fact

Educational Resource Pack

Fellowship Afloat

FELLOWSHIP AFLOAT CHARITABLE TRUST

RESOURCES AND IDEAS FOR EDUCATIONAL VISITS TO TOLLESBURY

Contents

FELLOWSHIP AFLOAT CHARITABLE TRUST • THE SAIL LOFTS • WOODROLFE ROAD
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Introduction

Fellowship Afloat have been receiving Junior School groups on board since1980 and are able to provide a great deal of expertise and local knowledge. Living on board is an amazing experience and we have no doubt that your visit will be worthwhile, educationally and socially.

The aim of this resource book is to give you information and ideas, so that you and the children can derive the maximum benefit whilst you are in Tollesbury. We are happy to meet with teachers beforehand to organise the programme and plan the visit to suit individual requirements. We are also happy to speak to parents and children about their visit, showing slides and answering questions.

The Classroom

There is a classroom in one of the sail lofts which is available for the exclusive use of school groups during their visit. Materials may be left in the classroom and children may work on assignments and leave unfinished work safely until they have another opportunity to return to it.

It would be appreciated if examples of work could be left on display after a visit as this provides inspiration for other groups.

The Programme

While we can design the programme around your particular needs we also want to make the best use of the facilities that Fellowship Afloat have and the environment around us. A lot of what we do will be governed by the tide and the weather. The tide is predictable - the weather is not, but it has to be exceptional to prevent us getting out and about. The Chief Instructor is responsible for sailing and all water-based activites, and these will be planned around the tide.

This book contains suggestions for preparatory work, activities while at the centre and follow-up work here and back at school. You may wish to explore all the areas, or be selective. Our staff will be happy to provide expert knowledge and help with all aspects of the programme.

These are some of the opportunities that exist; if there are others which you want to explore do talk to us about them.

Study of Trinity
Boat Study
Village Study
Dredging in the estuary
Study of the Saltmarsh / Habitats
Walk around the sea wall
Sailing in Wayfarer Dinghies
Visits to Maldon or Colchester

Materials

You will need to bring your own materials with you for written work, recording, sketching etc. The following are all suggestions of things which we have found useful and you could use as a check list:

Pencils	A range, particularly soft ones for drawing HB for writing Coloured - in a variety of shades Water soluable
Charcoal	Charcoal pencils are a good idea - less messy
Chalks	
Crayon	Chubby stumps are useful for rubbings
Inks	
Pens	
Paper	Plain A4 for written work Cartridge for drawing cut to A4 size Mounting paper Sugar or kitchen paper for rubbings Watercolour paper
Rubbers	
Pencil sharpeners	
Paint	Acrylics Water colours
Brushes	Variety of sizes
Pastels	
Clip boards	
Binocular microscope	
Camera	
Hand lenses	
Specimen containers	Preferably with magnifying lids and millimetre graduations
Plastic bags	
Plastic wallets	To protect children's work
Metric tape measure	
Clinometer	
Ice cream containers	good for storage

The National Curriculum

The Lightvessel *Trinity*
full of opportunities

The Lightship - full of opportunities

The activities undertaken during educational visits to the Lightship focus around many different aspects of the National Curriculum. The specific combination will depend on the requirements of each particular group visiting the Lightship.

The rich habitat of saltmarsh combined with the unique experience of living aboard the Lightship lend themselves to developing all areas of the curriculum. This includes the creative, inspirational artistic subjects of English and Art and the logical questioning lines of investigative enquiry and analysis involved in Scientific and Geographical research.

For many groups studying Key Stage Two the educational activities at the Lightship centre around the three subject areas: Science, Geography and History. Maximum use is made of the fabulous resources provided by the local environment including: the village of Tollesbury, the salt marsh habitat, the sailing/boating opportunities and the Lightship itself.

The following pages look in more detail at the three subject areas: Science, History and Geography. The ideas listed are by no means definitive - they give a taster of the breath and diversity of experiences available during an educational visit.

Key Stage Two - Science

A field trip to Tollesbury includes the unique experience of staying on board the Lightship 'Trinity' and living in the middle of a completely different habitat - the saltmarsh. By living on the saltmarsh the children are continually participating in a *'hands on' investigative approach*. to learning about the saltmarsh including: the movement of the tides, the creatures moving and living in the mud, the extent to which the marsh is continually covered by the sea, the way the tide moves up the shoreline eroding gullies and creeks, the different birds feeding and living on the marsh. All this can be observed from looking out through the wide windows from the saloon on board Trinity!

The most popular projects enjoyed by visiting schools come into the *Life Processes and Living Things* section in the Science Programme of Study. Outlined below are two projects that are regularly requested.

Saltmarsh Study

The unique experience of living on the saltmarsh means that information and knowledge about the saltmarsh is continually being absorbed by the children in an informal 'hands on' style. To complement this, time is set aside to walk on the marsh and to study it at close quarters. Questions considered include:

- how and why did the saltmarsh form
- who/what lives on the saltmarsh
- how do animals and plants survive being covered with salt water
- identify plants and animals found
- is the saltmarsh the same all over - do the plants differ

Benthos Study

The children are taken out in the launch to a suitable part of the creek and under careful supervision given the chance to use dredge nets to carefully investigate the life forms found on the sea bed.

The life forms captured are transferred to large buckets and brought back to *Trinity* for further study. Questions considered:

- what was found in the nets
- identify animals from information resources on board
- study and examine under microscope
- consider life cycles of creatures found and adaptation to habitat
- record findings including sketches before creatures are returned
- why is it necessary to return creatures to same place

The children are given opportunities to question, observe and record findings and are encouraged to make suggestions and forward their own ideas and predictions and to back these up with evidence from observations. When using equipment clear instruction is given to enable the children to use apparatus correctly and safely.

Extra activities that could be included:

Key Stage Two Science

Under the *Materials and their Properties* section of the Science Programme of Study: part three - *Separating mixtures of materials,* the following experiments could be undertaken -

- that solid particles of different sizes can be separated sieving
- that some solids e.g. salt dissolve in water to give solutions but some do not e.g. sand, chalk
- that insoluble solids can be separated from liquids by filtering that solids that have dis solved can be recovered by evaporating the liquid from the solution *ref to the Red Hills of the Romans found at Tollesbury.*
- that there is a limit to the mass of solids that can dissolve in a given amount of water and that this limit is different for different solids.

Under *The Earth and Beyond* section a visit to Tollesbury provides a wonderful opportunity to study the stars and planets. Children from some areas may never have been able to see the night sky due to bright electric lights.

Key Stage Two - Geography

A field trip to Tollesbury provides an excellent opportunity for pupils to practice and study **Geographical skills.** Working in the field gives first hand experience of investigating the places and themes as listed in the National Curriculum Programme of Study:

Pupils should be given opportunities to:

a *investigate the physical and human features of their surroundings;*

b *undertake studies that focus on geographical questions and that are based on direct experience;*

c *become aware that the world extends beyond their own locality.*

Places - the contrasting locality of Tollesbury

Within this part of the Programme of Study pupils need to study another locality *'in which the physical and/or human features contrast with those in the locality of the school.'*At Tollesbury the village and saltmarsh habitat provide an unusual and interesting contrasting locality. A visit to Tollesbury can cover all aspects of Section Five of the Geography Programme of Study where the children will learn:

a about the main physical and human features, *e.g.: Blackwater estuary, Marina and boat yard, saltmarsh environment, Tollesbury village including church, school, shops and housing estates.*

b how localities may be similar and how they may differ, *eg both have schools but Tollesbury is in the country and contrasting one may be in the city or town*

c how the features of the localities influence the nature and location of human activities within them: *e.g. Tollesbury being on the estuary has a long tradition offishing and oyster industries but this has changed over the years to make way for leisure boating activities; caution is needed in building too close to the sea wall as land is liable to flooding in high Spring tides combined with a strong wind.*

d about recent or proposed changes in the localities - *in a country village most of the past community employment has been in farming or the fishing industry but in recent years a large housing estate has been built with many of the inhabitants working in nearby towns e.g. Maldon, Colchester and Chelmsford.*

e how the localities are set within a broader geographical context, *Tollesbury only has one main road linking it to other places but this has not restricted the expansion of the village. Easier and improved transport system has enabled people to live at the coast in the coun try and to work in the town or commute to London.*

A visit to Tollesbury can also form part of a **Geographical Thematic** Study. The location of Tollesbury on the Blackwater estuary places it in a fine position to study any of the four topics: Rivers, Weather, **Settlement and Environmental Change.**

Key Stage Two - History

A visit to Tollesbury can provide opportunities to look at various times in the past. If details of a particular time span is requested then the staff at the centre can advise on specific places to visit.

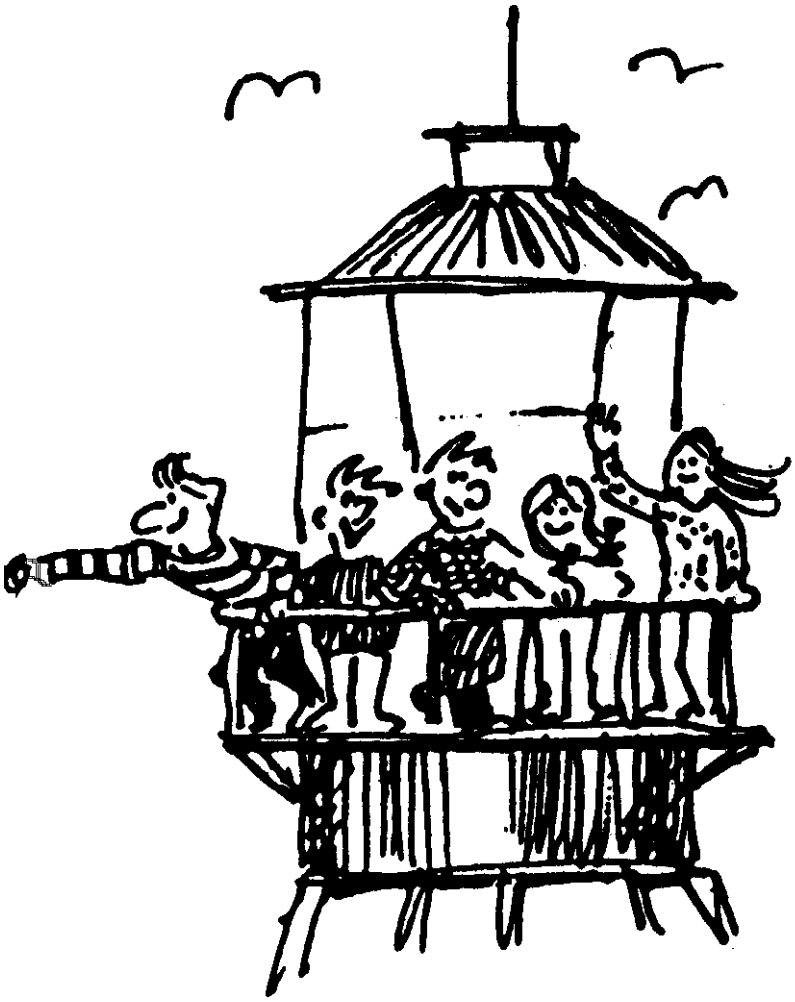
The following gives a taster of some of the interesting historical areas in and around Tollesbury:

Study Unit 1. Romans, Anglo-Saxons and Vikings in Britain The Red Hills found along the coast line provide the remains of an industry which produced salt from sea water. In Tollesbury fourteen possible red hill sites are known and further research would almost certainly discover more. Some of these are Roman, some older. There are also two possible Roman villa sites in Tollesbury. Tollesbury is approx. half hours drive from Colchester - well known for its Roman significance.

Study Unit 3a: Victorian Britain
Tollesbury Village provides some examples of Victorian buildings and at one time Tollesbury had its own railway to transport oysters from the saltmarsh!

Study Unit 3b: Britain since 1930
Tollesbury, like all communities in Britain no matter how small, was affected by the Second World War. In the Churchyard in the village the War Memorial pays tribute to those who died.
Along the sea wall the remains of Pill Boxes can been seen - used as sea defences against attack.
Tollesbury used to have its own pier but this was blown up in 1940 by the British so it could not be used as a landing stage by the enemy.

LIGHTVESSEL STUDY



SUGGESTIONS FOR THE STUDY OF TRINITY

PREPARATORY PRE VISIT WORK

Discuss the reasons why Lighthouses and Light Vessels were needed?

Why Lighthouses and Light Vessels?

Use maps of the coast of the British Isles to locate where they were constructed or positioned.

Investigate the work of Trinity House.

Research the History of Trinity House and of the 'Lights".

WORK ONBOARD TRINITY

Allow a whole day, or two half days for the Light Vessel Study.

1 Remind children of the things they discovered during the preparatory work before their visit.

2 Watch the video about Light Vessels so that children can have an idea of what it was like aboard a working Light Vessel.

3 Organise a visit to the various areas of the vessel. This is an opportunity for children to visit parts of the ship that are not normally available to them and to enable them to get the feel of the Light Vessel.

For many children this will be their first experience of a ship - except perhaps of a cross channel ferry - much of it will be difficult for them to conceive.

Divide the children into groups of about 4 or 5 each with an adult leader. The Light Vessel Quiz will prove useful as a guide to the various parts of the ship. Ask each group to start at a different point and to spend about five minutes before moving on. Some teachers will use the question and answer section of the quiz whilst others will prefer children to use their own skills of observation and discovery.

It will take about 45 minutes to an hour for each group to work its way around the vessel.

4 Bring the children back to the saloon for a general discussion of what they have seen and experienced and for the opportunity to ask questions and consider that which they have seen .

Each child will have his or her own thoughts on those areas which hold the most interest and of which areas of the vessel they would most like to do a closer study.

Group the children so that they can go back to one or two areas for further work.

CLOSE WORK OF INDIVIDUAL AREAS OF THE LIGHT VESSEL

1 STERN DECK

This is the area which we now know as the saloon and galley. Use the plan and early photographs to envisage how she looked at sea.

This area contained the galley, washrooms, toilets, mess room and stern deck. Use the photographs to identify where things originally were.

Make sketches of before and after.

Look at the view through the stern fairlead.

Sketch the area Use pastels, water colours etc.

Sketch, take rubbings of the port light which now goes through to the galley.

Look closely at the door and draw its fittings.

Identify the areas which were originally outside and those that were inside.

Measure and locate the original mess room, the galley and the toilet areas.

Look for any evidence of previous use.

Write in poetry or prose of life in this area.

2 CREWS QUARTERS

Look at the materials used in construction.

Compare the accommodation for the master with that for the engineers and the seamen. Give consideration for the reasons for the differences.

Take sketches of the bunks, brass fittings, port lights etc.

Think of the reasons why the Master needed a day cabin in addition to a cabin in which to sleep. What sort of task may have been performed there.? What sort of things would have been needed for the tasks.?

Take rubbings of brass fittings, port lights, doors, drawers etc.

Think about why the Light Vessel needed a magazine or powder store.

Imagine that you were the Master and write a log of his day's work.

Sit in one of the seamen's cabins and imagine what it would have been like to have lived aboard for several weeks in bad weather and a heavy sea.

Express your thoughts in prose or poetry.

Write a letter home to your wife and family.

3 FOREDECK

Look at all of the machinery on deck.

Make sketches of the anchor chain, windlass, spare anchor housings.

Take rubbings.

Sketch the mast, the lifting derrick and other items to be found.

Look at the outlook through the fairleads.

Think about why the sides of the ship are so high at this point.

Imagine what it was like to have been working in this area. Express your thoughts in poetry or prose.

4 FORWARD ACCOMMODATION AREA AND ENGINE ROOM

From the plan identify the original use of the accommodation area. Use the photographs to locate where things had been.

Discover what had originally been where your cabin is now.

Make sketches of how it is now with those taken from the photographs to make later comparisons.

Go down into the Engine Room.

Allow plenty of time for detailed sketches and rubbings to be made of the parts of:

The engines **The compressors** **The engineer's desk**

The generators **The batteries** **The companion way**

Think about the noise, the movement caused by the sea, the smell of diesel engines.

Find somewhere to sit and think about how it used to be when the ship was working at sea.

5 THE LOOKOUT AND LIGHT TOWER

Think about the purpose of the lookout. Compare how it was and how it is now.

Sketch the original fittings and the modern ones.

Imagine any conversation which may have been made over the ship's radio.

Climb the light tower stopping and looking at each level.

Sketch the fog horn, the pendulum, the lights and the reflectors.

Look closely at the fittings and make sketches and rubbings.

