

## Notes on the Invertebrate Fauna and Fish-food of the Bays between the Start and Exmouth.

By

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### Introduction.

THE following records are based on notes taken on board the *Oithona* when engaged in fishing in the bays. Whilst the primary object of the work was the distribution of fish, it was thought that something would be gained if the distribution of the invertebrates in the same area were known. The time at our disposal, however, did not allow of hauls with the dredge and shrimp trawl, so that the records are based, in all but one case, on the invertebrates caught in an otter trawl, the exception being on the Limpet Rocks off Torcross, where one haul with the dredge was taken. This is accountable for the fact that many of the smaller invertebrates were not caught at all, whilst some are only recorded because they were found in fish stomachs. The almost total absence in the records of Tunicata, Polyzoa, and small species of the other groups is due to the fact that only those were recorded which could be identified on board. The records themselves, however, incomplete as they are, are fairly representative of the distribution of the species recorded.

For a description of the bottom-deposits and the positions of the stations worked over, the reader is referred to the Report to the Devon Committee in the present number of this Journal, pp. 451, 460, 467.

### I. Records of Invertebrates.

#### START BAY.

##### STATION I.

This ground was characterised by the presence in moderate numbers of *Chaetopterus variopedatus* and *Atelecyclus heterodon*, the latter of which occurred on only one other ground, "the Corner," where it was common. *Maia squinado*, *Corystes cassivelaunus*, and *Solen ensis*, the latter in Plaice stomachs, were more common on this ground than elsewhere.

Other common species were *Eupagurus Bernhardus* and *E. Prideauxii*, with their attendant anemones *Sagartia parasitica* and *Adamsia palliata*, these being especially abundant, and also *Astropecten irregularis*, *Asterias rubens*, *Portunus depurator*, *Pecten opercularis*, *Solen pellucidus*, and *Syndosmyna alba*, the two latter being taken in Plaice and Dab stomachs.

Soil, fine sand and mud; depth, 9-20 fathoms.

### List of Species.\*

#### HYDROZOA.

Hydractinia echinata. Not uncommon.	Sertularia abietina. Common.
Obelia longissima. Dead; taken once.	Hydrallmania falcata. Moderately common.
Campanularia verticillata. Taken once.	Antennularia antennina. Taken once.
Sertularella Gayi. Taken once.	„ ramosa. Occasionally taken.
„ polyzonias. Taken once.	
Sertularia operculata. Taken once.	

#### ACTINOZOA.

Alcyonium digitatum. Occasional.
Sagartia parasitica. Common with <i>E. Bernhardus</i> .
Adamsia palliata. Common with <i>E. Prideauxii</i> .

#### ECHINODERMA.

Astropecten irregularis. Common.	Echinus miliaris. Taken occasionally.
Asterias rubens. Common.	Spatangus purpureus. Fragment only.
Ophiura ciliaris. Taken occasionally.	Echinocardium cordatum. Occasionally.

#### POLYCHÆTA.

Aphrodite aculeata ( <i>Linn.</i> ). Not uncommon.
Acholœ astericola ( <i>Clpd.</i> ). Taken once.
Chætopterus variopedatus ( <i>Clpd.</i> ). Not uncommon.

#### CRUSTACEA

Maia squinado. Very common.	Atelecyclus heterodon. Moderately common.
Eurynome aspera. Taken once.	Corystes cassivelaunus. Common.
Cancer pagurus. Taken occasionally.	Eupagurus Bernhardus. Very common.
Portunus puber. Taken once.	„ Prideauxii. Very common.
„ depurator. Common.	Porcellana longicornis.
„ holsatus. Occasionally.	Palinurus vulgaris. One.
Polybius Henslowii. One ♂ taken.	Homarus vulgaris. One.
Gonoplax angulatum. One taken from Thornback stomach.	

\* The following is the nomenclature used throughout:—

Hydrozoa.	Hincks, <i>British Hydroid Zoophytes</i> .
Actinozoa.	Gosse, <i>The British Sea-anemones and Corals</i> .
Echinoderma.	Bell, <i>Catalogue of British Echinoderms in the British Museum</i> .
Crustacea.	Bell, <i>British Stalk-eyed Crustacea</i> .
Mollusca.	Forbes and Hanley, <i>British Mollusca</i> .
Polyzoa.	Hincks, <i>British Marine Polyzoa</i> .
Tunicata.	Herdman, <i>A Revised Classification of the Tunicata</i> . Linn. Soc. Jour., xxiii.

## MOLLUSCA.

Corbula gibba. One in Plaice stomach.	Pecten opercularis. Common in Dab stomachs.
Solen ensis. Moderately common in Sole and Plaice stomachs.	Natica monilifera. Shells very common; two alive.
Solen pellucidus. Moderately common in Sole and Plaice stomachs.	Natica nitida. Occasional.
Syndosmya alba. Common in Dab and occasionally in Plaice stomachs.	Buccinum undatum. Occasional.
Mactra solida. In Dab stomachs.	Philine aperta. Occasional.
Lutraria elliptica. Shells only.	Loligo media. Moderately common.
Cardium aculeatum. Shells only.	Sepia officinalis. Moderately common.
	„ elegans. Occasional.

## STATION II.

This ground was not particularly rich, *Portunus depurator* being the only species which was at all common. *Peachia triphylla*, of which two specimens were taken, deserves mention on account of its rarity.

Soil, coarse sand; depth, 5-7 fathoms.

## List of Species.

## HYDROZOA.

Sertularella polyzonias. Occasionally.	Hydrallmania falcata. Occasionally.
Sertularia abietina. Occasionally.	

## ACTINOZOA.

Peachia triphylla. Two only.	Adamsia palliata. Not uncommon.
Sagartia parasitica. Not uncommon.	

## ECHINODERMA.

Astropecten irregularis. Moderately common.
Asterias rubens. Moderately common.

## POLYCHÆTA.

Aphrodite aculeata. Not uncommon.
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## CRUSTACEA.

