

THE INTERTIDAL INVERTEBRATE FAUNA OF THE SEVERN ESTUARY

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THE Severn Estuary and Bristol Channel together form the largest inlet in the coastline of the British Isles and the largest estuarine system (Map 1). The area has long been noted for its spectacular tidal range (the largest in Europe), extensive shores and muddy water. The apparent paucity of the marine fauna in some places and the recent discovery that several species are contaminated with heavy metals have increased scientific interest in the Estuary, and make the publication of this "Fauna" topical.

We have carried out various surveys on the distribution patterns of the common shore organisms (Boyden and Little, 1973; Crothers, 1974, 1976; Little and Boyden, 1976; Mettam, in prep.) and have now pooled our records to compile this list of intertidal invertebrates. It was fortunate that a series of papers (notably by Bassindale, 1941, 1943c, and Purchon, 1938, 1948, 1957) was published in the *Proceedings of the Bristol Naturalists Society* and is thus available for comparison with our own records which mostly relate to the period 1970–1976. In most cases we have summarized the older records before giving our own. Two of us (C.R.B. and C.L.) have re-visited Bassindale's original sites and attempted a direct comparison with his records. Other observations have arisen from general collecting or were incidental to shore visits made for other purposes (J.H.C. on the English Coast and C.M. on shores in Wales and of the Upper Estuary). The lack of a recent record does not necessarily mean that a species once present is now absent, unless this is specifically mentioned.

We are well aware of the idiosyncratic element in our records, and of many deficiencies, but hope nevertheless that the "Fauna" will prove useful and stimulate others with taxonomic expertise to give some time to this unique area.

The "Fauna" is more than a simple list of species, and can be read as a summary of invertebrate distribution along a linear sequence of estuarine conditions. To assist in this interpretation we have listed the northern and southern shores of the Lower Estuary separately (for conditions are quite different on the two sides) but have considered the Upper Estuary, where differences between the two banks

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are insignificant, as a single area. For many species records are only given for specific locations, but it is probably safe to assume that an animal present at site A and site B will also be found at suitable intermediate sites.

The Lower Estuary (Maps 2 and 3) has no natural boundary with the Bristol Channel on the one hand, or with the Upper Estuary on the other, so we have had to select somewhat arbitrary limits to our areas. We have taken our seaward limit at Porlock and Kenfig, where Kelp (*Laminaria*) first appears on the shore; and assumed that the Upper Estuary begins at the M4 roadbridge at Aust and Beachley. We refer to the northern shore of the Lower Estuary as the Welsh Coast and to the southern shore as the English Coast, to avoid confusion for those people accustomed to apply the terms north and south to the edges of land masses rather than the sea.

A PHYSICAL DESCRIPTION OF THE AREA

The main physical and chemical features of the estuary have been described by Bassindale (1942b, 1943a, 1943b, 1955) whilst more recent investigations in the outer estuary by the University of Liverpool (Abdullah, Dunlop and Gardner, 1973; Abdullah and Royle, 1974) and the Institute for Marine Environmental Research (I.M.E.R. Reports, 1971–1975) provide further data. We have drawn on these sources in presenting the brief account which follows.

The spectacular tidal range in the Severn Estuary and the formation of the Severn Bore are in part caused by the funnel shape of the whole inlet. The mean spring tidal range increases from 6.3 m in Milford Haven through 8.5 m at Ilfracombe, 8.6 m at Swansea, 10.5 m at Watchet, 11.1 m at Cardiff to 12.3 m at Avonmouth. The maximum predicted tidal range occurs at the Severn Bridge (14.6 m in 1976). Mean spring ranges decline in the Upper Estuary, being 8.8 m at Sharpness and but 2 m at Gloucester (Admiralty Hydrographic Department, 1975).

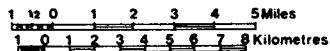
Surface salinity of the water is roughly constant at 35‰ around the island of Lundy (at the mouth of the Bristol Channel), but becomes increasingly variable up the Estuary. Thus the variation is between 10 and 27‰ at Avonmouth and between 1 and 25‰ at Sharpness. Saline water is not thought to penetrate above Gloucester although the influence of the tide on water level is felt as far up stream as Upton-on-Severn. Salinity changes are accompanied by changes in the suspended solid matter. The water at Porlock contains an average of 0.1 grammes per litre, and this figure rises to a maximum of 4.1 g/l at Arlingham. The evidence suggests that a wedge of silty water oscillates to and fro in the estuary and that relatively little is passed out into the Bristol Channel. Much of the silt is deposited as “fluid mud” during neap tides, only to be resuspended on the next springs (Kirby and Parker, 1975). The vertical silt pattern is thus far from homogeneous even though the Severn is regarded as homogeneous in terms of salinity.

Various other physical factors also change progressively from west to east, with exposure to wave action being perhaps the most important.

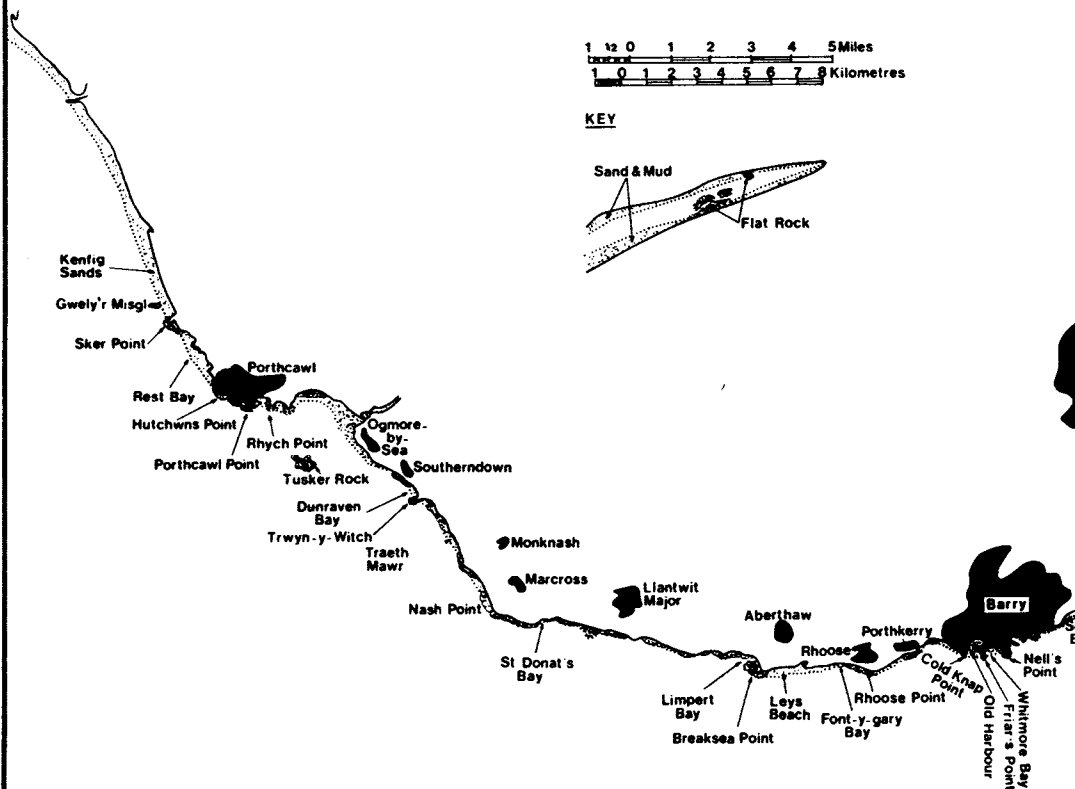
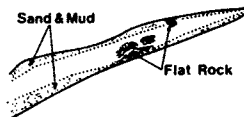
The Welsh Coast (Map 2)

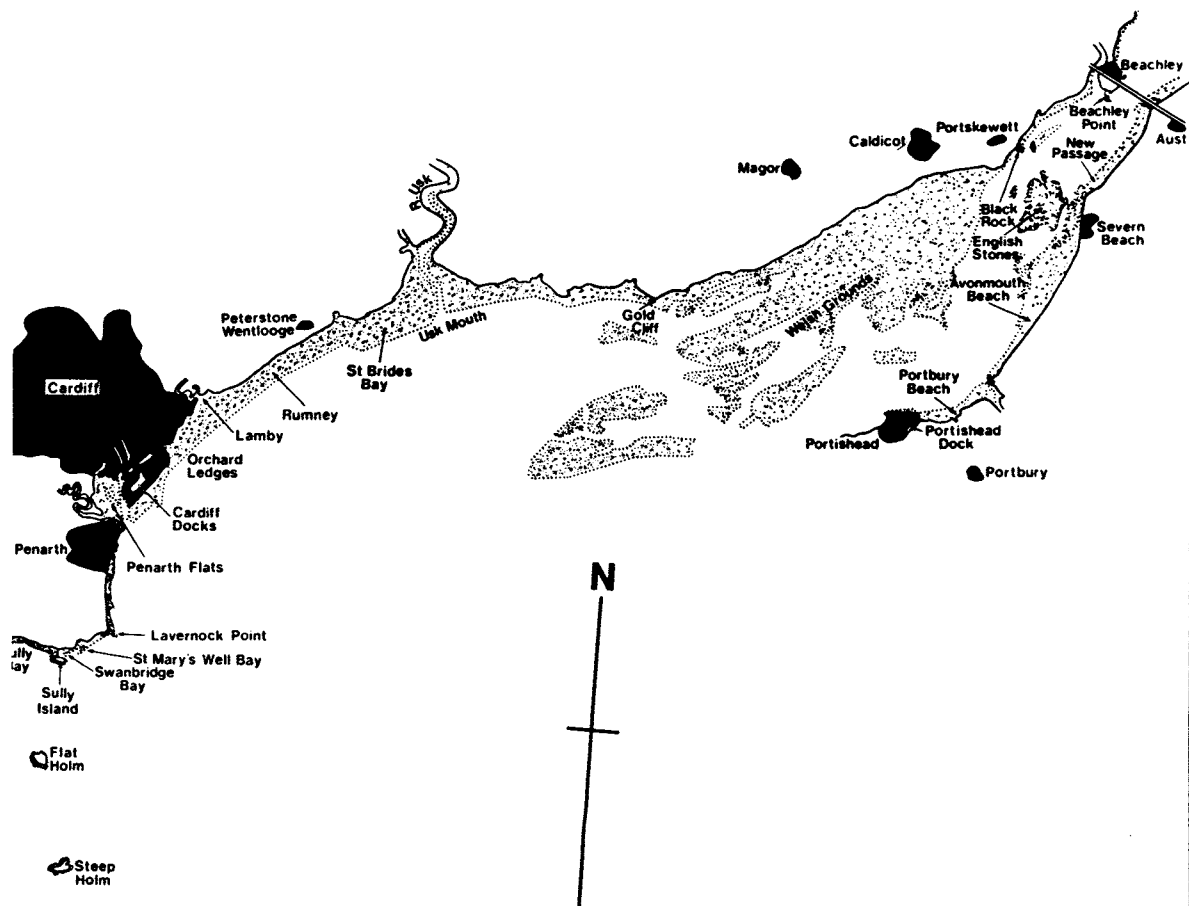
The coast is conveniently considered in three sections according to aspect: a south-west facing shore from Sker Point to Nash Point; a south-facing shore

THE WELSH COAST

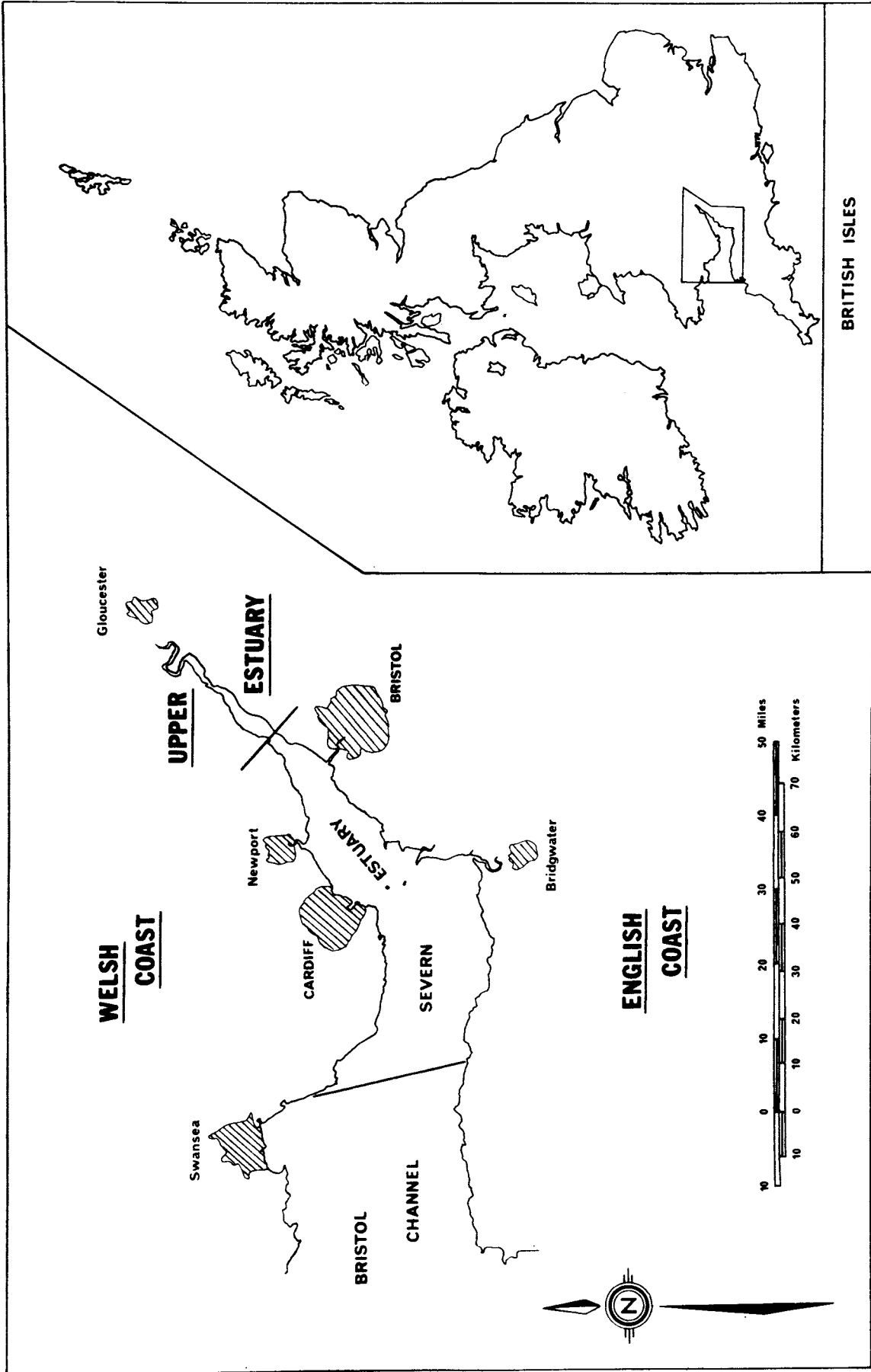


KEY





MAP 2.



MAP 1.

as far as Lavernock Point; and a south-east facing shore continuing into the Upper Estuary. The first section is exposed to strong surf action but the rest of the coastline is progressively sheltered both by virtue of its aspect and its eastward position.

Kenfig Sands are a surf-washed extension of the Swansea Bay sands and are backed by extensive dunes. Sker Point, an outcrop of Triassic conglomerate, breaks the line of sand and is flanked at low tide by flat rock platforms, the larger one to the west being called Gwely'r Misgl. At Porthcawl a stretch of rocky coast shelters several sandy bays and sand predominates as far as the River Ogmore, building up impressive dunes at Merthyr Mawr. Tusker Rock lies offshore and is exposed at low tide.

From Ogmore to Nash Point erosion of the high limestone cliffs has produced a shelving beach platform partly covered with sand in places but mostly visible as exposed rock colonized by barnacles and mussels. Sand scour considerably reduces the fauna towards Ogmore and the upper shore frequently consists of a ridge of barren boulders. Trwyn y Witch is a conspicuous point of harder limestone. Further east the cliffs are of Blue Lias with alternating bands of limestone and shale.

Beyond Nash Point the coast is similar but with a greater cover of fucoid algae, particularly on the lower shore. At Llantwit Major a spit of stabilized boulders provides a more varied habitat and the comparative shelter of Limpert Bay gives increased fucoid cover and faunal diversity. Beyond Aberthaw a sparsely colonized pebble beach extends intermittently as far as Barry, where rocky points alternate with sandy bays that have some mud at extreme low water. The Old Harbour is a semi-enclosed bay where the sand is mixed with variable amounts of mud. The presence of mud as a film on rocks and weeds is a general feature of the shores from here on. At Sully patches of liquid mud are sometimes deposited on the shore, whilst a variety of sediments is deposited around Swanbridge Bay (Purchon, 1948).

The beach platform, partly overlain with sand, continues past Lavernock Point to Penarth. Apart from very mixed sediment at Orchard Ledges alongside Cardiff Docks, an unbroken expanse of mudflats continues to Goldcliff where a platform of Red Marl protrudes. The flats consist of mud over a clay base, the depth of mud increasing towards the River Usk. A newly-completed seawall provides a fairly continuous hard surface on the upper shore but above Goldcliff the sediments are variable.

The Welsh Grounds consist of inshore mud giving way to offshore mobile sand banks at the western end and stable pebble banks upstream towards Caldicot.

A further rocky outcrop at Portskewett is separated from the English Stones by the narrow channel known as "The Shoots". From here to Beachley the shore is a continuous mud bank backed by salt marsh.

The English Coast (Map 3)

This coastline may also be considered in three sections: the steep shores of Exmoor, the extensive shores between Minehead and Hinkley Point, and the west-facing shores from Stert Flats to the Severn Bridge.

The eastern extremity of the Exmoor coast is formed of Hangman Grit, one of the hardest facies of the Old Red Sandstone. The land falls steeply from over 300 m to the sea, but only at Hurlstone Point is the bedrock exposed over the

whole shore. Everywhere else between Porlock and Minehead at least part of the shore is covered with boulders or a storm beach of mobile shingle. Gore Point, at the western end of Porlock Bay, is formed entirely of boulders that are still partially embedded in periglacial head material. There is a small patch of solid rock to the west at First Rocks.

Across Porlock Bay there is no outcrop of rock at all. Apart from a small patch of sand below the village of Porlock Weir, the shore is composed of pebbles and boulders set in the stiff clay of a submerged forest and backed by the impressive shingle bank known as "Bossington Beach".

There are two sandy beaches between Hurlstone Point and Minehead: Selworthy Sand and Greenaleigh Bay (just west of Greenaleigh Point), both composed of rather coarse particles and sparsely colonized by animals. Minehead Harbour is muddy but the rest of the bay is sandy with patches of gravel and small pebbles, whilst in Blue Anchor Bay the sediments range from fine sand to mud; particle size decreasing down the beach.

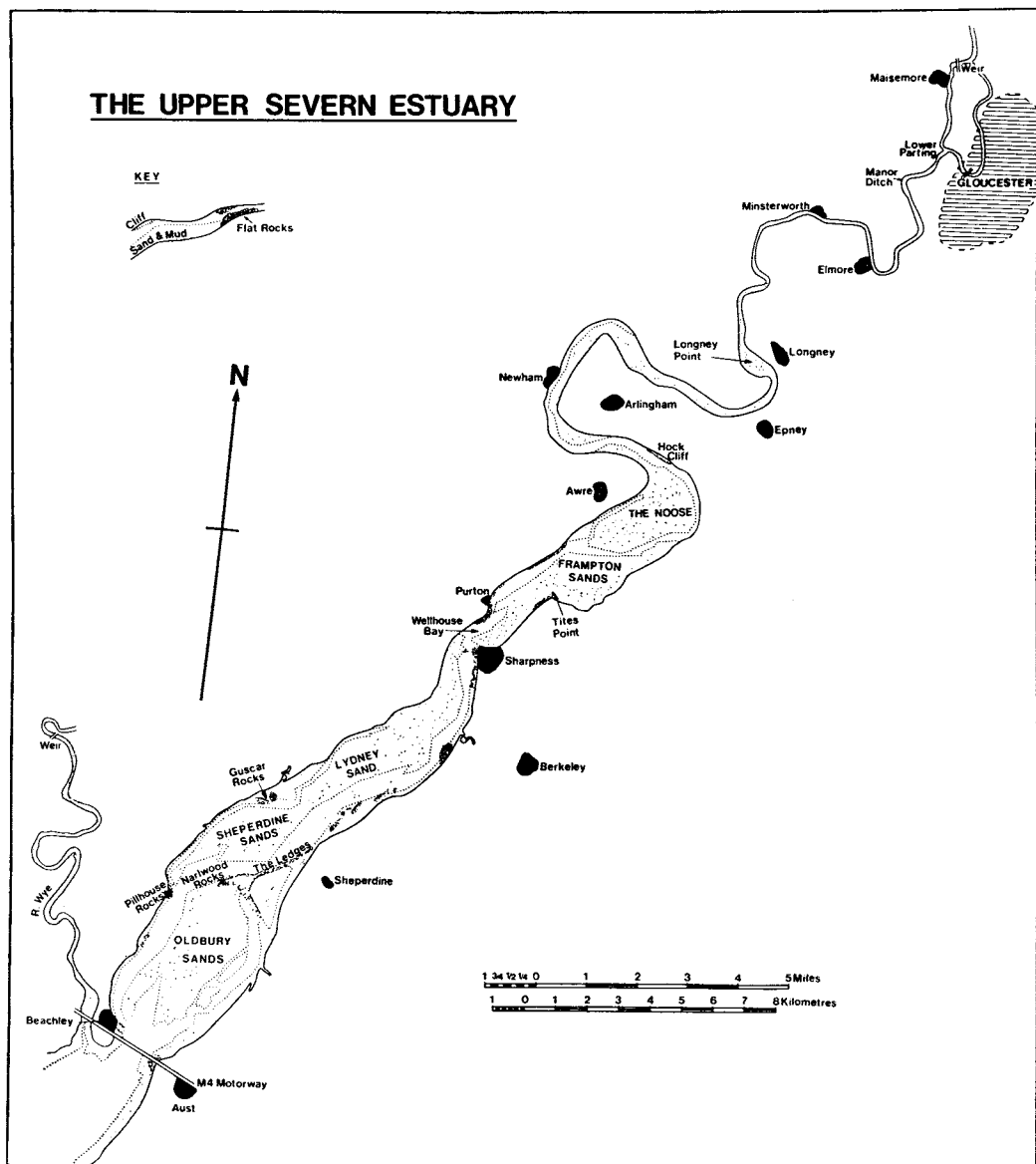
The rocky shores east from Blue Anchor are formed from soft Jurassic and Triassic sediments which have been eroded away to leave extensive wave-cut platforms backed by nearly-vertical low cliffs. In some places these cliffs are eroding by about a metre per year (Gilbertson and Mottershead, 1975). The rock within the wave-cut platform shows alternating bands of harder limestones and softer shales, heavily folded and criss-crossed by large and small faults. In many places the lower shore is formed of the Blue Lias.

The west-facing coast north of Stert Flats comprises extensive sandy/muddy beaches, separated by lens-shaped Carboniferous Limestone headlands—Brean Down, Birnbeck Island, Sand Point and Wain's Hill, Clevedon (Blackstone Rocks). The beaches become steeper and muddier as one moves northwards. Sandstone cliffs run from Clevedon to Portishead, terminating there at Royal Beach. Relatively barren mudbanks, often contaminated with sewage, lie on both sides of the Avon mouth. South of Severn Beach there are shingle banks at low water, and then come the English Stones; extensive rock flats reaching almost across the estuary. From here to Aust (the motorway bridge) the shore is a continuous mudbank, fringed with saltmarsh along the top.

The Upper Estuary (Map 4)

The bed of the Upper Estuary is filled with extensive sand banks, usually cut off from the land even at low tide by deep channels although some are accessible on foot. The shore itself is often a steep mud cliff dropping right down to low water mark although natural and artificial rocky outcrops occur in places. The largest of these are the "Ledges" surrounding the Oldbury Power Station reservoir at Sheperdine. Algal cover is generally extensive on hard surfaces but above Sharpness it is restricted by scouring. Salt marshes occur along both banks and there has been extensive erosion, as well as some reclamation in recent years.

Above Longney the sandbanks give way to a narrow, typically riverine stretch of estuary, winding upstream to divide at Lower Parting. The steep mud banks are here protected by boulders on the sharp corners, e.g. at Manor Ditch. The weirs at Maisemore and Llanthony (Gloucester) mark the limit of normal tidal influence, although the Severn Bore can overtop them on occasions.



MAP 4.

CLASSIFICATION

Phylum	Sub-Phylum	Class	Sub-Class	Order	Page
PROTOZOA					
	Sarcomastigophora	<i>SARCODINA</i>			
				FORAMINIFERIDA	485
	Ciliophora	<i>CILIATEA</i>			
				PERITRICHIDA	485
				HETEROTRICHIDA	485
PORIFERA		<i>CALCAREA</i>			485
		<i>DEMOSPONGIARIA</i>			
				TETRACTINOMORPHA	486
				CERATINOMORPHA	486
COELENTERATA		<i>HYDROZOA</i>			
				ANTHOMEDUSAE	487
				LEPTOMEDUSAE	487
				CHONDROPHORA	489
				SIPHONOPHORA	489
		<i>SCYPHOMEDUSAE</i>			
				SEMAEOSTOMAE	489
				RHIZOSTOMAE	489
		<i>ANTHOZOA</i>			
		<i>Octocorallia</i>			
				ALCYONACEA	489
		<i>Hexacorallia</i>			
				ACTINIARIA	489
CTENOPHORA		<i>TENTACULATA</i>			490
		<i>NUDA</i>			491
PLATYHELMINTHES		<i>TURBELLARIA</i>			
				RHABDOCOELA	491
				TRICLADIDA	491
				POLYCLADIDA	491
		<i>CESTODA</i>			
				PSEUDOPHYLLIDA	491
		<i>TREMATODA</i>			
				DIGenea	491
NEMERTINI		<i>ANOPLA</i>			
				PALAEONEMERTINI	491
				HETERONEMERTINI	492
		<i>ENOPLA</i>			
				HOPLONEMERTINI	492
ANNELIDA		<i>ARCHIANNELIDA</i>			493
		<i>POLYCHAETA</i>			493
		<i>MYZOSTOMARIA</i>			502
		<i>OLIGOCHAETA</i>			503
		<i>HIRUDINEA</i>			503
SIPUNCULA					503
ECHIURA					503
ARTHROPODA					
	Crustacea	<i>OSTRACODA</i>			
				PODOCOPA	504
		<i>COPEPODA</i>			
				EUCOPEPODA	504
		<i>CIRRIPEDIA</i>			
				THORACICA	505
				RHIZOCEPHALA	507
		<i>MALACOSTRACA</i>			
		<i>Peracarida</i>			
				CUMACEA	507
				TANAIDACEA	507
				ISOPODA	507
				AMPHIPODA	510

Phylum	Sub-Phylum	Class	Sub-Class	Order	Page
			<i>Eucarida</i>	MYSIDACEA	513
				EUPHAUSIACEA	514
				DECAPODA	514
	Pycnogonida				518
	Arachnida				
		<i>ACARI</i>			519
	Myriapoda				
		<i>CHILOPODA</i>			519
	Insecta				
		<i>APTERYGOTA</i>			
				THYSANURA	519
		<i>PTERYGOTA</i>		COLLEMBOLA	519
				HEMIPTERA	520
				TRICHOPTERA	520
				COLEOPTERA	520
				DIPTERA	520
MOLLUSCA					
		<i>POLYPLACOPHORA</i>			521
		<i>GASTROPODA</i>			
		<i>Prosobranchia</i>			
				ARCHAEOGASTROPODA	521
				MESOGASTROPODA	523
				STENOGLOSSA	525
		<i>Opisthobranchia</i>			
				BULLOMORPHA	526
				PYRAMIDELLOMORPHA	526
				APLYSIOMORPHA	527
				PLEUROBRANCHOMORPHA	527
				SACOGLOSSA	527
				NUDIBRANCHIA	527
		<i>Pulmonata</i>			
		<i>BIVALVIA</i>		BASOMMATOPHORA	529
		<i>Protobranchia</i>			529
		<i>Lamellibranchia</i>			
				DYSODONTA	529
				OSTREIFORMES	530
				PSEUDOLAMELLIBRANCHIA	530
				EULAMELLIBRANCHIA	531
		<i>CEPHALOPODA</i>			
				DECAPODA	532
				OCTOPODA	533
ENTOPROCTA					533
BRYOZOA					
		<i>STENOCLAEMATA</i>			
		<i>GYMNOLAEMATA</i>			
				CYCLOSTOMATA	533
				CHEILOSTOMATA	534
				CTENOSTOMATA	536
ECHINODERMATA					
		<i>CRINOIDEA</i>			538
		<i>ASTEROIDEA</i>			
				SPINULOSA	538
				FORCIPULATA	538
		<i>OPHIUROIDEA</i>			
				OPHIURAE	538
		<i>ECHINOIDEA</i>			
				DIADEMATOIDEA	539
		<i>HOLOTHUROIDEA</i>			
				DENDROCHIROTA	539
CHORDATA					
	Tunicata				
		<i>ASCIDIACEA</i>			
				ENTEROGONA	539
				PLEUROGONA	539

PHYLUM **PROTOZOA**
 Sub-Phylum **Sarcomastigophora**
 Class **SARCODINEA**
 Order **FORAMINIFERIDA**

ELPHIDIIDAE

Elphidium crispum (L.)