Think about why the pendulum was needed.

Sit and get a feel of what it might have been like at the top of the tower in a rough sea.

Write a short account of the work which the seamen had to do and describe what it would have been like doing it on a bad day.

6 BOAT DECK AND HELIDECK

Look at the equipment and fittings in this area and make drawings and rubbings. Look closely at details rather than just concentrating on large sketches.

Think about the purposes of the lifeboats.

Write a story about how it would have been if the Light Vessel had to have been evacuated, think about the atmosphere, the feelings of the crew the experiences they would have had during the emergency, the evacuation, being on the sea in the life-boats.

FOLLOW UP WORK

Use sketches in art work such as printing, hands and machine embroidery etc.

Make models of various parts of the light vessel.

Make working models of the lifting derrick and the boat derricks.

Use technology to design and construct the revolving lights.

Develop written work started during the visit.

Dramatise children's thoughts about life onboard.

Convey the emotions of living onboard for long periods of time through creative music making.

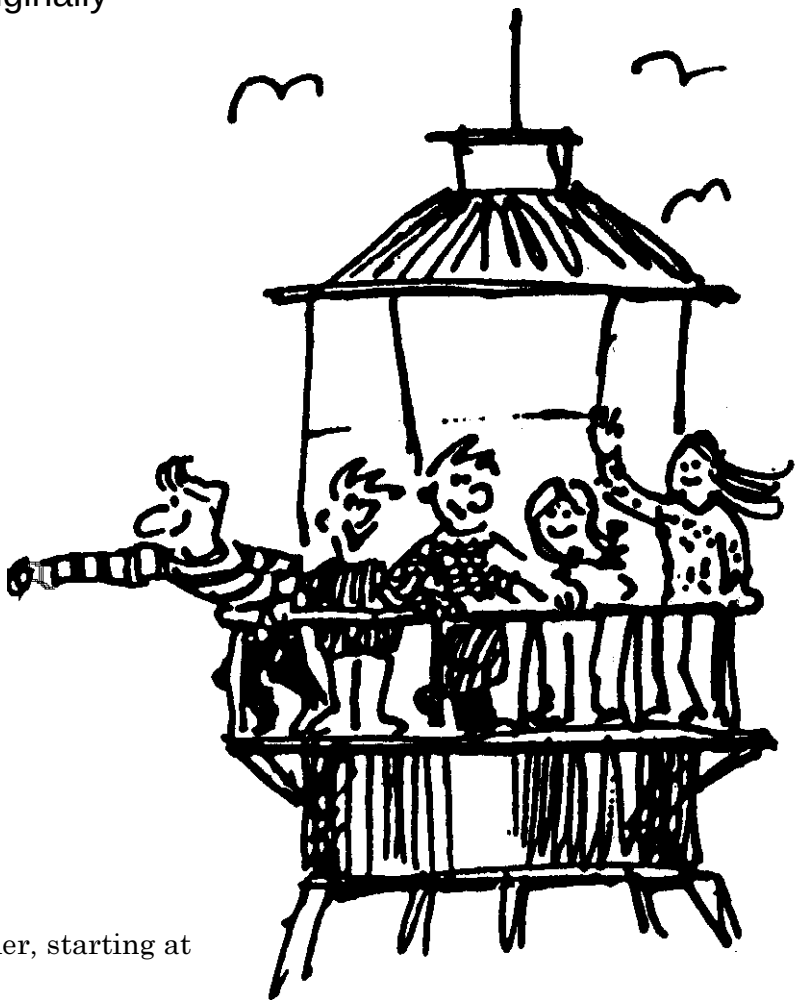
Consider the implications of being away from family and friends.

Discuss the skills needed to live and work in what could be testing and uncomfortable times.

Explore personal relationships - trust, comradeship, tensions etc.

LIGHTVESSEL TOUR

around *Trinity* as it was originally



Please tour in the following order, starting at the area marked:

Galley, Mess Room & Stern Deck

Master's & Seamen's Living Quarters

Foredeck

Chain Compartment & Forward Store

Engine Room

Lookout

Boatdeck and Helideck

Light Tower

LIGHTVESSEL NO 15

Fellowship Afloat is based on board a converted Lightvessel named "Trinity", in recognition of it's previous owners, Trinity House. She would have been known as "Number 15", and she spent much of her life on station at Scarweather in the Bristol Channel.

She was originally built in 1954 and was modified several times before we converted her, the most notable change being the addition of the helideck C1977. Her first station was in Morecombe Bay, but after that she was at Scarweather for much of her life; a total of 22 years, and was then used at various stations including Channel for a short time.

Fellowship Afloat purchased her in 1988. She was towed round from Harwich in the September, and brought up into her present berth on a big tide. She had four large anchors, each weighing up to 1½ tons, put out, one from each quarter, in order to make her secure. The plan was to convert her into a residential base for 36 guests, making the best possible use of the space.

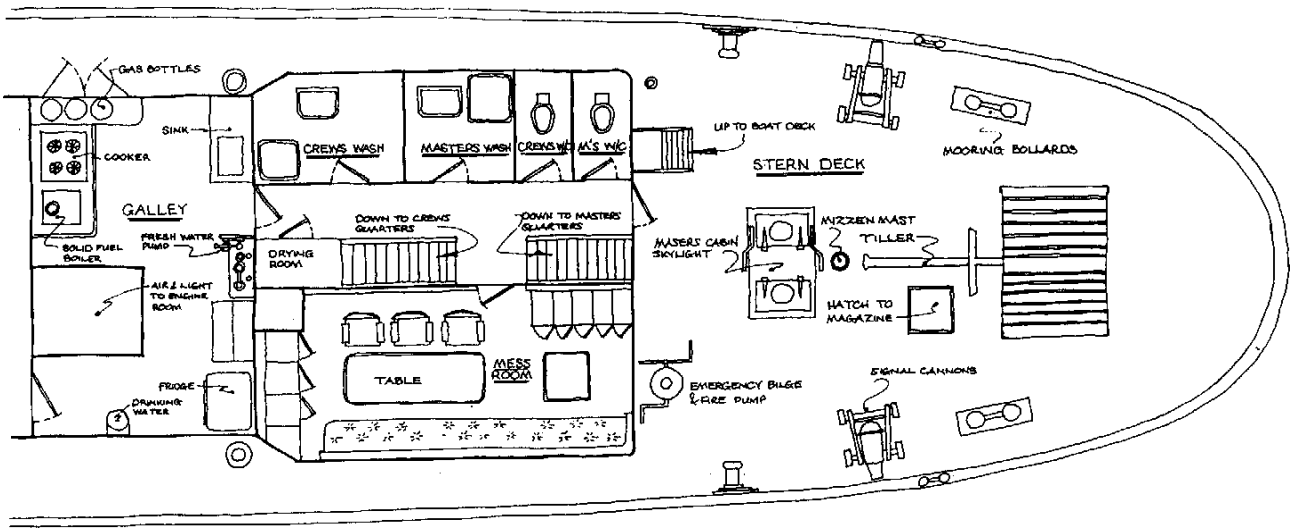
In 1991 an extensive conversion of LV No 15 was completed, during which many changes were made. We added 36 berths towards the bow of the ship, and converted an area at deck level near the stern into our galley and saloon area. Some areas have been left almost exactly as they were, most notably the engine room, light tower and crews' quarters.

There is something interesting for all tastes around the lightship, from the preserved engine room for the technically minded, to the top of the light tower for those that just like to look.

FACTS & FIGURES

Length:	137 feet / 42.54m
Width:	25 feet/ 7.62m
Height:	below water level 11 feet / 3m
	above water level 40 feet / 12.2m
Weight:	353 tons
Built:	1954
	Phillips & Son, Dartmouth, Devon

GALLEY, MESS ROOM & STERN DECK



Above the crew's sleeping quarters were the galley, washrooms, toilets and messroom. This is where the crew spent much of their day - cooking their meals and relaxing in the mess room while watching TV.

The stern deck was a working area, and contained items such as emergency bilge pumps and mooring bollards. The signal cannon were used in the early days to warn ships of danger.

This whole area is much different now, as we have created a saloon on the sterndeck; galley in the messroom, wash-up, pantry and shop in the toilet and washroom and a reception area where the galley was.

Interesting features that remain are the fresh water pump in the reception area, and various sounding holes in the wash-up area. You can also still look through the stern fairlead.

STERN DECK AND SURROUNDING AREAS

This is the area which we now know as the saloon, galley and reception. Use the plan and early photographs to imagine how she looked at sea.

This area oringinally contained the galley, washrooms, toilets, mess room and stern deck. Use the photographs to identify where things originally were.

Make sketches of before and after.

Look at the view through the stern fairlead.

Sketch the area using pastels, water colours etc.

Sketch or take rubbings of the port light which now goes through to the galley.

Look closely at the door and draw its fittings.

Identify the areas which were originally outside and those that were inside.

Measure and locate the original mess room, the galley and the toilet areas.

Look for any evidence of previous use.

Read the builder's plate to see when she was built.

Write in poetry or prose of life in this area.

What sort of water was the Lightvessel filled with from the stern deck?

How many steel posts hold up the helipad?

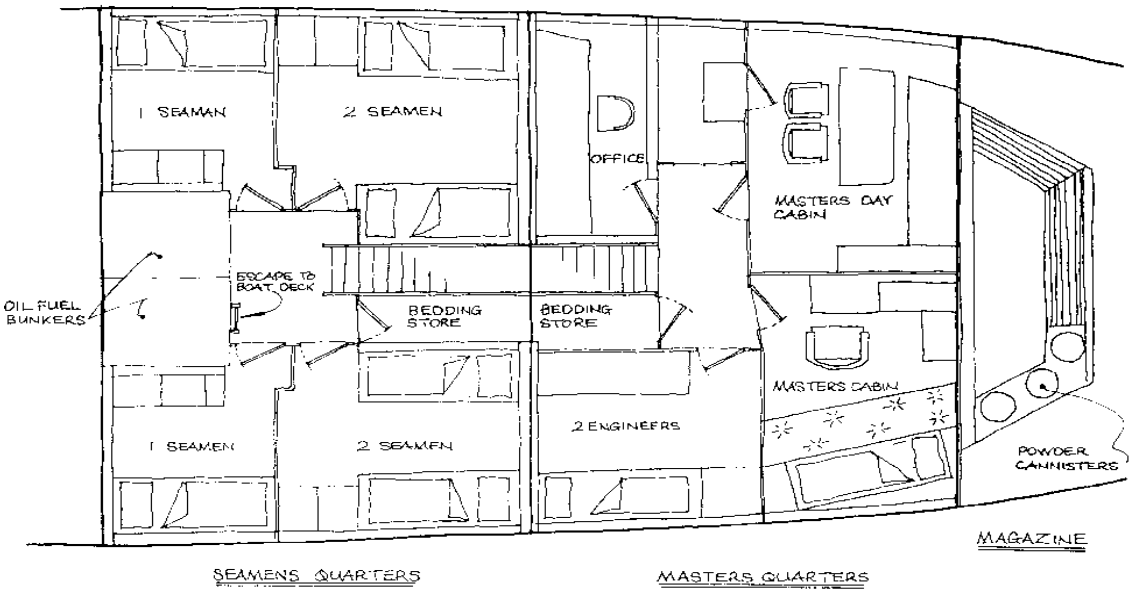
How many soundings could you make in and near the mess room area?

What colour marks the fresh water pump in the galley?

How many portholes in the mess room?

When was the Lightvessel built?

MASTER'S & SEAMEN'S LIVING QUARTERS



The original living quarters of the Lightvessel could be found below the stern deck, washrooms and mess room. There were a total of six cabins - 4 seaman's cabins, a visiting engineer's cabin and Master's cabin, sleeping in total 9 people. The Master also had a day cabin and office.

In the very stern there was a magazine where gunpowder for the signal cannon and pyrotechnics were kept - this sealed cabin was entered through a special hatch in the stern deck.

This area has been left much as it was when in use as a working lightvessel. There are many brass fittings around the place, and all of the furniture and bunks are made from utilie, a hardwood similar to mahoghany. We have, however, added a toilet and shower room in one of the crew's bedding stores under the stairs, and converted the magazine into a Master's bathroom.

Interesting features to look at are the numerous brass fittings, the woodwork and, in the master's day cabin, the internal ship's telephone.

CREWS' QUARTERS

Look at the materials used in construction.

Compare the accommodation for the master with that for the engineers and the seamen. Why are there differences?

Make sketches of the bunks, brass fittings, port lights etc.

Think of the reasons why the Master needed a day cabin in addition to a cabin in which to sleep. What sort of task may have been performed there? What sort of things would have been needed for the tasks?

Take rubbings of brass fittings, port lights, doors, drawers etc.

Think about why the Lightvessel needed a magazine.

Imagine that you are the Master; write a log of your day's work.

Sit in one of the seamen's cabins and imagine what it would have been like to have lived aboard for several weeks in bad weather and a heavy sea.

Express your thoughts in prose or poetry.

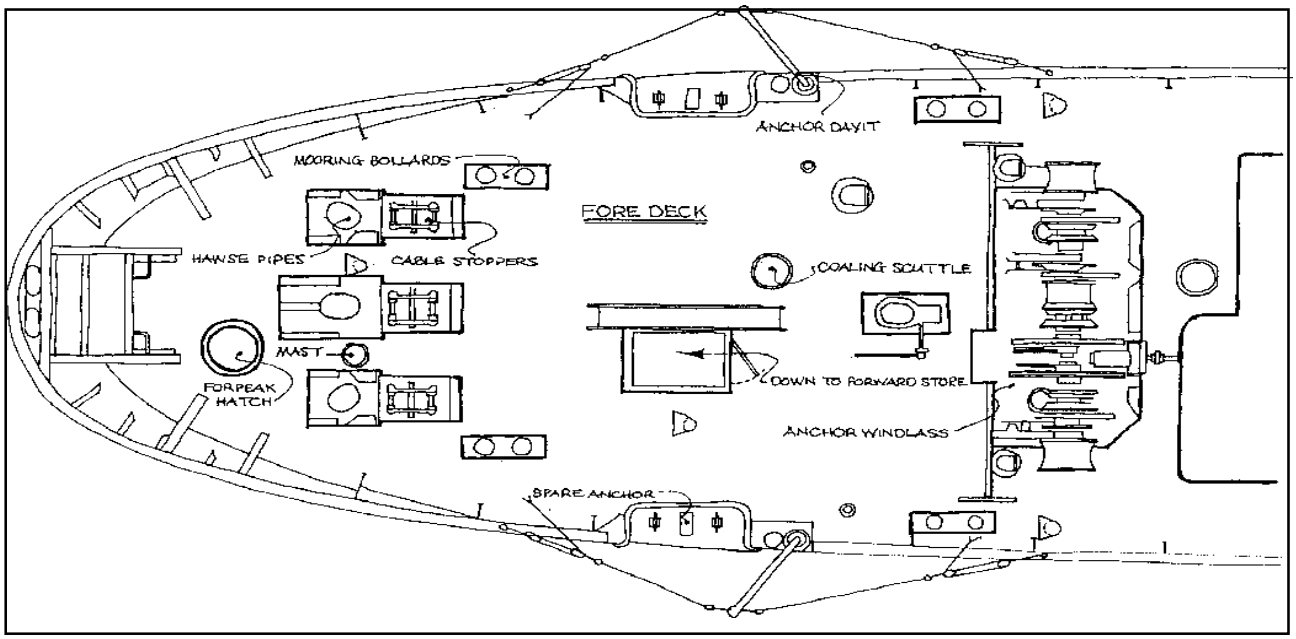
Write a letter home to your wife and family.

Who could speak to the master's dayroom?

The master has many drawers in his sleeping cabin - how many can you count?

Why were there guard rails around the table in the dayroom?

FOREDECK



One of the most important things on the lightvessel was the main anchor weighing 3 - 4 tons. The 385 metre length of chain was controlled on the the anchor windlass which payed-out or hauled-in lengths of chain according to weather conditions - it was essential that the Lightvessel stayed exactly in position. On each side of the bows in two recesses were kept two spare anchors weighing 1¼ tons; these were always at the ready in case the main anchor chain broke.

Because the main anchors were so large and important, this is almost the only function that the foredeck had. However, there were also various bollards for mooring the Lightvessel, and stairs down to the forward store.

This area is much as it was. We have added a buoyancy aid locker, utility sinks and potato peeler, and not much else. The ends of the anchor chains can still be seen running down the hawse pipes.