Maia squinado. Not uncommon.	Eupagurus Prideauxii. Not uncommon.
Portunus depurator. Common.	Solen pellucidus. In fish stomachs.
„ holsatus. Not uncommon.	Syndosmya alba. In fish stomachs.
Eupagurus Bernhardus. Not uncommon.	

## MOLLUSCA.

Mactra solida. In stomachs of <i>Calionymus</i> .	Rissoa parva. Taken once.
Cardium aculeatum. Shells only.	Natica monilifera. Shells only.
Nucula nitida. In stomachs of <i>Calionymus</i> .	Nassa incrassata. In stomach of <i>Calionymus</i> .
Pecten opercularis. Occasionally.	Buccinum undatum. Not uncommon.
	Philine aperta. Taken once.

## STATION III.

The Skerries Bank, scoured as it is by strong currents and disturbed by the heavy seas which sweep over it during gales from the N.E. round by S. to S.W., has a fauna which is not well represented in catches made with an otter-trawl. In fact, some hauls made on it did not give more than two or three invertebrates altogether. Echinoderms, other than *Echinocyamus pusillus*, which was taken from the stomachs of Plaice caught on the bank, were altogether absent, and the only living molluscs taken were *Dendronotus arborescens* and *Æolis papillosa*, both of which were found on an old crab-pot. It, however, is one of the chief grounds on which the edible crab, *Cancer pagurus*, is taken in the neighbourhood. Besides *Cancer*, the only other common species are *Portunus depurator* and *Maia squinado*. *Gastrosaccus spinifer* was, however, very common in the stomachs of *Raia blanda*, but no living specimens were taken in the trawl, due doubtless to the size of the mesh, and this is probably accountable for the absence in the records of such forms as shrimps, pandalids, etc.

Soil, coarse sand; depth, 3-18 fathoms.

## List of Species.

## ACTINOZOA.

- Sagartia parasitica*. Occasional.  
 „ *viduata*. A dozen on an old crab-pot.  
*Adamsia palliata*. Occasionally.

## ECHINODERMA.

- Echinocyamus pusillus*. Common in Dab stomachs.

## HIRUDINEA.

- Pontobdella muricata* (*Linn.*).

## CRUSTACEA.

- Maia squinado*. Common.  
*Cancer pagurus*. Common.  
*Portunus depurator*. Moderately common.  
 „ *holsatus*. One in stomach of *Acanthias*.  
*Eupagurus Bernhardus*. Occasionally.  
 „ *Prideauxii*. Occasionally.  
*Gastrosaccus spinifer*. Very common in stomachs of *Raia blanda*.

## PYCNOGONIDA.

- Pycnogonum littorale*. Two on an old crab-pot.

## MOLLUSCA.

- Mactra solida*. In stomach of *Callionymus*.  
*Natica monilifera*. Shells.  
*Dendronotus arborescens*. A dozen on an old crab-pot.  
*Æolis papillosa*. Two or three on an old crab-pot.

## POLYZOA.

- Cellaria fistulosa*. Taken once.

## LIMPET ROCKS OFF TORCROSS.

A haul of the dredge was taken on this ground. Of the fifty-seven species recorded, twenty-six, all mollusca, were represented by dead shells only. *Corbula nucleus*, *Solen pellucidus*, *Syndosmya alba*, and *Nucula nitida* were each represented by two living specimens, these being the only living specimens of those species which we obtained. Shells of *Mactra stultorum* were common, although it was not found alive, nor in the stomachs of any fish captured in the bays. It was found, however, in spawning Plaice caught in the deep water off Portland. Of the other species recorded only few specimens were taken.

Soil, coarse sand and rocks.

## List of Species.

## PORIFERA.

*Clione celata*. One colony.

## HYDROZOA.

*Sertularella polyzonias*.  
*Sertularia abietina*.

*Hydrallmania falcata*.  
*Antennularia antennina*.

## ACTINOZOA.

*Aleyonium digitatum*. Several colonies on shale.  
*Adamsia palliata*. Several.

## ECHINODERMA.

*Astropecten irregularis*. One or two.  
*Asterias rubens*. Two.  
*Ophiura ciliaris*. Several.

*Ophiothrix fragilis*. One.  
*Echinus miliaris*. One.

## GEPHYREA.

*Phascolion strombi* (*Mont.*). One.

## POLYCHÆTA.

*Acholœ astericola*. One.  
*Pectinaria* sp. ? Fragment of tube.  
*Lanice conchilega* (*Pallas*).

*Sabellaria spinulosa* (*Leuck.*). Several  
on stones, shells, etc.  
*Serpula* sp. ?

## CRUSTACEA.

*Stenorhynchus phalangium*. One.  
*Eupagurus Prideauxii*. Several.

*Anapagurus lævis*. Three.  
*Porcellana longicornis*. Several.

## MOLLUSCA.

(Shells only, unless otherwise stated.)

*Saxicava rugosa*. A few.  
*Mya truncata*. One.  
*Corbula nucleus*. Two alive.  
*Solen ensis*. A few.  
,, *siliqua*. A few.  
,, *pellucidus*. Two alive.

*Syndosmya alba*. Two alive.  
*Mactra stultorum*. Common.  
,, *solida*. A few.  
*Lutraria elliptica*. A few.  
*Psammobia ferröensis*. A few.  
*Tapes virginea*. One.



MOLLUSCA—*continued.*

Venus striatula. A few.	Turritella communis. A few.
Artemis exoleta. One.	Natica monilifera. A few.
Lucinopsis undata. A few.	„ nitida. A few.
Cardium aculeatum. One.	Murex erinaceus. One.
Cardium echinatum. A few.	Aporrhais pes-pelecani. One.
Nucula nitida. Two alive.	Nassa reticulata. One alive.
Pecten pusio. A few.	„ incrassata. Several.
„ opercularis. A few.	Buccinum undatum. One.
„ varius. A few.	Fusus gracilis. One.
Ostræa edule. A few.	

## POLYZOA.

Bugula turbinata. One colony.
Cellaria sinuosa. One colony.