Welsh Coast: in salt marsh pools at Lamby (Brough, Delhanty & Thompson, 1964).

Elphidium articulatum (d'Orbigny)

English Coast: in salt marshes but not in soft mud at Brean, Clevedon and New Passage (Murray & Hawkins, 1976).

Protoelphidium anglicum Murray

English Coast: with *Ammonia* this species dominates soft intertidal muds at Brean, Clevedon and New Passage. Also in salt marshes (Murray & Hawkins, 1976).

Ammonia beccarii (L.)

English Coast: dominates soft intertidal muds at Brean, Clevedon and New Passage. Also in salt marshes (Murray & Hawkins, 1976).

Milliammina fusca (Brady)

Welsh Coast: probably this species in soft mud at Magor. Not found on the English Coast by Murray & Hawkins (1976).

HYPERAMMINIDAE

Haliphysema tumanowiczi Bowerbank

Welsh Coast: on old Bryozoans at Llantwit Major.

English Coast: common on Bryozoans at Porlock.

Sub-Phylum **Ciliophora**
 Class **CILIATEA**
 Order **PERITRICHIDA**

VAGINICOLIDAE

Vaginicola species

Welsh Coast: in salt marsh pools at Lamby (Brough *et al.*, 1964).

Order **HETEROTRICHIDA**

FOLLICULINIDAE

Folliculina ampulla (O. F. Muller)

Welsh Coast: in salt marsh pools at Lamby (Brough *et al.*, 1964).

English Coast: probably this species from Greenaleigh Bay, 8.2.74.

PHYLUM **PORIFERA**

SPONGES

Class **CALCAREA**

Classification follows Burton (1963)

HOMOCOELIDAE

Leucosolenia coriacea (Montagu)

Welsh Coast: present at Breaksea Point (Purchon, 1948 as *L. lacunosa* (Johnson)).

English Coast: present as very small clusters of fine anastomosing tubes under boulders on the lower shore at Porlock. rare 29.8.73.

SYCETTIDAE

Sycon ciliatum (Fabricius)

Welsh Coast: Purchon (1957) noted a *Sycon* species from Kenfig which falls within the group currently called *S. ciliatum*. Still occasional at Kenfig.

English Coast: under boulders on the lower shore at Porlock, 9.2.74, and similarly at Greenaleigh Bay 8.2.74 and Blue Anchor 22.8.73.

GRANTIIDAE

Grantia compressa (Fabricius)

Welsh Coast: recorded by Purchon (1948, 1957) at Kenfig and Breaksea Point. Recently found at Kenfig, Porthcawl (Rhych Point), 25.9.76, Llantwit Major, 5.10.75, and at Rhoose.

English Coast: at low water mark, Porlock, 9.2.74 and Blue Anchor, 3.5.73.

***Leuconia nivea* (Grant)**

English Coast: at low water mark, Porlock, 29.8.73 and 9.2.74.

Class *DEMOSPONGIARIA*
Order *TETRACTINOMORPHA*

OSCARELLIDAE

***Oscarella lobularis* (O. Schmidt)**

Welsh Coast: common at Rhose (Fontygary Bay).

English Coast: an encrusting sponge from the lower shore at Porlock and Minehead is probably this species.

CLAVULIDAE

***Cliona celata* Grant**

Welsh Coast: living sponge visible in borings at Kenfig. Abundant at Porthcawl (Rhych and Newton Points). Common at Nash Point.

English Coast: boring into shells at low water mark, Porlock.

***Suberites carnosus* (Johnston)**

English Coast: young specimen on a whelk shell inhabited by a hermit crab at Minehead, 29.8.73.

***Terpios fugax* Duchassaing & Michelotti**

Welsh Coast: recorded by Purchon (1957) from Kenfig.

AXINELLIDAE

***Hymeniacidon perleve* (Montagu)**

Welsh Coast: from Kenfig and Llantwit Major, and probably this species also at Breaksea Point (Purchon, 1948, 1957). Very common recently from Porthcawl to Nash Point.

English Coast: Bassindale (1943c) recorded small colonies on the lower shore at Porlock, first rocks.

Order *CERATINOMORPHA*

SPONGIIDAE

***Dysidea fragilis* (Montagu)**

English Coast: recorded on several occasions under lower shore boulders at Porlock.

HAPLOSCLERIDAE

***Haliclona oculata* (Pallas)**

Welsh Coast: Purchon (1948, 1957) noted this species at Kenfig and Barry, and possibly also at Sully. Recently common at Kenfig (Gwely'r Misgl), 18.3.76 and from Llantwit Major, 5.10.75. Good growths at low water springs at Lavernock Point.

English Coast: Bassindale (1943c) noted a single colony at Porlock, first rocks. Recently found at Minehead, 29.8.73.

***Haliclona* sp.**

a second *Haliclona* recently recognized on both sides of the Channel but not yet identified to species.

Welsh Coast: Llantwit Major: first noted, 5.10.75.

English Coast: common from Porlock to Blue Anchor.

DESMACIDONIDAE

***Amphilectus fucorum* (Esper)**

Welsh Coast: present at Llantwit Major, 5.10.75.

***Myxilla incrustans* (Johnston)**

Welsh Coast: common under boulders in pools and on exposed faces at Kenfig (Sker Point).

***Microciona* sp.**

Welsh Coast: juvenile specimens from Llantwit Major, 5.10.75.

***Ophlitaspongia seriata* (Grant)**

Welsh Coast: occasional on the lower shore at Kenfig.

***Raspailia hispida* (Montagu)**

English Coast: a small colony at Porlock, first rocks (Bassindale, 1943c).

***Halichondria panicea* (Pallas)**

our records do not distinguish this species from *H. bowerbanki* Burton.

Welsh Coast: recorded by Purchon (1948, 1957) at Kenfig, Llantwit Major, Breaksea Point, Barry Harbour and Sully. Recent records show it very abundant on the lower shore from Kenfig to Llantwit Major. Present on Flatholm.

English Coast: Bassindale (1943c) found it abundant near a sewer outfall at Porlock but did not record it elsewhere. Recently we have found it common on the lower shore from Porlock to Kilve with isolated clumps as far upstream as Sand Point.

PHYLUM COELENTERATA

Class *HYDROZOA*

HYDROIDS

Order ANTHOMEDUSAE

TUBULARIIDAE

Tubularia indivisa (L.)

Organ Pipes Hydroid

Welsh Coast: Kenfig, Llantwit Major, Barry and Portskewett (Purchon, 1948, 1957). In recent years it has been widespread but rather scarce between the tidemarks, although locally common at Kenfig (Sker Point) and Trwyn y Witch.

English Coast: Bassindale (1941, 1943c) found it common from Blue Anchor to Portishead, locally abundant at Weston, but did not see any in Porlock Bay. Earlier records are from Portishead (Purchon, 1938) and Portishead and Weston (Matthews, 1924). We have found the species to be generally distributed at extreme low water mark from Hurlstone Point to Portishead wherever there is rock at this level, although absent from Clevedon and rare at Sand Point.

Upper Estuary: Bassindale (1941) recorded abundant but dwarfed specimens at Aust (all dead, 9.3.40). Recently common or abundant at Aust and Beachley, breeding 4.4.74, and reaching Oldbury (Pillhouse Rocks).

Tubularia larynx Ellis & Solander

English Coast: only one positive record of this species, at Blue Anchor, 31.8.73.

CLAVIDAE

Clava multicornis (Forskål)

Welsh Coast: recorded on *Sertularia cupressina* at Penarth Head and on *Laomedea gelatinosa* at Peterstone Wentlooge.

English Coast: Bassindale (1941) found it common at Blue Anchor, 23.4.40. Now common at Portishead.

Upper Estuary: found on *Tubularia* and in the gully at Aust (Bassindale, 1941). Still common there and at Beachley. Many young ones, 4.4.74.

Cordylophora caspia Allman

Upper Estuary: abundant on rocks and submerged wood at Newnham, Manor Ditch and Lower Parting. In winter dies back to stalks.

Turritopsis nutricula McCrady

English Coast: common on empty *Pholas* shells in the rock at Blue Anchor (Bassindale, 1941 as *Turris neglecta* Lesson).

Order LEPTOMEDUSAE

CAMPANULARIIDAE

Clytia johnstoni (Alder)

Welsh Coast: recorded by Purchon (1948) at Aberthaw and Barry, and recently in Dunraven Bay.

English Coast: Bassindale (1941) found it on *Tubularia* from Kilve and Weston. We have recorded it on *Tubularia* from Blue Anchor and on *Corallina* at Brean Down.

Obelia dichotoma (L.)

Welsh Coast: recorded from Barry (Purchon, 1948) and Peterstone Wentlooge (Rees, 1940).

English Coast: found at Portishead by Purchon (1938) and recently at Blue Anchor, 27.6.68, 3.5.73.

Obelia flabellata Hincks

English Coast: recorded in Portishead Dock by Purchon (1938, p 328) but not included in Bassindale (1941).

Obelia geniculata (L.)

English Coast: common at Battery Point, Portishead (Matthews, 1924).

Gonothyraea loveni (Allman)

Welsh Coast: abundant on mussels in Roath Dock, Cardiff (the only hydroid present), breeding in November 1974.

English Coast: on mooring ropes in Portishead Dock (Purchon, 1938).

***Laomedea gelatinosa* (Pallas)**

Welsh Coast: quite common on stones at Peterstone Wentlooge (Purchon, 1948) and still there in 1976.

English Coast: abundant in a pool at St Audries Bay (Sanford, 1860). Recorded on rocks and stones amongst mud at Blue Anchor (common, 23.4.40), Stolford, and Weston (abundant on Birnbeck Island, 19.4.39) by Bassindale (1941).

Upper Estuary: found only at Aust: on weed in the gully (Bassindale, 1941) and near *Tubularia*, 17.11.71.

***Laomedea flexuosa* Hincks**

English Coast: not found by Bassindale but in 1973 recorded from Blue Anchor, Watchet, Brean Down and Portishead.

Upper Estuary: common under overhangs at Aust, 5.4.74.

HALECIIDAE

***Halecium halecinum* (L.)**

English Coast: small colonies at low water springs, Kilve, 21.5.39 (Bassindale, 1941).

SERTULARIIDAE

***Dynamena pumila* (L.)**

Welsh Coast: recorded by Purchon (1948, 1957) from Kenfig, Llantwit Major, Aberthaw, Barry and Sully. Now abundant at Sker Point and common east to Aberthaw.

English Coast: rare at Kilve and Portishead (Bassindale, 1941; Purchon, 1938). Found by us at Blue Anchor, Watchet and Brean Down. Often quite common at Watchet in drainage channels on the upper shore.

***Sertularella polyzonias* (L.)**

English Coast: probably this species attached to rock or stones at Hurlstone Point, Minehead and Blue Anchor.

***Sertularella fusiformis* Hincks**

English Coast: a single record, from Minehead, 28.8.73.

***Abietinaria abietina* (L.)**

English Coast: no record of this species growing between the tidemarks but dead specimens have been stranded at Portishead (Purchon, 1938).

***Hydrallmania falcata* (L.)**

Open Coasts: there are no records of this species growing on the shore but Bassindale (1941) found dead specimens stranded all over the estuary. Purchon (1948, 1957) noted colonies stranded at Kenfig and Aberthaw.

***Sertularia cupressina* (L.)**

Welsh Coast: found at Kenfig, Peterstone Wentlooge and, poorly developed, at Portskewett (Purchon, 1948, 1957). Now abundant at Lavernock Point and Penarth whilst there is extensive cover over the lower shore at Goldcliff.

English Coast: Bassindale (1941) found it common from Kilve to Aust although absent from Blue Anchor and Weston. We have found it generally present throughout the area from Porlock to Aust.

Upper Estuary: only recorded at Aust: regularly spaced over a wide area, with reproductive bodies in May 1939 (Bassindale, 1941): locally common, 17.11.71 but scarce, 4.4.74.

***Sertularia operculata* (L.)**

Welsh Coast: Kenfig (Purchon, 1948).

English Coast: stranded at Portishead (Purchon, 1938).

PLUMULARIIDAE

***Kirchenpaueria pinnata* (L.)**

Welsh Coast: on *Fucus serratus* at Kenfig, abundant in March 1972.

English Coast: found at Porlock, 30.8.73 and Minehead, 28.8.73.

***Ventromma halecoides* (Alder)**

English Coast: found at Porlock, 30.8.73.

***Plumularia setacea* (Ellis & Solander)**

English Coast: probably this species from Porlock, 30.8.73.

***Nemertesia antennina* (L.)**

Welsh Coast: on the carapace of a spider crab, *Maia squinado*, stranded at Kenfig in June 1972.

***Nemertesia ramosa* (Lamouroux)**

Welsh Coast: one colony in a pool at Kenfig (Sker Point) in September 1973.

Order CHONDROPHORA

VELELLIDAE

Velella velella (L.)

By-the-wind Sailor

Welsh Coast: large numbers stranded at Ogmore in July 1947. Widespread and fairly numerous as far east as Llantwit Major in July and August 1954 (Jefferson, 1955).

Order SIPHONOPHORA

PHYSALIIDAE

Physalia physalis (L.)

Portuguese Man-o'-War

Welsh Coast: a few stranded at Porthcawl in November 1954 (Jefferson, 1955).

Class SCYPHOMEDUSAE

JELLY-FISH

Order SEMAEOSTOMAE

PELAGIIDAE

Chrysaora hysoscella (L.)

English Coast: individuals occasionally stranded east to Minehead, most often seen in summer.

AURELIIDAE

Aurelia aurita (L.)

Common Jelly-fish

English Coast: thought by Matthews (1924) to breed in Portishead Dock but, although he found adults common in August and early September, Purchon (1938) could find no trace of the scyphistoma stage. Adults were again abundant in the dock in August 1976.

Upper Estuary: taken in kypes at Oldbury, 25.8.37 and 29.6.39 (Bassindale, 1941).

Order RHIZOSTOMAE

RHIZOSTOMIDAE

Rhizostoma octopus (L.)

English Coast: one stranded at Porlock, 25.4.68, and at least fifty at Minehead, 12.2.68.

Class ANTHOZOA

SEA ANEMONES & CORALS

Sub-Class Octocorallia

Order ALCYONACEA

SOFT CORALS

ALCYONIDAE

Alcyonium digitatum (L.)

Dead Man's Fingers

Welsh Coast: small colonies common under overhanging ledges at Kenfig (Gwely'r Misgl) (Purchon, 1948).

English Coast: very small colonies at Blue Anchor, 3.5.73.

Sub-Class Hexacorallia

Order ACTINIARIA

SEA ANEMONES

EDWARDSIIDAE

Fagesia carnea (Gosse)

English Coast: in piddock holes at Kilve, 20.12.72, about 1 cm in diameter.

ACTINIIDAE

Actinia equina (L.)

Beadlet Anemone

Welsh Coast: recorded by Purchon (1948, 1957) east to Sully. Now generally distributed; common or abundant as far east as Barry but becoming rarer towards Penarth Head. Present on Flatholm. Absent above Cardiff.

English Coast: Bassindale (1941, 1943c) found it common at Porlock, fairly common at Blue Anchor, at Kilve and near the Old Pier at Weston, though not on Birnbeck Island. Matthews (1924) found it fairly common at Portishead but Purchon (1938) could find only one individual and Bassindale (1941) found none at all in 1939. Yonge & Lloyd (1939) record it from Steepholm. We find the species widespread and abundant on western shores extending up the channel to Portishead. On Brean Down and at Weston and Portishead numbers seem to vary greatly from year to year.

- Anemonia sulcata*** (Pennant) Snakelocks Anemone
English Coast: two found at Gore Point (Porlock) 25.1.73 and another one seen there, 16.8.74.
 Common further west.
- Tealia felina*** (L.) Dahlia Anemone
Welsh Coast: Purchon (1948, 1957) recorded it at all his stations and it remains generally common on the lower shore, extending up the Channel to Beachley.
English Coast: Bassindale (1941, 1943c) found it common from Blue Anchor to Portishead but did not see it at Porlock. We find it common and very widely distributed along the lower shore from Porlock to Aust where there is a hard substrate, though perhaps most abundant at Porlock. Rare on Steephholm (Yonge & Lloyd, 1939).
Upper Estuary: Bassindale (1941) found it rare in the gully at Aust. Large specimens are now common at low water at both Aust and Beachley.
- Bunodactis verrucosa*** (Pennant) Gem Anemone
Welsh Coast: Kenfig (Purchon, 1957).
- Anthopleura thallia*** (Gosse)
English Coast: occasional in crevices at Hinckley Point, 27.9.76. The specimen collected had the prominent verruci typical of the species on but one side of the column, with small lumps in their place on the other.
- DIADUMENIDAE
- Diadumene cincta*** Stephenson
Welsh Coast: one collected at Kenfig (Sker Point) 18.3.76.
- Diadumene luciae*** (Verrill)
Welsh Coast: recorded near Cardiff (Rees, 1940; Bassindale, 1942b); abundant on wooden piles near the sewer outlet at Peterstone Wentlooge, 15.10.47 (Purchon, 1948). Small anemones, probably this species, have been abundant in recent years at Goldcliff.
English Coast: dense clusters under overhangs and on *Tubularia* at extreme low water mark, Hinckley Point, 27.9.76.
- METRIDIIDAE
- Metridium senile*** (L.) Plumose Anemone
Welsh Coast: Kenfig (Purchon, 1957). One white anemone, 1.3 cm in diameter at Sker Point, 23.2.74.
- SAGARTIIDAE
- Sagartia elegans*** (Dalyell)
Welsh Coast: Kenfig and Barry (Purchon, 1948, 1957).
- Sagartia troglodytes*** (Price)
Welsh Coast: Llantwit Major, Barry and Sully (Purchon, 1948, 1957). Probably this species in high level pools at Barry 1970–1975.
English Coast: Bassindale (1943c) found two var. *decorata* at Gore Point (Porlock) and (1941) several var. *ornata* at Blue Anchor. Yonge & Lloyd (1939) found three in a high level pool on Steephholm.
- Cereus pedunculatus*** (Pennant) Daisy Anemone
Welsh Coast: common on rocks at Kenfig and occasional at Aberthaw, both at low water springs.
- ACTINOSTOLIDAE
- Stomphia coccinea*** (O. F. Müller)
English Coast: widely distributed at extreme low water mark from Blue Anchor to Hinckley Point. The white anemones mentioned by Bassindale (1941) p 155 at Blue Anchor and Kilve may have been this species.

PHYLUM CTENOPHORA

SEA GOOSEBERRIES

Class TENTACULATA

Pleurobrachia pileus (O. F. Müller)

A planktonic species which is sometimes stranded on beaches in large numbers. Records extend from the open coasts up to Lydney, where several were found in pools amongst the sand banks, 6.6.75.

Class *NUDA*

Beroë cucumis Fabricius

English Coast: occasionally stranded east to Minehead.

PHYLUM **PLATYHELMINTHES**

Class *TURBELLARIA*

FLATWORMS

Order RHABDOCOELA

FECAMPIIDAE

Fecampia erythrocephala Giard

Welsh Coast: Aberthaw (Limpert Bay): one adult in the nest of *Amphithoë rubricata*, 26.5.74, no egg cases seen.

Order **TRICLADIDA**

PROCERODIDAE

Procerodes ulvae (Oersted)

Welsh Coast: recorded only from Dunraven Bay although searched for in many apparently suitable places where freshwater streams cross the foreshore.

English Coast: usually common in the stream west of Gore Point (Porlock) and always abundant in the stream at Kilve Pill. Apparently no change from Bassindale (1941, 1943c) to the present day.

Order **POLYCLADIDA**

LEPTOPLANIDAE

Leptoplana tremellaris (O. F. Müller)

Welsh Coast: recorded at Llantwit Major and Aberthaw by Purchon (1948, 1957) and it is probably this species that is now frequent under boulders on these shores.

English Coast: Bassindale (1941) found a few under stones at Blue Anchor and it is probably this species which is sometimes common at Porlock and regularly found east to Brean Down.

Class *CESTODA*

TAPEWORMS

Order **PSEUDOPHYLLIDA**

DIBOTHRIOCEPHALIDAE

Ligula intestinalis (L.)

Upper Estuary: the metacystode in *Gobius minutus* taken in kypes at Oldbury in 1938 and 1939. A high proportion of the fish collected in September 1939 were infected (Bassindale, 1941).

Class *TREMATODA*

FLUKES

Order **DIGenea**

MICROPHALLIDAE

Microphallus similis Jagerskiöld

Welsh Coast: cercaria (*Cercaria ubiquita* Lebour) from rough winkles, *Littorina saxatilis* agg. at Lavernock Point. A 4 per cent infection recorded in 1976. Metacercaria (encysted) in the digestive gland of shore crabs, *Carcinus maenas*, at Lavernock Point.

Cercaria littorinae Rees

Welsh Coast: cercaria rare in rough winkles, *Littorina saxatilis* agg., at Lavernock Point, 1976.

PHYLUM **NEMERTINI**

Class *ANOPLA*

Order **PALAEONEMERTINI**

TUBULANIDAE

Tubulanus annulatus (Montagu)

English Coast: one from Porlock Bay, 14.10.74.

Order HETERONEMERTINI

CEPHALOTRICHIDAE

Cephalothrix rufifrons (Johnston)

Welsh Coast: one in muddy sand at Sully, October 1959.

LINEIDAE

Lineus longissimus (Gunnerus)

Bootlace Worm

Welsh Coast: possibly this species locally abundant in mud ridges on the upper shore at Rumney (Cardiff).

English Coast: one really long one from Porlock bay, 9.2.74.

Lineus ruber (O. F. Müller)

Welsh Coast: the greenish form, called *L. gesserensis* at one time, was recorded by Purchon (1948, 1957) from Aberthaw, Barry, Sully and Peterstone Wentlooge. It is now fairly common at Aberthaw and abundant under stones on the upper shore at Barry and Sully. Egg masses seen in March and April.

English Coast: green and rose specimens were recorded as rare from Blue Anchor to Portishead by Bassindale (1941). He did not find it at Porlock. The species is now widespread and probably common. Both colour varieties occur at Porlock and Watchet.

Upper Estuary: darker specimens were recorded by Bassindale (1941) at Aust and almost black ones locally abundant at Sheperdine (High Heron Rocks) in 1939. He could find none at Sheperdine or Aust after the cold winter of 1939/1940 but a few recolonized after the milder winter of 1940/1941. Still present at Aust and Beachley and several found near the edge of the tidal reservoir at Oldbury (The Ledges) 29.4.71.

Class ENOPLA

Order HOPLONEMERTINI

EMPLECTONEMATIDAE

Emplectonema neesi (Oersted)

Welsh Coast: *Emplectonema*, probably this species, at Kenfig in September 1972. Common at Llantwit Major, St Donat's Bay and Dunraven in Spring 1976.

English Coast: Porlock: one at Gore Point, 15.9.73 and another in the Bay, 14.10.74. One from Minehead (Madbrain Sands) 22.5.75.

PROSORHOCMIDAE

Oerstedtia dorsalis (Abildgaard)

Welsh Coast: Aberthaw (Purchon, 1948).

English Coast: Greenaleigh Bay, 20.3.73 and Brean Down, 14.8.70.

AMPHIPORIDAE

Amphiporus lactifloreus (Johnston)

Welsh Coast: Aberthaw, Barry and Sully (Purchon, 1948). Present now at Llantwit Major, frequent at Aberthaw and common at Sully (though less so than *Lineus ruber*). Present on Flatholm.

English Coast: two collected at Porlock, 13.10.73 and probably common under boulders at Kilve.

TETRASTEMMATIDAE

Tetrastemma melanocephalum (Johnston)

Welsh Coast: Goldcliff; one in sand at the base of the sea wall, 16.7.71.

English Coast: Stert Flats: one from soft mud, 11.8.72.

Tetrastemma species 1

English Coast: Steepholm; one at South Landing, 2.6.73 and two more from soft mud below mean tide level, 1.7.73.

Tetrastemma species 2

Upper Estuary: Awre; two under stones on mud at high water mark, 11.8.76.

Prostomatella Friedrich sp.

English Coast: in clean sand at Minehead and Weston, with densities of up to 50 per sq m. Limited to a narrow zone around mean high water of neap tides at Weston but extending over the whole middle shore at Minehead (see Little & Boyden, 1976).

PHYLUM ANNELIDA

Class ARCHIANNELIDA

DINOPHILIDAE

***Dinophilus* sp.**

Welsh Coast: recorded by Purchon (1948, 1957) in upper shore pools at Kenfig, Llantwit Major and Barry. Common across the shore at Aberthaw, 17.4.75.

English Coast: from high tide pools at Kilve (Bassindale, 1941). Found by us amongst weeds at Porlock, in *Bicellariella* tufts at Minehead and in mud at low water at Kilve.

NERILLIDAE

***Nerilla antennata* O. Schmidt**

English Coast: one collected with a *Tubularia* colony at Blue Anchor, 27.8.76.

Class POLYCHAETA

BRISTLE WORMS

Classification and nomenclature within this Class follow that of Hartman (1959, 1965).

APHRODITIDAE

***Aphrodita aculeata* L.**

Sea Mouse

Welsh Coast: two cast ashore at Kenfig, September 1972. One inter-tidal record at Barry, 1.5.65 (National Museum of Wales)

POLYNOIDAE

Scale Worms

***Lepidonotus clava* (Montagu)**

English Coast: one at Greenaleigh Point, 8.2.74.

***Lepidonotus squamatus* (L.)**

Welsh Coast: recorded from Barry and Sully by Purchon (1948, 1957). Now common under boulders, in rock crevices and *Sabellaria* reefs at all stations east to Lavernock Point.

English Coast: occasional at Porlock and between Blue Anchor and Portishead (Bassindale, 1941, 1943c). Now common between Porlock and Kilve under boulders on the lower shore.