Interesting features include the fairleads through the deck to the chain lockers, the anchored davits (cranes) and of course the large anchor windlass.

FOREDECK

Look at all of the machinery on deck.

Make sketches of the anchor chain, windlass, spare anchor housings, etc.

Take rubbings.

Sketch the mast, the lifting derrick and other items to be found.

Look at the VIEW through the fairleads.

Think about why the sides of the ship are so high at this point.

Imagine what it was like to have been working in this area. Express your thoughts in poetry or prose.

What is the safe working load of the foredeck lifting derrick?

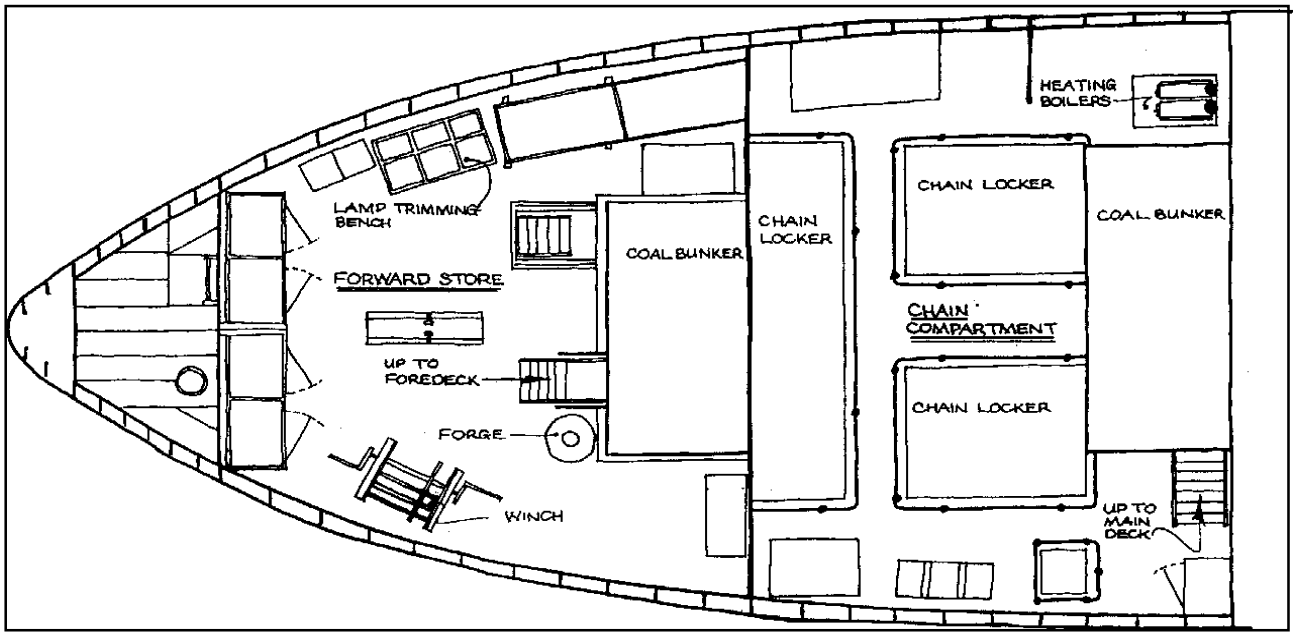
Which valves are normally kept closed?

How many red ventilators kept the air fresh in the cable locker and forward store?

How many anchors were there?

Why do you think there were that number?

CHAIN COMPARTMENT & FORWARD STORE



Towards the front of the ship can be found various store rooms. A total of four areas once existed here; a chain compartment; a forward store; a lower forward store and right up in the bows was the foc'sle.

In the chain compartment there were once three large metal lockers for storing the various anchor chains, and also one of the two coal bunkers for the central heating was here.

The forward store acted like a garage housing various paints, oil, lamps and such like to continue maintenance on board the ship as well as the other coal bunker and a special locker for storing spare pieces of curved glass for the light tower.

The forward store and chain comparment have now been converted into the group accommodation. The bulkhead between the two rooms now forms a fire partition in the middle of the cabins. The main chain locker is now the drying room and the two smaller lockers now contain the sewage pump room and stair well respectively. Underneath the forward cabins can still be found the lower forward store, where there is only 1½ metres headroom.

Interesting features in this area are the chain pipes, or fairleads, where the anchor chains came through the deck to be stored in the lockers.

FORWARD ACCOMMODATION AREA

From the plan identify the original uses of the accommodation area. Use the photographs and diagram to locate where things had been.

Discover what had originally been where your cabin is now.

Make sketches of how it is now and sketches from the photographs to make later comparisons.

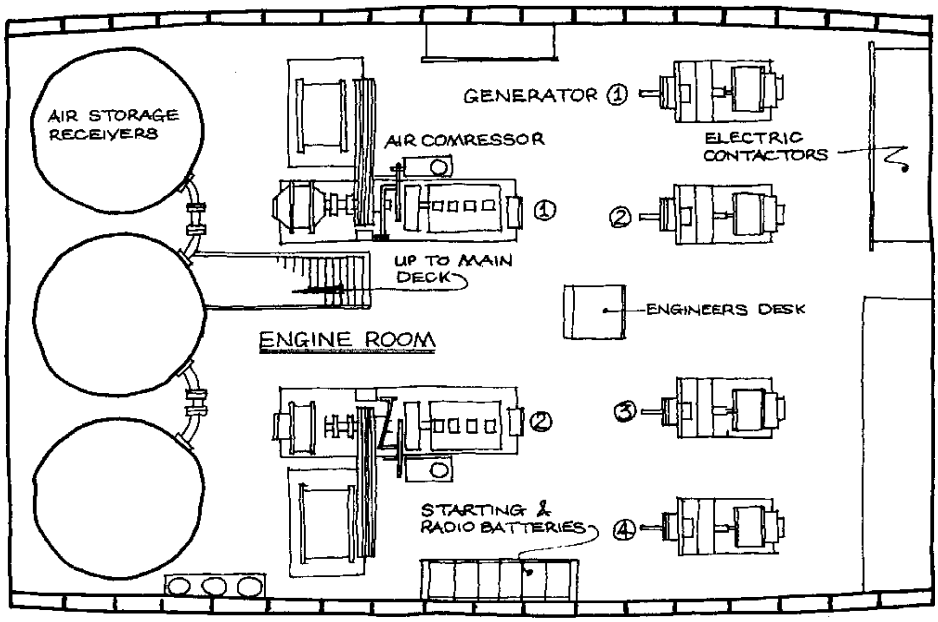
Stand under one of the chain pipes and imagine what the noise must have been like when the anchor chain came crashing in. Imagine how it felt to be down below when there was a gale and the ship was tossing around. Think about the rythm of the movement of the boat - perhaps you could write a poem.

How many chain fairleads came through the foredeck?

How many portlights were there in the forward store?

What was the drying room area originally?

ENGINE ROOM



The engine room, or machinery space, was the heart of the Lighvessel. The four generators provided power for the main optic and the cabin lighting. There are also two compressors that provided compressed air for the anchor windlasses and the fog horn.

Each generater provided 100volts D.C at 5.5kw each. They are Gardner IL2's and could easily be run in parallel if more power was required.

The two compressors are Gardner LR's and generated compressed air at 100psi (although the foghorn only required 30psi). At least one electricity generator was always running, whilst the air compressors were only run when needed.

A bank of twelve 24volt lead-acid batteries were used to start the engines as required and to power the wireless room.

This area is almost unchanged; all the engines remain and would still work. The only additions are our boilers and hot water system in one corner of the room; up near the deckhead you can see lots of plumbing.

Interesting features in this area:

The compressors were used when we were converting the Lightvessel and needed to do lots of steel cutting. Notice the date on the air receivers - the large cream tanks behind the stairs.

There is a telephone that linked with the master's dayroom and the lookout.

ENGINE ROOM

Allow plenty of time for detailed sketches and rubbings to be made of the parts of:

The engines **The compressors** **The engineer's desk**

The generators **The batteries** **The companion way**

Think about the noise, the movement caused by the sea, the smell of diesel engines. Imagine what it would be like trying to mend an engine with the ship tossing around.

Find somewhere to sit and think about how it used to be when the ship was working at sea.

Whose make of engine supplied electricity and compressed air?

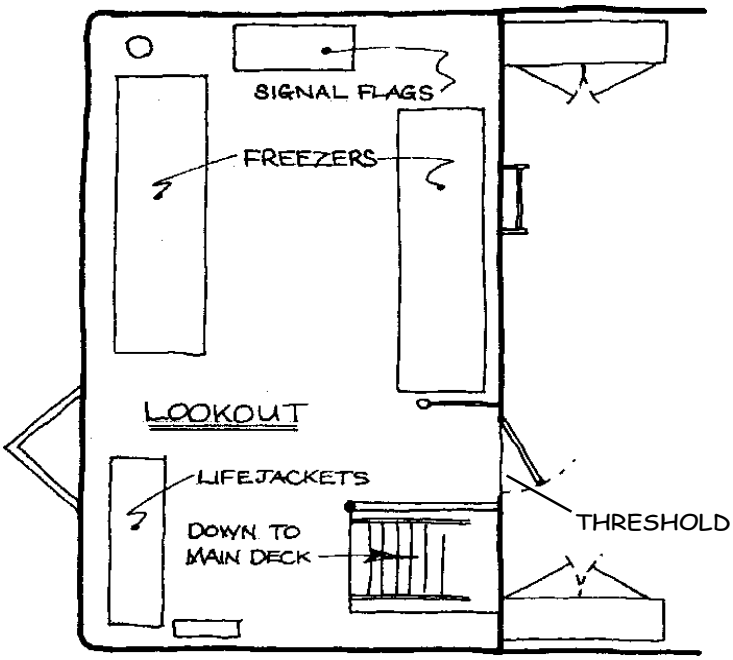
What was last examined in Jan' 92?

What mustn't you lift when running?

Why do you think there were so many engines?

Where could an engineer speak to?

LOOKOUT



At the front end of the boatdeck can be found the lookout. This was, as the name describes, a place where the crew could keep a look out for ships. It has not always been called this; originally it was called the steering shelter as in the early days the Lightvessel had a rudder and it was from here that the ship could be steered.

It was a fairly uncomfortable area - not a place for going to sleep. Whoever was on 'lookout' would record on a chalk board the length of chain that was out.

This area has been totally changed to make a small meeting room. The table is the original table from the mess room. Note: the 'fiddles' on the table to keep things on the table in stormy weather. We also have our marine VHF radio here so that we can communicate with our sailing fleet when it is out and with other boats in the estuary.

Interesting features in this area are the remains of the steering system and the intercom to the engine room and masters' day room; flare/rocket launcher in forward port corner. On top of the lookout is the big black fog horn that warned ships of danger.

THE LOOKOUT

Think about the purpose of the lookout. Compare how it was and how it is now.

Sketch the original fittings and the modern ones.

Imagine any conversation which may have been made over the ship's radio.

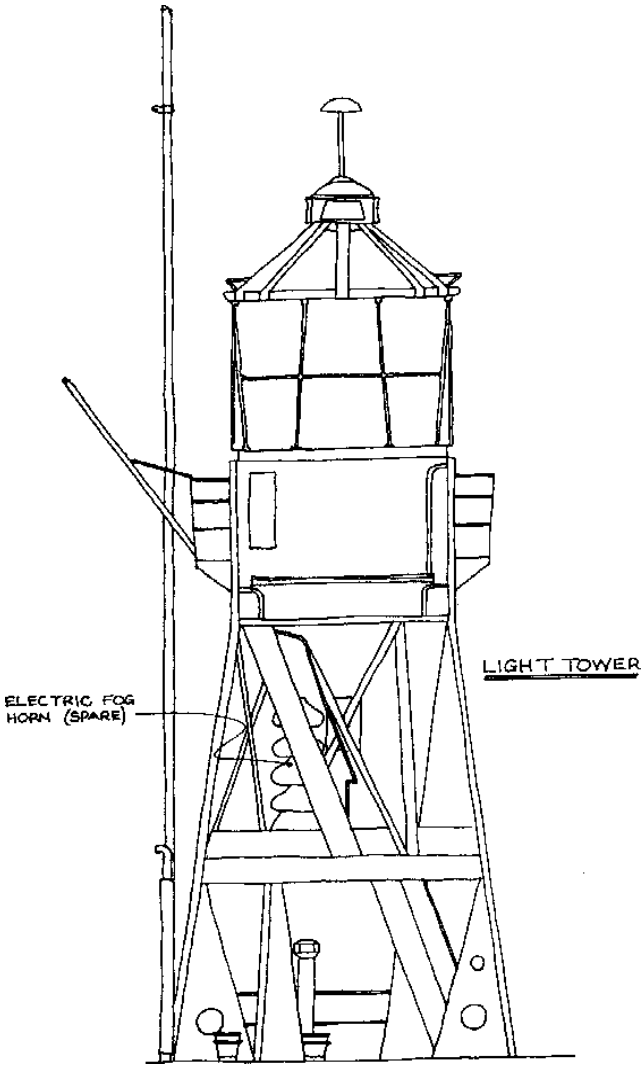
What flood could be operated from the Lookout?

How many lookouts in the Lookout?

LIGHT TOWER

The main purpose of the Lightvessel was to warn ships of danger, so it had to have a light which was high up and a very loud fog horn.

The lantern room at the top of the tower contains the optic. This is made up of 8 sets of lamps and mirrors in four pairs. All the pairs could be adjusted to produce a characteristic pattern of flashes that were unique to the particualr station that the Lightvessel was on. Each individual set of lamps and mirrors produced a beam of over 700,000 cd with a range of 25 miles and divergence of 4.8°. The lamps were rated at 100v, 375w and were individually numbered for record-keeping purposes. They had to be 40 feet above sea level allowing sailors to calculate distance from LV.



The only change in the entire light tower was the decommissioning of the lantern by removing the motor that turned. it. We do still have a small light burning all the time.

A t the bottom of the tower can be found a large wooden box that was used to house the radio beacon batteries; on the first level is the emergency fog horn, powered by electricity; on the second level is the pendulum used to keep the lantern vertical and on the top level is the lantern itself mounted on gimbals.

Climb the light tower stopping and looking at each level.

Sketch the fog horn, the pendulum, the lights and the reflectors.

Look closely at the fittings and make sketches and rubbings.
Think about why the pendulum was needed.

Sit and get a feel of what it might have been like at the top of the tower in a rough sea.

Write a short account of the work which the seamen had to do and describe what it would have been like doing it on a bad day.

Six alight, how many in the shade?

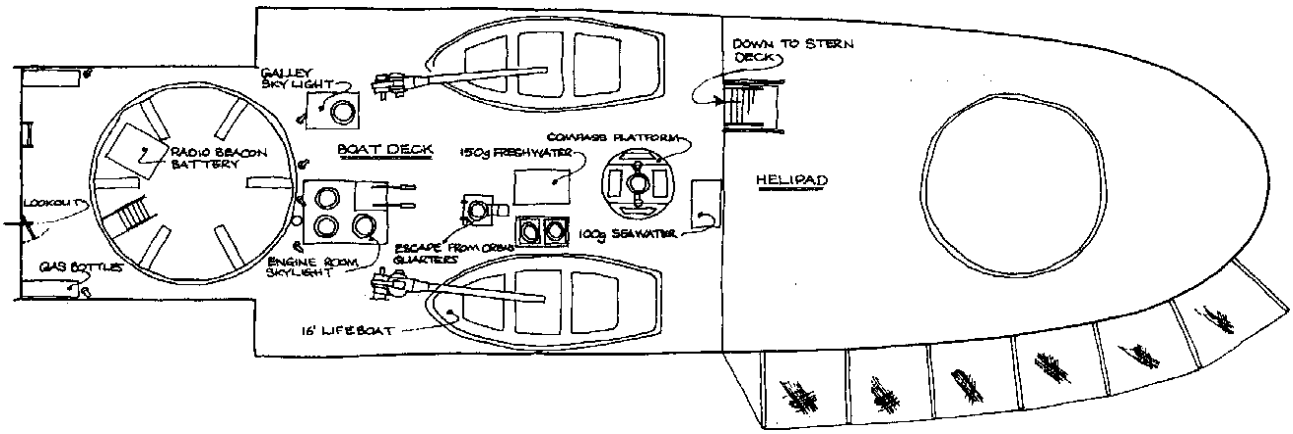
What was locked before opening the hatch?

How many lenses are there?

How far can you see from the top deck?

Can you identify any of the places?