## TUNICATA.

Ciona intestinalis. Two.
Asciidiella aspersa. Two.

## TORBAY.

## STATION IV.

Although not a rich ground, as far as species are concerned, some of those which did occur were very common, notably *Asterias rubens*, *Ophiura ciliaris*, *Eupagurus Bernhardus* with the anemone *Sagartia parasitica*, *Portunus depurator*, and *Philine aperta*. *Syndosmya alba* was very common in the stomachs of Dabs.

Soil, fine sand to mud; depth, 4-5 fathoms.

## List of Species.

## ACTINOZOA.

<i>Sagartia parasitica</i> . Very common.
<i>Actinoloba dianthus</i> . Taken once.

## ECHINODERMA.

<i>Asterias rubens</i> . Very common.
<i>Ophiura ciliaris</i> . Very common.

## CRUSTACEA.

<i>Maia squinado</i> . Occasional.		<i>Portunus holsatus</i> . From stomach of
<i>Portunus puber</i> . Occasional.		Dab.
„ <i>depurator</i> . Very common.		<i>Eupagurus Bernhardus</i> . Very common.

## MOLLUSCA.

<i>Solen siliqua</i> . Shells.
„ <i>pellucidus</i> . In Plaice stomachs.
<i>Syndosmya alba</i> . In Plaice stomachs. Very common.
<i>Mactra solida</i> . In Plaice stomachs. Common.
<i>Lutraria elliptica</i> . Shells.

MOLLUSCA—*continued.*

- Lucinopsis undata. Shells.  
 Cardium aculeatum. Shells common ; one alive.  
 Mytilus edulis. Taken once.  
 Nucula nitida. In Plaice stomachs.  
 Natica monilifera. Not uncommon alive.  
 Nassa reticulata. Occasionally.  
 Buccinum undatum. Occasionally.  
 Philine aperta. Very common.  
 Sepia officinalis. Occasionally.

## STATION IVa.

*Portunus depurator* and *Philine aperta* were the only species at all common. *Cardium aculeatum* was taken alive in moderate numbers, and one or two specimens of *Portunus arcuatus* and *Homarus vulgaris* were also taken.

Soil, sand and *Zostera* ; depth, 3-5 fathoms.

## List of Species.

## ECHINODERMA.

- Asterias rubens*. Not common.

## CRUSTACEA.

- |                                     |  |                                 |
|-------------------------------------|--|---------------------------------|
| Maia squinado. Occasional.          |  | Eupagurus Bernhardus. Rare.     |
| Portunus puber. Taken once.         |  | Porcellana longicornis. Rare.   |
| „ depurator. Common.                |  | Palinurus vulgaris. Taken once. |
| „ arcuatus. Taken once.             |  | Homarus vulgaris. Taken once.   |
| Corystes cassivelaunus. Occasional. |  | Crangon vulgaris. Rare.         |

## MOLLUSCA.

- |   |  |                                  |
|---|--|----------------------------------|
| Cardium aculeatum. Not uncommon<br>alive. |  | Philine aperta. Very common.     |
| Mytilus edulis. Taken once.               |  | Loligo Forbesii. Occasionally.   |
|   |  | Sepia officinalis. Occasionally. |

## STATION V.

This ground was characterised chiefly by its foulness, caused by the presence of old baskets, boxes, rope, etc. *Sertularia abietina*, *Asterias rubens*, *Portunus depurator*, and *Philine aperta* were the commonest species.

Soil, mud ; depth, 6 fathoms.

## List of Species.

## HYDROZOA.

- |                                     |  |                        |
|-------------------------------------|--|------------------------|
| Hydractinia echinata. Not uncommon. |  | Sertularia operculata. |
| Sertularella polyzonias.            |  | „ cupressina.          |
| Diphasia pinnata.                   |  | Hydrallmania falcata.  |
| Sertularia abietina. Common.        |  |                        |

## ACTINOZOA.

- Alcyonium digitatum. Taken once.  
 Sagartia parasitica. Moderately common.  
 Actinoloba dianthus. Moderately common.

## ECHINODERMA.

- |  |                                     |
|--|-------------------------------------|
| Astropecten irregularias. Moderately common. | Asterias rubens. Small, common.     |
| Solaster papposus. Taken once.               | Ophiura ciliaris. Occasional.       |
|  | Echinocardium cordatum. Taken once. |

## POLYCHÆTA.

- Aphrodite aculeata. Not uncommon.  
 Acholœ astericola. Taken once.

## CRUSTACEA.

- |  |                                 |
|--|---------------------------------|
| Maia squinado. Not uncommon.             | Porcellana longicornis. Not un- |
| Portunus depurator. Very common.         | common.                         |
| Eupagurus Bernhardus. Moderately common. | Homarus vulgaris. Taken once.   |

## MOLLUSCA.

- |                                     |                                  |
|-------------------------------------|----------------------------------|
| Solen vagina. In Plaice stomachs.   | Ostrea edule. Two.               |
| „ pellucidus. In Plaice stomachs.   | Buccinum undatum. Not uncommon.  |
| Syndosmya alba. In Plaice stomachs. | Philine aperta. Common.          |
| Mactra solida. In Plaice stomachs.  | Loligo media. (?) Not uncommon.  |
| Cardium aculeatum. Shells.          | Sepia officinalis. Not uncommon. |
| Pecten opercularis. Not uncommon.   |                                  |

## STATION VI.

This ground was remarkable for the large number of swimming crabs, *Portunus depurator*, which were taken on it. *Eupagurus Bernhardus*, *Porcellana longicornis*, and *Philine aperta* were also present in quantity, but not quite so common as *Portunus*. *Gonoplax angulatum* and *Turritella communis*, two mud-haunting species, were moderately common, whilst *Tritonia Hombergii*, a mollusc, which in the Plymouth neighbourhood is generally taken in 30 fathoms, is an interesting record. *Antedon bifida* was present on the rough ground at the Berry Head end of the station.

Soil, mud; depth, 8-10 fathoms.