***Eunoe nodosa* (M. Sars)**

English Coast: a few amongst *Tubularia* at Portishead (Purchon, 1938).

***Harmothoe imbricata* (L.)**

There has been some confusion between this and the next species. Bassindale (1943c) was unable to distinguish some specimens which had characteristics of both species. All specimens critically examined by us have been attributed to *H. impar* on the position of the eyes (Pettibone, 1953). We have no confirmed records of *H. imbricata* but Bassindale (1941) listed the following sites:

English Coast: common under stones from Blue Anchor to Weston. Matthews (1924) found it fairly common at Portishead but it was not recorded in 1939 nor by Purchon in 1936.

***Harmothoe impar* (Johnston)**

Welsh Coast: Aberthaw and Barry (Purchon, 1948). Generally fairly common on more sheltered shores under stones and boulders as far west as Sully. Many small worms (*c.* 10 mm long) at Aberthaw in September 1973. One at Rhoose Point with the black and white elytra usually typical of *H. imbricata*.

English Coast: specimens are probably of this species rather than *H. imbricata*. Common and widespread at Porlock (Bassindale, 1943c). Still common there and found east to Kilve.

***Harmothoe longisetis* (Grube)**

Welsh Coast: recorded from Aberthaw and Sully by Purchon (1948) but these records may possibly refer to damaged specimens of *H. extenuata*.

***Harmothoe johnstoni* (McIntosh)**

Welsh Coast: one in a pool at Aberthaw (Limpert Bay). It had a caudal appendage but was not otherwise distinguishable from *H. impar*.

***Harmothoe reticulata* (Claparède)**

Welsh Coast: never common but individuals are found occasionally at Llantwit Major and Rhoose under stones on the lower shore.

***Harmothoe extenuata* (Grube)**

Welsh Coast: found at Kenfig, Aberthaw, Barry and Sully by Purchon (1948, 1957 as *Lagisca*). Now generally present east to Sully at low water, but not common.

English Coast: common at Porlock: the commonest scale worm in Greenaleigh Bay: present at Kilve.

Polynoë scolopendrina Savigny

Welsh Coast: occasional in sand at Kenfig. In holes in the rock at Southerndown (Trwyn y Witch).

English Coast: Bassindale (1943c) found one at Gore Point (Porlock).

Gattyana cirrosa (Pallas)

Welsh Coast: individuals collected at Sully (Swanbridge Bay), commensal with *Neoamphitrite jigulus*, 24.2.74, 19.4.75 and 15.4.76.

SIGALIONIDAE

Sthenelais boa (Johnston)

Welsh Coast: recorded at Kenfig by Purchon (1948) and again recently at Gwely'r Misgl. Regularly found at Llantwit Major in coarse sand under boulders.

English Coast: Bassindale (1943c) found two near Gore Point (Porlock). Two recent records: one from Porlock, 11.7.68 and the other from Kilve, 7.2.74.

Pholoë minuta (Fabricius)

Welsh Coast: very many on *Halichondria* at Porthcawl (Rhych Point) 25.9.76.

PHYLLODOCIDAE

Paddleworms

Eteone longa (Fabricius)

Welsh Coast: Barry and Sully (Purchon, 1948). Recently at Barry. Small *Eteone*, probably this species, occur as far upstream as Magor.

English Coast: Minehead in sand, 5.7.73 and common there in February 1975.

Eteone flava (Fabricius)

Welsh Coast: Barry (Old Harbour) in sand.

English Coast: one from Portishead in the tube of *Terebella* (Purchon, 1938). Recently from Minehead, a few in sand, 5.7.73 and common, 10.3.74. (Little & Boyden, 1976).

Mysta picta (Quatrefages)

Welsh Coast: one at Aberthaw, 7.9.71.

Eumida sanguinea (Oersted)

Welsh Coast: abundant on the lower shore at Kenfig in September 1973.

Pirakia punctifera (Grube)

English Coast: one near Gore Point (Porlock) (Bassindale, 1943c as *Eulalia*).

Eulalia rubiginosa St Joseph

Welsh Coast: several in crevices at low water, Lavernock Point, 21.1.73.

Eulalia viridis (L.)

Welsh Coast: Kenfig and Llantwit Major (Purchon, 1957). Now frequent at Kenfig (Sker Point) and Southerndown (Tryn y Witch) among barnacles. Occasional on the lower shore at Llantwit Major, Cwm Nash and Aberthaw.

Phyllodoce laminosa Savigny

Welsh Coast: one at Llantwit Major, 5.10.75.

English Coast: occasional at Porlock and in Greenaleigh Bay.

Phyllodoce lamelligera (L.)

English Coast: three collected from Watchet (Helwell Bay) 3.3.73; one of which laid a green egg mass in the laboratory.

Anaitides mucosa (Oersted)

Welsh Coast: one in an empty piddock (*Barnea*) burrow in peat at low water neaps, Aberthaw (Purchon, 1948, as *Phyllodoce*) and one in sand (Clark & Haderlie, 1960, as *Phyllodoce*).

Anaitides maculata (L.)

Welsh Coast: recorded at Kenfig, Aberthaw and Barry by Purchon (1948, 1957, as *Phyllodoce*).

Now abundant in the mussel beds at Kenfig (Gwely'r Misgl) and occasionally in moderate numbers at St Donats. Egg masses common in sand at Aberthaw in spring.

English Coast: occasional under rocks on sand at Minehead and one found at Kilve, 24.2.74.

HESIONIDAE

Kefersteinia cirrata (Keferstein)

Welsh Coast: recorded from Kenfig and Llantwit Major by Purchon (1957). Still common at both these sites, among mussels at Kenfig and under stones on coarse sand at low water. Fairly common in St Donats Bay.

English Coast: one from Blue Anchor (Bassindale, 1941) and another from Porlock, 9.2.74.

SYLLIDAE

Amblyosyllis formosa (Claparède)

Welsh Coast: recorded at Kenfig (Sker Point) by Purchon (1957, as *Pterosyllis*) and two recent specimens from St Donats Bay.

Odontosyllis ctenostoma Claparède

English Coast: one at Porlock, 9.2.74.

Typosyllis armillaris (Müller)

Welsh Coast: recorded from Barry and Sully, where there were two ripe females in a gully, 24.4.47 (Purchon, 1948, as *Syllis*). This species is probably generally common east to Lavernock Point, where it was very common in crevices, 9.7.71 and 21.7.73.

English Coast: one from Minehead in February 1975 and two ripe females in a middle shore crevice at Kilve in April 1974.

Syllis gracilis Grube

Welsh Coast: occasional individuals at St Donats, 17.3.76, and at Aberthaw (Limpert Bay), 10.8.71.

Autolytus species 1

Welsh Coast: one at Nash Point, 23.6.74.

Autolytus species 2

Welsh Coast: a female stolon with green eggs at Nash Point, 23.6.74. Possibly *A. langerhansi*.

Autolytus species 3

Welsh Coast: juveniles, less than 10 segments, abundant on *Gonothyraea* in Roath Dock (Cardiff) in October 1974.

Procerastea nematodes Langerhans

Welsh Coast: three specimens apparently inhabiting the dead stalks of *Tubularia indivisa* at Nash Point, 23.6.74.

NEREIDAE

Rag Worms

Neanthes diversicolor (O. F. Müller)

Welsh Coast: recorded at Barry and Sully (Purchon, 1948, as *Nereis*), Wentlooge Flats (Rees, 1940 and Purchon, 1948, as *Nereis*), and Portskeewett (Purchon, 1957, as *Nereis*). At Aberthaw (Leys Salt Marsh) this species is larger than elsewhere and inhabiting muddy sand. Common in Aberthaw lagoon. Locally abundant in Swanbridge Bay on the upper shore and generally abundant on mud flats from Penarth to Portskeewett.

English Coast: Bassindale (1941, as *Nereis*) found one at Blue Anchor, several at Kilve where the stream runs over the beach, and then abundant in mud and under stones on mud up-channel to Aust. We have found it in Porlock salt marsh and once in sand at Minehead, 10.4.74. It is present in the mud of Steart Flats but not from Berrow to Weston, although it is present in the Weston Marine Lake. Abundant in mudflats and mudbanks from Sand Point to Severn Beach, and also found in Portishead Docks.

Upper Estuary: Bassindale (1941, as *Nereis*) recorded it up to Purton, although he found only a few at Arlingham Passage on 18.4.39 and none later. Now generally abundant wherever mud banks occur as far as Awre and common in salt marshes. Found at Arlingham in June but not December 1972. Present at Epney in June 1972 and one here in sand (Rodley Sands) in March 1975.

Neanthes succinea (Frey & Leuckart)

Welsh Coast: recorded in hard mud at Peterstone Wentlooge by Rees (1940, as *Nereis*) but not seen there, nor elsewhere in the estuary, recently. It is the abundant nereid in Roath Dock (Cardiff). Heteronereids, 14.10.74.

Neanthes virens (Sars)

Welsh Coast: Sully and Portskeewett (Purchon, 1948, 1957, as *Nereis*). One from the peat beds at Kentig in 1974. Large worms are occasional at Barry (Cold Knap Point and Friars Point) under stones. Very common in muddy gravel and clay at Sully (Swanbridge Bay) where heteronereids occur infrequently from February to April (several seen, 17.4.75). Small worms were common at Goldcliff in September 1973 and a few found in clay at Caldicot in August 1975.

English Coast: recorded as common at Portishead by Matthews (1924) and Purchon (1938) but not seen there by Bassindale in 1939. He found one in a kype at Severn Beach (Bassindale, 1941, as *Nereis*). We have sporadic records from Greenleigh Bay, Minehead, Weston (Birnbeck Island), Clevedon (common in Ladye Bay, 21.12.72), Portishead (Battery Point) and Severn Beach, where several small worms were found in the peat beds in August 1975.

Neanthes irrorata (Malmgren)

Welsh Coast: although only recorded at Llantwit Major by Purchon (1957, as *Nereis*) this species is now common in mucous tubes at Llantwit and Aberthaw (Limpert Bay). Large individuals, more than 150 mm long, often occur in pairs but no heteronereids have been found. At Sully (Swanbridge Bay) smaller worms are fairly common in mud and clay with *N. virens*. These small worms, always found in mucous tubes, have indistinct paragnaths and could be mistaken for *P. dumerilii*, which this species closely resembles.

English Coast: a single record from Porlock (Gore Point), 12.7.68.

Nereis pelagica L.

Welsh Coast: recorded from Aberthaw, Barry and Sully (Purchon, 1948, 1957). Single worms from Kenfig (Gwely'r Misgl), 9.2.74 and Llantwit Major, 15.5.76. Widespread generally under stones, it is the common nereid at Barry and in the *Sabellaria* reef at Sully and Lavernock (mostly orange specimens). Common under stones at Goldcliff, 25.9.73, but grey green with oocytes. No heteronereids seen.

English Coast: Bassindale (1941, 1943c) found it at Porlock and common at Blue Anchor, Kilve and Weston, although absent from Portishead. We find it the common nereid from Porlock to Kilve: it is present at Brean Down and was recorded from Portishead (Royal Beach), 21.3.73.

Upper Estuary: Aust (Bassindale, 1941).

Eunereis longissima (Johnston)

Welsh Coast: several full-sized worms in blackened sand under boulders at Kenfig (Gwely'r Misgl), 19.3.76; A spent heteronereid at Llantwit Major, 15.5.76; several juveniles in gravelly mud at Sully (Swanbridge Bay) in 1972 and one found there in April 1975.

Perinereis cultrifera (Grube)

Welsh Coast: Kenfig and Llantwit Major (Purchon, 1957). Fairly common now at Kenfig, mostly in crevices but also under boulders. Commoner than *N. pelagica* at Llantwit Major, 5.10.75. Several, including heteronereids, in the old *Sabellaria* reef at Aberthaw (Limpert Bay), 10.8.71.

English Coast: one perhaps doubtful record from Porlock, 25.4.68, but another fine worm from Hinckley Point, 27.9.76.

Platynereis dumerilii (Audouin et Milne-Edwards)

Welsh Coast: formerly common at Rhooose (Fontygary Bay) but not seen after the cold winter of 1962/1963.

English Coast: occasional, in tubes, on *Corallina* in rock pools at Weston (Bassindale, 1941). We found one at Porlock, 9.2.74 and another at Kilve, 24.2.74.

NEPHTYIDAE

Catworms

The distribution of *Nephtys* species was studied by Clark & Haderlie (1960); Haderlie & Clark (1959). Further details are given by Boyden & Little (1973) and Little & Boyden (1976).

Nephtys caeca (Fabricius)

Welsh Coast: recorded by Purchon (1957) at Llantwit Major: searched for unsuccessfully there by Haderlie & Clark (1959).

Nephtys longosetosa (Oersted)

Welsh Coast: Kenfig, one at mean tide level on Margam Sands (Clark & Haderlie, 1960).

Nephtys hombergi Savigny

Welsh Coast: probably this species recorded by Rees (1940) at Peterstone Wentlooge. We have found it fairly common in Barry Old Harbour, with large mature specimens present: occasional juveniles in muddy gravel at Sully (Swanbridge Bay): small worms common in liquid mud at low water, Peterstone Wentlooge: and frequent in sewage stream mud at Magor where *Neanthes diversicolor* is scarce.

English Coast: Bassindale (1941) found one at Blue Anchor; considered it common, with *Arenicola* and *Macoma*, at Weston; and repeated Purchon's (1938) report of it as common at Portishead in 1936. This is the *Nephtys* which commonly occurs in the lower reaches of estuaries (Haderlie & Clark, 1959) and it locally replaces *Neanthes diversicolor* in the flats west of Weston, occupying a different microhabitat where both species co-exist (Boyden & Little, 1973). We find it common between Stolford and Portishead and, exceptionally, from Minehead to Severn Beach.

Upper Estuary: one in liquid mud over sand at Awre in June 1975.

Nephtys cirrosa Ehlers

Welsh Coast: from muddy sand at Aberthaw and Sully (Purchon, 1948). Now common in sand at Kenfig and Porthcawl (Rest Bay). Fairly common at Barry, mixed with *N. hombergi*. A few

found in a mobile sandbank to the east of Sully Island and at Lavernock (St Mary's Well). In clean sand at Magor.

English Coast: recorded by Bassindale (1941) only from Blue Anchor, where it was common in muddy sand with *Arenicola* on the middle shore. It is now absent from coarse sandy beaches like Selworthy Sand and Greenaleigh Bay but common in sand from Minchhead to St Audries Bay. It was found in clean sand at Portishead, 9.3.73 but not seen there in 1974–1976.

SPHAERODORIDAE

Sphaerodoridium minutum (Webster & Benedict)

Welsh Coast: a few at Uskmouth and Magor in mud and muddy sand in August 1974. One at Magor, 12.6.76, in sewage stream.

GLYCERIDAE

Glycera convoluta Kefenstein

Welsh Coast: occasional individuals from muddy sand at St Donats, Aberthaw, Sully and Lavernock.

English Coast: one from Minehead (Madbrain Sands), 10.3.74.

GONIADIDAE

Goniada emerita Audouin et Milne-Edwards

English Coast: one from the lower shore at Porlock (First Rocks), 25.2.71.

EUNICIDAE

Lysidice ninetta Audouin et Milne-Edwards

Welsh Coast: single records from Kenfig and St Donats Bay, 17.3.76.

English Coast: Porlock; two near Gore Point (Bassindale, 1943c).

Marphysa sanguinea (Montagu)

Welsh Coast: Kenfig and Sully (Purchon, 1948, 1957). Found at Kenfig (Gwely'r Misgl) in coarse sand under boulders, 19.3.76. Occasional individuals from Llantwit and St Donats. Common at Sully in rock crevices and the old *Sabellaria* reef. An aggregation of five in one spadeful of mud at Swanbridge Bay, 15.4.76, had large oocytes. Common at Lavernock Point in crevices.

English Coast: Bassindale (1941, 1943c) recorded single specimens from Porlock and Blue Anchor, and we have two recent records from the same sites, 20.3.69 and 23.9.76 respectively.

LUMBRINERIDAE

Lumbrineris latreilli Audouin et Milne-Edwards

Welsh Coast: commonly found under stones and in crevices at Llantwit Major and St Donats Bay in 1975 and 1976.

English Coast: Bassindale (1941) found a few at Blue Anchor and Kilve: we have found single worms in Porlock Bay, 9.2.74, Blue Anchor, 23.9.76 and Kilve, 7.2.74 whilst several were taken at Minchhead in February 1975.

Lumbrineris fragilis (O. F. Müller)

Welsh Coast: recorded at Barry (Purchon, 1948).

Lumbrineris coccinea (Renier)

Welsh Coast: one 12 mm long from Sully (Swanbridge Bay), 21.1.73. A new British record.

Lumbrineris impatiens Claparède

Welsh Coast: a single record reported from Rhoose (Fontygary Bay).

ARABELLIDAE

Arabella iricolor (Montagu)

English Coast: single specimens from Porlock in 1940 (Bassindale, 1941) and 12.7.68.

ORBINIIDAE

Scoloplos armiger (O. F. Müller)

Welsh Coast: recorded at Aberthaw by Purchon (1948) and Clark & Haderlie (1960). Common in the muddy sand of Barry Old Harbour, egg masses abundant from February to March. One worm in mud at Penarth Head in February 1974.

English Coast: recorded in sand at Minehead (middle shore), Weston and Clevedon (lower shore). Present at Portishead (Kilkenny Bay), 9.3.73 but not 2.7.73.

PARAONIDAE

Aricidea minuta Southward

Welsh Coast: abundant in dirty shell gravel, extreme low water springs, at Barry in September 1974 and 1975. Sometimes present in liquid mud at low water springs, Peterstone Wentlooge.

Paraonis fulgens (Levinson)

English Coast: common in sand at Minehead, 5.7.73: the distinctive burrows were common there in February 1975 but no living worms seen.

SPIONIDAE

Boccardia redeki (Horst)

Upper Estuary: abundant in crevices at low water throughout the year at Sharpness (Wellhouse Bay). This appears to be a new British record.

Polydora caeca (Oersted)

English Coast: many in holdfasts of *Fucus vesiculosus*, high on the shore at Watchet (Helwell Bay), 14.9.73.

Polydora ligni Webster

Welsh Coast: found in mud at Sully (Swanbridge Bay); abundant in hard clay near low water springs at Peterstone Wentlooge; and generally present in small numbers on the Wentlooge flats.

Polydora ciliata (Johnston)

On the Island of Lundy, nearer the mouth of the Bristol Channel, George (1974) found only *P. giardi* and doubted the earlier records of *P. ciliata*. We have yet to find *P. giardi* within the area of this survey.

Welsh Coast: recorded by Purchon (1948, 1957) from Kenfig, Aberthaw, Barry, Sully and Peterstone Wentlooge—where it was also found by Rees (1940). Generally common at low water from Kenfig to Sully boring into limestone, often in pools. They become the dominant organism at Dunraven Bay, Barry (Friars Point) and elsewhere, covering the rocks with a layer of mud from their tubes.

English Coast: abundant in slate on the middle shore at Blue Anchor, breeding, 23.4.40; and in limestone in upper shore pools at Kilve (Bassindale, 1941). In upper shore pools on Steephelm (Yonge & Lloyd, 1939). Now generally common on the lower shore and in pools wherever limestones are exposed from Blue Anchor to Weston. Present at Clevedon and Portishead (Royal Beach), 21.3.73.

Nerine foliosa (Audouin et Milne-Edwards)

Welsh Coast: one from St Donats Bay and two from sand at low water at Barry (Whitmore Bay), 27.9.73.

Nerine bonnieri Mesnil

English Coast: Minehead: one in sand with *Haustorius*, 4.3.73.

Nerine cirratulus (Delle Chiaje)

Welsh Coast: recorded at Llantwit Major by Purchon (1957). Small individuals abundant in wet sand at Porthcawl. Common on the upper shore at Marcross (Traeth Mawr) and in a well-marked zone at Barry (Whitmore Bay). Common around the jetty in Barry Old Harbour, and in gravel under stones near Cold Knap Point.

English Coast: abundant in sand on the middle shore at Blue Anchor (Bassindale, 1941). Three in sand at Minehead, 5.7.73; one at Kilve in mud, 24.2.74; and two in sand at Brean, 14.8.70.

Scolecopsis ciliatus (Kieferstein)

Welsh Coast: found at Barry by Purchon (1948).

English Coast: one at Porlock, 10.8.74; abundant in dirty sand at St Audries Bay, 10.8.72.

Scolecopsis fuliginosa (Claparède)

Welsh Coast: probably this species in rock crevices at Aberthaw; one in dirty sand at low water springs, Barry, September 1975.

Spio filicornis (Müller)

Welsh Coast: in sand at Lavernock (St Mary's Well Bay).

English Coast: common at Minehead, 5.7.73.

Pygospio elegans Claparède

Welsh Coast: Barry (Purchon, 1948). Common in muddy crevices at Aberthaw (Limpert Bay); locally abundant in muddy sand at Barry Old Harbour; in sand at Sully (Swanbridge Bay), present in sand at the base of the sea wall at Goldcliff and widespread in sands of the Welsh Grounds. Abundant in mud with *Neanthes diversicolor* and *Streblospio shrubsolei* at Portskeewett.

English Coast: recorded at Weston (Bassindale, 1941) and Portishead (Purchon, 1938). Generally common in sandy and sometimes muddy areas from Minehead to Portishead (Portbury).

Upper Estuary: Sheperdine, tubes on the upper shore and living worms near low water (Bassindale, 1941). Now common across Oldbury Sands.

Spiophanes bombyx (Claparède)

Welsh Coast: common in coarse sand at low water springs, Marcross (Traeth Mawr) in September 1974.

Streblospio shrubsolii (Buchanan)

Welsh Coast: abundant in liquid mud near the sewage pipe at Peterstone Wentlooge. Generally present and often common in the Wentlooge flats. Common in a steep mud bank at Portskeewett.

Upper Estuary: in a steep mud bank at Beachley.

MAGELONIDAE

Magelona papillicornis O. F. Müller

Welsh Coast: a few at low water springs, Barry (Whitmore Bay) in September 1973.

CIRRATULIDAE

Thread Worms

Cirratulus cirratus (O. F. Müller)

Welsh Coast: several in St Donat's Bay, 17.3.76.

English Coast: under stones on the lower shore at Porlock, 12.7.68.

Cirriformia tentaculata (Montagu)

Welsh Coast: common in black gravel under boulders at Kenfig (Gwely'r Misgl); few at Aberthaw; common at Rhose; present under stones on mud in Barry Old Harbour; abundant in a narrow zone at about mean tide level at Sully (Swanbridge Bay).

English Coast: probably this species on the middle shore at Blue Anchor, 26.8.76.

Tharyx marioni (Saint-Joseph)

Welsh Coast: locally common in sandy mud at Sully (Swanbridge Bay).

English Coast: single records from Minehead and Kilve: common in mud at low water at Weston, more so in summer (Little & Boyden, 1976).

Dodecaceria concharum Oersted

Welsh Coast: one from an empty, but attached, shell of the oyster *Ostrea edulis* at Marcross (Nash Point), 23.6.74.

FLABELLIGERIDAE

Flabelligera affinis Sars

Welsh Coast: one at Porthcawl in September 1976.

Pherusa plumosa (Müller)

West Coast: in mid shore crevices at St Donats Bay.

English Coast: one from Greenaleigh Bay, 8.2.74; occasional at Blue Anchor and Watchet; found on Steephholm in upper shore pools, 2.6.73.

SCALIBREGMIDAE

Sclerocheilus minutus Grube

Welsh Coast: occasional in St Donats Bay and one at Sully, in a bryozoan mat, 25.10.76.

OPHELIDAE

Ophelia rathkei McIntosh

Welsh Coast: recorded by Rees (1938, as *O. cluthensis*) in sand at Lavernock (St Mary's Well Bay).

Not found recently at Lavernock but common in dry sand on the middle shore at Barry: with large oocytes in December.

Travisia forbesii Johnston

Welsh Coast: Lavernock (St Mary's Well Bay) common in mobile sand at LWS. Several found in sand at Redwick.

English Coast: found in sand at LW, 4.2.73 and 10.3.74 at Minehead (Madbrain sand).

CAPITELLIDAE

Capitella capitata (Fabricius)

Welsh Coast: one at Sully (Swanbridge Bay) January 1970.

Capitellides giardi Mesnil

Probably this species but peristomial achaetous region not apparent.

Welsh Coast: locally abundant in mud and also in sand with *Bathyporeia pilosa* at Barry (Old Harbour). Generally present and locally abundant on Wentlooge flats.

Upper Estuary: common in Sheperdine Sands off Gascar Rock but not seen elsewhere.

ARENICOLIDAE

Lugworms

Arenicola marina (L.)

Welsh Coast: recorded at Kenfig, Aberthaw (where large specimens found at the upper margin of the sands) Barry and Sully (Purchon, 1948). Present on all sandy beaches but very sparse

on the exposed sands of the outer estuary. Common at Porthcawl (Rest Bay). Few at Southern-down in deep sand and absent from Marcross (Traeth Mawr) except for groups in shelter at the eastern end of the beach. Casts among stones at Llantwit Major. Abundant at Aberthaw (Limpert Bay). At Barry, mostly small worms abundant in the Old Harbour and wetter parts of Whitmore Bay. Few in sand around Swanbridge Bay, Sully. At Penarth, large worms occur in deep sand below the pier and small ones in shallow sand over rocks to Penarth Head. Abundant in the muddy sands of the Welsh Grounds with low densities in the clean mobile sands of the mid channel grounds.

English Coast: widespread and generally common in muddy sand, abundant at Blue Anchor and Weston (Bassindale, 1941). Recorded at Stolford by Haderlie and Clark (1959). Now generally abundant in sand, often clean sand, from Minehead to Sand Bay. Always found at Clevedon and Portishead at low water.

Upper Estuary: one in a kype at Oldbury, 26.10.38 (Bassindale, 1941). Now abundant all over Oldbury Sands. Locally common in sand at Lydney and Sharpness. Apparently absent from the sand at Awre in August 1974 and 1975 but there were a few in the mud at the base of the river bank.

SABELLARIIDAE

Honeycomb Worms

Sabellaria alveolata (L.)

This species, which has been studied extensively in the clean water and sandy beaches of North Cornwall by Wilson (e.g. 1976), thrives in the muddy waters of the Outer Estuary. It is evidently a long-lived species and most intertidal reefs receive only sporadic recruitment of young worms. Most reefs in the Severn Estuary are considerably eroded at the present time, and partly overgrown with fucoid algae in places. Crisp (1964) reported extensive mortality after the cold winter of 1962/1963 but it is not known if the residual reefs of old tubes contained living worms beforehand.

Welsh Coast: Purchon recorded "very fine growths" at Kenfig, and noted the species present at Llantwit Major, Aberthaw, Barry and Sully (Purchon, 1948, 1957). We have only found a few isolated tubes at Kenfig (Sker Point) but numbers have probably been increasing since 1973. At Dunraven Bay the eroded turrets of a formerly massive reef are inhabited by a healthy abundance of worms. The more exposed beach platform at Marcross is covered with a thin film of encrusting tubes below low water neaps. A massive reef, about 10 cm thick, occurs at Aberthaw (Limpert Bay) but the upper margin is eroded away. A light settlement occurred here in 1968. Total mortality in the reef at Sully was reported by Crisp (1964) but many living worms were found there between 1969 and 1972, with a few alive in 1973. At Lavernock the eroded turrets of a former reef contain many living worms.