BOATDECK AND HELIDECK



When the Lightvessel was originally commissioned, it did not have a helideck, as all crew and supply transfers were done by boat. The boat deck was used for many things, but perhaps its most important function was the storage of the two lifeboats that could be used to evacuate up to 24 people from the Lightvessel in an emergency. Also here were the header tanks for fresh and salt water and a compass platform that had the ships' compass on it.

The helideck was added and was used for the transfer of personnel, although a supply ship was still used for the transfer of supplies.

This area has changed little. We have removed both lifeboats and added guard rails around the helideck.

If you stand on the helipad and look towards the tower you can see the guiding marks for the helicopter to land - rectangle shapes which would have been painted bright yellow, and a round disk on either side of the pad on one of the arms of the nets. The nets would have been folded in on top of the helipad, and only opened out when a helicopter was expected.

6 BOAT DECK AND HELIDECK

Look at the equipment and fittings in this area and make drawings and rubbings. Look closely at details rather than just concentrating on large sketches.

Think about the purposes of the lifeboats.

Write a story about how it would have been if the Light Vessel had to have been evacuated, think about the atmosphere, the feelings of the crew the experiences they would have had during the emergency, the evacuation, being on the sea in the lifeboats.

How many persons could be saved at a time?

Which cabin's skylight stands next to the gas cylinders?

What catches you if you fall from the helideck?

What filling is done on the boat deck?

FELLOWSHIP AFLOAT
Lightvessel Quiz

Name(s): MASTER COPY - DO NOT THROW AWAY

Galley, Mess Room & Stern Deck

1. What sort of water was the Lightvessel filled with from the stern deck? Fresh
2. How many steel posts hold up the helipad? 4
3. When was the Lightvessel built? 1954
4. How many soundings could you make in and near the mess room area? 4
6. How many portholes are there in the mess room? 6
7. What colour marks the fresh water pump in the galley? Blue

Master's & Seamen's Living Quarters

8. Who could the master speak to from his dayroom? Engineering Space/Steering Shelter / Look Out Engine Room
9. The master has many drawers in his sleeping cabin - how many can you count? 12
10. What was the magazine used for? Storage of flares and cannons

Foredeck

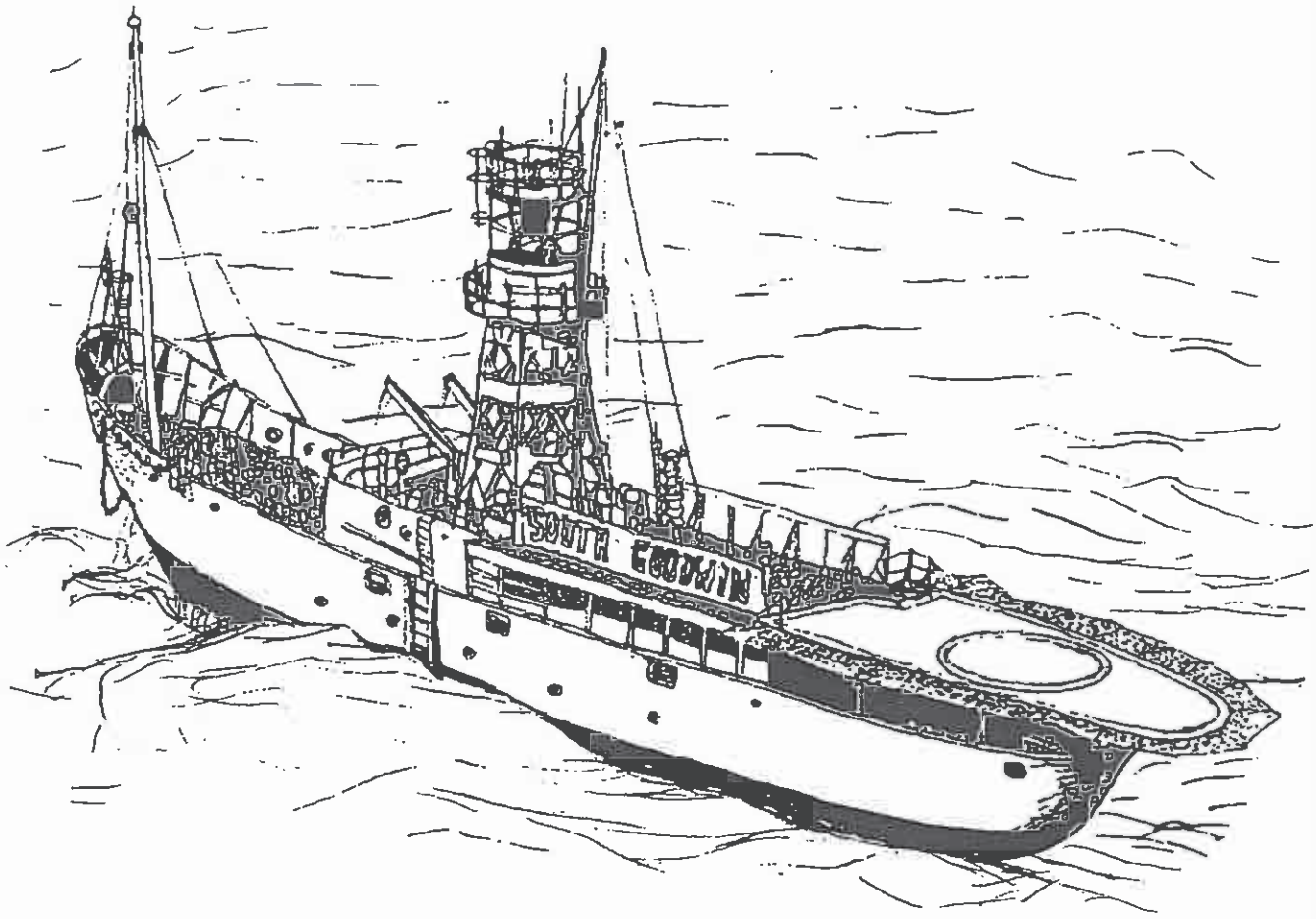
11. What is the safe working load (SWL) of the foredeck lifting derrick? 1 ton
12. Which valves are normally kept closed? Bilge
13. How many red ventilators kept the air fresh in the cable locker and forward store? 6
14. How much does the main anchor weigh? Over 2 tonnes
15. How many anchors were there? 3
16. Why do you think there were that number? Safety

Chain Compartment & Forward Store

17. How many chain fairleads came through the foredeck into the Chain Compartment? 3
18. How many portholes are there in this area? 10
19. Name two items that were stored in this area. .....

The following extracts are taken from Trinity House information and provide some background history.

LIGHT VESSELS



Trinity House* presently maintains a fleet of 14 fully automatic light vessels off the coasts of England and Wales and the Channel Islands. These are:-

CHANNEL	SANDETTIE
DOWSING	SEVENSTONES
DUDGEON	SHIPWASH
EAST GOODWIN	SMITHS KNOLL
FALLS	SOUTH GOODWIN
NEWARP	SUNK
OUTER GABBARD	ST. GOWAN

The first Light Vessel was laid at the Nore Station in the entrance to the River Thames, in 1732 by two private individuals who financed its maintenance by levying a toll on passing ships. Because of the obvious difficulties of keeping a vessel anchored out at sea in its correct position and of finding a crew willing to work under such conditions, Trinity House had initially been opposed to the idea of Light Vessels. However, the Nore Light Vessel proved so popular and successful that Trinity House adopted the scheme and took charge of the vessel from its original owners. A second vessel was established at the Dudgeon station off the Lincolnshire coast in 1736 and by 1802 Trinity House had established five more at the Owers, Newarp, Goodwin, Sunk and Stanford stations.

* @ 2.99 : ELEVEN AUTOMATIC LIGHTVESSELS IN SERVICE.

The function of the Light Vessels, like other navigational aids is to warn mariners of potential dangers at sea. They are normally moored to mark shoals and sandbanks which extend for many miles offshore beyond the sight of landmarks and which when covered at high water pose great dangers for the mariner. Both lights and fog signals are used to warn shipping of the hazards in the area. The vessels are predominantly red in colour.

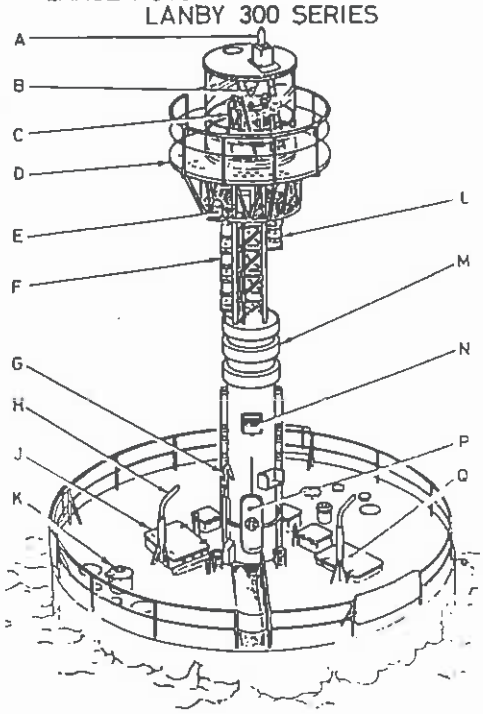
Until about 1886 Light Vessels were of wood construction. Later they were chiefly composite, followed by iron and since 1936 the ships have all been made of steel.

The vessels themselves are not self-propelled. They are towed to and from stations by service vessels. This happens periodically when they are in need of maintenance and have to be dry docked. For this reason the vessels are numbered while the stations are named, so that the vessels can be rotated around the various stations without leaving any station unlit. This system of organisation was begun as early as 1825 when No.2 Light Vessel was built. No.95 Light Vessel was completed in 1939 and as no Light Vessels were built during the Second World War the numbering sequence began again in 1946 re-commencing with No.1 proceeding to the No.24 Light Vessel, purchased by Trinity House in 1984.

In the 1970's Trinity House replaced a number of manned Light Vessels by Large Automatic Navigation Buoys (LANBY). A Lanby is of discus shape design, of all steel construction, weighs about 40 tons plus an equal weight of sea water ballast and is about 40' in diameter. The light and fog signal are electric. It is powered by diesel generators and is fully automatic with reserve equipment in case of failure. A considerable amount of electronic aids to navigation can be carried and the machinery is capable of running for six months or more without attention.

Trinity House presently have 6 LANBYS on station with 3 held in reserve.

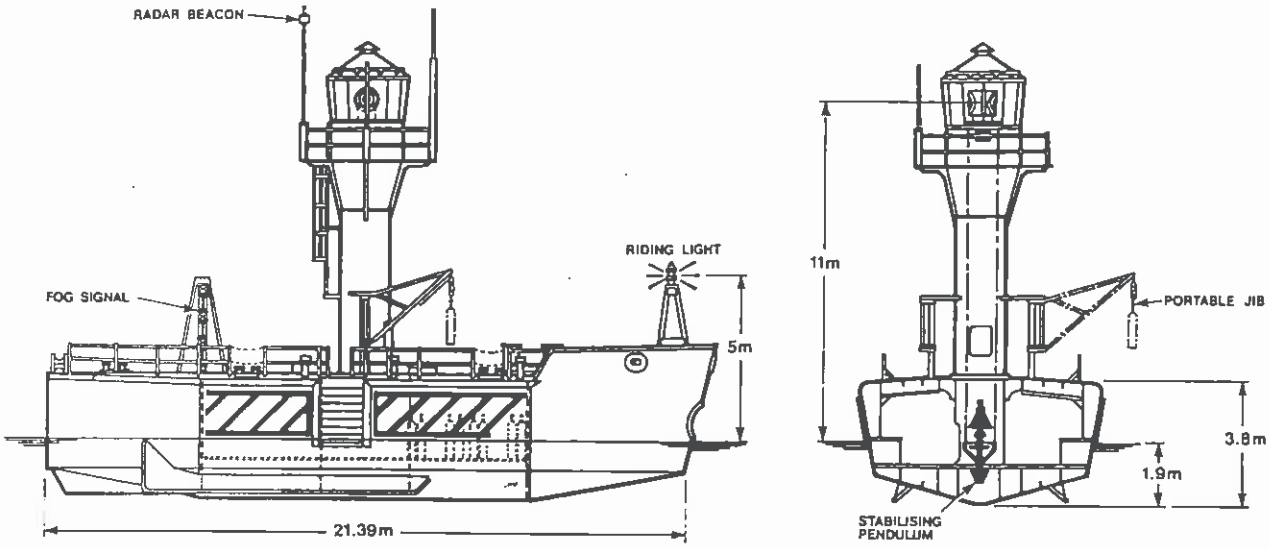
LARGE AUTOMATIC NAVIGATION BUOY
LANBY 300 SERIES



A RACON
B STAND-BY LIGHT
C MAIN LIGHT OPTIC
D GALLERY
E ANCHOR LIGHTS
F MAIN FOG SIGNAL
G EXHAUST PIPE
H LIFTING DAVIT
J EQUIPMENT HATCH
K FUELING HATCH
L STAND BY FOG SIGNAL
M COOLING AIR OUTLET DUCTS
N AIR INTAKE WATER SEPERATOR
P ENTRANCE DOOR
Q EQUIPMENT HATCH

HEIGHT OF FOCAL PLANE ABOVE WATER LINE = 12·3 m
DIAMETER OF HULL = 12·2 m
DEPTH OF HULL = 2 29m

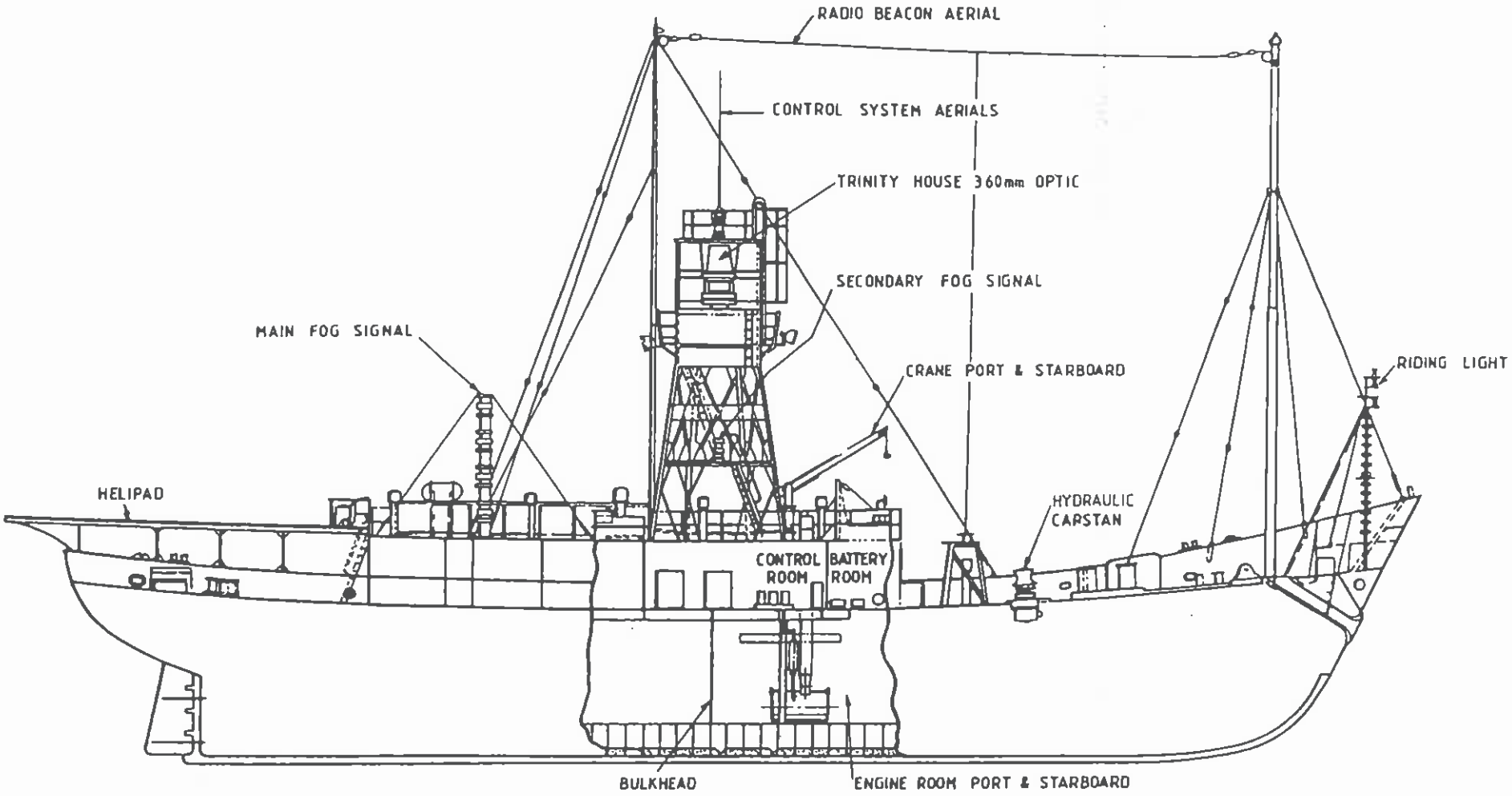
In addition to the LANBY, Trinity House have two small unattended lightships or lightfloats in service. These are 21 metres wide and are specifically designed for service in exposed deep sea locations. They are capable of exhibiting various flashing characters with an optical range of approximately 17 nautical miles and of producing a two mile sound signal. They are equipped to remain on station for up to 3 years between major overhauls.