## List of Species.

## HYDROZOA.

- Sertularia abietina. Not uncommon.

## ACTINOZOA.

- |                                    |                                    |
|------------------------------------|------------------------------------|
| Alcyonium digitatum. Not uncommon. | Adamsia palliata. Not uncommon.    |
| Sagartia parasitica. Common.       | Actinoloba dianthus. Not uncommon. |



## ECHINODERMA.

Antedon bifida. Taken once.	Asterias rubens. Common.
Astropecten irregularis. Moderately common.	Ophiothrix fragilis. Not uncommon.
Solaster papposus. Occasional.	Echinus miliaris. Not uncommon.

## POLYCHÆTA.

Aphrodite aculeata. Not uncommon.	Dasychone bombyx (Dal.). Occasional.
Acholoe astericola. Taken once.	Serpula sp.? Common.

## CRUSTACEA.

Maia squinado. Occasional.	Eupagurus Bernhardus. Very common.
Cancer pagurus. Occasional.	Eupagurus Prideauxii. Occasional.
Portunus depurator. Extremely common.	Porcellana longicornis. Very common.
Gonoplax angulatum. Not uncommon.	
Corystes cassivelaunus. Fairly common.	

## MOLLUSCA.

Saxicava arctica. Taken once.	Pecten varius. Taken once.
Thracia pubescens. Shells.	Ostræa edule. Occasionally.
Solen siliqua. Shells.	Trochus zizyphinus. Common.
Syndosmya alba. In fish stomachs.	Turritella communis. Not uncommon.
Lutraria elliptica. Shells.	Buccinum undatum. Not uncommon.
Venus striatula. Shells.	Philine aperta. Very common.
Cardium aculeatum. Shells.	Tritonia Hombergii. Three.
Pinna pectinata. Shells.	Loligo Forbesii. Taken once.
Pecten opercularis. Occasional.	„ media (?). Taken once.
„ maximus. Shells.	

## POLYZOA.

Cellaria fistulosa.	Lepralia foliacea.
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## TUNICATA.

Phallusia mammillata. One.	Ciona intestinalis. One.
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## TEIGNMOUTH BAY.

## STATION VII.

*Philine aperta*, *Portunus depurator*, and *Aphrodite aculeata* were the only common species. *Pinnotheres pisum* was present in nearly all the specimens of *Mytilus edule* taken, but *Mytilus* itself was not common. *Polybius Henslowii* was taken occasionally.

Soil, coarse sand; depth, 5-6 fathoms.

## List of Species.

## ACTINOZOA.

Sagartia parasitica. Not uncommon.
Actinoloba dianthus. Not uncommon.

## ECHINODERMA.

- Astropecten irregularis*. Taken once.  
*Asterias rubens*. Not common.  
*Ophiura ciliaris*. Not common.

## HIRUDINEA.

- Pontobdella muricata*. Occasional.

## GEPHYREA.

- Phascolion strombi*. Taken once.

## POLYCHÆTA.

- Aphrodite aculeata*. Fairly common.  
*Lanice conchilega*. In Sole stomachs.

## CRUSTACEA.

- Maia squinado*. Occasionally.  
*Carcinus mænas*. Taken once.  
*Portunus depurator*. Common.  
*Polybius Henslowii*. Occasionally.  
*Pinnotheres pisum*. Common in *Mytilus*.  
*Eupagurus Bernhardus*. Not uncommon.  
*Nika edulis*. In stomach of *Scyllium*.

## MOLLUSCA.

- |   |  |
|---|--|
| <i>Solen ensis</i> . Shells.                      | <i>Mytilus edulis</i> . Not uncommon.    |
| „ <i>siliqua</i> . Shells.                        | <i>Nucula nitida</i> . In Sole stomachs. |
| „ <i>vagina</i> . Shells.                         | <i>Pecten opercularis</i> . Occasional.  |
| „ <i>pellucidus</i> . In Sole stomachs.           | „ <i>maximus</i> . Once only.            |
| <i>Syndosmya alba</i> . In Sole stomachs.         | <i>Ostræa edule</i> . Not common.        |
| <i>Mactra solida</i> . Common in Plaice stomachs. | <i>Buccinum undatum</i> . Occasional.    |
| <i>Lucinopsis undata</i> . Shells.                | <i>Philine aperta</i> . Common.          |
| <i>Cardium aculeatum</i> . Shells.                | <i>Loligo Forbesii</i> . Occasional.     |
| „ <i>echinatum</i> . Shells.                      | „ <i>media</i> . (?) Not uncommon.       |
|   | <i>Sepia officinalis</i> . Not uncommon. |

## STATION VIII.

*Serpula sp.?*, *Portunus depurator*, and *Pecten opercularis* were the commonest species on this ground. *Pinnotheres pisum*, as in Station VII, was present in nearly all the mussels taken.

Soil, coarse sand; depth, 4-6 fathoms.

## List of Species.

- |   |   |
|---|---|
| <i>Sagartia parasitica</i> . Fairly common. | <i>Actinoloba dianthus</i> . Moderately common. |
| <i>Adamsia palliata</i> . Not common.       |   |

## ECHINODERMA.

- Asterias rubens*. Moderately common.  
*Echinus miliaris*. Rare.

## HIRUDINEA.

Pontobdella muricata. Occasional.

## POLYCHÆTA.

Serpula sp. ? Common.

Nereis fucata (Sav.). In shell with Hermit-crab.

## CRUSTACEA.

Maia squinado. Not uncommon.

Carcinus mænas. Few ; small.

Portunus depurator. Common.

Pinnotheres pisum. Occasionally.

Eupagurus Bernhardus. Fairly common.

" Prideauxii. Taken once.

Homarus vulgaris. Taken once.

Galathea strigosa. Taken once.

## MOLLUSCA.

Mytilus edulis. Occasionally.

Pecten opercularis. Common ; small.

Ostræa edule. Not uncommon.

Buccinum undatum. Occasionally.

Cypræa Europæa. Not uncommon.