English Coast: Bassindale (1941) found it rare at Blue Anchor but abundant at Kilve at low water mark and at Weston "where it spreads onto shingle nearer MTL and covers an extensive area". Matthews (1924) recorded it common at Portishead but Purchon (1938) and Bassindale (1941) found this reef uninhabited. Common at Porlock but not forming a reef. At Minehead a fragmented reef extends over shingle to the east of the pier and there is a very extensive low reef at Blue Anchor at the western extremity of the rock platform. Only scattered individuals are found at Watchet but extensive colonies persist at Kilve and may be submerged in liquid mud at times. Reefs occur on shingle at Hinckley Point and are common as far as Clevedon. Some living worms were seen at Portishead, 28.1.71, forming good colonies in April 1974.

Sabellaria spinulosa Leuckart

Welsh Coast: Llantwit Major: one attached to a boulder, 5.10.75, and another, evidently cast ashore, was encased in *Flustra* fronds, 18.5.76.

English Coast: one recorded at Porlock by Bassindale (1943c). We have found it at Porlock and Greenaleigh Bay.

AMPHARETIDAE

Melinna cristata (Sars)

English Coast: one from Minehead (Madbrain Sands), 28.2.75.

TEREBELLIDAE

Neoamphitrite figulus (Dalyell)

Welsh Coast: recorded at Barry, Sully and Portskewett by Purchon (1948, 1957 as *Amphitrite johnstoni*). This worm has become more abundant in the last few years, at St Donats Bay; Sully (Swanbridge Bay), where large specimens were common in 1976 although they had been rare in 1972 and 1973; Goldcliff, where they are common in a clay/boulder sediment

with *Neanthes virens*. Small worms were abundant at Portskewett in 1972, under stones at low water and forming tubes on exposed rock surfaces. In 1975 this generation still had not attained the full size of the Sully population.

English Coast: recorded by Bassindale (1941, as *A. johnstoni*) in mud tubes under stones and on rock at Weston and Portishead. He considered that Matthews' (1924) record of *Amphitrite* sp. at Portishead undoubtedly referred to this species. We have found it abundant in mud tubes amongst *Laminaria* holdfasts in Porlock Bay, 9.2.74; and several at Portishead (Royal Beach), 28.1.71 and 21.3.73.

Upper Estuary: a flourishing colony at Aust in March 1939 later disappeared and was not present in August or in March 1940 (Bassindale, 1941, as *A. johnstoni*).

Amphitrite affinis Malmgren

English Coast: one on the lower shore at Porlock, 12.7.68.

Terebella lapidaria L.

Welsh Coast: recorded at Kenfig and Aberthaw, in muddy sand covered with small stones (Purchon, 1948, 1957). Recently at Kenfig in rock crevices.

English Coast: recorded from Portishead by Purchon (1938).

Eupolymnia nebulosa (Montagu)

English Coast: recorded as common at Porlock by Bassindale (1943c, as *Polymnia*). We have but one record from there, in September 1973.

Amphitritides gracilis (Grube)

English Coast: common at Porlock (Gore Point) (Bassindale, 1943c, as *Amphitrite*).

Lanice conchilega (Pallas)

Sand Mason Worm

Welsh Coast: recorded at Kenfig, Llantwit Major and Aberthaw (Purchon, 1948, 1957). Now common but scattered in sand amongst boulders at these sites and in St Donats Bay.

English Coast: Generally scarce as scattered individuals and small groups east to Watchet, although locally abundant at Minehead. Some tubes seen at Clevedon, 18.12.72.

Nicolea venustula (Montagu)

Welsh Coast: one from Llantwit Major, 16.5.76.

English Coast: recorded as common at Porlock by Bassindale (1943c) and it is now the commonest terebellid in Porlock Bay. Two records from Greenaleigh Bay, 20.3.73 and 8.2.74.

Polycirrus caliendrum Claparède

Welsh Coast: probably common, though only occasionally collected, at Llantwit Major and Aberthaw. A single record from Sully (Swanbridge Bay), 15.4.76. One from Llantwit Major was packed with oocytes, 5.10.75.

Thelepus setosus (Quatrefages)

Welsh Coast: Kenfig (Purchon, 1957). It is common at Llantwit Major and in St Donats Bay. Several juveniles, about 3 mm long, collected on tubes of *Pseudopotamilla* in Dunraven Bay, 6.11.75, lacked gills.

English Coast: Porlock: common and widespread (Bassindale, 1943c); abundant at Gore Point, 29.8.73 and often recorded in the Bay.

SABELLIDAE

Fan Worms

Fabricia sabella (Ehrenberg)

Welsh Coast: among mussels in Roath Dock, Cardiff. Minute sabellids, belonging to the sub-family Fabriciinae are common in fine algal turf on rock surfaces at Kenfig (Sker Point) and at Rhose Point but have not been positively identified.

Manayunkia aestuarina (Bourne)

Welsh Coast: sometimes in large numbers in the mud at Barry Old Harbour; common amongst strands of the alga *Vaucheria* at Cardiff (Lamby) in September 1973; and recorded on several occasions from the mud at Magor.

Pseudopotamilla reniformis (Müller)

Welsh Coast: recorded at Kenfig, Aberthaw (abundant in empty *Hiatella* borings) and Barry by Purchon (1948, 1957, as *Potamilla*). Now widespread and generally common at low water springs on rocky shores from Kenfig to Rhose Point.

English Coast: common and widespread at Porlock (Bassindale, 1943c, as *Potamilla*) Common at Porlock, 29.8.73 and on stones at Minehead in February 1975.

SERPULIDAE

Apomatus similis Marion et Bobretzky

English Coast: it was probably this species that Bassindale (1943c) recorded at Porlock (Gore Point) as *A. ampulliferus* Phillipi. On boulders at Porlock, 12.7.68.

Pomatoceros triqueter (L.)

Welsh Coast: recorded by Purchon (1948, 1957) from Kenfig (Sker Point), Aberthaw, Barry and Sully. It is now the dominant organism on vertical rock faces on the lower shore at Sker Point and at Porthcawl, where it covers the sides of the gullies which are topped with crusts of *Sabellaria* on the ridges. Generally present, but scattered, east to Sully.

English Coast: Bassindale (1943c) found it widespread at Porlock, but otherwise (1941) recorded but one tube at Weston. Now generally common west of Minehead, probably best developed at Hurlstone Point, but definitely uncommon at Blue Anchor, Watchet and Kilve. A few at Sand Point, 18.12.72.

Filograna implexa M. Berkeley

The non-operculate form listed as *Salmacina dysteri* (Huxley) by Hartman (1959) is here included with this species. Our records refer to both the operculate and non-operculate morphs.

English Coast: recorded as common at Porlock (Gore Point) by Bassindale (1943c) and still regularly found there, both on Gore Point and in Porlock Bay. Once recorded at Minehead, 28.8.73.

Protula tubularia (Montagu)

Welsh Coast: reported common at Rhooose.

English Coast: rare at Porlock (Bassindale, 1943c). After *Pomatoceros* this is the commonest large serpulid on the rocky shores east to Watchet. Only a few at Kilve.

Hydroides norvegica Gunnerus

This species may possibly have been confused with the previous one in the past. There are no recent records, but Bassindale (1941) reported:

English Coast: occasional small tubes at Blue Anchor and Weston.

Upper Estuary: Aust and Sheperdine.

Mercierella enigmatica Fauvel

An immigrant species thriving in artificially-heated docks.

Welsh Coast: at Peterstone Wentlooge on stones at the seaward end of the *Spartina* zone (Purchon, 1948). Scattered tubes on mussels and the stone walls of Roath Dock, Cardiff: and a massive encrustation, some 10 cm thick, on a floating boom. September 1974.

English Coast: abundant on a steel hull in Portishead Dock (Purchon, 1938). Many scattered tubes on stones on the open shore above Avonmouth in September 1975.

Dexiospira pagenstecheri (Quatrefages)

Welsh Coast: generally common on the underside of stones and boulders, and on *Corallina*, from Kenfig (Sker Point) to Sully.

English Coast: occasional from Porlock to Watchet, although not seen at Minehead. Possibly reaching Kilve.

Dexiospira spirillum (L.)

Welsh Coast: recorded by Purchon (1948) from Aberthaw, Barry and Sully (as *Spirorbis*) but there are no recent records and these may refer to *D. pagenstecheri*. See de Silva & Knight-Jones (1962).

Laeospira tridentatus (Levensen)

Welsh Coast: on stones at Sully (de Silva & Knight-Jones, 1962, as *Spirorbis*).

English Coast: common to abundant at Porlock and locally common on Hurlstone Point.

Laeospira rupestris (Gee & Knight-Jones)

English Coast: rare at Porlock and not seen further east.

Laeospira corallinae (de Silva & Knight-Jones)

English Coast: very local on *Corallina* at Porlock, but up to ten tubes per plant.

Laeospira borealis (Daudin)

Welsh Coast: reported on *Fucus* sp. at Sully by M. Jenkins, but not seen by us.

Class MYZOSTOMARIA

Myzostoma cirriferum Leuckart

English Coast: on a young *Antedon* at Porlock, 31.10.74.

Class OLIGOCHAETA

The following records are isolated identifications and remarks relating to an abundant and ecologically significant group of worms, which is clearly in need of specialist attention.

ENCHYTRAEIDAE

Welsh Coast: an unidentified enchytraeid worm is common in the mud of Barry Old Harbour.

TUBIFICIDAE

Pelosclex benedeni Udekem

Welsh Coast: generally common in mud at Barry Harbour, Penarth flats, Wentlooge flats and the muddy regions of the Welsh Grounds.

English Coast: probably widespread in mud flats.

Tubifex costatus (Claparède)

Welsh Coast: in sand and mud at Barry Old Harbour.

Clitellio arenarius (Müller)

Welsh Coast: recorded from Peterstone Wentlooge by Purchon (1948).

NAIDAE

Upper Estuary: an undetermined naid species is frequent among the stalks of *Cordylophora* at Newham.

Dero sp.

Upper Estuary: in mud on the river bank at Manor Ditch.

Class HIRUDINEA

LEECHES

Order RHYNCHOBDELLIDA

GLOSSIPHONIIDAE

Glossiphonia complanata L.

Upper Estuary: Bassindale (1941) recorded three at Ashleworth Ferry, 22.8.39: and we found two under stones at Awrc in August 1975.

Order ERPOBDELLIDA

ERPOBDELLIDAE

Erpobdella octoculata L.

Upper Estuary: one at Ashleworth Ferry, 22.8.39 (Bassindale, 1941).

PHYLUM SIPUNCULA

Golfingia minuta (Keferstein)

Welsh Coast: Kenfig and Aberthaw (Purchon, 1948, 1957). Occasional in the *Sabellaria* reef at Sully.

English Coast: possibly this species at Blue Anchor, 27.6.68.

Golfingia elongata (Keferstein)

This is the commonest species of *Golfingia* in the area. A search has been made for the superficially similar *G. rimicola* Gibbs (1973) but no specimens have been obtained.

Welsh Coast: frequently collected in the *Sabellaria* reef at Aberthaw and Sully; occasional under stones at Aberthaw, St Donats Bay and Sully (Swanbridge Bay). A record from Flatholm, 29.6.73.

English Coast: one under a stone at Blue Anchor (Bassindale, 1941). Regularly collected at Porlock and Watchet and occasionally at sites in between, extending east to Kilve.

Golfingia vulgaris (Blainville)

Welsh Coast: uncommon: one at Kenfig (Gwely'r Misgl), 18.3.76 and another recorded in St Donats Bay. One collected from mud at Sully (Swanbridge Bay) had *Loxosomella* attached to its posterior end.

English Coast: occasional at Porlock; single records from Greenleigh Bay and Watchet.

PHYLUM ECHIURA

Thalassema thalasseum (Pallas)

Welsh Coast: one reported by M. Jenkins from Rhoose (Fontygary Bay). Not seen by us within the area although it was common further west in September 1976.

PHYLUM **ARTHROPODA**
 Sub-Phylum **Crustacea**
 Class **OSTRACODA**
 Order **PODOCOPA**

CYTHERIDAE

Leptocythere castanea (G. O. Sars)

Welsh Coast: abundant on the upper shore at Peterstone Wentlooge (Rees, 1940).

Unidentified ostracods have been recorded on the Welsh Coast in the mud of Barry Old Harbour, and in salt marsh pools at Lamby (Cardiff) (Brough *et al.*, 1964). On the English Coast a single specimen was noted by Bassindale (1941) at Blue Anchor. They are common on algae at Porlock and present at Weston.

Class **COPEPODA**
 Order **EUCOPEPODA**
 Sub-Order **Calanoida**

TEMORIDAE

Eurytemora velox (Lilljeborg)

Welsh Coast: generally present in salt marsh pools at Lamby throughout the year (1960 and 1961).

Most abundant in August. Females with eggs present from January to October. (Brough *et al.*, 1964).

Eurytemora affinis (Poppe)

Welsh Coast: in salt marsh pools at Lamby: females with eggs in March and September 1960 and in January 1961 (Brough *et al.*, 1964).

ACARTIIDAE

Acartia longiremis (Lilljeborg)

Welsh Coast: in the salt marsh pools at Lamby in August 1960 and September 1960 and 1961 (Brough *et al.*, 1964).

Sub-Order **Harpacticoida**

LONGIPEDIIDAE

Canuella perplexa Scott

Welsh Coast: in salt marsh pools at Lamby for most of the year, most abundant from April to June, in August and October. Females with eggs from April to July (Brough *et al.*, 1964).

ECTINOSOMIDAE

Ectinosoma curticorne Boeck

Welsh Coast: in salt marsh pools at Lamby: females with eggs in April/May 1960 and from February to July 1961 (Brough *et al.*, 1964).

HARPACTICIDAE

Tigriopus brevicornis (O. F. Müller)

Welsh Coast: common in high level rock pools at Kenfig (Sker Point) and Barry (Purchon, 1948, as *T. fulvus*).

English Coast: common in high level rock pools on Brean Down and Birnbeck Island 1972, 1973, Searched for but not found on Hurlstone Point and other western headlands, 1968–1976.

DIOSACCIDAE

Amphiascus giesbrechti G. O. Sars

Welsh Coast: in the salt marsh pools at Lamby (Brough *et al.*, 1964).

Stenhelia palustris (Brady)

Welsh Coast: in the salt marsh pools at Lamby and Peterstone Wentlooge (Brough *et al.*, 1964).

CANTHOCAMPTIDAE

Nitochra spinipes Boeck

Welsh Coast: in the salt marsh pools at Lamby from December 1960 to March 1961 (Brough *et al.*, 1964).

Mesochra lilljeborgi Boeck

Welsh Coast: in the salt marsh pools at Lamby in May and June 1960. Females with eggs (Brough *et al.*, 1964).

LAOPHONTIDAE

Laophonte nana G. O. Sars

Welsh Coast: in the salt marsh pools at Lamby in January and May 1960, and in January, May, June and October 1961. Females with eggs in May and June 1961 (Brough *et al.*, 1964).

Platychelipus littoralis Brady

Welsh Coast: Peterstone Wentlooge (Rees, 1940).

CLETODIDAE

Nannopus palustris Brady

Welsh Coast: in the salt marsh pools at Lamby in March 1960, females with eggs, and from March to July 1961 (Brough *et al.*, 1964). Peterstone Wentlooge (Rees, 1940).

TACHIDIIDAE

Tachidus brevicornis Lilljeborg

Welsh Coast: in the salt marsh pools at Lamby from February to April 1960, from November 1960 to April 1961, and in September 1961. Most abundant in April: females with eggs from November to April (Brough *et al.*, 1964). Peterstone Wentlooge (Rees, 1940).

Tachidus littoralis Poppe

Welsh Coast: in the salt marsh pools at Lamby (Brough *et al.*, 1964).

Sub-Order Cyclopoida

LICHOMOLGIDAE

Mytilicola intestinalis Steuer

Welsh Coast: parasitic in mussels, *Mytilus edulis*, at Rest Bay (Porthcawl) in January 1974.

Sub-Order Lernaeoida

LERNAEIDAE

Lernaecera lusci (Bassett-Smith)

English Coast: parasitic on the gills of a Whiting, *Gadus merlangus*, caught in a rock pool at Porlock in March 1973.

Upper Estuary: parasitic on the gills of a Whiting taken in Oldbury kypes in 1938 (Bassindale, 1941, as *Lernaea*).

Lernaenicus sprattae (Sowerby)

English Coast: parasitic on the eye of Sprat, *Clupea sprattus*, caught in nets at Weston in 1941 (Bassindale, 1941).

Upper Estuary: parasitic on the eye of Sprat caught in Oldbury kypes in 1938 (Bassindale, 1941).

Class CIRRIPEDIA

BARNACLES

Order THORACICA

LEPADIDAE

Stalked Barnacles

Lepas fascicularis Ellis & Solander

Welsh Coast: several clusters cast ashore at Ogmore in 1947 (Jefferson, 1955).

VERRUCIDAE

Verruca stroemia (O. F. Müller)

Welsh Coast: Llantwit Major, Breaksea Point and Barry (Purchon, 1948, 1957).

English Coast: recorded by Bassindale (1943c) at Porlock and now widespread and common under boulders on the lower shore from Porlock to Minehead. Occasional at Blue Anchor.

CHTHAMALIDAE

Chthamalus stellatus (Poli)

Welsh Coast: the earlier records, e.g. of Purchon (1948, 1957), almost certainly refer mainly to *C. montagui* and *C. stellatus* is probably confined to western shores. See Southward (1976).

English Coast: the only positive records are from Hurlstone Point. Southward (1976) found that 34 per cent of *Chthamalus* at mean low water neaps were of this species, but only 2 per cent at mean high water neaps. Common on the lower middle shore in autumn 1976.

***Chthamalus montagui* Southward**

Welsh Coast: *Chthamalus*, probably this species, recorded by Purchon (1948, 1957) east to Sully. Now common or abundant on western shores and reaching Sully Island in the east. It was probably this species seen at Lavernock Point in 1970 and on Penarth Head in 1974.

English Coast: Bassindale (1941, 1943c) recorded *Chthamalus* only from Porlock. *C. montagui* is now widespread and abundant in Porlock Bay and east to Minehead: scarce at Blue Anchor and apparently reaching its eastern limit on the western mole of Watchet Harbour Wall in 1975. Southward (1976) includes a record from Weston in 1954.

BALANIDAE

***Balanus balanus* (L.)**

English Coast: rare at Porlock (Bassindale, 1943c, as *B. porcatus*); scattered individuals widespread on the lower shore at Porlock (Gore Point and around the Bay) and in Greenaleigh Bay.

***Balanus crenatus* Bruguière**

Welsh Coast: recorded east to Sully by Purchon (1948, 1957). The commonest lower shore barnacle at Kenfig, Nash Point, Breaksea Point, and Barry (Porthkerry and Friars Point) extending east to Sully.

English Coast: large individuals are common or abundant on lower shore rocks or boulders as far east as Minehead, but thereafter decrease in abundance and are progressively replaced by *B. improvisus*. *B. crenatus* is usually the dominant species at Blue Anchor but not at Watchet. *B. crenatus* was not recorded by Bassindale (1941, 1943c) and his papers suggest that *B. improvisus* was the dominant lower shore species from Porlock to Aust.

***Balanus perforatus* Bruguière**

Welsh Coast: newly settled spat recorded by Purchon (1948) at Breaksea Point and Barry; and adult barnacles from Kenfig and Llantwit Major by Purchon (1957). Adults are regularly found at Kenfig (Sker Point) but the species was not seen east of this Point between 1970 and 1975. Young spat settled at Llantwit Major and St Donats Bay in 1975 and were still alive in spring 1976.

English Coast: rare at Porlock (Bassindale, 1943c). Now locally common in Porlock Bay east to Hurlstone Point and occasional as far as Minehead though not seen further east. Bassindale (1941) discounts Matthews' (1924) record of this species at Brean Down and from Portishead to Clevedon, suggesting confusion with *B. improvisus*.

***Balanus balanoides* (L.)**

Welsh Coast: recorded by Purchon (1948, 1957) at all sites up-channel to Peterstone Wentlooge but not at Portskewett. Now common or abundant on suitable surfaces east to Sully Island; present on Flatholm; and extending north-eastwards in decreasing numbers as far as Goldcliff.

English Coast: Bassindale (1943c) could only find spat at Porlock, but he recorded (1941) adults fairly common at Blue Anchor and Kilve though rare on Steephholm and at Weston. The species is now common on suitable hard surfaces east to Minehead and locally common as far as Brean Down. It remains scarce on Steephholm and at Weston, Clevedon and Portishead.

***Balanus improvisus* Darwin**

Welsh Coast: Purchon (1948, 1957) recorded this species from Kenfig, Llantwit Major, Breaksea Point and Barry as well as from Sully to Portskewett; but we did not find it west of Sully between 1970 and 1975. North-east of Sully it increases in abundance becoming common at Portskewett.

English Coast: Bassindale (1943c) recorded it at Porlock and (1941) from Blue Anchor to Portishead. We did not find the species west of Blue Anchor in 1968–1976. Abundance increases up the channel and it is common at Clevedon and (in some years) at Portishead.

Upper Estuary: Bassindale (1941) found it common at Aust but only a few large individuals at Sheperdine and Sharpness. We have found it fairly common up the estuary as far as Newnham.

***Elminius modestus* Darwin**

Welsh Coast: this immigrant species from Australasia was first recorded in the Bristol Channel at Barry, 29.10.47 (Purchon, 1948) and it has since spread along the Welsh coast on to all shores although not common west of Barry. It is abundant between Barry and Sully but becomes less common again towards Beachley. Present on Flatholm.

English Coast: present on all hard shores, becoming the commonest barnacle from Blue Anchor to Aust and on Steephholm.

Upper Estuary: abundant on the piers of the Severn Bridge at Aust and occasional at Oldbury (Severn House Farm: Pillhouse Rocks).

Order RHIZOCEPHALA

SACCULINIDAE

Sacculina carcini Thompson

Welsh Coast: one on *Carcinus maenas* at Southerndown, June 1974.

Upper Estuary: on *Macropipus holsatus* caught in a kype at Oldbury in 1938 (Bassindale, 1941).

Class MALACOSTRACA

Sub-Class Peracarida

Order CUMACEA

BODOTRIIDAE

Cumopsis goodsiri (Van Beneden)

English Coast: on sandy beaches; common at Minehead and present at Blue Anchor, St Audries Bay and Weston.

DIASTYLIDAE

Diastylis rathkei (Krøyer)

Welsh Coast: at a density of 10 per sq metre on the lower shore at Peterstone Wentlooge (Rees, 1940). Still abundant in the mud there with isolated records from upper shore sand at Aberthaw and Sully.

English Coast: in mud and shallow water at low tide, Kilve and Stolford (Bassindale, 1941).

One recent record from Minehead, 22.5.75, otherwise generally distributed from Hinckley Point to Clevedon (Boyden & Little, 1973).

Order TANAIDACEA

TANAIDAE

Tanaissus lilljeborgi (Stebbing)

English Coast: this is the "unidentified" tanaid of Boyden & Little (1973), found throughout the year all over the beach at Minehead.

Order ISOPODA

Sub-Order Gnathiidea

GNATHIIDAE

Gnathia oxyuraea (Lilljeborg)

Welsh Coast: a temporary inhabitant of the salt marsh pools at Lamby (Cardiff) in 1961 (Brough *et al.*, 1964). A juvenile *Gnathia*, perhaps this species, from mud flats at Peterstone Wentlooge, June 1975.

Sub-Order Flabellifera

ANTHURIDAE

Anthura gracilis (Montagu)

Welsh Coast: Sully; one female with ten young collected from a *Sabellaria* tube (Purchon, 1948).

Cyathura carinata (Krøyer)

Welsh Coast: occasional in rock crevices and amongst *Sabellaria* tubes at Breaksea Point; frequent in mud at Barry (Old Harbour) but less so at Sully (Swanbridge Bay).

English Coast: Blue Anchor and Kilve (Bassindale, 1941). Occasional at Minehead and Kilve but rather more common at Portishead, Avonmouth and Severn Beach.

Upper Estuary: single specimens from Sharpness and Sheperdine (Bassindale, 1941). Recently in pure mud at Sharpness and Lydney.

LIMNORIIDAE

Limnoria lignorum (Rathke)

Gribble

Welsh Coast: recorded from Barry (Jones, 1963) and Peterstone Wentlooge (Purchon, 1948).

English Coast: one individual, not in wood, from Porlock; but abundant in the piles of Weston Old Pier, 22.4.39, with a few *Chelura* (Bassindale, 1941, 1943c). Purchon (1938) records *Limnoria* from Portishead Dock and from driftwood on the beach. All the *Limnoria* collected from old groynes at Porlock, 9.2.74 and subsequently were of this species.

Limnoria tripunctata (Menzies)

Welsh Coast: at a density of 70 per sq inch, this was much the commonest species of *Limnoria* in Lady Windsor Dock, Barry (Jones, 1963).

CIROLANIDAE

Eurydice pulchra Leach

Welsh Coast: recorded from Kenfig by Purchon (1957) and more recently from Barry, where it is commoner in Whitmore Bay than in the Old Harbour, and at Beachley.

English Coast: Kilve and Weston (Bassindale, 1941), Portishead (Purchon, 1938). May be found anywhere along this coast but seems to be especially common between Weston and Aust.

Upper Estuary: rare at Arlingham, and with caddis larvae in a saltmarsh pool at Sheperdine—in water of 22‰, though absent from the same pool later when the salinity was only 8‰ (Bassindale, 1941). Particularly common up to Sharpness.

Eurydice affinis Hansen

Welsh Coast: Barry Old Harbour.

English Coast: a single individual collected on the upper shore at Minehead in summer 1973.

Eurydice spinigera Hansen

Welsh Coast: adults plentiful in the surf at night, Monknash (Traeth Mawr), 22.9.73: a single record from the sand in Barry Old Harbour.

SPHAEROMATIDAE

Sphaeroma serratum (Fabricius)

Welsh Coast: recorded from Barry, Sully, Peterstone Wentlooge and Portskewett by Purchon (1948, 1957).

English Coast: rare at Kilve although common at Portishead (Bassindale, 1941). Recent records are from Blue Anchor and Hinckley Point.

Upper Estuary: common at Aust and Sheperdine, rare at Sharpness (Bassindale, 1941).

Sphaeroma monodi Bocquet

Welsh Coast: in crevices near high water neaps at Aberthaw (Limpert Bay) and several at Goldcliff in August 1975.

English Coast: probably common in empty piddock tubes, Watchet.

Upper Estuary: under stones at low water, Awre.

Sphaeroma rugicauda Leach

Welsh Coast: recorded at Peterstone Wentlooge by Rees (1940) and in salt marsh pools near Lamby (Cardiff) by Brough *et al.* (1964). Now generally abundant in salt marsh pools from Cardiff to Portskewett. There were considerable aggregations under stones on the upper shore at Portskewett in December 1976.

English Coast: in Portishead Dock and one from Royal Beach (Purchon, 1938). Recent records from salt marsh pools at Porlock Weir.

Upper Estuary: specimens with an unusually smooth dorsal surface were collected from the break-water and salt marsh pools at Tites Point, Purton, 18.3.39. Also recorded that day in sand at Arlingham Passage. Jones (1865) records the abundance of *Sphaerosoma dentata* in salt marsh pools north of Sharpness (Bassindale, 1941).

Sphaeroma hookeri Leach

Welsh Coast: several aggregations of up to fifty specimens under stones at Goldcliff in July 1975.

English Coast: Clevedon (Stebbing, 1906).

Dynamene bidentata (Adams)

Welsh Coast: adults at Marcross in September 1976: young ones sometimes common on algae in pools at Aberthaw (Breaksea Point).

English Coast: in old *Balanus perforatus* shells and on red algae in pools at Porlock: young females common in August 1973.

Upper Estuary: recorded by Jones (1865) in salt marsh pools north of Sharpness (Bassindale, 1941, as *Naesa*).