At the beginning of the decade, Trinity House began to seriously study the feasibility of converting existing Light Vessels to automatic operation. This proved to have a number of advantages over purchase of further lanby stock, in particular, the greater space availability and the better sea-keeping qualities of a Light Vessel offered significant improvements.

Additionally, the building of helicopter landing platforms at the stern of these vessels allows engineering personnel to be transported to the vessel rapidly and reliably in the event of any equipment breakdown. Prior to the automation of the Trinity House Light Vessel fleet monthly crew changes were effected in this way. Previously to this the relief of men and supply of stores was carried out by a Trinity House vessel using a motor launch. In rough weather the reliefs were often delayed for a number of days, even weeks until weather conditions were suitable to allow a vessel to get close enough to the light ship to transfer the crew.

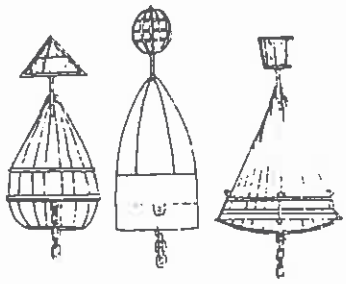
Prior to June, 1989, when the last manned Trinity House light vessel was converted to automatic operation each vessel was manned by a crew of 10 persons with 5 men on the station at any one time each crew member working one month at station and one month ashore. The crew operated a 24 hour watchkeeping system on both the light and fog signal equipment. Today, this function can be provided by electronic means via a telemetry, or radio link, between the light vessel and its shore based monitoring station. The position of the vessel and the performance of the aids to navigation on the vessel are displayed on a computer located at the base station. This information is updated by the computer every six minutes.



AUTOMATED LIGHTVESSELS 1, 5 & 10

BUOYAGE

Trinity House are responsible for over 500 buoys positioned around the coasts of England, Wales and the Channel Islands. Of these almost two-thirds are lighted.

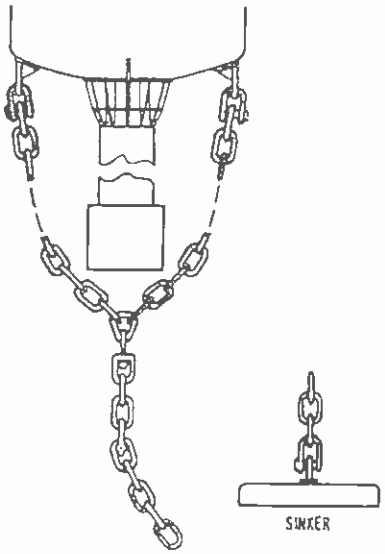


Buoys came generally into use in European waters in the late 15th or early 16th century. The first buoys were laid in the River Thames to assist pilotage in about 1538. At first all buoys consisted of baulkes of timber usually surmounted by a staff or pole and it was only when iron ships generally replaced wooden ones that metal buoys came into use.
Left: buoys in use in 1861.

They are generally used for marking out channels through sandbanks and shoals in estuaries and for delineating approaches to a port when shore marks would either be too far distant or could not adequately define the shipping route; they are also used to indicate isolated dangers and areas of special significance such as submarine mining grounds or sewer outfalls.

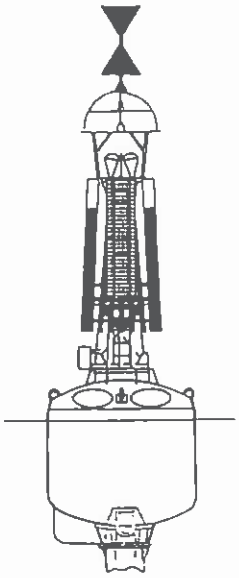
In 1977, a new system of buoyage was introduced into UK waters which was devised by the International Association of Lighthouse Authorities. This system replaced over 30 different systems which were in use worldwide prior to that date. The system consists of firstly, lateral marks which are used to mark well defined channels and indicate the port and starboard hand sides of the route to be followed and secondly, cardinal buoys which are used in conjunction with a compass to indicate where the mariner may find the best navigable waters.

Cardinal Buoys are designed to allow the mariner to know in which direction the safest water lies by, firstly, their flashing sequence, secondly, their colouring and finally their topmark. Thus the mariner would be able to identify the buoy if the light were extinguished and/or its topmark missing. An A5 coloured leaflet describing the IALA Buoyage System is available from the Information Officer at Trinity House upon request or an A4 booklet is available form the International Association of Lighthouse Authorities, 13 rue Yvon Villarceau, 75116, Paris, upon receipt of a cheque for £1.



Trinity House utilises two classes of design of buoy. Class I buoys, the largest, are 10′ in diameter and are over 50.5′ high including tail tube and weigh over 10 tons. These are used for deep sea and channel separation zones and have a long tail tube for maximum stability. Class II buoys are used for the majority of channel marking. Trinity House buoys are made of generally 10mm welded steel.

The buoy moorings consist of a chain bridle which is shackled to the buoy's two mooring chains via a swivel. The mooring is usually 38mm or 32mm open link chain of a length approximately 3 times the water depth down to a cast iron sinker of 3 - 5 tonnes.
Left: mooring chain and sinker.

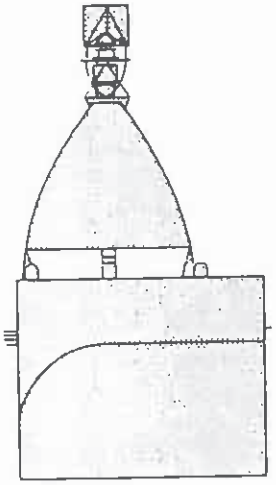


Trinity House has embarked on a programme of converting all lighted buoys to solar powered operation over the next three years following successful trials with a number of types of equipment from different manufacturers. Solar panels can be fitted to existing structures without major modifications to the buoy. These solar power systems are replacing buoy installations powered by dissolved acetylene gas which necessitates regular and costly maintenance by a Trinity House vessel. Left: a solar powered Class I buoy.

Some buoys are equipped with fog signals in the form of bells, automatic whistles, the sound form which is produced by drawing air into a chamber as the buoy rises to a wave and passing it out at low pressure through a whistle bell as the buoy dips into the sea, or electric whistles which are powered from primary batteries.

Additionally, some buoys are equipped with radar beacons commonly known as racons which provide for the mariner an easily identifiable image by radar of the position of the aid to which it is fitted. Racons have a range of up to 25 miles compared with up to 10 miles for some lights on the standard buoys.

Trinity House in conjunction with private enterprise have developed a fast water buoy which will remain upright in all states of tide, up to 6 knots, principally for use in areas where there is a fast tidal flow, to allow the light to be seen from all directions. The buoy is boat shaped and is moored from a single eye as opposed to double moorers on standard buoys.
Right: a fast water buoy.



Trinity House is developing a lightweight buoy, known as an Airportable Emergency Buoy (AEB) fitted with a racon which can be deployed by helicopter in the event of an emergency at sea such as a wreck. This buoy is being designed to act as a temporary mark until a Trinity House tender is available to lay a permanent marker.

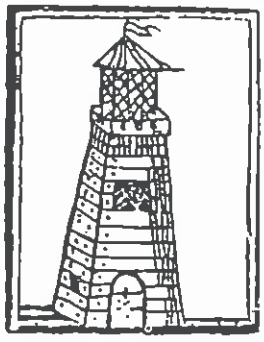
The AEB, which has foam buoyancy, consists of an aluminium body with a composite lattice superstructure. It is secured to the seabed by an anchor, ground chain and a nylon mooring line.

Trinity House is also participating in experimental work looking into the feasibility of producing a buoy which could be powered by capturing the energy produced by wave movement.

LIGHTHOUSES

HISTORY

The Corporation of Trinity House was first empowered to erect Seamarks by Queen Elizabeth I under the provisions of the Seamarks Act 1565. In 1594 the Lord High Admiral surrendered to Her Majesty the rights of beaconage, buoyage and ballastage vested in him with the recommendation, which was adopted, that these be bestowed upon Trinity House. A long interval, however, elapsed before the Corporation became responsible for the management of all Lighthouses owing to the continued practice of the Crown of issuing patents or grants of Lighthouses to private individuals who, on payment of a rent, had the right to collect tolls for the use of particular lights. These private lights, as may be imagined, varied in efficiency and in 1836 Trinity House was given compulsory powers to levy out the private individuals who owned the lights and to maintain them itself at a cost of £1,200,000, some of which was financed with the assistance of a State Loan. As an example of the value of certain Lighthouses at that time the purchase in 1841 of Skerries Lighthouse, off the Anglesey coast, cost the Corporation £444,000.



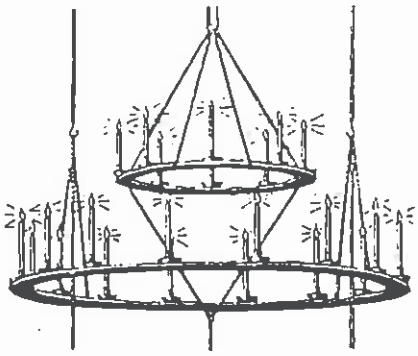
Lowestoft Lighthouse 1609

The first Lighthouse built by Trinity House was at Lowestoft in 1609. Two Lighthouses were originally erected here to guide vessels into the Stamford Channel. However, the LowLight was discontinued in 1923 when the channel silted up.

Today Trinity House administers over 80 Lighthouses around the coasts of England, Wales and the Channel Islands. Additionally, it is responsible for Europa Point Lighthouse at Gibraltar and for the maintenance on behalf of the Department of Transport of Sombrero Lighthouse, N. Anguilla and Cape Pembroke Lighthouse in the Falkland Islands.

DEVELOPMENT OF LIGHTING SOURCES

Open fires have been used since ancient times to guide ships into harbour and give warning of hazards. The first recorded lighthouse, the Pharos of Alexandria, built in the 3rd century B.C. was a stepped structure 140m. high surmounted by an open fire. Huge statues were sometimes used as aids to navigation. The Colossus of Rhodes carried a cresset or fire basket in the form of a torch which guided ships entering the harbour. Early lighthouses generally followed the pattern of a coal or wood fire kindled in a brazier on top of a tower. At first these fires were burnt in the open but later they were enclosed by a lantern provided with a ventilating flue in an attempt to carry away the smoke clouds which formed around the fire and frequently obscured the light. One of the earliest towers to be fitted with a lantern is on the island of St. Agnes, Isles of Scilly built in 1680. The brazier is still in existence and serving as an ornamental flower stand.

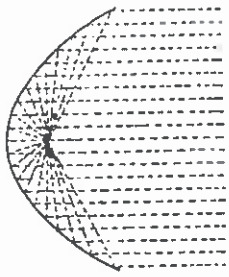


Smeaton's Chandelier 1759

As coal fires were impractical at most offshore stations the builders of the first 3 Eddystone lighthouses used candles as the illuminant. Smeaton who built the lighthouse of 1759 - 1882, employed 24 candles arranged in a two tier chandelier for his light, which would have been visible for approximately 5 miles.

The first oil burner suitable for lighthouse purposes was invented in 1782 by Argand who contrived to burn oil from a circular wick with a central current of air passing through it. Later, further concentric circular wicks were added until the number increased to as many as 10.

With the introduction of properly designed oil wick lamps came the advent of an efficient lighthouse beam projector. This was the catoptric system (using mirrors to concentrate and direct the rays) designed by William Hutchinson, Dock Master of Liverpool in 1763. The design consisted of a metal bowl with a layer of internal plastering in which were embedded a large number of pieces of mirrored glass.



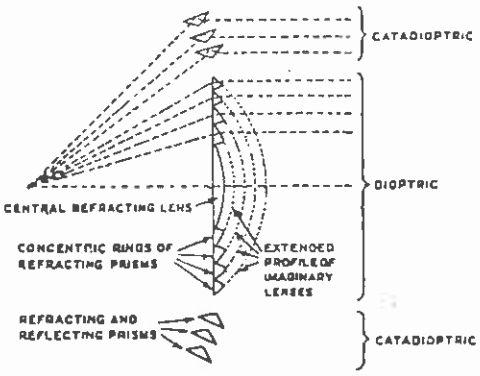
Catoptric Apparatus

In a reflector of this type, known as a parabolic reflector, the light rays diverging from a light source placed at the focal point, fall onto the surface of the reflector, and are reflected into a beam of light diverging outwards from the whole reflector. An early catoptric system is still in use in the British Isles at Walney Island Lighthouse near Barrow-in-Furness, which is administered by the Lancaster Port Commissioners.

The next advancement in the production of lighthouse apparatus was in 1822 when Augustin Fresnel made use of the refractive properties of glass for the generation of his beams. He designed an annular lens panel, built up of a central lens with a series of concentric sequential prismatic rings assembled around it. All the lens elements were cemented together in a frame and when an illuminant was placed at the common focus a concentrated pencil beam of light was projected. This system of lighting was known as a dioptric system. Fresnel took a number of such panels and mounted them around an oil wick burner, on a carriage which he made to revolve, thus creating the first flashing light.

Refraction by the dioptric system was not effective beyond some 45 degrees from the axis, and therefore, only the light within this angle could be condensed. Light upwards and downwards was not collected and was lost. Fresnel therefore made a further development to his dioptric system. He manufactured separate rings of prisms, each prism accepted light, refracted it on to the back face, where it was reflected on to the front face, which finally refracted it into the horizontal. Almost all the light produced

could now be collected and projected over the sea. This system of illumination has been so finely developed today that the light produced can be seen up to 28 miles out to sea.



Dioptric and Catadioptric Apparatus

In 1901, Arthur Kitson invented a burner in which, instead of the oil being vaporized at the wick and burnt as an open flame, it was converted into vapour under pressure in a retort and then mixed with air in a mixing chamber to form a flammable gas for heating an incandescent mantle. This had the effect of trebling the power of former wick burner lights.

In the nineteenth century gas was used experimentally for lighthouse illumination but found generally inadequate; however acetylene gas has continued to be used successfully for unattended remote stations and buoys. Early in this century the operation of this sort of station was much improved by the invention by Gustaf Dalen, a Swedish engineer, of the sun-valve. This consists of an arrangement of reflective gold plated bars supporting a suspended absorbent black rod. This rod absorbs the sun's direct and reflected heat and expands downwards cutting off the supply of gas during the hours of daylight.

Nearly all Lighthouses today are electricity powered either from the mains or by electricity generated at the station. The sources of light vary from station to station ranging from huge 3000 KW bulbs to 150W metal halide lamps which are only 9 cm. high. At some stations, such as Dungeness, banks of sealed beam units provide the light source.

LIGHTHOUSE TYPES

There are three different types of Lighthouses. Firstly, there is the Tower Light which is erected on a single rock in the middle of the sea. Trinity House maintains six sea lights, Eddystone, Smalls, Bishop Rock, Longships, Wolf and Hanois; Bishop Rock is the tallest standing 53.4m high from the first course of masonry to the top of the helideck.

Some Lighthouses are built on islands a short distance from the shore. These are called Island Lights. Tower and Island Lighthouses are manned by two crews of three keepers who each spend one month on the Lighthouse and one month ashore. On the Tower Lights the accommodation is very limited with the keepers sleeping in curved bunks called Banana Bunks which are built around the walls inside the tower. They all share one bedroom. At the Island Lighthouses the accommodation is more spacious and the keepers generally have their own bedrooms and spare accommodation is

provided for visiting engineering personnel.