Philine aperta. Not uncommon.

Aplysia punctata. Not uncommon.

Loligo Forbesii. Occasional.

" media (?). Occasional.

Sepia officinalis. Moderately common.

## TUNICATA.

Phallusia mammillata. Occasional.

Ciona intestinalis. Occasional.

## STATION IX.

This was the richest ground investigated, the commonest species being *Actinoloba dianthus*, *Echinus miliaris*, *Serpula sp.*, *Gammarus locusta*, and *Ostræa edule*, the last species being sufficiently common to make oyster-dredging a profitable occupation. Both *Serpula* and *Actinoloba* were generally attached to shells, notably the inside of a *Cyprina* valve, and to stones. Among the less common species which were not taken alive elsewhere were *Synapta digitata*, *Ophiactis Balli*, *Henricia sanguinolenta*, *Galathea squamifera*, *Protula tubularia*, *Kellia suborbicularis*, *Cardium echinatum*, and *Aporrhais pes-pelecani*.

Soil, fine sand, mud, and stones ; depth, 11-12 fathoms.

## List of Species.

## PORIFERA.

Suberites domuncula. Occasional.

## HYDROZOA.

Sertularella polyzonias.

Sertularia abietina.

Hydrallmania falcata.

## ACTINOZOA.

Alcyonium digitatum. Occasional.

Sagartia parasitica. Common.

Adamsia palliata. Not uncommon.

Actinoloba dianthus. Very common.

## ECHINODERMA.

Synapta digitata. Fragment.	Henricia sanguinolenta. Occasional.
Astropecten irregularis. Not uncommon.	Ophiura ciliaris. Not uncommon.
Solaster papposus. Taken once.	Ophiothrix fragilis. Occasional.
Asterias glacialis. Taken once.	Ophiactis Balli. Occasional.
„ rubens. Common.	Echinus miliaris. Very common.
	„ esculentus. Occasional.

## GEPHYREA.

Phascolion strombi. Common.

## HIRUDINEA.

Pontobdella muricata. Occasional.

## POLYCHÆTA.

Aphrodite aculeata. Very common.	Protula tubularia ( <i>Mont.</i> ). Not uncommon.
Chaetopterus variopedatus. Not uncommon.	Serpula sp.? Very common.
Polymnia nebulosa ( <i>Mont.</i> ). Taken once.	

## CRUSTACEA.

Stenorhynchus longirostris. Occasional.	Eupagurus Bernhardus. Common.
Inachus dorsettensis. Occasional.	„ Prideauxii. Not uncommon.
„ dorynchus. Occasional.	„ euanensis. Occasional.
Maia squinado. Common.	Porcellana longicornis.
Portunus puber. Common.	Galathea squamifera.
„ depurator. Common.	„ dispersa.
Gonoplax angulatum. Occasional.	Gammarus locusta. Abundant.
Pinnotheres pisum.	

## MOLLUSCA.

Solen ensis. Shells.	Pecten maximus. Not uncommon.
„ siliqua. Shells.	„ opercularis. Moderately common.
„ vagina. Shells.	Ostræa edule. Common.
Mactra solida. Shells.	Trochus zizyphinus. Common.
Venus striatula. Shells.	„ magus. Shell.
Lucinopsis undatum. Shells	Turritella communis. Common.
Cyprina islandica. One alive and shells.	Aporrhais pes-pelecani. Taken once.
Cardium aculeatum. Shells.	Natica monilifera. Shells, common.
„ echinatum. Not uncommon.	Purpura lapillus. Taken once.
Kellia suborbicularis. Two.	Buccinum undatum. Not uncommon.
Mytilus edulis. Not uncommon.	Loligo Forbesii. Occasional.
Pinna pectinata. Shell.	„ media (?). Occasional.

## POLYZOA.

Cellaria fistulosa. Occasional.
„ sinuosa. Occasional.
Lepralia foliacea. Not uncommon.

## TUNICATA.

Phallusia mammillata. Occasional.
Ciona intestinalis. Occasional.
Ascidella aspersa. Occasional.

## THE "CORNER."

This ground was characterised by the large quantity of hydroids which were present, notably *Obelia longissima*, *Campanularia verticillata*, *Halecium halecinum*, *Sertularella polyzonias*, *Sertularia abietina*, *Hydrallmania falcata*, and *Antennularia antennina*. *Atelecyclus heterodon* was also present in moderate numbers. Several of the smaller crustacea were taken, *Hyas coarctatus*, *Galathea dispersa*, *Crangon vulgaris*, and *C. spinosus*, due possibly to the hydroids filling up the meshes of the trawl.

*Turritella communis*, which was common, especially in the muddy part of the ground, generally had hydroids attached to the shell. A large species of *Botryllus*, the "pork" of the Plymouth trawlers, was not uncommon.

Soil, mud, fine sand, and coarse sand; depth, 30 fathoms.

## List of Species.

## PORIFERA.

Suberites domuncula. Occasional.

## HYDROZOA.

Hydractinia echinata. Occasional.	Sertularia abietina. Common.
Obelia longissima. Common.	Hydrallmania falcata. Very common.
Campanularia verticillata. Common.	Antennularia antennina. Common.
Laföea dumosa. Occasional.	„ ramosum. Not uncommon.
Halecium halecinum. Common.	Aglaophenia myriophyllum. Not uncommon.
Sertularella Gayi. Not uncommon.	
„ polyzonias. Common.	

## ACTINOZOA.

Alcyonium digitatum. Occasional.  
Sagartia parasitica. Common.  
Adamsia palliata. Not uncommon.

## ECHINODERMA.

Astropecten irregularis. Not uncommon.	Ophiothrix fragilis. Not uncommon.
Asterias rubens. Common; small.	Echinus miliaris. Not uncommon.
„ glacialis. Two taken.	Spatangus purpureus. Fragment only.

## GEPHYREA.

Phascolion strombi. One.