Sub-Order Valvifera

IDOTEIDAE

Idotea baltica (Pallas)

Welsh Coast: recorded at Llantwit Major and Portskewett by Purchon (1957).

English Coast: on lower shore algae at Porlock (Gore Point), 15.2.68.

***Idotea emarginata* (Fabricius)**

Welsh Coast: numbers not affected by the cold winter of 1962/1963 at Sully (Crisp, 1964).

***Idotea chelipes* (Pallas)**

Welsh Coast: recorded from Sully by Purchon (1948 in the text on p 292 but not in the list on p 294). Recently from Aberthaw.

English Coast: recorded, as *I. viridis*, from Porlock (Bassindale, 1943c), Steepholm (Yonge & Lloyd, 1939) and Portishead (Purchon, 1938).

Upper Estuary: one in the gully at Aust and two at Sheperdine (Bassindale, 1941, as *I. viridis*).

***Idotea granulosa* Rathke**

Welsh Coast: recorded from Barry and Sully by Purchon (1948); and recently from Nash Point, and from Goldcliff (where it was common in September 1973) up to Portskewett.

English Coast: Bassindale (1941) caught both males and females in small numbers from Weston to Aust. Our records extend the range to Porlock.

Upper Estuary: up to Sheperdine (Bassindale, 1941).

***Idotea linearis* (L.)**

English Coast: one in the shrimp nets at Stolford, 10.6.39 (Bassindale, 1941) and another from Porlock (Gore Point), 27.2.71.

***Idotea pelagica* Leach**

Welsh Coast: common on the mussel beds at Kenfig (Sker Point) and at Porthcawl (Rest Bay) and Southerndown (Trwyn-y-Witch).

ARCTURIDAE

***Astacilla longicornis* (Sowerby)**

English Coast: common on *Tubularia* tufts at extreme low water, Blue Anchor, 26.8.76 and Watchet (West Bay), 25.9.76, (Helwell Bay), 19.8.74.

Sub-Order Asellota

JANIRIDAE

***Janira maculosa* Leach**

Welsh Coast: Aberthaw (Breaksea Point), Barry and Sully (Purchon, 1948). Common under stones at Lavernock Point, 21.1.73. Present on Flatholm.

English Coast: common under stones near low water mark at Blue Anchor and Kilve, less so at Weston (Bassindale, 1941). Fairly common at Porlock, First Rocks (Bassindale, 1943c). Now generally distributed under stones from Porlock to Clevedon (Ladye Point).

the ***Jaera albifrons*** group of species

It is impossible to reconcile the older records of *J. albifrons* (Fabricius) and *J. marina* (Fabricius) with the four species now recognized: *J. albifrons* Leach, *J. forsmanni* Bocquet, *J. ischiosetosa* Forsman and *J. praehirsuta* Forsman: any or all of which might be expected to occur in the area, see Naylor (1972).

Welsh Coast: Llantwit Major, Breaksea Point, Barry, Sully and Peterstone Wentlooge (Purchon, 1948, 1957).

English Coast: widespread and common at Porlock: common from Blue Anchor to Aust (Bassindale, 1941, 1943c).

Upper Estuary: up to Sharpness (Bassindale, 1941).

***Jaera albifrons* Leach**

English Coast: generally distributed in Greenaleigh Bay and at Minehead in 1974, 1975.

Upper Estuary: common across the shore at Oldbury (Pillhouse Rocks): with eggs, 24.6.74.

MUNNIDAE

***Munna minuta* Hansen**

Welsh Coast: Llantwit Major, 5.10.75.

English Coast: one or two individuals collected from Porlock, Minehead and Blue Anchor in September 1973.

Sub-Order Oniscoidea

LIGIIDAE

***Ligia oceanica* (L.)**

Sea Slater

Generally distributed around the high water mark on all suitable shores, including those of Steepholm and Denny Island, as far up the estuary as Sharpness. Most often seen at night on

harbour walls and other man-made structures. Apparently no change from Bassindale and Purchon to the present day.

Sub-Order Epicaridea

CRYPTONISCIDAE

Hemioniscus balani (Spence Bate)

a parasite of *Balanus* species (Acorn Barnacles).

Welsh Coast: extremely abundant in *B. balanoides* at Sully Island, and also found at Breaksea Point and Barry. Single female specimens have also been obtained from *B. improvisus* at Sully, 21.4.47 and Barry, 29.10.47 (Purchon, 1948).

English Coast: in *B. balanoides* at Blue Anchor (Bassindale, 1941).

Order AMPHIPODA

Sub-Order Gammaridea

AMPELISCIDAE

Ampelisca sp.

English Coast: one from Blue Anchor, 22.4.40 (Bassindale, 1941).

HAUSTORIIDAE

Bathyporeia guilliamsoniana (Bate)

Welsh Coast: recorded by Purchon (1948) at Barry but not seen recently.

Bathyporeia pelagica (Bate)

Welsh Coast: Barry, September 1973.

English Coast: one in sand at Blue Anchor, 23.4.40 (Bassindale, 1941). Now common at Minehead but perhaps less so in Blue Anchor Bay.

Bathyporeia elegans Watkin

English Coast: one young male from Kilve, 21.5.39 (Bassindale, 1941).

Bathyporeia sarsi Watkin

Welsh Coast: Barry (Old Harbour and Whitmore Bay): not common in September 1973.

Bathyporeia pilosa Lindström

Welsh Coast: recorded from Barry (Old Harbour) and Sully Island, where there were females with eggs, 20.6.47 (Purchon, 1948). Now common in Barry Old Harbour, offshore sandbanks at Goldcliff, and sparsely distributed in sand on the Welsh Grounds.

English Coast: common all over the sandy shore at Minehead and in St Audries Bay. To be found on the upper shore wherever sand accumulates from Blue Anchor to Sand Point.

Upper Estuary: four taken at Arlingham Passage, 22.8.39 (Bassindale, 1941). Common at Sharpness and, in summer, at Awre, Arlingham and Newnham.

Haustorius arenarius (Slabber)

Welsh Coast: generally present though not common in exposed sandy beaches.

English Coast: one at Blue Anchor, 23.4.40 (Bassindale, 1941). Living in sand from Minehead to Portishead (one record) being most abundant in the west. Searched for unsuccessfully in the coarse sand of Selworthy Sand and Greenaleigh Bay.

Upper Estuary: Sharpness, somewhat variable in abundance.

Urothoe grimaldi Chevreux

English Coast: one from the middle shore at Blue Anchor, 9.8.72.

Urothoe brevicornis Bate

Welsh Coast: perhaps this species in sand at Barry, September 1975.

English Coast: Minehead; this is the dominant haustoriid amphipod, occupying a zone below that of *H. arenarius* and reaching densities of 140 per sq metre in July 1973. See Boyden & Little (1973), Little & Boyden (1976).

CALLIOPIIDAE

Apherusa bispinosa Bate

Welsh Coast: recorded from Barry by Purchon (1948) and specimens, probably of this species, collected from Sully and Portskeewett in 1973.

English Coast: one male from Porlock (Bassindale, 1943c).

Calliopius crenulatus Chevreux et Fage

English Coast: recorded at Kilve in May and August 1939; abundant on the lower shore and middle shore pools at Weston and Portishead (Bassindale, 1941, 1942a). Three males from Porlock (Bassindale, 1943c).

***Calliopus laevisculus* (Krøyer)**

English Coast: Weston; a few, probably of this species, 20.4.39 (Bassindale, 1941).

PARAMPHITHOIDEAE

***Neopleustes bicuspis* (G. O. Sars)**

English Coast: Kilve; two, probably of this species, 18.8.39 (Bassindale, 1941).

GAMMARIDAE

***Gammarellus angulosus* (Rathke)**

English Coast: several large adults collected at Porlock (Gore Point), 27.2.71.

***Gammarellus homari* (Fabricius)**

Welsh Coast: Breaksea Point, Barry, Sully and Peterstone Wentlooge (Purchon, 1948). Probably this species common on middle shore at Sully.

English Coast: immatures common at Porlock, First Rocks (Bassindale, 1943c): probably present at Porlock, occasional from Kilve and Stolford, common at Weston (Bassindale, 1941, 1942a): rare at Portishead (Purchon, 1938). Our only record is from Kilve, 7.2.74.

***Cheirocratus sundevalli* (Rathke)**

English Coast: one male from Porlock, Gore Point (Bassindale, 1941).

***Melita palmata* (Montagu)**

Welsh Coast: recorded by Purchon (1948) from Breaksea Point, Sully Island and Peterstone Wentlooge. In 1973/1974 it was found on the lower shore at Sully, at the seaward edge of the *Spartina* zone at Peterstone Wentlooge, and low on the middle shore at Portskewett.

English Coast: rare at Kilve and Weston (Bassindale, 1941).

Upper Estuary: fairly common at Aust (Bassindale, 1941).

***Maera othonis* (Milne-Edwards)**

English Coast: rare at Porlock, females without eggs (Bassindale, 1943c).

***Gammarus locusta* (L.)**

Welsh Coast: Breaksea Point and Sully (Purchon, 1948).

English Coast: rare at Kilve and Weston (Bassindale, 1941, 1942a).

***Gammarus zaddachi* Sexton**

English Coast: one immature from Porlock (Bassindale, 1943c) and abundant in the stream at Kilve Pill (Bassindale, 1941 *G. zaddachi* Sexton *typical variety* Spooner). Recent records from the streams running over the beach at Porlock and Kilve.

Upper Estuary: recorded from Aust to Ashleworth Ferry (Bassindale, 1941 as *G. zaddachi* Sexton *typical variety* Spooner) and (Bassindale, 1942a, as *G. zaddachi* form *C.*). Recorded in 1973 from Newnham, Hartland's Mill and Aldney Island (Gloucester).

***Gammarus salinus* Spooner**

Welsh Coast: recorded by Purchon (1948, 1957, as *G. zaddachi salinus*) from Sully, Peterstone Wentlooge and Portskewett. Present at Goldcliff and common at Portskewett in 1973 and 1974.

English Coast: recorded by Bassindale (1941, 1942a, as *G. zaddachi* forms *A* and *B*) at most sites upstream of Blue Anchor. It was abundant above Weston in the summer of 1939.

Upper Estuary: Bassindale (1942a) found it abundant up to Sheperdine, and considered it the commonest amphipod in that section of the river from Aust to Sheperdine. In 1973 it was common at Sheperdine (Guscar Rocks) and Sharpness (Wellhouse Bay).

***Gammarus duebeni* Liljeborg**

English Coast: in the stream at Porlock, Gore Point (Bassindale, 1943c), but not in the upper parts of the estuary (Bassindale, 1941). The use of the name *Rivulogammarus* for this species is incorrect (Stock, 1969).

***Marinogammarus marinus* (Leach)**

Welsh Coast: recorded from Llantwit Major, Aberthaw (Breaksea Point), Barry, Sully, and Portskewett by Purchon (1948, 1957). Present on the middle shore at Portskewett, 29.1.74.

English Coast: recorded by Bassindale (1941, 1942a, 1943c) from Porlock Bay, Blue Anchor, Kilve, Weston and Portishead, but not as common as he would have expected.

Upper Estuary: many records between Aust and Sharpness (Bassindale, 1941, 1942a): and from Beachley and Sharpness (Wellhouse Bay) in 1973.

***Marinogammarus obtusatus* (Dahl)**

Welsh Coast: recorded from Aberthaw (Breaksea Point), Barry and Sully by Purchon (1948) and from Breaksea and Sully in 1973.

English Coast: recorded as common at Blue Anchor, Kilve, and Weston by Bassindale (1941, 1942a) and a few on Steephholm (Yonge & Lloyd, 1939).

Marinogammarus finmarchicus (Dahl)

Welsh Coast: recorded from Barry by Purchon (1948).

Marinogammarus stoeberensis (Reid)

English Coast: recorded from Porlock Bay, Blue Anchor and Kilve by Bassindale (1941, 1942a, 1943c, as *Gammarus*).

DEXAMINIDAE

Dexamine spinosa (Montagu)

English Coast: recorded at Porlock by Bassindale (1943c) and at Clevedon by Stebbing (1906).

TALITRIDAE

Talitrus saltator (Montagu)

Welsh Coast: Portskeewett (Purchon, 1957).

English Coast: one at Kilve and common at Portishead (Bassindale, 1941). Common all along the coast (Matthews, 1924). Recently common below sand dunes, Burnham.

Upper Estuary: one from Oldbury in 1939 and reported as abundant at Sharpness by Jones (1865) as *T. locusta* (Bassindale, 1941).

Orchestia mediterranea A. Costa

Welsh Coast: Portskeewett (Purchon, 1957): recently at Sully.

English Coast: one male from Portishead, 11.3.40 (Bassindale, 1941).

Upper Estuary: Beachley.

Orchestia gammarella (Pallas)

Welsh Coast: Kenfig, Llantwit Major and Sully (Purchon, 1948, 1957).

English Coast: abundant at Blue Anchor, present at Kilve, and abundant again at Portishead (Bassindale, 1941). Also present at Portishead in 1936 (Purchon, 1938).

Upper Estuary: abundant at Aust, common at Sharpness and Tites Point (Bassindale, 1941).

Talorchestia deshayesei (Audouin)

Upper Estuary: abundant in sand at high water mark, Aust (Bassindale, 1941).

Hyale nilssoni (Bate)

English Coast: Blue Anchor and Weston (Bassindale, 1941), Portishead (Purchon, 1938).

Upper Estuary: rare at Aust and Sheperdine (Bassindale, 1941): probably this species common on *Ascophyllum* at Oldbury (Pillhouse Rocks), 24.6.74.

AMPHITHOIDAE

Amphithoe rubricata (Montagu)

Welsh Coast: recorded by Purchon (1948) from Aberthaw (Breaksea Point) and Sully Island. Common now at Aberthaw and fairly common east to Sully.

English Coast: recorded by Bassindale (1941, 1943c) from Porlock, Blue Anchor, Kilve and Stolford. Most common in west. Recently common at Porlock.

JASSIDAE

Jassa falcata (Montagu)

Welsh Coast: common, with mature males present, at Nash Point, 21.7.74. Recorded at Llantwit Major, 27.4.75 and, probably this species seen at Aberthaw (Limpert Bay).

COROPHIIDAE

Corophium volutator (Pallas)

Welsh Coast: recorded by Purchon (1948) at Aberthaw and Peterstone Wentlooge but not from Barry, where it is now abundant. Occasional in the Wentlooge Flats.

English Coast: one at Kilve (Bassindale, 1941) and rare at Portishead (Purchon, 1938). Sometimes common in Porlock salt marsh and always so in the submerged forest, and in Minehead Harbour. The species has a very local distribution at Blue Anchor and in muddy beaches between Stert Flats and Sand Bay. It is rare or absent on "short" shores further north. See Boyden & Little (1973).

Upper Estuary: Aust, Sharpness, Tites Point Purton and Arlingham Passage (Bassindale, 1941). Still present up to Arlingham.

Corophium acherusicum A. Costa

English Coast: common in Portishead Dock (Purchon, 1938).

Upper Estuary: one in the Berkeley Canal near Elmore, 22.8.39 and several at Ashleworth Ferry, 22.8.39 (Bassindale, 1941). Large numbers taken from tubes on hydroids at Newnham in December 1973.

Corophium arenarium Crawford

Welsh Coast: common in sand at Barry Old Harbour.

English Coast: this species takes the place of *C. volutator* on sandy beaches. Not seen at Minehead, St Audries Bay, or on the lower shore sandbanks at Clevedon and Portishead, probably because they are unable to form permanent burrows on these shores. Densities up to 1,600 per sq m to the seaward of Stert Flats (Boyden & Little, 1973).

Upper Estuary: present up to Sharpness throughout the year, and in summer at Arlingham.

***Corophium insidiosum* Crawford**

English Coast: common on weeds in Portishead Dock (Purchon, 1938).

***Corophium lacustre* Crawford**

Upper Estuary: Newnham, December 1973: large numbers of *Corophium*, provisionally identified as this species with *C. acherusicum*.

CHELURIDAE

***Chelura terebrans* Philippi**

English Coast: with *Limmoria* in the piles of Weston Old Pier (Bassindale, 1941).

PODOCERIDAE

***Dulichia porrecta* (Bate)**

English Coast: Porlock, two in a pool at Gore Point (Bassindale, 1943c).

Sub-Order Hyperiidea

HYPERIIDAE

***Hyperia galba* (Montagu)**

English Coast: in the radial canals of jellyfish stranded near Minehead: from *Rhizostoma*, 12.2.68 and *Chrysaora*, 20.8.74.

Sub-Order Caprellidea

CAPRELLIDAE

Skeleton Shrimps

***Caprella linearis* (L.)**

English Coast: very numerous on *Tubularia* from Blue Anchor and Watchet, 19.8.74, 26.8.76, 25.9.76. One record from Kilve, 7.2.74. Not found on *Tubularia* at Hinckley Point in September 1976.

***Caprella fretensis* Stebbing**

English Coast: one, deep red in colour, from Porlock, 28.8.76.

unidentified *Caprella* sp.

Welsh Coast: recorded by Purchon (1957) from Kenfig. Possibly *C. hirsutum*.

English Coast: common on some tides at Porlock and occasionally taken at Blue Anchor and Kilve.

Order MYSIDACEA

OPOSSUM SHRIMPS

MYSIDAE

***Siriella armata* (Milne-Edwards)**

English Coast: one from a rock pool at Porlock (Gore Point), 15.9.73.

***Gastrosaccus spinifer* (Goës)**

English Coast: rare in shrimp nets at Stolford, 9.6.39 (Bassindale, 1941).

Upper Estuary: rare in shrimp kypes at Oldbury, 20.5.39 (Bassindale, 1941).

***Schistomysis spiritus* (Norman)**

English Coast: a few in the Stolford shrimp nets, 9.6.39 and one in a hand net at low water, Portishead, 19.8.39 (Bassindale, 1941).

***Schistomysis ornata* (G. O. Sars)**

English Coast: one netted at Kilve, 21.5.39 (Bassindale, 1941).

***Praunus flexuosus* (Müller)**

Welsh Coast: taken on the shore at Barry by Purchon (1948).

English Coast: sometimes taken at Stolford and recorded from Portishead Dock in 1936 (Purchon, 1938) and 1939 (Bassindale, 1941).

Upper Estuary: fairly common in kypes at Oldbury (Bassindale, 1941).

***Praunus inermis* (Rathke)**

English Coast: two from Porlock (Gore Point) in August 1973.

***Mesopodopsis slabberi* (Van Beneden)**

English Coast: a few at Kilve and Stolford, one from Portishead (Bassindale, 1941). Much the commonest mysid in the Porlock/Minehead area and sometimes found in rock pools at low tide.

Neomysis integer (Leach)

Welsh Coast: recorded at Barry by Purchon (1948). Common in salt marsh pools at Aberthaw in September 1976 and in shallow water at Goldcliff.

English Coast: abundant in summer upstream from Stolford, and present though not common upstream from Kilve in winter. Much commoner on open coasts than *Praunus flexuosus*. Present in Portishead Dock, 29.3.39 though less common than *P. flexuosus* (Bassindale, 1941). Common at Porlock and Weston in July 1973.

Upper Estuary: common up to Sheperdine in winter and abundant to Arlingham Passage in summer (Bassindale, 1941). Collected from Sheperdine and Arlingham in summer 1973.

Sub-Class *Eucarida*

Order EUPHAUSIACEA

EUPHAUSIIDAE

Meganctiphanes norvegica (M. Sars)

English Coast: single records from Stolford shrimp nets, 7.7.39, 19.7.39 and four from Burnham, 17.10.39 (Bassindale, 1941).

Order DECAPODA

Sub-Order Natantia

Section Caridea

PASIPHAEIDAE

Pasiphaea sivado (Risso)

Welsh Coast: recorded from the shallow sub-tidal at Breaksea Point, Sully Island and Peterstone Wentlooge by Purchon (1948). One stranded at Sully, 20.6.74.

English Coast: abundant during summer in shrimp nets at Stolford (Bassindale, 1941); recorded from Bridgwater and Clevedon by Stebbing (1906) and from Portishead by Matthews (1924). Frequently collected in the power station filters at Hinckley Point.

Upper Estuary: recorded as far up as Berkeley (Bassindale, 1941).

PALAEMONIDAE

Palaemon adspersus (Rathke)

Upper Estuary: taken in Oldbury kypes in November 1938 and, rare, on 25.6.40 (Bassindale, 1941, as *Leander*).

Palaemon elegans Rathke

Welsh Coast: recorded at Llantwit Major, Breaksea Point and Barry by Purchon (1948 as *Leander squilla*). Abundant at Porthcawl, 20.2.77.

English Coast: one from Burnham, 10.3.40 (Bassindale, 1941, as *L. squilla*) and another from Porlock, 16.8.74.

Upper Estuary: a few in kypes at Berkeley, August 1938 (Bassindale, 1941, as *L. squilla*); and among drift weeds in a deep upper shore pool near Sharpness, in berry. (Jones, 1865, as *P. squilla*).

Palaemon longirostris Milne-Edwards

Upper Estuary: one from a freshwater pool behind the embankment at Sheperdine, 21.8.39; and three netted at Berkeley in August 1937 (Bassindale, 1941, as *Leander*).

Palaemon serratus (Pennant)

Common Prawn

Welsh Coast: recorded from Llantwit Major and Barry by Purchon (1948, 1957, as *Leander*) and now fairly common at Llantwit Major, Aberthaw and Sully.

English Coast: coasts of Somerset (Stebbing, 1906). Taken by Bassindale (1943c, 1941) at Porlock, Stolford and Weston. Females in berry taken in the Stolford nets in May, June and July but not in August. This is now the common large prawn of the English coast, often seen at Porlock and occasionally from Minhead to Hinckley Point. Adults are most common in summer.

Upper Estuary: in Oldbury kypes, 1938 (Bassindale, 1941, as *Leander*).

Palaemonetes varians (Leach)

Ditch Prawn

Welsh Coast: var. *microgenitor* occurs in salt marsh pools and slightly brackish drainage rhines behind the sea wall at Lamby (Cardiff) (Lofts, 1956a). These two populations are physiologically different (Lofts, 1956b). *P. varians* is abundant in Aberthaw lagoon and salt marsh; generally present in salt marshes up Channel to Portskewett. There were very large numbers in the rhines at Lamby in 1975 and 1976.

English Coast: at Clevedon (Stebbing, 1906) and in Portishead Dock (Purchon, 1938). Sometimes common in Porlock Weir salt marsh; abundant in the rhines at Brean; abundant in salt marsh pools at Clevedon.

Upper Estuary: several in a freshwater pool behind the embankment at Sheperdine, 21.8.39 (Bassindale, 1941).

ALPHEIDAE

Athanas nitescens (Montagu)

English Coast: immature animals regularly collected at Porlock and occasionally in Greenaleigh Bay. One adult female, 8.2.74.

Alpheus macrocheles (Hailstone)

English Coast: one from Porlock Bay (Bassindale, 1943c).

HIPPOLYTIDAE

Eualus pusiolus (Krøyer)

English Coast: one female in berry at Porlock (First Rocks) (Bassindale, 1943c as *Spirontocaris*).

Either this species or *Thorulus cranchi*, or both, is common in lower shore pools from Porlock to Greenaleigh Bay and sometimes present east to Blue Anchor.

Hippolyte varians Leach

English Coast: common in lower shore pools from Porlock to Minehead.

Thorulus cranchi (Leach)

Welsh Coast: from Breaksea Point and Barry (Purchon, 1948, as *Spirontocaris*).

English Coast: three from First Rocks (Porlock) (Bassindale, 1943c, as *Spirontocaris*). Either this species or *Eualus pusiolus* (or both) is common in lower shore pools from Porlock to Greenaleigh Bay and sometimes present east to Blue Anchor.

PROCESSIDAE

Processa canaliculata Leach

English Coast: one in nets at Stolford, 11.10.39 (Bassindale, 1941).

Processa edulis (Risso)

English Coast: one adult female under a boulder at extreme low water, Porlock (Gore Point), 27.2.71.

PANDALIDAE

Pandalus montagui Leach

Aesop Prawn

Welsh Coast: recorded from Breaksea Point, Barry, Sully Island and (sub-tidally) from Peterstone Wentlooge (Purchon, 1948). Now fairly common east to Sully, where they are sometimes stranded in large numbers.

English Coast: rare in nets at Stolford, 18.8.39, common, 13.9.39 and abundant, 11.10.39: common in nets at Weston, 17.12.38 (Bassindale, 1941). Common at Portishead (Matthews, 1924) and occasionally stranded there (Purchon, 1938). Recorded at Clevedon by Stebbing (1906). Recently common at times in Greenaleigh and Blue Anchor Bays, and in the strainers at Hinckley Point power station.

Upper Estuary: an unusual record from Oldbury kypes, 19.10.39 (Bassindale, 1941).

CRANGONIDAE

Crangon crangon (L.)

Common Shrimp

The biology of this species in the Estuary has been described by Lloyd & Yonge (1947 as *C. vulgaris*).

Welsh Coast: recorded by Purchon (1948, 1957, as *C. vulgaris*) at all his sites from Kenfig to Portskeewett. Now generally common in pools and channels on muddy shores.

English Coast: along the coasts of Somerset (Stebbing, 1906). Portishead (Matthews, 1924). Bassindale (1941, as *C. vulgaris*) also notes the commercial fisheries which existed at Stolford and further upstream. Hose nets, swing nets and basketwork kypes are described and figured by Matthews (1934) and Davies (1936). The fisheries were very old and the kypes primitive. *C. crangon* is now generally distributed all along the coast from Minehead to Aust being regularly found in drainage channels at Blue Anchor and Watchet, and on all the "long beaches" between Stert and Sand Bay (Boyden & Little, 1973).

Upper Estuary: Sharpness (Jones, 1865; Smyth, 1639). There used to be commercial fisheries up to Berkeley (Bassindale, 1941, as *C. vulgaris*) but only one remains in operation in 1976, at Severn House Farm near Oldbury. Shrimping is actively pursued from sandbanks at Lydney.

Philocheas fasciatus (Risso)

Banded Shrimp

English Coast: several at Greenaleigh Bay, 27.8.76.

Sub-Order Reptantia

Section Macrura

NEPHROPSIDAE

***Homarus gammarus* (L.)**

Lobster

Welsh Coast: in pools at Kenfig (Purchon, 1957, as *H. vulgaris*).

English Coast: one of edible size, though minus both chelae, on the shore at Porlock in July 1976.

Another, 30 cm long, at Kilve, 27.10.73. It is said that lobsters can be found under the base of the old pier at Minehead but we have never done so.

AXIIDAE

***Axius stirhynchus* Leach**

Welsh Coast: a single record from Sully (Swanbridge Bay) in 1951 (Brough, Matheson & Jefferson, 1960). Individuals have been recorded recently under stones at Aberthaw, in crevices at St Donats Bay, at Sully, and in mixed sediment with *Neanthes virens* at Goldcliff.

English Coast: adults and juveniles regularly found under boulders at Porlock throughout the year.

Section Anomura

GALATHEIDAE

Squat Lobsters

***Galathea dispersa* Bate**

Welsh Coast: Sully (Swanbridge Bay), a single record of three animals.

***Galathea nexa* Embleton**

English Coast: occasional at Porlock and in Greenaleigh Bay. One record from Brean Down in April 1974.

***Galathea squamifera* Leach**

Welsh Coast: Barry (Purchon, 1948): now occasional up the Estuary to Sully.

English Coast: common at low tide at the end of Brean Down (Matthews, 1924). Bassindale (1943c) found two at Porlock. This is the commonest species of squat lobster in the area and probably accounts for most of the records of "*Galathea* sp.". It has been definitely identified from Porlock, Greenaleigh Bay, Minehead and Blue Anchor; and a single record from Weston, 11.1.74.

