eddystone bearing W. by N. about 6 miles.	Eddystone bearing W. by N. about 6 miles.	Bigbury Bay.
POLYCHAETA.					
<i>Sthenelais boa</i>	—	—	—	—	5
<i>Nephtys</i> sp.	6	13	3	6	7
<i>Lumbriconereis</i> sp.	—	—	—	—	1
<i>Glycera siphonostoma</i>	—	—	3	4	—
<i>Owenia fusiformis</i>	—	—	3	—	—
<i>Lanice conchilega</i>	—	—	4	2	—
<i>Capitella capitata</i>	2	—	—	—	—
<i>Nicomache lumbricalis</i>	—	—	1	—	—

MR. J. R. BAKER'S HAULS WITH CONICAL DREDGE—*continued.*

	Whitsand Bay.	Whitsand Bay.	Eddystone bearing W. by N. about 6 miles.	Eddystone bearing W. by N. about 6 miles.	Bigbury Bay.
CRUSTACEA.					
<i>Ampelisca spinipes</i>	2	—	—	2	—
<i>Ampelisca tenuicornis</i>	—	—	1	2	1
<i>Maera othonis</i>	—	—	—	2	—
<i>Bathyporeia norvegica</i>	12	—	—	—	—
<i>Hippomedon denticulatus</i>	—	1	—	—	—
<i>Siphonæoetes Colletti</i>	—	—	1	—	—
<i>Iphinoe trispinosa</i>	2	3	—	—	1
<i>Nika edulis</i>	—	—	1	—	—
<i>Galathea strigosa</i>	—	—	1	6	—
<i>Porcellana longicornis</i>	—	—	1	—	—
<i>Portunus pusillus</i>	—	—	1	—	—
GASTROPODA.					
<i>Nassa reticulata</i>	—	1	—	—	—
LAMELLIBRANCHIATA.					
<i>Donax vittatus</i>	2	—	—	—	—
<i>Pecten</i> sp. juv.	—	—	1	—	—
<i>Lucina borealis</i>	—	—	—	2	—
<i>Tellina donacina</i>	—	—	1	—	—
<i>Syndosmya prismatica</i>	—	—	—	2	—
<i>Spisula solida</i>	—	—	—	—	1
<i>Meretrix chione</i>	2	—	—	—	—
<i>Dosinia lupina</i>	—	—	2	6	—
<i>Venus gallina</i>	2	3	—	6	7
<i>Corbula gibba</i>	—	—	—	—	1
<i>Ensis ensis</i>	—	1	—	—	3
<i>Cultellus pellucidus</i>	—	—	3	2	10
ECHINODERMATA.					
<i>Amphiura filiformis</i>	—	—	1	—	—
<i>Ophiura albida</i>	—	—	—	4	2
<i>Echinocardium</i> sp.	—	1	1	—	1
<i>Cucumaria</i> sp.	—	—	1	—	—

LIST OF ALL SPECIES FOUND IN DEPOSITS OF SHELL GRAVEL, with tables of the number of individuals of each species, per sample of 20 litres, in each locality.

	Eddystone bearing W. 3 miles.	Eddystone bearing W. 1½ miles.	Mewstone N. ¼ W. Yealm Pt. N.E.	"New Grounds."
POLYCHAETA.				
<i>Harmothoe setosissima</i>	—	2	—	2
<i>Nephtys</i> sp.	—	—	—	2
<i>Lumbriconereis</i> sp.	1	—	—	—
<i>Glycera lapidum</i>	—	2	1	2
<i>Glycera Ehlersi</i>	—	2	—	—
<i>Glycera siphonostoma</i>	—	—	1	—
<i>Hyalonæcia sicula</i>	2	—	1	—
CRUSTACEA.				
<i>Maera othonis</i>	—	4	—	—
<i>Conilera cylindracea</i>	1	—	—	2
<i>Eulima polita</i>	—	—	1	—
<i>Galathea</i> sp. juv.	—	6	—	—
<i>Porcellana longicornis</i>	1	4	—	2
<i>Craspedochilus onyx</i>	—	2	—	—
<i>Trophon muricatus</i>	—	2	—	—
LAMELLIBRANCHIATA.				
<i>Nucula</i> sp.	1	—	3	—
<i>Glycimeris glycimeris</i>	1	4	—	—
<i>Lucina borealis</i>	—	2	—	—
<i>Tellina pusilla</i>	—	—	—	4
<i>Dosinia lupina</i>	—	—	1	10
<i>Venus fasciata</i>	3	4	—	4
<i>Gouldia minima</i>	—	—	—	2
<i>Tapes</i> sp.	1	2	—	—
<i>Cardium</i> sp. juv.	—	—	—	4
<i>Psammobia tellinella</i>	1	—	1	1
<i>Corbula gibba</i>	—	—	—	1
ECHINODERMATA.				
<i>Ophiura albida</i>	—	—	1	—
<i>Ophiothrix fragilis</i>	—	—	—	1
<i>Echinus</i> sp. juv.	1	—	—	—
<i>Echinocyamus pusillus</i>	1	—	1	2
CHORDATA.				
<i>Amphioxus lanceolatus</i>	4	—	2	—