## POLYCHÆTA.

Aphrodite aculeata. Not common.	Chætopterus variopedatus. Occasional.
Gattyana cirrosa (Pall.). One.	Sabellaria spinulosa. Occasional.
Acholœ astericola. Two.	Sabella pavonina. Occasional.



## CRUSTACEA.

Stenorhynchus longirostris. Common.	Eupagurus Bernhardus. Common.
Inachus dorsettensis. Not uncommon.	"    Prideauxii. Not uncommon.
Hyas coarctatus. One.	"    cuanensis. Occasional.
Maia squinado. Occasional.	Porcellana longicornis. Common.
Cancer pagurus. Occasional.	Galathea dispersa. Common.
Portunus depurator. Very common.	Crangon vulgaris. Occasional.
Atelecyclus heterodon. Common.	"    spinosus. Two.
Corystes cassivelaunus. Not uncommon.	Scalpellum vulgare. Few.

## MOLLUSCA.

Syndosmya alba. Shells.	Trochus zizyphinus. Shells.
Mactra solida. Shells.	"    granulatus. Shells.
Venus striatula. Shells.	Turritella communis. Common alive.
Lucinopsis undata. Shells.	Natica monilifera. Shells.
Cyprina islandica. Shells.	Buccinum undatum. Few alive.
Cardium echinatum. Shells.	Philine aperta. Few alive.
Pinna pectinata. Shells.	Loligo Forbesii. Occasional.
Pecten opercularis. Few alive.	"    media (?). Occasional.
Ostræa edule. Shells.	Sepia officinalis. Occasional.
Dentalium entale. Shells.	"    elegans. Occasional.

## TUNICATA.

Botryllus sp. ? Few colonies.

## SUMMARY.

## HYDROZOA.

Hydroids were commonest in the "Corner," *Campanularia verticillata*, *Sertularella polyzonias*, *Halecium halecinum*, and *Hydrallmania falcata* being the most frequent. Station I. also gave about the same number of species, but not in any quantity, *Sertularia abietina* being the only common form.

## ACTINOZOA.

*Sagartia parasitica* was common on Stations I., IV., VI., IX., and the Corner; absent from Limpet Rocks and Station IVa. *Adamsia palliata* was commonest at Station I. and the Corner. *Actinoloba dianthus*, very common on Station IX., not uncommon Stations V., VI., VII., VIII., but absent from Start Bay and Stations IV. and IVa. in Torbay. *Peachia triphylla* and *Sagartia viduata* were recorded once from Stations II. and III. respectively.

## ECHINODERMA.

Excepting for the presence of *Echinocyamus pusillus* in the stomachs of Plaice, the Skerries Bank was quite devoid of Echinoderms. *Astropecten irregularis*, *Asterias rubens*, *Ophiura ciliaris* were more or less common in all the bays, chiefly on fine sand and mud. *Asterias glacialis*, of

which the previous most easterly record was Salcombe, was taken in Teignmouth Bay (Station IX.); the Corner; one and a half miles off Berry Head; and in Brixham Harbour, but only one or two specimens from each locality. *Echinus miliaris* was common only on Station IX., whilst the following were found there and not elsewhere: *Synapta digitata*, *Henricia sanguinolenta*, *Ophiactis Balli*, and *Echinus esculentus*.

#### POLYCHÆTA.

*Aphrodite aculeata* was present in all the bays, but common at Station IX. only. *Acholoe astericola*, although not always recorded, was probably present on all stations on which *Astropecten irregularis* was commonly taken. *Chaetopterus variopedatus* was characteristic of Stations I. and IX. and the Corner; whilst *Serpula* sp. ? was abundant on Station IX. and common on Stations VI. and VIII. *Polymnia nebulosa* and *Protula tubularia* were taken on Station IX. only. *Nereis fucata* is recorded only from Station VIII., but it was probably present on nearly all the grounds with *Eupagurus Bernhardus*.

#### CRUSTACEA.

*Maia squinado* was common only on Stations I., III., and IX. *Cancer pagurus* was common on the Skerries (Station III.), but only a few specimens were taken on the other grounds. *Carcinus maenas* was only taken in Teignmouth Bay, whilst *Portunus depurator* was common on all grounds excepting the Limpet Rocks, especially so on Stations VI., IV., V., and the Corner. *Pinnotheres pisum* (the "poison crab") was present only in Teignmouth Bay, but there nearly every mussel examined had one or more—one had three, all males. *Gonoplax angulatum* was taken alive on Stations VI. and IX. only; whilst *Atelecyclus heterodon* was common on Station I. and the Corner and absent from the rest. *Corystes cassivelaunus* was common only on Stations I. and VI. *Eupagurus Bernhardus* was more or less common on all the grounds, being especially so on Stations I., IV., and VI. *E. Prideauxii* was common only on Station I. and the Corner. *Porcellana longicornis*, common only on Station VI.

#### MOLLUSCA.

Chiefly represented by shells. Living specimens of the following were taken:—*Solen pellucidus*, *Nucula nitida*, *Corbula gibba*, *Syndosmya alba* on the Limpet Rocks; *Cardium aculeatum*, Station IV<sub>A</sub>.; *C. echinatum*, Station IX.; *Mytilus edulis* from Stations IV., VII., VIII., and IX. *Pecten opercularis* and *Ostræa edule* were commonest in Teignmouth Bay. *Turritella communis*, common only on Stations VI., IX., and the Corner, generally with hydroids (the Corner) or *Alcyoni-*

*dium* sp.? (Stations VI. and IX.) growing on the shell. *Natica monilifera* was taken alive on Stations I. and IV. only, but shells were common on most grounds. *Buccinum undatum* was common only on Station VI.; *Philine aperta*, common in Torbay and Station VII. of Teignmouth Bay. The following were taken alive on one station only, and generally in very small numbers:—*Aplysia punctata* (Station VIII. not uncommon), *Tritonia Hombergii* (Station VI.), *Dendronotus arborescens* (Station III.), *Æolis papillosa* (Station III.).