***Galathea strigosa* (L.)**

Welsh Coast: one recorded from Rhoose (Fontygary Bay) in June 1966 and two more there, 20.8.74.

English Coast: large animals occasional at Porlock and in Greenaleigh Bay. Single records from Minehead and Brean Down.

PORCELLANIDAE

Porcelain Crabs

***Porcellana longicornis* (L.)**

The Long-clawed Porcelain Crab

Welsh Coast: recorded by Purchon (1948, 1957) from Kenfig, Llantwit Major, Aberthaw (Breaksea Point) and Barry. Now generally present at low water springs on rocky shores as far east as Sully. Reported to have increased in abundance since the cold winter of 1962/1963 to become the more numerous *Porcellana* in Fontygary Bay.

English Coast: abundant at Porlock, First Rocks (Bassindale, 1943c). Now abundant at Porlock and common as far east as Minehead. Not seen between Blue Anchor and Hinkley Point but common on Brean Down, 13.9.73 and a single record from Sand Point, 18.12.72.

***Porcellana platycheles* (Pennant)**

The Broad-clawed Porcelain Crab

Welsh Coast: recorded by Purchon (1948, 1957) from Kenfig, Llantwit Major and Breaksea Point.

It now occurs on rocky shores east to Rhoose Point, but reported to have decreased in numbers since 1962. Abundant quite deep in crevices at St Donats Bay.

English Coast: usually found at Porlock, on Gore Point and in the Bay. Bassindale (1943c) recorded it as rare at First Rocks and in recent years (1968–1976) it is certainly much less common than *P. longicornis*. Sporadic records from Hurlstone Point and Minehead.

PAGURIDAE

Hermit Crabs

***Pagurus bernhardus* (L.)**

Welsh Coast: recorded by Purchon (1948, 1957, as *Eupagurus*) at all his sites from Kenfig to Peterstone Wentlooge. Small hermit crabs are now common as far east as Sully; all those examined have been of this species. Present on Flatholm.

English Coast: recorded from Porlock, Blue Anchor, Kilve and Weston by Bassindale; from Brean Down by Matthews (1924) and Portishead by Purchon (1938) (Bassindale, 1941, 1943c, as *Eupagurus*). This is by far the commonest hermit crab in the area; always abundant at Porlock,

Blue Anchor, Watchet and Hinckley Point—and inevitably seen on the intervening shores. Abundant on Brean Down Spit. The upstream limit in 1971 was Clevedon (Ladye Point).

Pagurus cuanensis (Thompson)

English Coast: Porlock (Gore Point): several seen whenever searched for, but it is necessary to examine a large number of small hermits to find any at all. Looked for but not found elsewhere.

Anapagurus hyndmanni (Bell)

English Coast: frequently found at Porlock, where it is the second commonest hermit crab. One record from Minhead, 16.3.68.

Section Brachyura
Sub-Section Oxystomata

TRUE CRABS

LEUCOSIIDAE

Ebalia tuberosa (Pennant)

English Coast: single females from Porlock, 25.2.71 and 27.2.71.

Sub-Section Brachygnatha

MAIIDAE

Spider Crabs

Maia squinado (Herbst)

Welsh Coast: occasional in summer at Kenfig.

English Coast: no records of living crabs, but recently-cast skeletons are occasionally washed up on Bossington Beach (Porlock Bay) in summer.

Eurynome aspera (Pennant)

English Coast: one from Porlock (Gore Point), 3.4.69.

Inachus leptochirus Leach

English Coast: one post-pubertal male from Porlock (Gore Point), 11.4.68 and an immature, 27.2.71.

Macropodia rostrata (L.)

English Coast: one pre-pubertal male from Porlock (Gore Point), 27.2.71.

PORTUNIDAE

Swimming Crabs

Portumnus latipes (Pennant)

Welsh Coast: common in coarse sand at low water springs, Kenfig; one from the middle shore at Ogmere.

English Coast: a single record of one young crab at Minhead, 9.9.68, but recently-cast skeletons are regularly found there and at Greenleigh Bay in August.

Carcinus maenas (L.)

Shore Crab

Welsh Coast: recorded by Purchon (1948, 1957) at all his sites from Kenfig to Portskewett. Large crabs are common in summer as far east as Penarth Head, but only juveniles have been seen above this point. Fairly common on rocky shores, muddy shores, and along the edge of the salt marshes. Only one record of a crab parasitized by *Sacculina*: at Southerndown (Trwyn y Witch) in June 1974.

English Coast: common up to Portishead (Bassindale, 1941; Matthews, 1924; Purchon, 1938). Seemingly ubiquitous save on the most exposed headlands. Females in berry common from February to April and occasionally also in August.

Upper Estuary: Bassindale (1941) recorded young crabs up to Sheperdine; several young crabs at Oldbury, 6.2.71.

Macropipus holsatus (Fabricius)

Welsh Coast: one stranded at Kenfig in May 1976 and another on a sand spit in St Mary's Well Bay.

English Coast: in shrimp nets or kypes: several minute specimens at Kilve, 21.5.39, rare at Stolford, 18.8.39, 3.5.40 and 5.6.40, and taken throughout the year at Weston (Bassindale (1941) as *Portunus*). Occasionally caught now in the filters of Hinckley Point power station. e.g. 13.4.73, 6.8.74.

Upper Estuary: caught in kypes at Oldbury during the summers of 1938 and 1939. Once with the parasitic barnacle *Sacculina* (Bassindale, 1941, as *Portunus*).

Macropipus marmoreus (Leach)

Welsh Coast: recorded by Purchon (1948, as *Portunus*) from Breaksea Point, Sully Island and Peterstone Wentlooge.

English Coast: recorded by Bassindale (1941, as *Portunus*) in shrimp nets at Stolford: one, 20.6.39; a few in July and November 1939 and one on 8.5.40.

***Macropipus puber* (L.)**

Velvet Swimming Crab

Welsh Coast: common between Dunraven Bay and Aberthaw.

English Coast: recorded in Portishead Dock in the summer of 1921 (Matthews, 1924) but not otherwise mentioned by Bassindale (1941, as *Portunus*). Adults are now quite common at Porlock in summer and young crabs can be found there throughout the year. Taken in decreasing numbers east to Minehead and once at Blue Ben near Kilve. Adults are occasionally taken in the filters of Hinckley Point power station.

PIRIMELIDAE

***Pirimela denticulata* (Montagu)**

Welsh Coast: reported occasionally in Fontygary Bay before the cold winter of 1962/1963. Not recorded since.

ATELECYCLIDAE

***Atelecyclus rotundatus* (Olivi)**

Circular Crab

Welsh Coast: one young crab, 4 mm carapace diameter, reported at Kenfig in September 1972.

CANCRIDAE

***Cancer pagurus* L.**

Edible Crab

Welsh Coast: Purchon (1948, 1957) found young crabs at all his sites from Kenfig to Sully and this remains the pattern.

English Coast: occasional small specimens from Porlock and up to Weston (Bassindale, 1941, 1943c).

Young crabs up to 8 cm across the carapace are abundant at Porlock and regularly seen on all shores east to Watchet. Occasional small specimens may be found up to Clevedon.

XANTHIDAE

***Xantho pilipes* Milne-Edwards**

English Coast: recorded as abundant at Porlock by Bassindale (1943c, as *X. hydrophilus*). Certainly not abundant 1968–1976 but regularly found at Gore Point and in the Bay. Not seen east of Greenaleigh Bay.

***Pilumnus hirtellus* (L.)**

Hairy Crab

Welsh Coast: recorded at Kenfig (Gwely 'r Misl) by Purchon (1957). Now commonly found on all rocky shores from Kenfig to Aberthaw, where berried females occur. One small crab from Roath Dock Cardiff, 1.11.74.

English Coast: only recorded by Bassindale as rare at Porlock (Bassindale, 1943c) but now widely distributed and usually common at Porlock and Greenaleigh Bay. Occasional at Minehead, Blue Anchor and Watchet. Single records from Brean Down, 13.9.73 and Sand Point, 18.12.72.

GONEPLACIDAE

***Goneplax rhomboides* (L.)**

Angular Crab

English Coast: occasionally found at extreme low water, Blue Anchor. A male and a female found separately, 18.3.69 and an immature, 17.4.69.

PINNOTHERIDAE

***Pinnotheres pisum* (Pennant)**

Welsh Coast: found in the mussel beds at Kenfig and Porthcawl (Rest Bay), parasitic (?) in the mussel *Mytilus edulis*. 20 per cent of mussels examined in January 1974 ($n = 150$) were infected, most containing both male and female crabs.

Sub-Phylum Pycnogonida

PYCNOGONIDAE

Sea Spiders

***Pycnogonum littorale* (Ström)**

Welsh Coast: at Kenfig and Peterstone Wentlooge (Purchon, 1948, 1957).

English Coast: one at Porlock (Bassindale, 1943c) and two on *Tubularia* at Blue Anchor (Bassindale, 1941). Recently just a single specimen from Greenaleigh Bay, 20.8.74.

NYMPHONIDAE

***Nymphon gracile* Leach**

Welsh Coast: Kenfig and, rare, at Portskewett (Purchon, 1957). One amongst bryozoans at Kenfig (Sker Point), 18.3.76. *Nymphon* species are fairly common on rocky shores as far as Goldcliff but have not often been identified to species.

English Coast: single specimens at Porlock, 9.2.74 and Kilve, 7.2.74.

***Nymphon rubrum* Hodge**

Welsh Coast: Peterstone Wentlooge (Purchon, 1957). Probably fairly common at Goldcliff in September 1975.

English Coast: a single specimen from Porlock (Gore Point), 28.8.76.

AMMOTHEIDAE

***Achelia echinata* (Hodge)**

Welsh Coast: recorded at Kenfig by Purchon (1957). Now common there. Very common at Porthcawl (Rhych Point) in September 1976 and recorded at Southerndown (Trwyn y Witch) in January 1977.

English Coast: occasional on algae at Porlock, 9.2.74; 17.3.76, and once at Minehead (Madbrain Sands), 28.8.73.

PHOXICHILIDIIDAE

***Phoxichilidium femoratum* (Rathke)**

Welsh Coast: common at Porthcawl (Rhych Point), 25.9.76.

Sub-Phylum **Arachnida**

Order **ACARI**

MITES

The Mites have been little studied but are certainly abundant on open rock surfaces, in crevices, amongst strand-line litter, on hydroids and by salt marsh pools. They extend from the open coasts at least as far up the Estuary as Arlingham. We are at present unable to identify this group sufficiently accurately to justify the inclusion of any specific names, although Purchon (1938) lists three mites from high water mark at Portishead.

Sub-Phylum **Myriapoda**

Class **CHILOPODA**

CENTIPEDES

GEOPHILIDAE

***Strigamia maritima* (Leach)**

English Coast: in vast numbers amongst drift-line seaweeds on a pebbly beach south of Portishead (Pocock, 1906, as *Linotaenia*). Two in drift-line litter at Portishead, 28.1.71.

***Necrophloeophagus longicornis* (Leach)**

English Coast: occasional in gravel under large stones near high water mark at Portishead (Purchon, 1938, as *Geophilus*).

Sub-Phylum **Insecta**

Class **APTERYGOTA**

Order **THYSANURA**

MACHILIDAE

***Petrobius brevistylis* Carpenter**

This appears to be the common rock jumper of the Bristol Channel. It is more widely distributed than *P. maritimus*, reaching almost to Bristol on the Somerset side of the Avon. Search for it higher up than the mouth of the Avon has so far been negative (Womersley, 1925). Since Womersley did not record *P. maritimus* nearer than Newquay it seems likely that records of *Petrobius* sp. belong to this species (Bassindale, 1941, as *P. carpenteri*).

Welsh Coast: *Petrobius* sp. recorded from Kenfig to Sully by Purchon (1948, 1957) and is now common along the sea wall as far up the Estuary as Magor.

English Coast: Weston to Kewstoke on the cliffs (Womersley, 1924). Probably this species from Porlock on the shingle bank (Bassindale, 1943c), Kilve, Weston and Portishead (Bassindale, 1941, as *P. carpenteri*). *Petrobius* is now abundant from Porlock to Portishead in cracks and crannies near high water mark.

Order **COLLEMBOLA**

NEANURIDAE

***Anurida maritima* Laboulbène**

Welsh Coast: Kenfig and Portskeewett (Purchon, 1957, as *Lipura*). It is probably present on all the intermediate shores as well.

English Coast: abundant at Portishead (Purchon, 1938) but not otherwise noted by Bassindale

(1941, as *Lipura*). Probably present on all west Somerset shores although specially notable at Hurlstone Point, Blue Anchor and Watchet.

ISOTOMIDAE

Isotoma maritima (Tullberg)

English Coast: among debris on the shore at Portishead (Womersley, 1925).

Archisotoma besselsi (Pack)

English Coast: common at Weston, over the middle shore, and abundant at Sand Point (Womersley, 1924, 1925).

Class **PTERYGOTA**
Order **HEMIPTERA**

BUGS

CORIXIDAE

Lesser Waterboatmen

Sigara selecta (Fieber)

Welsh Coast: abundant in Aberthaw lagoon at 28‰, 23.9.76.

Sigara stagnalis (Leach)

Welsh Coast: present in Aberthaw lagoon, 23.9.76 but not common.

Order **TRICHOPTERA**

CADDIS

LIMNephilidae

Limnephilus affinis Curtis

Welsh Coast: frequently found in salt marsh pools at Lamby (Cardiff) (Brough *et al.*, 1964) and probably this species common in salt marsh pools at Portskeewett.

Upper Estuary: probably this species recorded by Bassindale (1941) in salt marsh pools at Sheperdine where the salinity ranged between 8 and 22‰.

Order **COLEOPTERA**

BEETLES

CARABIDAE

Aepus maritimus Ström

English Coast: two under a stone at Blue Anchor, middle shore (Bassindale, 1941).

Dicheirotichus gustavi Crotch

Welsh Coast: in saltmarshes at Aberthaw and Peterstone Wentlooge.

English Coast: Clevedon (Blathwayt, 1906, as *Dichirotrichus pubescens*).

Nebria complanata L.

Welsh Coast: at high water springs, Kenfig.

English Coast: Burnham (Blathwayt, 1906).

Nebria brevicollis (Fabricius)

English Coast: Burnham (Blathwayt, 1906).

STAPHYLINIDAE

Bledius unicornis (Germar)

Welsh Coast: in Aberthaw salt marsh.

Bledius tricornis (Herbst)

Welsh Coast: in Aberthaw salt marsh.

CURCULIONIDAE

Mecinus collaris Germar

Welsh Coast: forms galls on Sea Plantain, *Plantago maritima*, on Aberthaw salt marsh.

HETEROCERIDAE

Heterocerus maritimus Guérin-Méneville

Welsh Coast: in the salt marsh at Aberthaw.

Order **DIPTERA**

FLIES

COELOPIDAE

Coelopa frigida (Fabricius)

Seaweed Fly

English Coast: Minehead (Blathwayt, 1906): adults and larvae, probably of this species at Portishead (Purchon, 1938).

Fly maggots are common in mud flats from Sand Bay to Gloucester (and probably in equivalent places on the Welsh Coast). Highest densities occur just below the salt marsh and reach 80 per sq m

at Portishead (Kilkenny Bay). Bibionid larvae have been recorded at Portishead (Purchon, 1938); *Culex* larvae and pupae in salt marsh pools at Severn Beach, Oldbury and Sheperdine (Bassindale, 1941); and chironomid larvae from Portishead (Purchon, 1938) and towards Gloucester.

PHYLUM MOLLUSCA

Class POLYPLACOPHORA

CHITONS

CRYPTOPLACIDAE

Acanthochitona crinita (Pennant)

Welsh Coast: recorded from Llantwit Major by Purchon (1957) and now occasional there and at Aberthaw.

English Coast: in *Corallina* pools on the lower shore at Porlock and Minehead (Madbrain Sands).

LEPIDOCHITONIDAE

Lepidochitona cinerea (L.)

The only chiton found over most of the Estuary.

Welsh Coast: recorded by Purchon (1948, 1957) from all his sites, Kenfig to Portskewett. Now generally common on the lower shore up to Portskewett, including the north coast of Flatholm.

English Coast: in 1939/1940 the species was found at Porlock, was common at Blue Anchor, Kilve, Stolford and Steepholm and occasional at Weston and Portishead (Bassindale, 1941, 1943c). In 1936, Purchon (1938) had recorded it as abundant at Portishead. Now common from Porlock to Brean Down, being especially abundant around Watchet. Above Weston it is occasional on the open rock but often quite common in pools (e.g. Sand Point and Clevedon Pool) up to Aust. Present on Steepholm.

Upper Estuary: only in the gully at Aust and only one at Sheperdine (Bassindale, 1941). We have not seen it above the gully at Aust.

LEPIDOPLEURIDAE

Lepidopleurus asellus (Gmelin)

English Coast: one at Porlock, First Rocks (Bassindale, 1943c). Several found recently at Porlock and a single record from Blue Anchor.

Tonicella marmorea (Fabricius)

English Coast: one from Porlock, Gore Point, 25.2.71.

Tonicella rubra (L.)

English Coast: one from Porlock, First Rocks (Bassindale, 1943c), and several from this area in recent years.

Class GASTROPODA

SLUGS AND SNAILS

Sub-Class Prosobranchia

Order ARCHAEOGASTROPODA

FISSURELLIDAE

Emarginula reticulata J. Sowerby

Slit Limpet

Welsh Coast: recorded from Llantwit Major by Purchon (1957). Now occasional at Llantwit Major, Fontygary Bay and Limpert Bay. Empty shells are frequently incorporated in *Sabellaria* tubes.

English Coast: abundant and large at Porlock (First Rocks and Gore Point) (Bassindale, 1943c). Now common on the lower shore at Porlock, Greenaleigh Bay and Minehead (Madbrain Sands). It is occasionally seen at Blue Anchor and we have one record from Kilve, 20.10.72. Empty shells occur up to Weston.

Diodora apertura (Montagu)

Key-hole Limpet

English Coast: rare at Porlock (Bassindale, 1943c). Isolated individuals regularly found from Porlock to Greenaleigh Bay.

PATELLIDAE

Patella vulgata L.

Common Limpet

Welsh Coast: recorded at all sites examined by Purchon (1948, 1957) from Kenfig to Portskewett. Large numbers died at Sully Island in the cold winter of 1962/1963 and later very few could be found alive (Crisp, 1964). It is now common or abundant as far up the Estuary as Goldcliff, with a few at Portskewett. Contamination with heavy metals is detailed by Nickless *et al.* (1972).

English Coast: common at Porlock, and from Blue Anchor to Portishead, including Steepholm (Bassindale, 1941, 1943c). Now common or abundant from Porlock to Portishead. Contamination with heavy metals is detailed by Butterworth *et al.* (1972) and Peden *et al.* (1973).

Upper Estuary: only occasional at Aust up to 1975, but there was a good settlement of spat in 1976. Density was up to 25 limpets per sq m on the rock surface, 22.11.76.

***Patella depressa* Pennant**

Black-footed Limpet

English Coast: although Fretter & Graham (1976) state this species to be absent from the Bristol Channel east of Lynton, limpets with at least some characters of this species are common on Hurlstone Point and individuals extend east to Watchet.

***Patella aspera* Lamarck**

China Limpet

Welsh Coast: on the lower shore at Southerndown (Trwyn y Witch).

English Coast: occasional on the lower shore at Porlock and Hurlstone Point.

***Patina pellucida* (L.)**

Blue-rayed Limpet

Welsh Coast: large individuals are found on *Fucus serratus* between Nash Point and Aberthaw.

English Coast: abundant and large at Porlock (Bassindale, 1943c). Now regularly recorded there on *Laminaria* and once on *Fucus serratus*. Up to twelve limpets per *Laminaria* plant.

ACMAEIDAE

***Acmaea virginea* (Muller)**

White Tortoiseshell Limpet

English Coast: common and large at First Rocks, Porlock (Bassindale, 1943c, as *Patelloida*). Now rare at extreme low water springs, Porlock, feeding on *Lithothamnium*.

TROCHIDAE

***Calliostoma zizyphinum* (L.)**

Topshells
Painted Top-shell

Welsh Coast: recorded at Aberthaw (Breaksea Point) by Purchon (1948). Generally scarce in the area until 1974, with occasional records from Limpert Bay. Common at Nash Point, 23.6.74, with both coloured and albino forms: fairly common from Dunraven to Nash Point in September 1976: many small specimens in St Donats Bay in 1975.

English Coast: fairly common at Porlock (Bassindale, 1943c). Abundant in the *Laminaria* zone at Porlock and on Hurlstone Point. Common in Greenaleigh Bay and frequent at Minehead (Madbrain Sands) but not seen east of this site. Both albino and normally coloured shells occur at all sites.

***Monodonta lineata* (da Costa)**

Thick Top-shell

Welsh Coast: recorded by Purchon (1957) at Kenfig and Llantwit Major. It was very occasional in Fontygary Bay before 1963 but there was complete elimination of this species along the Welsh Coast east of the Gower during the cold winter of 1962/1963 (Crisp, 1964). It has not been recorded since.

English Coast: abundant at Porlock (Bassindale, 1943c, as *Osilinus*). Still abundant there and present in small numbers on Greenaleigh Point, at Blue Anchor and at Watchet (Helwell Bay).

***Gibbula tumida* (Montagu)**

English Coast: a single specimen collected with many *G. cineraria* at Porlock, 27.2.71.

***Gibbula cineraria* (L.)**

Grey Top-shell

Welsh Coast: recorded by Purchon (1948, 1957) at Kenfig, Llantwit Major and Aberthaw (Breaksea Point). Now probably common on most shores west of Aberthaw but numbers seem to fluctuate. One on the south side of Sully Island in March 1970: two at Lavernock Point, 29.2.76.

English Coast: abundant at Porlock and common at Blue Anchor (Bassindale, 1941, 1943c). At present it is commonest at Porlock, decreasing in numbers and range east to Watchet where it is confined to extreme low water mark.

***Gibbula umbilicalis* (da Costa)**

Purple Top-shell

Welsh Coast: recorded at Llantwit Major, Aberthaw and Sully by Purchon (1948, 1957). Now abundant across the middle shore at Porthcawl but not at Ogmere. Generally abundant at Aberthaw. A small population at Barry (Porthkerry) in 1973. Rare at Sully with records of single individuals in 1959, 1965 and 1974 although common there in 1975. One specimen from Lavernock Point, 29.2.76.

English Coast: abundant at Porlock and a few at Blue Anchor (Bassindale, 1941, 1943c). Now generally distributed on rocky shores between Porlock and Kilve, being abundant west of Minehead and becoming scarce east of Watchet. Fairly common in some middle shore pools at Kilve, the eastward limit of any established population, with a single record from Hinckley Point in 1972.

TURBINIDAE

***Tricolia pullus* (L.)**

Pheasant Shell

Welsh Coast: recorded by Purchon (1948) from Aberthaw (Breaksea Point); and now often common there in pools and on the lower shore. Single records from Llantwit Major, 5.10.75 and Barry (Friar's Point); two at Lavernock Point, 29.2.76.

English Coast: common at Porlock, First Rocks (Bassindale, 1943c). Certainly most abundant at Porlock in recent years but often seen at Hurlstone Point and in Greenaleigh Bay whilst several have been found at Minehead (Madbrain Sands). Very occasional at Blue Anchor and Kilve.

Order MESOGASTROPODA

LITTORINIDAE

Chink Shells and Winkles

***Lacuna crassior* (Montagu)**

English Coast: occasional on the lower shore in Greenaleigh Bay, and a single individual at Watchet (Helwell Bay), 28.2.75.

***Lacuna pallidula* (da Costa)**

Welsh Coast: individuals, about 6 mm long, at Aberthaw (Limpert Bay), 28.2.76 and Penarth Head, 29.2.76.

English Coast: on red algae and *Fucus serratus* from the lower middle shore at Porlock and east to Blue Anchor and Watchet. Common in September 1976. Present on Steepholm.

***Lacuna parva* (da Costa)**

English Coast: several collected on the lower shore at Porlock, 16.10.74.

***Lacuna vineta* (Montagu)**

Banded Chink Shell

English Coast: a single individual of var. *gracilis* found at Porlock, 27.2.75.

***Littorina mariae* Sacchi & Rastelli**

Formerly regarded as a variant of *L. littoralis* and described as a separate species in 1967. The older records do not distinguish between them and *L. mariae* is certainly more widely distributed than this entry would suggest.

Welsh Coast: the reticulated morph (only) has been found on *Fucus serratus* from Limpert Bay, Sully and Penarth Head.

***Littorina littoralis* (L.)**

Flat Winkle

Welsh Coast: recorded from Kenfig, Aberthaw (Breaksea Point), Barry, Sully and Portskewett by Purchon (1948, 1957). It is probably this species (rather than *L. mariae*) amongst *Pelvetia* at Kenfig, common on sheltered shores where *Fucus vesiculosus* occurs, and abundant on *Ascophyllum* in Sully Bay. Common at Goldcliff and Portskewett. Flatholm. The olive-green morph predominates and the reticulated morph has not been found where *L. mariae* occurs.

English Coast: Bassindale (1943c) only found spawn at Porlock, but snails, common or abundant, from Blue Anchor to Portishead (Bassindale, 1941). Common on Steepholm (Yonge & Lloyd, 1939). Flat winkles are now common or abundant on all seaweed-covered shores from Porlock to Severn Beach including Steepholm. We have yet to positively identify *L. mariae* on this coast, but small reticulated Flat Winkles do occur at Watchet.

Upper Estuary: common at Sheperdine, 26.3.39 but absent, 21.8.39 and 14.3.40 (Bassindale, 1941). Common at Aust in 1939/1940 and at Aust and Beachley from 1971 to 1975. Absent during this time from Sheperdine and Sharpness (Wellhouse Bay). The upstream limit in 1975 was at the northern end of the Oldbury tidal reservoir (The Ledges). In November 1976 the species was abundant on the middle shore at Severn House Farm near Oldbury.

***Littorina littorea* (L.)**

Edible Winkle

Welsh Coast: recorded at Kenfig, Llantwit Major, Aberthaw, Barry and Sully (Purchon, 1948, 1957). Frequent up the Estuary from Kenfig to Goldcliff. A single record from Portskewett (Black Rock). Quite common on Flatholm in 1973.

English Coast: common at Porlock, Blue Anchor and Kilve; frequent at Weston; sparse on Steepholm (Yonge & Lloyd, 1939) and absent elsewhere although Matthews (1924)—but not Purchon (1938)—found it at Portishead (Bassindale, 1941, 1943c). Widely distributed in recent years from Porlock to Weston (Sand Point). Only common at Porlock. Absent from the foreshore above Sand Point but common in Clevedon Marine Lake. Quite common on Steepholm in 1973. Heavy metal levels in this species given by Butterworth, Lester & Nickless (1972).

Upper Estuary: Sharpness, a few (Jones, 1865).

***Littorina neritoides* (L.)**

Small Winkle

Welsh Coast: recorded from Kenfig and Barry by Purchon (1948, 1957). Now abundant at Kenfig and also at Marcross where it occurs especially on vertical faces of the beach platform. Generally absent from soft cliff faces, but abundant on Trwyn y Witch. On middle shore boulders at Rhoose Point. At Barry it is confined to a zone about high water springs at Friars Point, being absent from adjacent promontories which are less exposed.

English Coast: Minehead and between Burnham and Brean (Swanton, 1912): this is the only record in Bassindale (1941) and the second part must surely refer to empty shells. Common now at Porlock and on Hurlstone Point, where it is always much less abundant than the rough winkles, and regularly found at Minehead on the Harbour Wall. Sparse on the upper shore at Blue Anchor and Watchet (West Beach). The eastern limit in 1975 was the west mole of Watchet Harbour.