The third type of Lighthouse is the Shore Lighthouse built on headlands on the mainland; here the keepers live in accommodation adjoining the Lighthouse with their families. There are normally four keepers assigned to each Shore Lighthouse.

The keepers' main duties are to operate and maintain the Lighthouse and fog signal equipment. At some stations the keepers also provide weather information which is forwarded to the Meteorological Office.

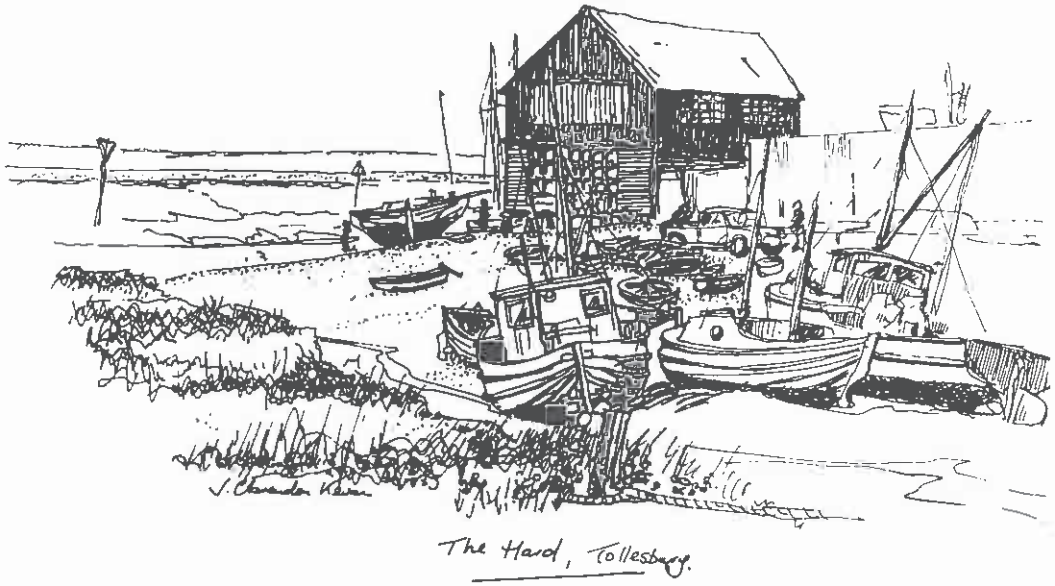
Prior to the advent of helicopters to carry the monthly relief of keepers this task was performed by a motor boat from a Trinity House tender and the keepers were hoisted to and from the Lighthouse by breeches buoy. During the winter months it was often days, sometimes weeks, before a vessel was able to manoeuvre to a position close enough to the Lighthouse to carry out the relief safely. Helicopters were first used for exchanges of keepers in 1972 when the relief was carried out by winching the keepers down on to a rock close to the Lighthouse. Naturally, this operation could only take place at low water and during calm sea conditions. Subsequently, Trinity House designed a helicopter landing platform which could be fitted above the lantern. The first was built at Wolf Rock Lighthouse in 1973 and a subsequent similar platform at Bishop Rock Lighthouse won a Structural Steel Design Award. Trinity House presently operates a Bolkow 105D twin-engined helicopter which is capable of landing on the lantern top helidecks and of carrying 5 persons plus 500 kgs of gear.

AUTOMATION

Helicopters also allow for maintenance personnel to be transported quickly and efficiently to offshore stations in the event of equipment breakdown. This, coupled with the availability of a remote monitoring system, using a telemetry link which can be used where an unmanned station is not in line with its control station, lead to Trinity House having the ability to proceed with a full automation programme which commenced in the late 1970's. The present programme predicts that Lighthouse automation will be completed by 1997. Initially Lighthouses have been grouped together by area and are monitored from a locally based area control station. Seven such stations have been established at Harwich, North Foreland Lighthouse, St. Catherine's Lighthouse, Lizard Lighthouse, Nash Lighthouse, St. Ann's Lighthouse and Holyhead. Eventually all Lighthouses will be monitored and controlled from the main Trinity House operating base at Harwich. Remote monitoring is achieved through radio links using VHF and microwave. Information may be relayed from the Lighthouse to the base station and the base station can send control signals to the Lighthouse in this way. The control station continually scans the outstations on a rota basis. During the scan any change of state on a particular outstation is shown on a VDU screen.

At present the Meteor Burst System of communication is under evaluation for Service use as a means of remote monitoring. Meteor Burst communication is based on the phenomenon whereby radio waves will reflect off the ionised trails left by meteors. The radio waves are scattered and this can be used to support radio communication at HF and VHF.

TOLLESBURY BOAT STUDY



SUGGESTIONS FOR TOLLESBURY BOAT STUDY

PREPARATORY PRE VISIT WORK

Allow at least a term for the preparatory work - all the children in the class can be involved including those not coming to Tollesbury.

1.HISTORICAL BACKGROUND

Look at maps of the East Coast to discover the location of Tollesbury in relation to other coastal towns.

Pay particular attention to the major towns such as Newcastle, Ipswich, Colchester, harwich, London and discuss what type of trade may be existed between them.

Consider factors which would have encouraged the transport of goods by sea.

Discuss the fishing opportunities off the east coast and explore the importance of Tollesbury to this.

Look at the importance of the Oyster trade to this part of the coast.

2. BOATS

Look at the different methods of powering boats - rowing, sailing, steam, motor.

Pay particular attention to sailing boats.

Look at the different types of boats - fishing, cargo, pleasure, passenger, residential.

Discuss the various materials used in constructions - wood steel, fibre, ferro-cement.

Pay particular attention to wooden construction.

3. SKILLS

Expose children to the techniques of art skills which will help them in the visual presentation of their observations whilst at Tollesbury - close observational work, sketching, use of a variety of pencils, pen and ink, pastels, water colours.

Work on skills in printing, fabric printing, constructions skills for model making.

Develop skills in estimating and accurate measurement and the preparation of sketches and plans for the construction of accurate scale models.

TOLLESBURY BOAT STUDY

Allow late morning and whole of afternoon with lunch taken near the marina.

IMPORTANT: Check that permission has been given by Tollesbury Saltings for access to the catwalks.

Remind children to stay on the catwalks and not to go onto the mud or any of the vessels.

1. BOATS MOORED ON THE SALTMARSH

Form the children into groups of about six, each with a leader, to study closely one area of the Saltmarsh.

Using the map divide the saltmarshes into four areas and allocate a group to each area. Ask each group to:

Look at the various materials used in the construction of boats in the area. Think about why the materials were used.

Make a count of the number of boats made from wood, fibre, glass, steel, ferro-cement. Plot these on a graph.

Make a count of the different types of boats.

Make a location map of the boats showing differentiation by type and by consturction materials. Discuss the reasons for use of materials, advantages/disadvantages etc.,

Look at the rigging, construction of hull, tiller, helm, wheel-housing, masts etc.

Choose a vessel for sketching, encourage children to look at detail rather than sketching the whole.

Encourage children to sit quietly and think about one of the boats, its current and original uses. Look for clues that can tell something about its original use and why it has lent itself for modification to its present use.

From discussion look for clues which can identify its port of origin, its age etc.

Look closely at one of the vessels and write either in poetry or prose.

Write a short story about what it would be like to sail on the chosen boat either today or in its origianl form.

Look at the way in which the vessel is moored, lines and knots used. Consider the effects of the tide on the mooring lines, what allowances have to be made for the variations.

Take measurements to discover length, beam height above water etc. Use a clinometer to determine height of masts.

Collate this information to be used in the construction of scale models.

2. THE BOAT YARDS

There are a number of boat yards; each could occupy one group.

Look at the boats being built/constructed. Study methods being used.

Observe work being undertaken and study methods and tools which are being used. Consider what skills are required.

Make comparisons of the apparent sizes of boats when out of the water to when in the water.

Consider the amount of the boat which is below the water line.

Study the shape of hulls and consider reasons for differences e.g. type of boat and its purpose - fishing, pleasure, racing etc.

Compare the keels of different boats and discuss reasons for differences.

Discuss the effect of the elements on the hull, superstructure, rigging etc.

Look for objects such as ropes, tackle etc. which may provide stimulus for drawing, writing, printing, rubbing etc.

Compare different methods of getting boats in and out of the water. Look at the crane and slipways. Consider means of power.

3. THE YACHT STORES

Discuss the original purpose of the Yacht Stores which today are known as the Sail Lofts.

Compare this with present uses.

Look at the material used in construction.

Consider why the buildings are constructed off the ground.

Sketch : Areas of one of the buildings to show the materials used
: Windows
: Doors
: Stairways

Take rubbings.

Look inside the Classroom to discover method of construction.

Take measurements and make sketches in preparation for modelling.

FOLLOW UP WORK AT THE CENTRE

Complete and develop written work started during the day.

Use sketches for the basis of water colour paintings, charcoal drawings etc.

Allow discussion between each of the groups and the comparing and pooling of information.

Complete graphs and prepare them for inclusion in later presentation.

Start work on aspects where there was insufficient time during the day.

FOLLOW UP WORK AT SCHOOL

Those children who remained behind could continue with work relevant to the visit so that they will be able to contribute to the follow up work which should occupy several weeks.

Collate the information on types of boats to be found at Tollesbury and present this using graphs, IT.

Develop written work.

From sketches and measurements made make models of:

Some of the boats

The Sail Lofts

Buildings in The Boat Yards.

The Crane

The slipway

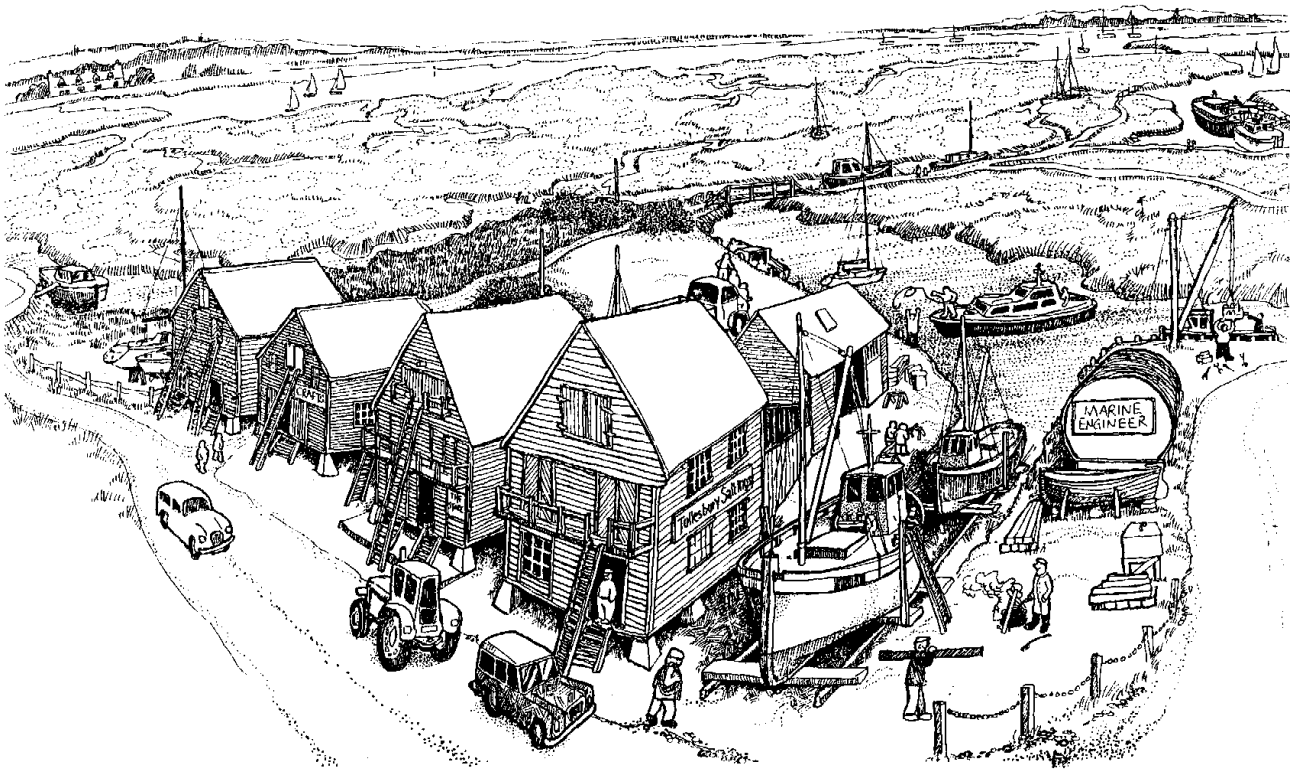
Make displays of knots.

From waste pieces found make comparisons of the different types of rope, thicknesses, materials used purpose.

Use sketches of parts of boats, dooryways/ windows of building etc. to make prints on paper and fabric for drapes.

Develop work from sketches using hand and machine embroidery.

HABITAT AND SALTMARSH STUDY



THE SALTMARSH

Mud and more mud

Special Protection

Saltmarsh Formation

Plants and zonation

Saltmarsh - sea defenses

Sea defenses at Tollesbury

Mud and more mud

On first appearance a saltmarsh can look like a vast expanse of mud ! But on closer examination a whole living ecosystem can be discovered. A saltmarsh does not have the same beauty as a wide, sandy beach with rock pools; however for some plants and animals the saltmarsh is the best and only place they can live. Due to the tide regularly covering the whole area - everything that grows on the saltmarsh must be salt tolerant (halophytic). This produces a habitat completely different from any found inland. Some of the birds, plants and animals are only found on saltmarshes and would never be seen in a garden, wood or in the countryside.

Special Protection

Saltmarshes have long been valued by ecologists, ornithologists and conservationists as important wildlife habitats - and the saltmarsh at Tollesbury is no exception. The whole saltmarsh is designated as a Site of Special Scientific Interest (SSSI). This is a designation endorsed by the Government and given to areas which are the best examples of national heritage including wildlife habitats, geological features and landforms. As well as this the saltmarsh has further protection from a number of European Community Directives - the site is named a Special Area of Conservation (SAC) under the Habitats Directive due to the marsh providing feeding and nesting sites for a wide range of wading birds and acting as an important migration stop-over site. In connection with this it also has protection under the EC Birds Directive designating the land as a Special Protection Area (SPA).

Saltmarsh formation

Marshes occur in virtually every river estuary . The fringing marshes at Tollesbury form part of the Blackwater estuary. It takes many years for the saltmarshes to develop and they begin to form where mud sediment is deposited on a low energy coast - where wave action is gentle to allow the mud to settle and accrete.

Plants and zonation

The tide plays a major part in the way the saltmarsh develops. It covers the mud flats twice a day cutting it off from the oxygen supply in the
air. Plants that thrive and flourish on the marsh must be salt tolerant and able to survive under the water for a number of hours each day. Different types of plants grow in the mud according to how well they can survive under the water. From spotting these plants the marsh can be separated into four zones or levels:

1 Lower level. Pioneer zone - closest to the sea
2 Low mid level
3 Mid to upper level
4 Upper level - only reached by high spring tides

The first zone (pioneer communities) is the one closest to the sea which is covered by the salty water most of the time. Here, very few types of plant can grow - examples of these plants include: glasswort, sea-aster, cord grass and sea-blite. (These can also be found further up the marsh combined with other species as the immersion in salt water decreases and additional plants appear.) Further inland the mud is covered for less time and more plants can establish themselves - these form the middle and upper zones.

Enjoy discovering this special, unique and highly protected habitat!

Saltmarsh - sea defences

As well as providing a home for a wonderful selection of flora and fauna the saltmarsh also plays another important role - providing a very effective, natural sea defence against flooding. In recent years the potential value of saltmarshes in coast protection and flood defence has been increasingly recognised. Concern about the effects of accelerated sea-level rise and a possible increase in storminess combined with the decline in the value of agricultural land and the strong arguments from conservationists to protect saltmarshes has forced authorities responsible for protecting the coastline to review their current practice.

Sea defences at Tollesbury

The coastline at Tollesbury, where *Trinity* is moored, is protected by a high concrete sea wall. Sea wall defences are very expensive to build and costly to maintain and with gradual sea level rise along the east coast they are repeatedly being breached. As a result of this the Environment Agency, responsible for coastal defences, has been considering alternatives to the hard engineering of building sea walls and has shown renewed interest in the development of soft engineering methods of saltmarsh creation and restoration. This would be particularly beneficial to the saltmarshes not only in Essex but also in Kent and parts of the South Coast where there is serious erosion and concern that the marshes may deteriorate further and in some places eventually disappear.