Of the Cephalopoda, *Loligo Forbesii* occurred in Torbay, Teignmouth Bay, and the Corner; *L. media* (?) in all the bays and the Corner; *Sepia officinalis* in all the bays; whilst *S. elegans* is recorded from Station I. and the Corner.

As summary to the foregoing pages, a few remarks may be made on the comparative abundance of some of the common forms on the various grounds in the bays, as shown in the following table:—

*List of Identified Species regarded as distinctive of the Grounds named.*

x = present. c = common. cc = very common.

SPECIES.	START BAY.			TORBAY.				TEIGNMOUTH BAY.		
	I.	II.	III.	IV.	IVa.	V.	VI.	VII.	VIII.	IX.
<i>Actinoloba dianthus</i>	—	—	—	—	—	x	x	x	x	cc
<i>Echinus miliaris</i>	—	—	—	—	—	—	c	—	—	cc
<i>Aphrodite aculeata</i>	x	x	—	—	—	x	x	c	—	cc
<i>Chaetopterus variopedatus</i>	x	—	—	—	—	—	—	—	—	x
<i>Protula tubularia</i>	—	—	—	—	—	—	—	—	—	c
<i>Serpulids</i>	—	—	—	—	—	—	c	—	x	cc
<i>Maia squinado</i>	cc	x	c	x	x	x	x	x	x	cc
<i>Portunus puber</i>	—	—	—	—	—	—	—	—	—	c
„ <i>depurator</i>	c	c	x	cc	c	cc	cc	c	c	c
<i>Corystes cassivelaunus</i>	c	—	—	—	x	—	x	—	—	—
<i>Atelecyclus heterodon</i>	x	—	—	—	—	—	—	—	—	—
<i>Pinnotheres pisum</i>	—	—	—	—	—	—	—	x	x	x
<i>Gonoplax angulata</i>	x	—	—	—	—	—	c	—	—	x
<i>Eupagurus Bernhardus</i>	cc	x	x	cc	x	c	cc	x	c	c
„ <i>Prideauxii</i>	cc	x	x	—	—	—	x	—	x	c
<i>Maetra solida</i>	x	—	—	c	—	c	—	c	—	x
<i>Syndosmya alba</i>	—	x	—	cc	—	c	c	c	—	—
<i>Solen pellucidus</i>	—	c	—	x	—	x	—	x	—	—
<i>Mytilus edulis</i>	—	—	—	—	x	—	—	x	x	x
<i>Ostræa edule</i>	—	—	—	—	—	x	x	x	x	cc
<i>Trochus zizyphinus</i>	—	—	—	—	—	—	c	—	—	c
<i>Turritella communis</i>	—	—	—	—	—	—	x	—	—	c

It is of interest to note that there is a considerable difference in the size of some of the species in the different bays. *Maetra solida*, for example, in Torbay and Teignmouth Bay is represented by small specimens

only; whilst in Start Bay those obtained were much larger. It is possible that such a distribution of the invertebrate fauna has a considerable, if not a predominant, influence on the distribution of the small and large fish. In Torbay and Teignmouth Bay, for example, the Plaice are, on the whole, much smaller than in Start Bay.

## II. Food of Fishes.

The contents of the stomachs of various fish were examined, with the following result:—

### PLAICE.

(*Pleuronectes platessa*.)

START BAY.—Nine fish examined, 7 to 20 inches in length.

#### ECHINODERMA.

*Ophiura ciliaris*. In one.  
*Echinocyamus pusillus*. In two, one of which was full.

#### POLYCHÆTA.

*Nephtys* sp.? In two.  
*Sabella pavonina*. In one.

#### CRUSTACEA.

*Eupagurus* sp.? In one.

#### MOLLUSCA.

*Corbula gibba*. In one.  
*Solen pellucidus*. In two.  
„ *ensis*. In two.  
*Syndosmya alba*. In three, all of which were full.

TORBAY.—Sixty-three fish, of which twenty-four were 12 inches and more in length.

#### ECHINODERMA.

*Ophiura ciliaris*. Arms only in five.

#### POLYCHÆTA.

*Nephtys* sp.? In eight.  
Unidentified. In twenty.

#### CRUSTACEA.

*Corystes cassivelaunus*. In three.  
Crab fragments. In one.  
Amphipod. In one.

#### MOLLUSCA.

*Solen ensis*. In one.  
„ *vagina*. Siphons only in five.  
„ *pellucidus*. In two.  
*Syndosmya alba*. In eleven.  
*Mactra solida*. In thirty. In fifteen of the plaice under 12 inches this mollusc constituted the sole food.  
*Nucula nitida*. In one.  
*Philine aperta*. The sole food in three or four of the larger Plaice.  
Lamellibranch fragments. In three.

TEIGNMOUTH BAY.—Twelve fish examined, eight being over 12 inches in length.

#### POLYCHÆTA.

Remains in one.

#### MOLLUSCA.

*Solen siliqua*. Fragments in one.  
*Mactra solida*. In nine, constituting the sole food.  
*Syndosmya alba*. In one.

In the eighty-four fish examined, the following occurred in 10 % and over of the stomachs:—*Mactra solida* (46 %), Polychæte remains unidentified (25 %), *Syndosmya alba* (17 %), *Nephtys* sp.? (12 %).

## DABS.

(Pleuronectes limanda.)

START BAY.—Ten fish were examined, of which five were over 8 inches in length.

## POLYCHÆTA.

Fragments in one.

## ECHINODERMA.

*Ophiura ciliaris*. In four.

## CRUSTACEA.

*Eupagurus* sp.? In three.*Portunus* sp.? In four.

Crab fragments. In one.

## MOLLUSCA.

*Syndosmya alba*. In one.*Macra solida*. In one.*Pecten opercularis*. In two.

Lamellibranch fragments. In one.

*Philine aperta*. In one.*Loligo media* (?). In one.

## PISCES.

*Ammodytes* sp.? In one.

TORBAY.—Seventeen fish examined, ten of which were under 8 inches in length.

## ECHINODERMA.

*Ophiura ciliaris*. In two.*Echinus* sp.? Fragments in one.