***Littorina saxatilis* (Olivi) Agg.**

Rough Winkle

Until recently rough winkles were regarded as one very variable species with several more or less distinguishable subspecies and varieties. A paper by Heller (1975) recognizes four distinct species: *L. rudis* (Maton), *L. patula* Jefferies, *L. nigrolineata* Gray and *L. neglecta* Bean; all of which occur in the area. Most of our records do not distinguish between these species and are here all lumped together. This *saxatilis* group is the commonest and most widely distributed shore gastropod in the Estuary.

Welsh Coast: at all Purchon's (1948, 1957) sites from Kenfig to Portskeewett. Now abundant on all shores. An orange morph is common on gravel at Sully, and a large form, noted by Purchon at Portskeewett, is still there.

English Coast: common or abundant at Porlock and from Blue Anchor to Aust, including Steephholm (Bassindale, 1941, 1943c). Now frequent to very abundant on all shores, including the islands.

Upper Estuary: common or abundant up to Sheperdine, rare at Sharpness and absent above Sharpness in 1939 (Bassindale, 1941). Now quite common at Aust, and occasional to Sharpness and Lydney.

HYDROBIIDAE

***Hydrobia ulvae* (Pennant)**

Behaviour in the area studied by Little and Nix (1976).

Welsh Coast: recorded at densities in excess of 18,000 per sq m at Peterstone Wentlooge (Rees, 1940): present at Barry and Portskeewett (Purchon, 1948, 1957). Now abundant in the mud of Barry Old Harbour and generally abundant at Penarth and on the Wentlooge Flats. Usually abundant at Magor and Caldicot.

English Coast: rare at Kilve, 21.5.39; common or abundant at Weston (Bassindale, 1941); occasional at Portishead (Purchon, 1938). Now common on all the mud flats from Blue Anchor to Severn Beach and New Passage. Occurrence and abundance is very erratic at all localities. Maximum recorded density is about 10,000 per sq m on Brean Flats and at Weston. Numbers at Portishead (Kilkenny Bay) were very low in July 1972 but increased in subsequent years (Boyden & Little, 1973; Little & Boyden, 1976).

Upper Estuary: common at Aust (Old Jetty), 16.8.39, 19.8.39; occasional at Sheperdine, 26.3.39 and rare, 21.8.39. Only an empty shell at Sharpness (Bassindale, 1941). Fairly common at Aust and a few individuals are recorded irregularly above the bridge at Oldbury, Sharpness and Arlingham Passage.

***Hydrobia ventrosa* (Montagu)**

Welsh Coast: present in Aberthaw lagoon and in salt marsh pans at Lamby (Cardiff) with *H. ulvae*. In 1973 about 10 per cent of the mixed population at Lamby were this species.

English Coast: old records in drainage ditches and pills from Weston to Avonmouth (Norman, 1860; Cundal, 1882; Knight, 1902; Swanton, 1912).

***Potamopyrgus jenkinsi* (Smith)**

Jenkins' Spire Shell

Not recorded in the Estuary itself but very common in the streams running into it, for example at Kilve, Elmore Back and Epney (Bassindale, 1941). Common in Kilve Pill in recent years.

RISSEOIDAE

***Cingula semicostata* (Montagu)**

English Coast: Bassindale (1943c) found two at Porlock. Occasional now at Porlock, Greenaleigh Bay, Blue Anchor and Watchet. Locally common at Kilve and on Flatholm. A single record from Brean Down.

Cingula semistriata (Montagu)

English Coast: Bassindale (1943c) found two at Porlock. Now common or abundant in suitable sites from Porlock to Blue Anchor although not found on Hurlstone Point.

Alvania crassa (Kammacher)

English Coast: single snails from Porlock, 25.8.72, 15.9.73, 27.2.75 and Minehead (Madbrain Sands), 28.8.73.

Rissoa parva (da Costa)

Welsh Coast: found at Breaksea Point by Purchon (1948). Common on mussel beds at Kenfig and usually common at Breaksea Point. Two at Llantwit Major, 5.10.75.

English Coast: two recorded by Bassindale (1943c) at Porlock. Common all over the shore there in August 1973, with individuals found in Greenaleigh Bay and at Blue Anchor.

BARLEEIDAE

Barleeia unifasciata (Montagu)

English Coast: several from red algae epiphytic on *Laminaria* at Porlock, 30.8.73.

TRIPHORIDAE

Triphora perversa (L.)

English Coast: single individual collected with sponges from Porlock (Gore Point), 28.8.76.

TORNIDAE

Tornus subcarinatus (Montagu)

English Coast: a single snail from a mid-shore *Corallina* pool at Porlock, 30.8.73; and several from rapids draining pools on the lower middle shore at Minehead (Madbrain Sands), 28.8.73.

SCALIDAE

Clathrus clathrus (L.)

English Coast: a single adult snail from extreme low water, Watchet (Helwell Bay) with a damaged shell, 21.2.74.

CALYPTRAIDAE

Crepidula fornicata (L.)

Slipper Limpet

Welsh Coast: two live individuals reported once in Fontygary Bay, 20.8.74.

CYPRAEIDAE

Cowries

Trivia monacha (da Costa)

English Coast: single individual at Porlock, 27.2.71.

Trivia arctica (Montagu)

English Coast: Porlock: individuals occasionally recorded. Not common.

Order STENOGLOSSA

WHELKS

MURICIDAE

Nucella lapillus (L.)

Common Dog-Whelk

The shores of the Estuary are colonized by an unusually elongated form of *Nucella lapillus* which merges with the normal form at the western end of our area. Near this junction, on both coasts, exceptionally large individuals occur on the lower shore. Shells in excess of 40 mm in height are common and some from Porlock exceed 55 mm; see Crothers (1974, 1977).

Welsh Coast: recorded by Purchon (1948, 1957) from Kenfig, Llantwit Major, Aberthaw and Barry. Now common or abundant on rocky shores at the western end of the area, becoming increasingly confined to the lower shore and decreasing in abundance east to Sully Island. Sometimes present at Lavernock Point, e.g. in 1970, 1975 and (common) 29.2.76; but not between 1972 and 1974. Common on Flatholm.

English Coast: abundant at Porlock, Blue Anchor, Kilve and Weston: fresh egg capsules in March/April 1939, 1940 (Bassindale, 1941, 1943c). Plentiful at Brean Down (Matthews, 1924 as *Purpura*). Now common or abundant on suitable shores in the west but becoming restricted to the lower shore east of Minehead. It extends northeast along the coast to Sand Point, including Steppholm; and has been recorded at Clevedon by Swanton (1912) although we have found no living animals there. Egg capsules are generally laid from the end of February to late April.

Ocenebra aciculata (Lamarck)

English Coast: one specimen collected at Porlock (Gore Point) in July 1973.

Ocenebra erinacea (L.)

Sting Winkle

Welsh Coast: Purchon (1948, 1957) found it at Kenfig, Llantwit Major, and Breaksea Point. It was common at Fontygary Bay until the cold winter of 1962/1963. The only record after that period is from Llantwit Major, 5.10.75.

English Coast: fairly common at Porlock and one at Blue Anchor (Bassindale, 1941, 1943c). Now fairly common at Porlock, where it is sometimes abundant as on 25.2.71, and occasional in Greenaleigh Bay and on Hurlstone Point. One record from Watchet, 5.3.77. Fresh empty shells occur at Minehead and Blue Anchor.

BUCCINIDAE

***Buccinum undatum* L.**

Common Whelk

Welsh Coast: found at Kenfig and Barry by Purchon (1948, 1957) and one recent record from Llantwit Major, 5.10.75.

English Coast: a single large whelk in Porlock Bay (Bassindale, 1943c). Living animals found on the lower shore at Weston (Bassindale, 1941), Brean Down (Matthews, 1924) and on Steephelm (Yonge & Lloyd, 1939). Bassindale noted young whelks hatching from egg capsules at Blue Anchor, 23.4.40 (Bassindale, 1941). Empty shells are common from Porlock to Clevedon and occasional live whelks are regularly found between Porlock and Watchet. Adults laying capsules at Watchet, 9.3.69 and 27.2.71. Living egg clusters seen at Minehead (Madbrain Sands), 28.2.75. Young whelks, 30–40 mm in height, are sometimes quite common on the lower shore at Blue Anchor, Watchet and Weston early in the year.

NASSARIIDAE

***Nassarius incrassatus* (Ström)**

Thick-lipped Dog-Whelk

Welsh Coast: fairly common amongst boulders on the lower shore at Fontygary Bay and Limpert Bay. One record from Llantwit Major, 5.10.75.

English Coast: several at First Rocks, Porlock (Bassindale, 1943c). Common at Porlock in recent years and extending east in small numbers to Watchet.

***Nassarius reticulatus* (L.)**

Netted Dog-Whelk

Welsh Coast: common in Fontygary Bay until the cold winter of 1962/1963, but not recorded since.

English Coast: one living animal at Porlock, 9.2.74. Empty shells, sometimes occupied by hermit crabs, are quite common at Blue Anchor.

TURRIDAE

***Lora rufa* (Montagu)**

English Coast: Swanton (1912) listed it from Weston and Clevedon, perhaps meaning empty shells. Several empty shells at Clevedon (Ladye Point), 21.12.72.

Sub-Class *Opisthobranchia**

SEA SLUGS

Order BULLOMORPHA

Sub-Order Retusacea

RETUSIIDAE

***Retusa obtusa* (Montagu)**

Welsh Coast: recorded from Barry by Purchon (1948, as *R. alba*) and apparently unaffected by the cold winter of 1962/1963 (Crisp, 1964). The distribution and life history of this population were described by Smith (1967). It is still common at Barry with occasional specimens recorded up to Cardiff.

English Coast: "frequent in muddy estuaries and brackish waters, Weston, Burnham and Clevedon" (Swanton, 1912, as *Tomatina*, perhaps referring more to shells than living animals). Now common, up to 56 per sq m, on mud flats from Stert to Sand Bay (Boyden & Little, 1973). Empty shells occur up to Avonmouth.

Order PYRAMIDELLOMORPHA

PYRAMIDELLIDAE

***Odostomia lukisi* Jeffreys**

English Coast: probably the less-common species associated with the tube-worm *Pomatoceros* at Porlock. Two specimens collected, 15.9.73 were positively identified as this species.

***Odostomia plicata* (Montagu)**

English Coast: this appears to be the commoner species of *Odostomia* associated with *Pomatoceros* at Porlock, Greenaleigh Bay and Minehead.

***Odostomia scalaris* (Macgillivray)**

Welsh Coast: common on *Mytilus* from the lower shore at Porthcawl (Rest Bay), 10.1.74.

* Classification follows Thompson (1976)

Order APLYSIOMORPHA

APLYSIIDAE

Aplysia punctata Cuvier

Sea Hare

English Coast: although common in North Devon, this species was not recorded in Somerset until 1976. One juvenile was found on the lower shore at Porlock, 17.3.76 and adults were common on the west side of Gore Point, 28.8.76, laying egg strings in great profusion. Some strings taken back to the lab. hatched out in about a week.

Order PLEUROBRANCHOMORPHA

Sub-Order Pleurobranchacea

PLEUROBRANCHIDAE

Berthella plumula (Montagu)

English Coast: single specimens on the middle shore at Porlock, 2.4.73, 6.9.75.

Order SACOGLOSSA

Sub-Order Elysiacea

ELYSIIDAE

Elysia viridis (Montagu)

English Coast: single small specimens from red algae at low water, Porlock, 30.8.73 and 17.3.76.

LIMAPONTIIDAE

Limapontia depressa Alder & Hancock

Welsh Coast: a population on the saltmarsh at Cardiff was unaffected by the direct effects of the cold winter 1962/1963, but was reduced in numbers following the increased erosion of the marsh (Crisp, 1964, as *L. capitata*). Very large numbers on the Lamby (Cardiff) salt marsh in 1973; small numbers at Peterstone Wentlooge, spawning, 5.5.76; and a few at the edge of the *Spartina* marsh at Magor.

English Coast: present on Clevedon salt marsh in 1971.

Order NUDIBRANCHIA

Sub-Order Dendronotacea

TRITONIIDAE

Tritonia lineata Alder & Hancock

English Coast: one in a muddy middle shore pool at Blue Anchor, 3.5.73.

DENDRONOTIDAE

Dendronotus frondosus (Ascanius)

English Coast: common on *Tubularia* at Watchet (Helwell Bay), 7.9.71 but not seen on many other visits between 1968 and 1976.

DOTOIDAE

Doto coronata (Gmelin)

Welsh Coast: sub-tidal at Breaksea Point (Purchon, 1948, as *Idulia*).

Doto fragilis (Forbes)

Welsh Coast: one at Kenfig in October 1972.

Sub-Order Doridacea

GONIODORIDIDAE

Goniodoris nodosa (Montagu)

Welsh Coast: several with spawn in St Donats Bay, 17.3.76.

English Coast: common at Porlock (Bassindale, 1943c). Individuals collected from Porlock, 27.2.71 and 1.3.75; common 8.3.77; and from Minehead, 2.3.75. All at low water springs and usually accompanied by patches of dorid eggs.

Ancula cristata (Alder)

Welsh Coast: recorded from Kenfig and Sully by Purchon (1948, 1957).

ONCHIDORIDIDAE

Adalaria proxima (Alder & Hancock)

Some confusion exists between this species and *Onchidoris muricata*. Early records tended to identify *O. muricata* on the English Coast and *A. proxima* on the Welsh, which is certainly not the true

position. All recent collections initially identified as *O. muricata* have in fact turned out to be *A. proxima* and it is probable that Bassindale's (1941, 1943c) records of *O. muricata* also belong here.

Welsh Coast: recorded by Purchon (1948, 1957) at Llantwit Major, Aberthaw (Breaksea Point), Sully Island—with spawn, 7.1.47, and Portskewett. Sometimes found now at Sully (Swanbridge Bay).

English Coast: Kilve, Weston and Portishead (Purchon, 1948). Recent collections have established that the present range is from Porlock to Portishead, and it may be quite common at low water on rocky shores within this area.

***Acanthodoris pilosa* (Müller)**

Welsh Coast: recorded at Kenfig, Aberthaw and Sully—more abundant in Swanbridge Bay than Sully Bay. Newly metamorphosed slugs on *Alcyonidium polyomm* at Breaksea Point, 31.10.47 (Purchon, 1948, 1957). Seemingly unaffected by the cold winter of 1962/1963 (Crisp, 1964). Now frequent at Sully.

English Coast: both dark and pale forms abundant in Porlock Bay (Bassindale, 1943c). Single individuals at Blue Anchor and Kilve (Bassindale, 1941). Several seen at Minehead (purple form) and Watchet in recent years: common at Kilve, 1972–1974, and several seen at Hinckley Point and Brean Down in 1973 and 1974.

***Onchidoris bilamellata* (Müller)**

English Coast: abundant at Porlock, First Rocks (Bassindale, 1943c, as *O. fusca*). One at Watchet, 2.3.75 and several at Kilve, 20.12.72, 7.2.75.

***Onchidoris muricata* (Müller)**

Welsh Coast: unaffected by the cold winter at Sully (Crisp, 1964).

English Coast: recorded from Porlock, Blue Anchor, Kilve and Weston—with spawn, 22.4.39—by Bassindale (1941, 1943). Purchon (1948) however identified specimens collected by Bassindale from Kilve and Weston as *Adalaria proxima* and all these records probably refer to that species.

POLYCERIDAE

***Polycera nothus* (Johnston)**

English Coast: one from the lower shore at Porlock, 30.8.73.

***Thecatera pennigera* (Montagu)**

Welsh Coast: not seen until 1976 when it was very common at Porthcawl and Ogmere in September.

English Coast: not seen until 1976 when there were several on the lower shore of Greenaleigh Bay in August.

***Limacia clavigera* (Müller)**

English Coast: one at Porlock, Gore Point (Bassindale, 1943c, as *Euphurus claviger*).

ARCHIDORIDIDAE

***Archidoris pseudoargus* (Rapp)**

Sea Lemon

Welsh Coast: two cast ashore at Kenfig after a gale in September 1972.

English Coast: one adult and many egg masses at Hurlstone Point, 26.2.71.

KENTRODORIDIDAE

***Jorunna tomentosa* (Cuvier)**

English Coast: one at low water, Porlock, 11.7.68.

Sub-Order Aeolidacea

CORYPHELLIDAE

***Coryphella pedata* (Montagu)**

Welsh Coast: one at St Donats Bay, 17.3.76.

English Coast: many small specimens with spawn at low water, Porlock, 30.8.73: one only, 6.11.75.

***Coryphella pellucida* (Alder & Hancock)**

English Coast: a single individual from Greenaleigh Bay, 28.2.71.

FACELINIDAE

***Facelina coronata* (Forbes & Goodsir)**

English Coast: one on *Tubularia* from Watchet (West Beach), 25.9.76.

AEOLIDIIDAE

***Aeolidia papillosa* (L.)**

English Coast: a single *Eolis* of the *gracilis* type, probably this species, was found amongst preserved *Tubularia* collected at Blue Anchor (Bassindale, 1941). One large, cream coloured, specimen at Watchet (Helwell Bay), 26.4.68. Occasionally recorded at Clevedon.

EUBRANCHIDAE

Eubranchius tricolor Forbes

English Coast: a single individual from Greenaleigh Bay, 20.8.74.

CUTHONIDAE

Catriona aurantia (Alder & Hancock)

Welsh Coast: recorded at Llantwit Major by Purchon (1948, as *Cratena*).

Tenellia pallida (Alder & Hancock)

English Coast: on *Laomedea gelatinosa* from St Audries Bay (Stanford, 1860), a single individual from Portishead, 5.5.74.

Trinchesia caerulea (Montagu)

Welsh Coast: common on the mussel bed at Kenfig in March 1950 (Purchon, 1957, as *Cratena glottensis*).

Sub-Class *Pulmonata*

Order BASOMMATOPHORA

ELLOBIIDAE

Leucophytia bidentata (Montagu)

English Coast: on the banks of the River Avon near Pill (Cundall, 1882), (Swanton, 1912).

Phytia myosotis (Draparnaud)

Welsh Coast: a few, probably of this species, in the salt marsh near Lamby in September 1973.

English Coast: abundant in the Avon Gorge, with *Sphaeroma rugicauda* and on the banks of the River Avon near Pill (Bassindale, 1941). Abundant on salt marshes between Clevedon and New Passage, 1970–1972.

LYMNAEIDAE

Lymnaea peregra (Müller)

Wandering Snail

Upper Estuary: one recorded by Bassindale (1941) at Epney.

Class *BIVALVIA*

Sub-Class *Protobranchia*

NUCULIDAE

Nut Shells

Nucula turgida Leckenby & Marshall

Welsh Coast: a single damaged specimen, probably this species, on the shore at Lavernock, 23.2.74. *Nucula* shell fragments are abundant between Aberthaw and Barry.

English Coast: one in sand at low water, Porlock, 29.8.73. Fairly common on the lower beach at Blue Anchor, up to 15 per sq m (Boyden & Little, 1973). Empty shells common from Porlock to Weston, and occasionally further upstream.

Nucula nucleus (L.)

English Coast: valves common at Porlock, and the living animal recorded as common at Blue Anchor in mud below mean tide level by Bassindale (1941, 1943c). No *N. nucleus* have been found in the Estuary recently and this observation may refer to *N. turgida*.

Sub-Class *Lamellibranchia*

Order DYSODONTA

MYTILIDAE

Mussels

Modiolus barbatus (L.)

Bearded Horse Mussel

English Coast: a single large mussel amongst *Tubularia* on Greenaleigh Point, 8.2.74.

Musculus discors L.

Green Crenella

English Coast: five collected from Porlock (First Rocks) by Bassindale (1943c). Now regularly found in *Laminaria* holdfasts at Porlock, amongst *Tubularia* on Greenaleigh Point, and in piddock holes at Kilve. Single individuals have been found at Minehead and Blue Anchor.

Musculus costulatus (Risso)

English Coast: recorded at Porlock, 30.8.73.

Mytilus edulis (L.)

Common Mussel

Welsh Coast: recorded at Kenfig, Llantwit Major, Breaksea, Barry and Sully by Purchon (1948, 1957). An extensive bed of large, 5 cm length, mussels occurs on flat rocks at Kenfig (Gwely'r

Misgl) and on Sker Point. Rocky shores to the west of Porthcawl are dominated by mussels. There are some very old individuals on Ogmores Rocks near low water. Mussel beds are generally well-developed on exposed points as far east as Marcross, where they are rather broken. A mid-shore bed occurs at St Donats Point and the most up-channel bed is found in a freshwater stream on the upper shore at Llantwit Major. Scattered individuals are found as far as Lavernock Point and are of the unguulate, slow growth form. Abundant in Roath Dock (Cardiff). Isolated individuals occur at Goldcliff.

English Coast: common and widely distributed in Porlock Bay (Bassindale, 1943c): small individuals widespread on the middle shore at Blue Anchor; occasional small specimens from Kilve and Portishead (Bassindale, 1941). No mussel beds comparable to those along the Welsh Coast occur: there is one small bed in the freshwater stream west of Gore Point (Porlock) where predation by *Nucella* is inhibited through the low salinity. There was a larger patch on fixed gravel north east of Minehead Harbour Wall in 1968 but it was subsequently smothered in sand. Small individuals were common in crevices at Hurlstone Point until the hot summers of 1975/1976 when numbers fell. Large clusters of small individuals are found on the intake tower for Hinckley Point power station. Scattered individuals are found on all shores east to Hinckley Point and, rarely, at Sand Point, Clevedon and Portishead. There is an abundant population of large mussels in Portishead Dock which have the strongly purple mantle edges of var. *galloprovincialis*.

Upper Estuary: isolated individuals reported from Aust by Bassindale (1941) and also in recent years.

Order OSTREIFORMES

OSTREIDAE

Oysters

Ostrea edulis L.

Flat Oyster

Welsh Coast: attached empty shells in the mussel bed at Kenfig (Purchon, 1957): oyster shells were not uncommon at Sully and several valves, showing little sign of abrasion were firmly attached. It seemed probable that oysters had lived there recently although no living specimens were obtained (Purchon, 1948). Old empty shells are still common and six living animals, 9 cm in diameter, were found at Porthcawl (Rhych Point), 25.9.76.

English Coast: there used to be productive oyster beds in Blue Anchor Bay (Hewitt, 1906) but Bassindale (1941, 1943c) could only record empty shells there and at Porlock. There are many oyster perches at Porlock Weir but recent attempts to grow oysters in them have been unsuccessful (Commander M. Ingram, personal communication).

Order PSEUDOLAMELLIBRANCHIA

ANOMIIDAE

Saddle Oysters

Anomia ephippium L.

Welsh Coast: recorded at Kenfig by Purchon (1957).

English Coast: common and large at Porlock, but only a few at Blue Anchor (Bassindale, 1941, 1943c). Probably this species common at Porlock, in Greenaleigh Bay and at Minehead (Madbrain Sands). A few at Blue Anchor, 27.8.73. There may be some confusion with *H. squamula*.

Heteranomia squamula (L.)

Welsh Coast: recorded at Llantwit Major and Aberthaw by Purchon (1948, 1957). Recently common at Aberthaw (Limpert Bay).

English Coast: one at Porlock, First Rocks (Bassindale, 1943c).

PECTINIDAE

Scallops

Chlamys distorta (da Costa)

Hunchback Scallop

English Coast: one specimen and some odd valves from Porlock (Bassindale, 1943c); one living scallop from Greenaleigh Bay, 28.2.71.

Chlamys varia (L.)

Variegated Scallop

Welsh Coast: one at Fontygary Bay, 20.8.74.

English Coast: one at Porlock (Bassindale, 1943c) and individuals seen there on various occasions recently. One from Blue Anchor.

Order EULAMELLIBRANCHIA

ERYCINIDAE

Lasaea rubra (Montagu)

Welsh Coast: a few in patches of the lichen *Lichina pygmaea* at Monknash, 25.5.74.

English Coast: locally common in rare patches of *L. pygmaea* at Porlock.

Kellia suborbicularis (Montagu)

English Coast: quite common at Porlock and regularly found east to Blue Anchor. Occasional at Watchet.

CARDIIDAE

Cockles

Cerastoderma edule L.

Common Cockle

Welsh Coast: recorded at Barry by Purchon (1948, as *Cardium*). Spat are often abundant in the mud of Barry Harbour but there are few adults, restricted to the muddy gravel areas. Several small cockles (1 cm) in gullies between rocks at Penarth Head.

English Coast: Bassindale (1941) only recorded empty shells. The abundance of these at Minehead suggests an offshore population there. A single live cockle was found on the shore at Weston in 1971. Empty shells are sporadic up the Estuary to Clevedon.

Cerastoderma glaucum (Poiret)

Welsh Coast: abundant in Aberthaw lagoon during the winter of 1971 (Boyden & Russell, 1972, as *Cardium*) but the population appeared to die out during the following year. Large and small specimens were abundant in August 1976 and, although appearing moribund, had recovered vigour by September.

English Coast: common in Portishead Dock (Matthews, 1924; Purchon, 1938, 1939, as *Cardium edule* var. *lamarki* (Bassindale, 1941)). Currently found in Weston Marine Lake and Portishead Dock (Boyden & Russell, 1972). Empty shells occur on the foreshore below these sites but no living cockles have been found.

VENERIDAE

Venerupis pullastra (Montagu)

Pullet

Welsh Coast: Porthcawl, 20.2.77.

Venerupis saxatilis (Fleuriu)

Welsh Coast: recorded from Kenfig and Aberthaw by Purchon (1948, 1957, as *Paphia*). Single specimens, attached to holdfasts of *Fucus serratus* have been seen at Marcross on several occasions.

LUTRARIIDAE

Lutraria lutraria (L.)

Otter Shell

English Coast: small individuals occasional in Portishead Dock (Purchon, 1938), but not found there recently.

SCROBICULARIIDAE

Abra tenuis (Montagu)

Welsh Coast: one individual, probably this species amongst *Macoma* at Magor.

English Coast: a single specimen of *Abra*, perhaps this species, found in shell gravel on the lower shore at Minehead (Madbrain Sands, 1972).

Scrobicularia plana (da Costa)

Welsh Coast: single specimens recorded by Rees (1940) at Peterstone Wentlooge and Purchon (1948) at Sully. Not recorded by Purchon at Barry but quite dense populations existed in the Old Harbour prior to 1963. Most individuals were small, mostly 0.5–1 cm and none exceeding 2.5 cm, 22.9.62. Total mortality in the cold winter of 1962/1963 (Crisp, 1964). Common again by 1970 and locally abundant, up to 160 per sq m, in soft mud on Penarth Flats in 1973 and 1974. Several found in peat on the upper shore at Peterstone Wentlooge in 1973. A few large specimens at Magor and many on the upper shore at Caldicot, first noted in 1975.

English Coast: frequent in mud and clay at low water, Weston (Swanton, 1912; Bassindale, 1941). There is one living population in Minehead Harbour. Empty shells are common in Porlock salt marsh and submerged forest, and can be found right up the Estuary.

Upper Estuary: empty shells at Aust and Sheperdine (Bassindale, 1941).

TELLINIDAE

Macoma balthica (L.)

Baltic Tellin

Welsh Coast: recorded from Aberthaw (Breaksea Point) and Barry by Purchon (1948). Abundant at Peterstone Wentlooge (Rees, 1940; Purchon, 1948). Not affected by the cold winter of 1962/1963 (Crisp, 1964). Common at Barry in 1970 but less so in 1972. Generally common in mud flats from Penarth to Caldicot.