Managed retreat sites

The Environment Agency has embarked on a number of experimental sites on saltmarshes where they have taken down sections of the sea wall to let the tide find its natural level. One of these is situated in Tollesbury and is within easy walking distance of *Trinity*. Here the wall has been breached and the saltmarsh encouraged to accrete and develop naturally. The sea water has been allowed to flow over the adjoining farm land rather than being stopped by the wall and as a result the saltmarsh is developing and growing rather than being curtailed by the sea wall. Research has shown that in conditions of very high tides, increased wave action and strong storm surges the saltmarsh provides efficient and successful protection. The construction of the saltmarsh with creeks, gullies and saltmarsh vegetation considerably dissipates the force of the wave action and reduces the strength of the surge. This in its turn reduces the extent and severity of the flood. The immense value this can provide has not been overlooked by coastal engineers who face a growing problem in how to protect the land from the encroaching sea. In many areas along this part of the Essex coast allowing saltmarsh to develop naturally may be the solution to the rising sea level. This is not only a relatively cheap way to proceed but also popular with conservationists.

Saltmarsh survival

In some areas along the Essex coastline the saltmarsh habitat is becoming an ever diminishing resource due to being squeezed between the sea wall on the one hand and the rising sea level on the other. Allowing new saltmarsh habitat to develop behind the sea wall becomes an almost essential option in order to conserve the resource.

HABITAT STUDY **Leader Information**

1. Ask the whole group what could be found living on the Saltmarsh.

   The answers you will be looking for are:

   (a) Plant (b) Human (c) Animal (d) Bird

2. Divide the children into four groups (duty teams?) one for each of the above. Alternatively each group can find evidence for all 4 species.
   Assign a pre-briefed adult to each group and a with clip board, paper and pencil to members of the group.

3. Each group to convene to discuss with its leader the evidence they will look for to support the hypotheses that the Saltmarsh will provide a habitat for their topic. Leader to write these down.

4. Each group goes out to test their evidence - in the course of this they may find more - write these down. (Send the animal group along the sea wall towards Old Hall).

5. Allow the time they need - (two schools spend 1 hr - 1.50hrs another 30 mins! - Suggest 45 mins)

6. Return to base and each group decide how they are going to write up their conclusion - they could include illustrations. Depends on the group's involvement but this could take another 30 mins.

7. Ask each group to make a presentation including their hypothesis, evidence and conclusion. In this way everyone will share in the experiences of the others symbiosis will take place!

Brief the group leaders before introducing the task to the children.

Their task is:

1. To 'tease' ideas out of the children - get them to discuss with each other the validity of their ideas for evidence, and get a consensus.

2. When out on the Saltmarsh they should encourage children to look/listen and leaders should direct children's' attention to things they have missed.

3. On return draw ideas and findings together, agree method of recording findings in a way in which presentation is to be made to the others.

Ask questions rather than answer them.

SALTMA RSH PLANTS

All the plants growing on the saltmarsh have had to adapt to survive. They could have been pushed out of less rigourous habitats where other species were more virulent, and have then had to contend with not only a very salty environment, but also one which floods with salt water. Some are better able to cope with this situation than others. The Samphire grows right down at the bottom of the mud pools where they are often completely submerged for several hours each tide. On the other hand the Sea Wormwood grows right on the highest parts of the saltings where it is unlikely to be covered very often if at all. Comparing these two plants will give an idea of the adaptation that has taken place.

The Phillips Flowers reference book is very good for identification purposes and there is also a set of photographs which can be used. Drawing a cross-section of a mud pool would be a good way of finding out the different zones that the plants tend to live in.

If you wander off the saltmarsh, for example looking at the banks around the hardstanding, or going onto the seawalls, you will immediately be able to observe a difference in the vegetation. Many of these plants you would find elsewhere in the countryside, but the sea kale is peculiar to areas near the sea.

You could do a comparison between plants that live on different parts or zones of the saltings, or between the saltmarsh plants and the seawall plants.

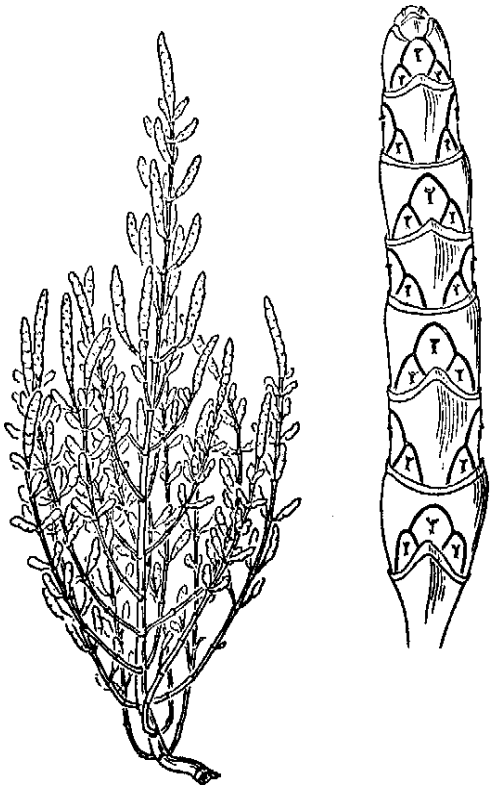
The following pieces about some of the plants gives descriptive, historical and anecdotal information which may be of interest. You may also find plants that are not mentioned here.

SALTMARSH PLANTS

Sea Plantain

Sea Plantain has long fleshy leaves rather like grass. It flowers from June to August, and also grows on mountains. Its leaves can also be used on salads.

Sea Plantain



Glasswort, Marsh Samphire

Glasswort, Marsh Samphire

Glasswort is the lowest of the true saltmarsh plants and grows where the mud is fairly stable. Its bright green fleshy leaves appear jointed, and at the end of the summer often turn red. At one time it used to be burnt in large amounts to produce soda for glass and soap making. In Cumbria it is also known as the Pickle Plant and as well as being good for pickling it can also be boiled and eaten with butter like asparagus. It is said to be best picked on the longest day (June 21st).

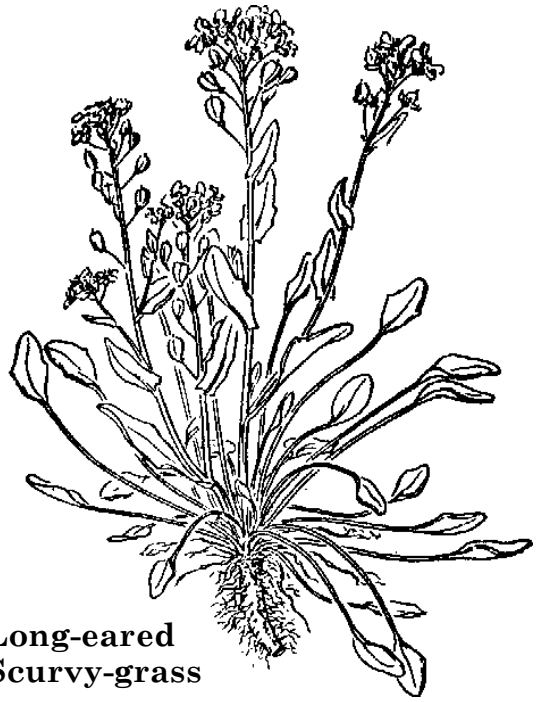
Sea Aster

Sea Aster is found towards the top of the saltmarsh and looks rather like Michaelmas Daisy, and grows up to 1 metre high. It also grows on cliffs and rocks, but dies out if the land is heavily grazed. it has fleshy leaves and its mauve flowers can be seen between July and September.

Sea Aster

Long-eared Scurvy-grass

Scurvy-grass is also called Spoonwort because of its spoon-shaped fleshy leaves. These contain vitamin C and were eaten by sailors to prevent scurvy. They have a rather bitter taste which was probably disguised with spices. Scurvy-grass is not a true grass, and it has white flowers between April and July. It grows about 10cm high.



Long-eared Scurvy-grass

Golden Samphire

Golden Samphire

Golden Samphire has fleshy leaves which sometimes have three parts at the tip. Its bright golden flowers appear in July and August and it also grows on sea cliffs and rocks. Its leaves are very tasty boiled and pickled in spiced in vinegar, or it can be used fresh as a salad vegetable.

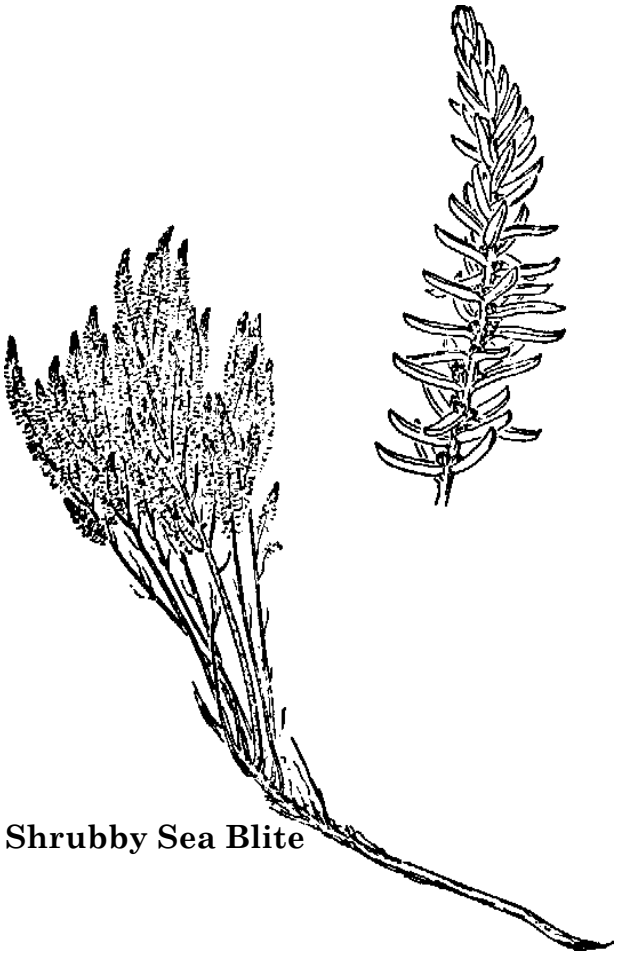
Thrift or Sea Pink

Thrift or Sea Pink

Sea Pink has rosettes of grass-like leaves and its pink flowers can be seen from March through to September, on the top of the saltmarsh. It is also found on cliffs, sandy places, and is even grown as a rockery plant in gardens. During the reign of King George IV it was also found on three-penny bits. If the marshes are grazed by sheep and cattle it tends to die out.

Sea Spurrey

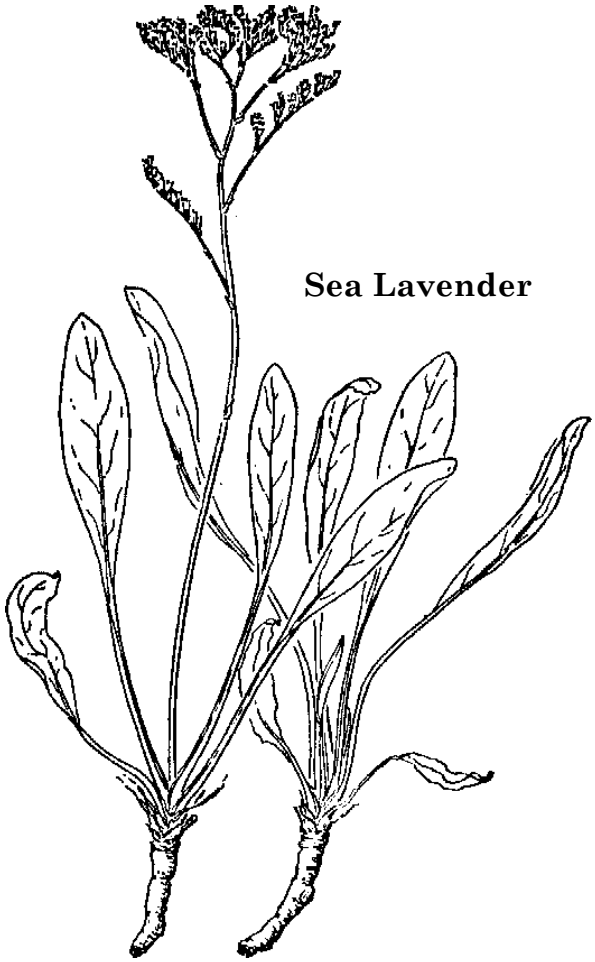
Sea Spurrey is found near the top of the saltmarsh and has tiny flowers which appear from June to September. The leaves are long and thin, grouped around the stem. The flowers near the top have petals which are white at the base and pale mauvy-pink further up. The tiny stamens are bright yellow. It is related to the Sand Spurrey seen in sandy, gravelly places. It grows to about 10cm in height.



Shrubby Sea Blite

Sea Lavender

Sea Lavender has fleshy dark green leaves and purple flowers which colour the whole of the saltmarsh from July to September. They can be dried and used for decorations in winter. Sea Lavender is not related to true lavender. An extract made from its roots was used to cure sore throats, catarrh, mouth ulcers and haemorrhoids.



Sea Lavender

Shrubby Sea Blite

Shrubby Sea Blite grows up to a metre high and is a perennial with many branches, and fleshy leaves rounded at the ends. From July to September it has tiny green flowers which are almost hidden among the leaves. It grows above the High Water line often on shingle banks. In some hot countries it is fed to camels.

Sea Wormwood

Sea Wormwood grows up to half a metre high on the top of the saltmarsh and has finely divided leaves covered in silvery down. It has small orange flowers in August and September, and a pungent smell. A close relative, ordinary Wormwood, is used for making a liqueur, and also Vermouth wine.
Wormwood Tea is also good for you in very small quantities - too much can damage the brain and heart.

Sea Wormwood

Sea Purslane

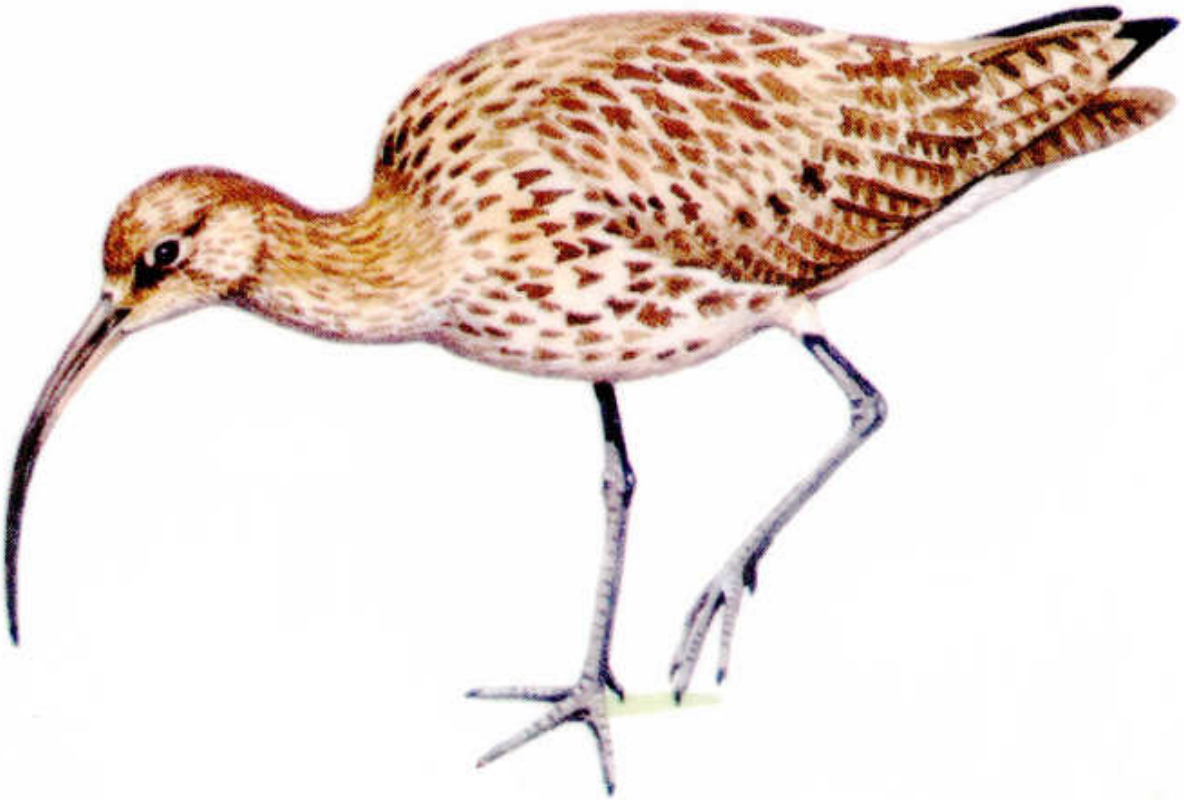
Sea Purslane

Sea Purslane is a dense perennial plant with greyish green leaves covered in fine hairs. It is found on the top of the saltmarsh and is particularly noticeable along the edge of creeks, growing up to 40 cm high. It is eaten as a vegetable in the Far East, and can be added to salads.