## POLYCHÆTA.

*Nephthys* sp.? In one.

Fragments in two.

*Sabella pavonina*. In one.

## CRUSTACEA.

*Eupagurus* sp.? In one.*Portunus* sp.? In one.*Portunus holsatus*. In one.

Amphipod. In one.

## MOLLUSCA.

*Solen* sp.? In two.*Cardium* sp.? In one.*Syndosmya alba*. In one.*Philine aperta*. In one.

“HITCHES” OFF TORBAY.—Eight fish examined  $7\frac{1}{2}$  to 10 inches in length.

## COELENTERATA.

*Sagartia?* sp.? Six of the dabs examined had been feeding on a small anemone, somewhat resembling *Sagartia viduata*, but they were too much digested to identify with any certainty. As many as fifty were counted in one stomach.

## POLYCHÆTA.

*Nephthys* sp.? In one.

Fragments. In one.

## CRUSTACEA.

*Eupagurus* sp.? In two.*Portunus* sp.? In two.

## MOLLUSCA.

*Philine aperta*. In one.*Æolis* sp.? In one.*Turritella communis*. Shell in one.

In the thirty-five fish examined, the following were present in 10 % or more of the stomachs:—*Portunus* sp. var. (22 %), *Sagartia?* sp.? (16 %), *Ophiura ciliaris* (16 %), *Eupagurus* sp.? (16 %), Polychæte remains (11 %).



**SOLES.**

START BAY.—Fifteen fish examined.

## POLYCHÆTA.

Remains in four.

## MOLLUSCA.

*Solen ensis.* In six.,, *pellucidus.* In three.*Turritella communis.* In one.

TEIGNMOUTH BAY.—Four fish.

## POLYCHÆTA.

*Nereis* sp. ? In one.*Lanice conchilega.* In one.

## MOLLUSCA.

*Solen pellucidus.* In three.*Syndosmya alba.* In all.*Nucula nitida.* In two.**BRILL.**

START BAY.—Forty-nine fish examined.

## PISCES.

*Clupea sprattus.* In one.*Gadus merlangus?* In one.*Ammodytes tobianus.* In thirty or more.,, *lanceolatus.* In thirty or more.TORBAY.—One brill of 8 inches was examined, and found to contain a single *Gobius minutus*.TEIGNMOUTH BAY.—Three fish were examined, of which one was empty and the others contained respectively a sand-eel (*Ammodytes*) and fish remains.**TURBOT.***(Rhombus maximus.)*START BAY.—Three fish were examined, and contained respectively: Sandeels, Grey Gurnard, and *Portunus holsatus*.**DRAGONET.***(Callionymus lyra.)*

START BAY.—Fourteen fish were examined.

## ECHINODERMA.

*Ophiura ciliaris.* In two.

## CRUSTACEA.

*Eupagurus* sp. ? In one.

## MOLLUSCA.

*Solen* sp. ? Fragments in two.*Mactra solida.* In six.*Tapes* sp. ? In one.*Nucula nitida.* Many in one.*Philine aperta.* In one.

Lamellibranch fragments. In two.

**GREATER WEEVER.***(Trachinus draco.)*

START BAY.—Several fish examined.

## CRUSTACEA.

*Pandalus* sp.? In three.

## PISCES.

*Ammodytes* sp.? In one.*Gadus* sp.? probably *pollachius*. In the remainder.**PIKED DOG-FISH.***(Acanthias vulgaris.)*

START BAY.—Seven fish examined.

## POLYCHÆTA.

Polynoid remains. In one.

## CRUSTACEA.

*Eupagurus* sp.? In one.*Portunus holsatus*. In two.

## PISCES.

*Ammodytes tobianus*. In two.*Gobius* sp.? In one.*Clupea sprattus*. In two.**ROUGH DOG.***(Scyllium canicula.)*

TEIGNMOUTH BAY. Two fish.

## GEPHYREA.

*Phascolion strombi*. In one.

## POLYCHÆTA.

Remains. In one.

## CRUSTACEA.

*Nika edulis*. In one.*Eupagurus* sp.? In one.

## MOLLUSCA.

*Buccinum undatum*. Operculum only.*Loligo media*. (?) Several in one.**ANGEL.***(Rhina squatina.)*TEIGNMOUTH BAY.—Two fish examined, each of which contained one *Portunus depurator* and many *Loligo media*. (?)**THORNBACK.***(Raia maculata.)*

START BAY.—The only fish examined contained one each of the following Crustacea:—

*Eupagurus* sp.?*Stenorhynchus* sp.?*Corystes cassivelanus*.*Portunus depurator*.*Gonoplax angulatum*.

**BLONDE.***(Raia blanda.)*

START BAY.—Eight fish examined.

**CRUSTACEA.***Gastrosaccus spinifer.* Common in six.**PISCES.***Ammodytes* sp. ? Common in six. | *Pagellus* sp. In two.*Trachinus vipera.* In two.**DORY.***(Zeus faber.)*START BAY.—All those examined contained numbers of small Gadoids, probably *Gadus pollachius*.

Although the number of fish stomachs examined is too small to draw any definite conclusion, the results tend to confirm the observations of Petersen,\* Herdman,† and the Scottish Fishery Board,‡ which show that the dab may not be a serious competitor with the plaice in the matter of food. Both species appear to feed at times on the same organisms; but the plaice, on the grounds examined, confined themselves chiefly to Mollusca and Polychæta, whereas the dab did not specialise in any one group. The dab, therefore, could only become a serious competitor with the plaice if it largely predominated in numbers. The presence of *Sagartia*? in such numbers in the stomachs of dabs from the "Hitches" is an interesting record. It is probable that the anemone was attached to *Turritella* or other gastropod shells, as one or two were found in that position.

\* Petersen, "Biology of our Flatfishes," 1893, p. 30.

† Herdman and Scott, *Trans. Liverpool Biological Society*, vol. ix., 1895, pp. 107-30.‡ *Report S. F. B.*, x. pp. 211-31; xx. pp. 486-538.