English Coast: common in muddy sand on the middle shore at Blue Anchor and Weston, rare at Portishead (Bassindale, 1941): one of our commonest shells about Weston and between Burnham and Brean (Swanton, 1912). Two individuals from Minehead (Madbrain Sands), 5.7.73: common in muddy sand at Blue Anchor and from Steart to Weston, maximum density 884 per sq m (Boyden & Little, 1973): not so common at Sand Bay, Clevedon, Portishead or Portbury. Those at Portishead in March 1973 were mostly juveniles but larger individuals were found at Avonmouth and New Passage.

Upper Estuary: abundant in stiff mud at Aust and Sheperdine, and two from Sharpness (Bassindale, 1941). Fairly common from Aust to Sharpness in 1972 and 1974.

HIATELLIDAE

Hiatella arctica (L.)

Welsh Coast: present at Kenfig and Llantwit Major, Aberthaw (Breaksea Point) and Barry (Purchon, 1948, 1957). Now generally abundant at low water at Breaksea and Barry but not seen further east.

English Coast: common at Porlock, First Rocks (Bassindale, 1943c, as *Saxicava gallicana*). Fairly common there in *Laminaria* holdfasts, 30.8.73 and single individuals from Greenaleigh Bay and Minehead (Madbrain Sands) in 1973 and 1974.

MYIDAE

Mya arenaria L.

Sand Gaper

English Coast: recorded from Portishead Dock (Purchon, 1938) but no living animals found there in 1971 and 1972. Fairly common in Clevedon Swimming Pool, 17.12.72. An empty shell was found at Blue Anchor, 4.2.73.

PHOLADIDAE

Barnea candida L.

Piddocks

White Piddock

Welsh Coast: Aberthaw (Breaksea Point) Purchon (1948).

English Coast: Bassindale (1941) found empty shells in rock borings at Blue Anchor and Kilve. Living animals now common in the stiff clay of Porlock submerged forest, and occasional in clay amongst the rock at Hinckley Point.

Barnea parva (Pennant)

Little Piddock

Welsh Coast: Aberthaw (Breaksea Point) and Sully Island (Purchon, 1948). Common in the mussel bed at Porthcawl (Rest Bay) and at Breaksea Point but only empty shells seen recently at Sully. Living animals quite common on the lower shore at Lavernock Point, 21.1.73.

English Coast: Bassindale (1941) found but one living at Kilve, although there were many empty shells in borings both there and at Blue Anchor. Now abundant between Blue Anchor and Hinckley.

Pholas dactylus L.

Common Piddock

Welsh Coast: empty shells common in burrows at Penarth Head, 1974.

English Coast: Bassindale (1941) only recorded empty shells, but the species is now common or abundant in deep burrows from Blue Anchor to Hinckley Point. Empty shells are found in shell gravel as far up channel as Weston.

Sphenia binghami Turton

Welsh Coast: probably common in piddock holes as far east as Aberthaw.

English Coast: very common in *Laminaria* holdfasts and in lower shore crevices at Porlock in 1973: common in Greenaleigh Bay, at Minehead and Watchet (up to 100 per sq m in piddock holes, 14.9.73): present at Blue Anchor and Kilve. Empty shells east to Hinckley Point.

TEREDINIDAE

Shipworm

Teredo navalis L.

Welsh Coast: in piles near the sewer mouth at Peterstone Wentlooge (Purchon, 1948).

English Coast: *Teredo* sp. locally common in buried driftwood, Porlock Bay, 1974.

Class CEPHALOPODA Order DECAPODA

SEPIIDAE

Sepia officinalis (L.)

Common Cuttlefish

Welsh Coast: Living cuttles in rock pools in Fontygary Bay in summer 1959 with egg masses on the fucoids. Eggs found, usually attached to fucoids, at Nash Point, 23.6.74; Fontygary Bay, July 1973 and Aberthaw, 10.7.71.

English Coast: occasionally netted at Stolford and Weston, e.g. 5.6.40 (Bassindale, 1940). Occasionally caught in the intakes of Hinckley Point power station. Developing egg capsules cast up in Greenaleigh Bay, 20.8.74.

Upper Estuary: occasionally caught in kypes at Oldbury, June 1938, May 1939 (Bassindale, 1940).

SEPIOLIDAE

Sepiola atlantica (d'Orbigny)

Little Cuttle

English Coast: occasionally taken in shrimp nets at Stolford and Burnham in 1939 (Bassindale, 1941). A little cuttle, perhaps this species, was reported to us as caught in Porlock Bay in August 1976.

Upper Estuary: rarely taken at Oldbury (Bassindale, 1941).

LOLIGINIDAE

Loligo forbesi Steenstrup

Common Squid

Upper Estuary: one caught in a kype at Oldbury in 1938 (Bassindale, 1941).

Squid Eggs

English Coast: egg capsules in the sand of Greenaleigh Bay (capsules on the surface attached to an anchor underneath), 20.8.74 and 27.8.76. Many clusters in varying stages of development. On both occasions young squids hatched from capsules taken back to the lab. They looked more like pictures of *Alloteuthis subulata* than anything else.

Order OCTOPODA

OCTOPODIDAE

Octopus vulgaris Lamarck

Common Octopus

Welsh Coast: one at Kenfig in 1950 (Purchon, 1957).

English Coast: one stranded on Hurlstone Point, 1.4.76 and returned, alive, the next day.

PHYLUM ENTOPROCTA

No systematic attempt has been made to collect Entoprocta. Nevertheless they are a common feature of the Lower Estuary shore fauna.

PEDICELLINIDAE

Pedicellina cernua (Pallas)

Welsh Coast: Aberthaw (Breaksea Point) and Barry (Purchon, 1948).

Pedicellina hispida Ryland

Welsh Coast: Porthcawl, probably this species, September 1976.

Pedicellina nutans Dalyell

Welsh Coast: Porthcawl, probably this species, September 1976.

Barentsia gracilis (Sars)

Welsh Coast: Aberthaw (Breaksea Point), Barry, and sub-tidally at Sully (Purchon, 1948). Sully, 25.10.76.

English Coast: under stones at low water, Kilve, 18.8.39 (Bassindale, 1941).

Barentsia mutabilis (Toriumi)

Welsh Coast: Porthcawl, September 1976.

LOXOSOMATIDAE

Loxosomella phascolosomata (Vogt)

Welsh Coast: on *Golfingia vulgaris* from mud at Sully (Swanbridge Bay), 15.4.76.

PHYLUM BRYOZOA

Class STENOLAEMATA

Order CYCLOSTOMATA

CRISIIDAE

Crisidia cornuta (L.)

English Coast: rare at Porlock in 1940 (Bassindale, 1943c) and only single colonies, 29.8.73 and 17.3.76.

Crisia eburnea (L.)

Welsh Coast: recorded by Purchon (1948, 1957) at Kenfig, Llantwit Major and, sub-tidally, from Aberthaw (Breaksea Point).

English Coast: common at Porlock, First Rocks (Bassindale, 1943c): many colonies there at low water, 29.8.73, 17.3.76.

***Crisia aculeata* Hassall**

Welsh Coast: one colony at Llantwit Major, 5.10.75.

English Coast: fairly common at First Rocks and Gore Point (Porlock) in 1940 (Bassindale, 1943c) and recorded there, 29.8.74, 17.3.76. One colony from Greenaleigh Bay, 8.2.74.

***Crisia denticulata* (Lamarck)**

English Coast: rare at Porlock (Bassindale, 1943c): one colony found there, 17.3.76.

TUBULIPORIDAE

***Tubulipora lobifera* Hastings**

English Coast: two colonies at Porlock, First Rocks (Bassindale, 1943c, as *T. lobulata*). Many colonies, probably of this species, were found at Porlock, 29.8.73.

***Tubulipora liliacea* (Pallas)**

English Coast: fairly common at First Rocks and Gore Point (Porlock) (Bassindale, 1943c).

Unidentified ***Tubulipora***

Welsh Coast: Llantwit Major, 5.10.75.

English Coast: Porlock, 16.10.74 and 17.3.76: Greenaleigh Bay, 8.2.74.

DIASTOPORIDAE

***Berenicea patina* (Lamarck)**

Welsh Coast: recorded by Purchon (1948, 1957) from Llantwit Major, Aberthaw (Breaksea Point), Barry and Sully. Now common at low water from Aberthaw to Sully, where it was abundant, 25.10.76.

English Coast: Porlock, abundant at First Rocks and Gore Point but not common in Porlock Bay: several colonies at Blue Anchor, 22.4.40 (Bassindale, 1941, 1943c). Recently common at Porlock, Minehead and Blue Anchor.

***Berenicea sarniensis* (Norman)**

English Coast: common and widespread at Porlock, with a number of new colonies (Bassindale, 1943c, as *Diastopora*).

LICHENOPORIDAE

***Disporella hispida* (Fleming)**

Welsh Coast: Aberthaw (Breaksea Point) (Purchon, 1948, as *Lichenopora*).

English Coast: common and widespread at Porlock, numerous small colonies (Bassindale, 1943c, as *Lichenopora*). Recently many colonies at Porlock and in Greenaleigh Bay.

Class *GYMNOLAEMATA*
Order *CHEILOSTOMATA*

AETIDAE

***Aetea anguina* (L.)**

English Coast: one colony on a *Laminaria* holdfast at Porlock, 29.8.73.

SCRUPARIIDAE

***Scruparia ambigua* (d'Orbigny)**

English Coast: one colony at Porlock, First Rocks (Bassindale, 1943c).

MEMBRANIPORIDAE

***Membranipora membranacea* (L.)**

Welsh Coast: Purchon (1957) found it on *Laminaria* at Kenfig in 1950.

English Coast: on *Laminaria* fronds at Porlock, 29.8.73.

***Electra pilosa* (L.)**

Welsh Coast: recorded by Purchon at Llantwit Major and Barry (Purchon, 1948, 1957, as *Membranipora*).

English Coast: common at Porlock (First Rocks and Gore Point) but rare in Porlock Bay (Bassindale, 1943c). We have found it common from Porlock to Watchet.

***Electra monostachys* (Busk)**

Welsh Coast: recorded from Kenfig to Portskewett by Purchon (1948, 1957, as *E. hastingi*). Recently common at Sully.

English Coast: Bassindale found one colony in Porlock Bay and recorded it common from Blue Anchor to Sheperdine (Bassindale, 1941, 1943c, as *E. hastingiae*). Recently common from Blue Anchor to Portishead and one of the most widely distributed bryozoans in the Estuary.

Upper Estuary: Aust and Sheperdine (Bassindale, 1941, as *E. hastingiae*). We have found it there and at Sharpness (Wellhouse Bay) but not at Sharpness itself.

***Electra crustulenta* (Pallas)**

Welsh Coast: abundant on the floating boom in Roath Dock, Cardiff.

English Coast: not recorded by Bassindale but it is now one of the commonest bryozoans along the upper stretches of the English Coast. We have found it abundant at Brean Down and Portishead.

Upper Estuary: Bassindale (1941, as var. *fossaria*) recorded it common at Aust and Sheperdine, with a little at Sharpness. We have found it abundant at Aust and present at Sharpness (Wellhouse Bay).

***Conopeum reticulum* (L.)**

Welsh Coast: recorded at Kenfig (Sker Point), 18.3.76.

***Callopora lineata* (L.)**

English Coast: fairly common at Porlock (Bassindale, 1943c, as *Membranipora*). We have found it there on *Anomia* shells and *Laminaria* holdfasts.

***Callopora dumerilii* (Audouin)**

English Coast: rare at Porlock (First Rocks and Gore Point) (Bassindale, 1943c, as *Membranipora*).

One colony from Porlock, 29.8.73.

***Callopora aurita* (Hincks)**

Welsh Coast: recorded by Purchon from all his sites, Kenfig to Portskeewett (Purchon, 1948, 1957).

Found recently at Llantwit Major and Sully.

English Coast: Porlock, Blue Anchor, Kilve and Weston (Bassindale, 1941, 1943c, as *Membranipora*): now one of the most widespread and common bryozoans in the area, common from Porlock to Portishead.

Upper Estuary: Bassindale (1941, as *Membranipora*) found it the commonest species at Aust, and it is still common there at low water.

FLUSTRIDAE

***Flustra foliacea* (L.)**

Welsh Coast: found at Kenfig and, sub-tidally, at Aberthaw and Sully (Purchon, 1948, 1957).

Found in the mussel bed at Kenfig, 9.2.74.

English Coast: many colonies exposed on the lowest tides in Greenaleigh Bay.

***Chartella papyracea* (Ellis & Solander)**

Welsh Coast: recorded by Purchon (1957, as *Flustra*) at Kenfig.

SCRUPOCELLARIIDAE

***Scrupocellaria scrupaea* Busk**

English Coast: one colony at Porlock (Gore Point), 29.8.73.

***Scrupocellaria scruposa* (L.)**

English Coast: rare at First Rocks and Gore Point, Porlock (Bassindale, 1943c). Several colonies there at low water, 29.8.73, and 16.10.74.

***Scrupocellaria reptans* (L.)**

English Coast: rare at Gore Point (Porlock) and in Porlock Bay (Bassindale, 1943c).

BICELLARIELLIDAE

***Bicellariella ciliata* (L.)**

Welsh Coast: recorded at Barry and, sub-tidally from Aberthaw and Sully by Purchon (1948, 1957). Common at Llantwit Major, 5.10.75.

English Coast: one colony at Gore Point, Porlock (Bassindale, 1943c). Rare at Kilve, May 1939; common, 18.8.39 but absent 10.3.40 (Bassindale, 1941). Many colonies in 1973 at Porlock, Minehead, and Blue Anchor but none at Kilve.

BUGULIDAE

***Bugula fulva* Ryland**

English Coast: several colonies at low water springs, Porlock (Gore Point), 17.3.76.

***Bugula plumosa* (Pallas)**

Welsh Coast: recorded on the shore at Barry and sub-tidally at Aberthaw by Purchon (1948).

Very common on the lower shore in summer at Kenfig (Sker Point) and intermittently common east to Fontygary Bay.

***Bugula turbinata* Alder**

English Coast: many colonies at low water, Porlock, 29.3.73.

CRIBRILINIDAE

***Cribrilina* species**

English Coast: on rocks at low water, Blue Anchor, 3.5.73.

HIPPOTHOIDAE

Hippothoa distans MacGillivray

English Coast: common all over the Porlock shores (Bassindale, 1943c).

Chorizopora brogniarti (Audouin)

English Coast: one colony from Porlock Bay (Bassindale, 1943c).

ESCHARELLIDAE

Escharella immersa (Fleming)

Welsh Coast: on the shore at Sully and sub-tidally from Aberthaw and Peterstone Wentlooge (Purchon, 1948, 1957). On an *Heteranomia* shell at Aberthaw, 14.4.75; and present at Sully, 25.10.76.

English Coast: Bassindale (1941, 1943c, as *Mucronella peachii*) recorded it at Porlock, Blue Anchor, Kilve and Weston. We have found it abundant from Porlock to Weston, and recorded one dead colony at Portishead, 5.5.74.

Escharella ventricosa (Hassall)

English Coast: widespread but rare at Porlock (Bassindale, 1943c, as *Mucronella*).

Escharella variolosa (Johnston)

English Coast: widespread but rare at Porlock (Bassindale, 1943c, as *Mucronella*). Single colonies from Porlock, 29.8.73 and Greenaleigh Bay, 8.2.74.

SCHIZOPORELLIDAE

Schizomavella linearis (Hassall)

Welsh Coast: recorded at Aberthaw (Breaksea Point) by Purchon (1948); and recently present at Llantwit Major, 5.10.75 and Sully, 25.10.76 on rocks at low water.

English Coast: common at Porlock (Bassindale, 1943c, as *Schizoporella*). Recently common at Porlock, Greenaleigh Bay and Minehead (Madbrain Sands).

Escharina spinifera (Johnston)

English Coast: abundant at Porlock (First Rocks and Gore Point) (Bassindale, 1943c, as *Schizoporella*).

Common on *Laminaria* holdfasts at Porlock, 29.8.73, and present in Greenaleigh Bay, 8.2.74.

HIPPOPORINIDAE

Cryptosula pallasiana (Moll)

Welsh Coast: recorded at Aberthaw (Breaksea) by Purchon (1948). Common at Llantwit Major, 5.10.75, and present at Kenfig (Sker Point), 18.3.76 and on the *Sabellaria* reef at St Donats, 17.3.76.

English Coast: fairly common at Porlock (First Rocks and Gore Point) (Bassindale, 1943c, as *Lepralia*). Purchon (1938) found it encrusting serpulid wormtubes on a ship in Portishead Dock. Recently abundant at Porlock and in Greenaleigh Bay.

MICROPORELLIDAE

Microporella ciliata (Pallas)

English Coast: a single colony on Gore Point (Porlock) (Bassindale, 1943c).

SMITTINIDAE

Smittoidea reticulata (MacGillivray)

English Coast: one colony from Porlock Bay (Bassindale, 1943c, as *Smittia*). We have found it at low water from Porlock to Blue Anchor.

EXOCELLIDAE

Escharoides coccineus (Abildgaard)

English Coast: one colony at Porlock, 16.10.74.

CELLEPORIDAE

Celleporaria pumicosa (Pallas)

English Coast: one colony at Porlock (Gore Point) (Bassindale, 1943c). Several colonies on *Laminaria* holdfasts at Porlock, 29.3.73.

Celleporina hassalii (Johnston)

English Coast: on *Laminaria* holdfasts at Porlock, 29.8.73.

Order CTENOSTOMATA

ALCYONIDIIDAE

Alcyonidium gelatinosum (L.)

Welsh Coast: present on Sker Point (Kenfig), 18.3.76 and common at Llantwit Major, 5.10.75.

English Coast: recorded at Blue Anchor, Kilve and Weston by Bassindale (1941). We have found colonies on most beaches between Porlock and Brean Down, but none at Weston.

Upper Estuary: large colonies occasionally taken in kypes at Oldbury (Bassindale, 1941).

***Alcyonidium polyoum* (Hassall)**

Welsh Coast: recorded from Llantwit Major, Aberthaw (Breaksea Point), and Sully by Purchon (1948, 1957). Generally common now from Kenfig east to Sully. Present on north coast of Flatholm.

English Coast: common at Porlock and rare at Portishead (Royal Beach) (Bassindale, 1943c, 1941; Purchon, 1938, as *Membranipora hexagonia*). We have found it common from Porlock to Brean Down and present at Weston and Portishead (Royal Beach).

Upper Estuary: present at Aust on *Fucus serratus*, 4.5.74.

***Alcyonidium hirsutum* (Fleming)**

Welsh Coast: in middle shore pools on *Corallina*, Porthcawl Point.

English Coast: fairly common at Porlock (First Rocks and Gore Point) (Bassindale, 1943). Hincks (1880) recorded it at Watchet. We have found it at Porlock and at Blue Anchor on upper shore *Corallina* in pools, and at Watchet on *Gigartina* from the middle shore.

FLUSTRELLIDAE

***Flustrellidra hispida* (Fabricius)**

Welsh Coast: common on *Fucus* and on rocks at Kenfig and Llantwit Major: very common on rocks at Rhoeose Point.

English Coast: common at Porlock, First Rocks (Bassindale, 1943c, as *Flustrella*). We have found it common there and at Hurlstone Point.

VESICULARIIDAE

***Vesicularia spinosa* (L.)**

Welsh Coast: at Barry and, sub-tidally, at Aberthaw (Purchon, 1948). Present at Llantwit Major, 5.10.75.

***Bowerbankia gracilis* Leidy**

Welsh Coast: Sully, 25.10.76.

***Bowerbankia gracillima* (Hincks)**

Welsh Coast: a temporary inhabitant of salt marsh pools at Lamby, Cardiff, with the protozoans *Folliculina* and *Vaginicola* (Brough *et al.*, 1964).

***Bowerbankia imbricata* (Adams)**

English Coast: Purchon (1938) found it common on overhanging ledges at low water on Royal Beach, Portishead. We have found it in the same place, and also one colony on Brean Down.

Upper Estuary: Aust; on the reef at low water (Bassindale, 1941). Present there at low water, 4.5.74.

***Bowerbankia pustulosa* (Ellis & Solander)**

Welsh Coast: abundant growth of this species (or possibly *B. citrina*) at low water springs, Porthcawl (Rhych Point), 25.9.76.

***Amathia lendigera* (L.)**

Welsh Coast: recorded by Purchon (1948) at Aberthaw (Breaksea Point). One colony from the mussel bed at Kenfig (Sker Point), 18.3.76.

English Coast: single colonies from Porlock, 29.8.73, and Greenaleigh Bay, 8.2.74.

WALKERIIDAE

***Walkeria uva* (L.)**

Welsh Coast: sub-tidal at Aberthaw (Purchon, 1948). Growing over *Alcyonidium hirsutum* at Porthcawl in September 1976. It is probably this species which is abundant at Sully around low water springs.

English Coast: on *Laminaria* holdfasts, 29.8.73, and stones, 31.7.76 at Porlock; on *Amathia* from Greenaleigh Bay, 8.2.74; and one colony, probably this species, from Minehead (Madbrain Sands), 28.8.73.

***Farrella repens* (Farre)**

English Coast: Bassindale (1941) found var. *elongata* on empty *Pholas* shells at Blue Anchor. We have found the same variety at Blue Anchor, 27.8.73; at Kilve, 7.2.74; and at Brean Down on *Bowerbankia*, 13.9.73.

Upper Estuary: on rocks and *Tubularia* at Aust.

PHYLUM ECHINODERMATA

Class CRINOIDEA

ANTEDONIDAE

Antedon bifida (Pennant)

Feather Star

English Coast: single individuals at Porlock (Gore Point), 31.10.74 and 27.2.75; with the parasitic annelid *Myzostoma*.

Class ASTEROIDEA

STAR FISHES

Order SPINULOSA

SOLASTERIDAE

Crossaster papposus (L.)

Sun Star

Welsh Coast: recorded from Aberthaw and Barry by Purchon (1948, as *Solaster*). Individuals seen recently at Aberthaw, Fontygary Bay and Sully.

English Coast: rare at Kilve, 21.5.39 but common there, 18.8.39 (Bassindale, 1941, as *Solaster*).

Recently it has been seen regularly at extreme low water from Porlock to Minehead, and once at Watchet, 8.10.76.

ECHINASTERIDAE

Henricia oculata Pennant

This species was included by Mortensen (1927) under *H. sanguinolenta* (O. F. Müller) and all the older records are under this name. However the species are once again recognized to be distinct, with *H. oculata* the southern species, and it is assumed that all the southwestern British *Henricia* belong to this form.

Welsh Coast: a few can usually be found at Llantwit Major and Aberthaw (Breaksea Point) (Purchon, 1948, 1957) and recent records. Both purple and yellow forms are found.

English Coast: regularly found from Porlock to Minehead but not further east. Commoner in spring than autumn.

Order FORCIPULATA

ASTERIIDAE

Asterias rubens L.

Common Starfish

Welsh Coast: Kenfig, Llantwit Major (Purchon, 1957). Generally common at Kenfig (Gwely'r Misgl) and sometimes in very large numbers at Nash Point. Hundreds devastated the mussel bed there in July 1974.

English Coast: regularly found from Porlock to Minehead, but not further east. Commonest at Hurlstone Point in the spring.

Class OPHIUROIDEA

BRITTLE STARS

Order OPHIURAE

OPHIOTRICHIDAE

Ophiothrix fragilis (Abildgaard)

Welsh Coast: recorded at Kenfig (Gwely'r Misgl) and Llantwit by Purchon (1957). Now occasional at Aberthaw.

English Coast: Bassindale (1943c) found it common at Porlock and it is usually found there now from First Rocks around the Bay and east to Greenaleigh Bay. Sometimes very common as on 16.3.72.

OPHIUCOMIDAE

Ophiocomina nigra (Abildgaard)

English Coast: a single specimen from Greenaleigh Bay, 20.3.73.

AMPHIURIDAE

Amphipholis squamata (Delle Chiaje)

Welsh Coast: Kenfig, Llantwit Major and Aberthaw; several newly metamorphosed on the sponge *Hymeniacidon* at Aberthaw, 31.10.47 (Purchon, 1948). Small ophiuroids, probably of this species, are common at Llantwit Major and Aberthaw.

English Coast: single specimens at Porlock and Blue Anchor (Bassindale, 1941, 1943c). Small ophiuroids, probably of this species are now found from Porlock to Watchet.

Class *ECHINOIDEA*

SEA URCHINS

Order DIADEMATOIDEA

ECHINIDAE

Psammechinus miliaris P. L. S. Müller

Welsh Coast: recorded from Kenfig and, sub-tidally, at Aberthaw by Purchon (1948, 1957).

One at Kenfig (Sker Point) in September 1973.

English Coast: occasional at Gore Point and in Porlock Bay, 3.4.69, 16.3.72, 27.2.75 and 31.7.76.

One large one in a low water pool at Minehead (Madbrain Sands), 22.5.75.

Echinus esculentus L.

Common Sea Urchin

English Coast: common in Porlock Bay (Bassindale, 1943c). Adults are locally common at Porlock on the lowest tides in spring.

Class *HOLOTHUROIDEA*

SEA CUCUMBERS

Order DENDROCHIROTA

CUCUMARIIDAE

Cucumaria saxicola Brady & Robertson

English Coast: all sizes locally common at Porlock (First Rocks) (Bassindale, 1943c).

Cucumaria lactea (Forbes & Goodsir)

English Coast: three from Porlock (Gore Point), 27.8.72. One, probably this species, from the same place, 8.3.77.

PHYLUM *CHORDATA*

Sub-Phylum *Tunicata*

SEA SQUIRTS

Class *ASCIDIACEA*

Order ENTEROGONA

ASCIDIIDAE

Ascidia aspersa (O. F. Müller)

Welsh Coast: found on the west side of Sker Point (Kenfig).

Ascidia mentula (O. F. Müller)

English Coast: only one positive record, from Greenaleigh Bay, 20.8.74.

Ascidia conchilega (O. F. Müller)

English Coast: frequent from Porlock to Greenaleigh Bay, occasional east to Blue Anchor.

Order PLEUROGONA

STYELIDAE

Styela coriacea (Alder & Hancock)

Welsh Coast: two on a crab, *Maia squinado*, at Kenfig in June 1972.

Polycarpa pomaria (Savigny)

English Coast: two found at Porlock, 29.8.73.

Dendrodoa grossularia (Van Beneden)

Welsh Coast: generally common now, though not recorded by Purchon, on boulders at low water springs. Extremely common at Rhoose Point. Clumps of dull brown specimens under flat stones on the south shore of Sully Island.

English Coast: common as far east as Weston, though not recorded anywhere by Bassindale. Those on western coasts are of the usual red colour but further east they become browner and paler. A few small ones at Sand Point.

Botryllus schlosseri (Pallas)

Star Ascidian

Welsh Coast: several small colonies on mussels in Roath Dock, Cardiff, 1.11.74 but not seen on the open shore.

English Coast: abundant in Portishead Dock (Matthews, 1924, as *B. violaceus*: Purchon, 1938). The only recent records are also from the Dock, on buoys with mussels, 17.12.72 in a salinity of 18‰.

Botrylloides leachi (Savigny)

English Coast: one very small colony on a stone at Greenaleigh Bay, 8.2.74. Searched for but not found on other visits.

PYURIDAE

Pyura tessellata (Forbes)

Welsh Coast: perhaps this species at Aberthaw (Purchon, 1948).

English Coast: quite common in Porlock and Greenaleigh Bays. Present on the lower shore at Minehead, 28.8.75, 10.3.74.

MOLGULIDAE

Molgula citrina Alder & Hancock

Welsh Coast: probably this species common in Roath Dock, Cardiff, 14.10.74.

English Coast: frequent in Portishead Dock (Purchon, 1938).

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INDEX

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