Common Cord Grass or Rice Grass

Cord Grass first appeared in Southampton Water in about 1870, and since then has steadily spread around the coast, and become common in Tollesbury in the last few years. It grows about a metre high and in some areas it has been deliberately planted to stabilise the mud and reclaim land from the sea. In North America a close relative of Cord Grass is used for thatching houses.

BIRDS



BIRDS WE ARE LIKELY TO SEE AROUND TOLLESBURY

This list does not cover all we are likely to see, nor does it give a full description of each bird. It simply aims to pick out the most striking features. (You may like to add your own notes.) We would be glad of your comments on the sheet at the end of the weekend.

Less-than-perfect drawings of birds are usually worse than none at all, so it is best to refer to bird books for proper coloured illustrations, and also for further information on the birds. The rough sizes refer more to length than anything else.

GULLS

Black-headed gull

In winter it doesn't usually have a black head, instead there is a black spot behind the eye, grey back, white underneath and black wing tips; a bit smaller than a woodpigeon. Noisy. Can often be seen at half tide padding about on the mud and listening for worms.

Herring gull

Almost as big as a mallard. Yellow bill with a red spot, pink legs, grey back and white body. Not usually seen on the saltings - more likely out at shingle head.

Greater black-backed gull

Large: bigger than a mallard. Black back, white body and heavy yellow bill. fierce to other birds.

Common Tern and Little Tern

Smaller than the black-headed gull, with a black cap, (the little tern has distinctive white circle above bill) white forked tail. The common tern has a red bill and feet and the little tern a yellow bill and feet. Seen swooping and diving along the borrowdyke.

DUCKS

Shelduck

A bit bigger than a mallard. Brown band round a white body, which is quite distinctive from a distance, dark green head and red bill. In flight wings beat very quickly.

Mallard

The commonest duck. Often seen along the borrowdyke - the male is quite striking but the female appears to be mostly brown.

Golden Eye

Quite a lot smaller than a mallard. Male is white underneath, has a dark green head with a white spot in front of the eye. Female has brown head, grey body, white “chin”. Dives a lot.

Tufted Duck

Small - only a bit bigger than a woodpigeon. Male has black head, back and chest, white underneath. The tuft on the back of head may be visible. Females are brown. Dives a lot.

Eider Duck

Same size as mallard. Both sexes have a long head with an aristocratic outline (the book will show what this means). Males are black and white, females brown. A sea duck.

OTHER BIRDS WHICH SIT ON THE WATER

Great Crested Grebe

Bit bigger than a crow, slender brownish body and long white neck, top of the head black. Longish dagger-shaped bill. Rarely more than a few together. Dives a lot.

Swan

Well, we all know this one - we are most likely to see the mute swan. Usually a pair nesting around the sea wall towards shingle point.

Brent Goose

These famous (some say notorious) visitors descend on Tollesbury every winter in their hundreds, many to feed on the fields around the fields around the Fleet as well as on the saltmarsh and mudflats. Their distinctive honk is missed when they return to Siberia in late March early April.

Cormorant

Large, long and thin and mainly black. Sits low in the water with its bill slightly upturned. Often sit like sloping sticks in a row at the end of a point of land. Flies straight and steady, often low on water, with distinctive long neck. On land sometimes holds its wings out to dry.

Moorhen

Common in the borrowdykes; sized between a blackbird and a woodpigeon. Black with red and yellow bill. Jerks its head when swimming. Quite shy and will dart away into the reeds, so you have to be quick and quiet to spot them.

Coot

Bigger than the moorhen; black with a white part to the face. Also common in the borrowdyke and also on larger water bodies.

WADERS

Oystercatcher

About the size of a woodpigeon. Strikingly black and white with a long orange bill and pink legs. Often strut about like little old men at the water's edge. When flying distinctive black and white 'V'.

Dunlin

A small wader - only slightly bigger than a sparrow. Grey and white in water, with fairly long thin bill. Usually in large flocks at the water's edge. In the air their formation flying is really magnificent, the whole flock apparantly changing colour as they turn.

Redshank

Bit bigger than a blackbird. Upper part of bill, and long legs, are red, unless its been standing feeding in the mud. Brownish back, but in flight has a white stripe along the back edge of the wings. Fairly common on the saltings and its cry can often be hear sounding lonely when the tide is out: an opportunity for feeding.

Curlew

Most striking feature is the very long, curved bill. Total length (including the bill) is about the same as a mallard. Brownish grey body; sometimes in large flocks. Distinctive voice heard at any time, but probably most noticeable at night.

OTHER WATERSIDE BIRDS

Grey Heron

Large; similar size to a cormorant, but has very long next and legs, a grey back and strong dagger-shaped bill. May be seen standing motionless beside water, look like a little old man all hunched up; or flying slowly, with legs trailing behind.

Marsh Harrier

Shorter than a mallard but with long wings, slightly bent at the "elbow" in flight. Usually seen flying low over the fields and seawalls, with occasional wing beats and long glides, with wings held in a shallow "V". Hunts its prey by pouncing on it in reeds etc. Manly brown, but male has grey on the wings and tail.

MAINLY LAND BIRDS

Kestrel

Smaller than a woodpigeon, this is the falcon often seen hovering head to wind beside the dual carriageway . . . and also over the fields at Tollesbury. Mostly brown, thought male has grey head and tail. Sometimes seen perched on posts.

Red-legged partridge

Becoming commoner in Tollesbury than the ordinary partridge, between a wood pigeon and blackbird in size. Apart from red legs it has black necklace and the body is mostly brown, with short wounded wings. Prefers running to flying, often seen in the fields behind the sea walls.

Pheasant

Much longer tail than the partridge, especially the male, who is brightly coloured.

Lapwing

Between a blackbird and wood pigeon in size. Black and white with a long wispy crest on the head, broad, rounded wings. Very acrobatic in flight. Usually in flocks. "Peewit" call.

Woodpigeon

Grey with white band across the wings in flight. Sometimes seen flying over the saltmarsh.

Skylark

Small streaky brown bird, slight crest on the head, bit bigger than a sparrow, striking song, especially when it hovers in flight, high in the air. Often seen around the sea wall.

Carrion Crow

Bigger than a woodpigeon: gloomy black all over. Slow flight, usuallysingle. Seen sitting on seawalls and posts.

BIRD QUIZ

Look for the following 10 birds and when you see them put a tick and write down where you saw it.

Blackheaded Gull	☐	_____
Shelduck	☐	_____
Oystercatcher	☐	_____
Curlew	☐	_____
Tern	☐	_____
Redshank	☐	_____
Heron	☐	_____
Cormorant	☐	_____
Coot	☐	_____
Swan	☐	_____

Write down the names of any other birds that you see.

Draw a picture of the bird you like best.

The Local Area

The Borrowdyke
The Red Hills
Extracts from Blackwater Matters

THE BORROWDYKE

The Borrowdyke is a local name for the channel (or delph) lying behind most of the seawall around Tollesbury Fleet. It was created when soil was excavated to build the seawall. Before this, much of the land behind it would have been similar to the saltmarsh around the Lightvessel of no value for farming, but rich in wildlife. The pressure to reclaim saltmarsh is reflected in land prices in 1638: two shillings per acre for reclaimed land, and only one penny per acre for saltmarsh.

Most of the present seawall was built before 1600, though in the next few decades saltmarsh at Salcott and Old Hall was still being reclaimed. Tollesbury Wick Marshes had been reclaimed by 1744, and Pennyhole Fleet between 1774 and 1799. Both these areas are still dissected by drainage channels. But whereas the Wick Marshes are partly used for arable farming, Pennyhole Fleet is still very wet and of considerable value for wildlife.

The relative levels of saltmarsh and farmland on opposite sides of a seawall often show something about its age. The reclaimed land settles with time, while the marsh accumulates silt and rises relative to the wall. If the landward side is more than six feet lower that he seaward side, the wall was probably built before 1600.

Today the Borrowdyke still provides some drainage for the farmland, and is connected to the sea by sluices through the seawall. The small creek almost opposite the Light-vessel has a sluice connecting Woodrolfe Creek to the Wick Marshes. Some of the sluices open automatically if the water on the landward side arises above a certain level: others are virtually never used now. Obviously they don't allow seawater onto the land (unless someone wedges them open!)

Although the Borrowdykes drain water off the farmland, which would be fresh water, a certain amount of seawater actually seeps through the seawall itself. Because of this the Borrowdykes contain slightly salty or "brackish" water: not ideal for either freshwater or seawater creatures.

As a result, the plants and animals found there have to be very specialised to tolerate these conditions, which may vary a lot at different times. So we usually find very few species, but often large numbers of individuals of each species, since there is little competition between species.

However, a brief survey of the creatures found in the Borrowdyke shows straightaway that most of them are more closely related to fresh water than marine life. The plants might include Sea Club Rush, Common Reed, Seaside Crowfoot, two different Tassel Pond Weeds, Curled Pond Weed and Fennel-like Pond Weed. The animals include stickleback, mayfly nymphs, snails, several species of water boatmen and water bee-tles. Birdwatchers may see coots, moorhens, reed buntings, swans, herons, mallards and the occasional godwit.

Different sections of Borrowdyke can be studied to investigate how variation in depth and chemical conditions gives rise to different plants and animals, each section having its own food web. Some sections dry up completely in summer and will contain only species adapted to such hazards.

From a conservation point of view, the Borrowdyke shares a number of dangers with freshwater ponds. It is easily disturbed by agricultural fertilisers, sewage and indus

trial effluents. Small quantities may actually increase the amount of life, but too much can result in "blooms" of algae which not only look unpleasant but take oxygen from the water, and suffocate much of the life in it.. In addition there is the natural tendency for such small water bodies to fill in with time as a result of plant development (succession), and periodic clearing is needed to maintain a good depth of water.

This unusually long, narrow habitat provides an interesting link between fresh and and sea water, saltmarsh and farmland, the past and the present.

THE RED-HILLS - Christine Couchman

Anyone familiar with the salt-marshes of Essex is likely sooner or later to notice areas of dark red soil in the fields behind the sea walls, or low reddish mounds on the saltings. These are the 'Red-Hills'; nearly three hundred of them are known to survive in Essex, and others have certainly been washed away by the sea. Similar sites have been found round the coast from Lincolnshire to Somerset. In Tollesbury alone, fourteen possible red-hill sites are known, and further research would almost certainly discover more.

Such a commonly occurring type of site must have performed a function vital to ancient man, even though the red-hills do not look very exciting today. And the substance they produced was equally unexciting and yet essential: salt. The red-hills are the remains of an industry which produced salt from sea water.

The process worked like this:- sea water would be allowed to flow at high tide into large shallow tanks or pits, where it evaporated in the sun and wind until the solution approached saturation point. Containers of this saline solution were then heated over fires until the solution crystallised into the pyramidal crystals familiar to users of the modern Maldon Sea Salt. There appear to have been two methods of carrying out the heating process: circular or subrectangular pans of coarse fired clay were either balanced on clay pedestals and wedge-shaped fire-bars, and fires lit beneath them; or the pans on fire-bars were placed across the top of the small hearths sunk in the ground. The earth around the fires and hearths was burned red by the heat. When the clay utensils broke, which must have happened quite often, they were simply discarded on site. Over the years, quite large mounds of burnt earth and fired clay objects (the technical term is 'briquetage') built up, resulting in the red-hills which we can still see today.

An experiment showed that four pints of sea water from Pyefleet Channel gave 92 grams (3.25 oz) of unpurified salt. Great heat was not needed; crystallisation took place without the water actually being boiled. After the initial crystallisation or course, the 'salt' would have to be treated further to remove impurities.

In Eastern Europe, salt-production can be traced back to the Neolithic period or New Stone Age (circa 4000-2000 BC). In Britain the earliest evidence for salt-working is in Lincolnshire and Norfolk, c. 1800 BC; but in Essex the earliest known sites are late Iron Age ('Belgic' c. 50 BC - 50 AD), or Roman. It appears that the Belgic sites are concentrated in the north of the County, while the Roman ones tend to be found along the Thames. In between there seems to be considerable overlap. The one red-hill which has been excavated in Tollesbury is of Late Iron Age date, but surface finds suggest that at least one other one is certainly Roman.

In some parts of the country salt-working was probably under State control in the Roman period (e.g. in Scotland). But in Essex there is nothing to suggest that salt-works were not privately owned. They may have formed part of the economy of some of the coastal villas, or farm estates. There are two possible Roman villa sites in Tollesbury.

There is some evidence to suggest that production of salt in the red-hills declined after the beginning of the third century AD. This may have been because of the rise in sea-level known to have taken place in the later Roman period, flooding the sites; or possibly the production of purer salt from the brine-springs of Cheshire and Worcestershire put the coastal salt-makers out of business.

Coastal salt production had revived, however, by the early Middle Ages. Many salt-pans are recorded in Doomsday Book (1086 AD), including eight in Tollesbury. None of the Tollesbury ones have yet been identified on the ground; but elsewhere in Essex some mounds have been shown to be mediaeval. And the village of Salcott, adjacent to Tollesbury, derives its name from 'Salt-Cottages'.

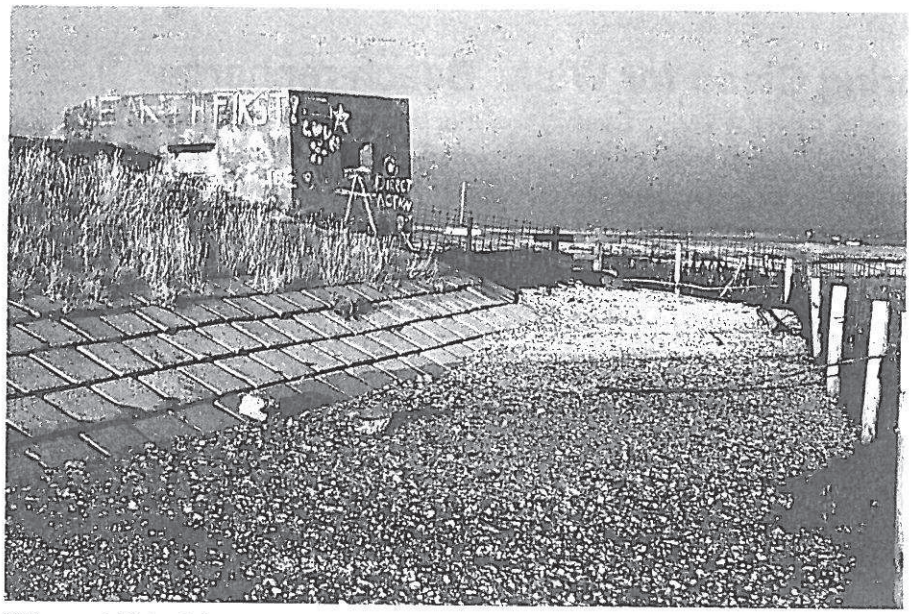
All the known red-hills have been discovered by observant people noticing red earth in the fields, or reddish lines in newly-cleaned ditches, or mounds in the saltings.

Pillboxes past and present

During World War II the marshes at Tollesbury were an important section of Britain's defences at the edge of the Colchester 'Stop line'. If Germany had invaded Britain and managed to get to their second objective, the front line would have run from the river Blackwater in the east, across to Gloucester in the west. Defence of this area was made easier by the flat terrain saltings, grassland, fleets and of course the Blackwater itself. Many of the structures survive today after 50 years of the harsh environment.

The pillboxes constructed at the Wick are a variation on the Type 22. These were positioned facing the direction which the military thought the enemy would attack from and at such spacings as to produce in action an inter locking field of fire. Along the section from Shinglehead Point to the old pier, two pillboxes are missing. They were probably removed as part of the seawall improvements that followed the 1953 floods. 'Loops' (firing positions) were located in each wall with a wooden shelf to lean on. They were kept to a minimum size to allow troops to move around inside freely and reduce the chance of bullets entering the building. At the centre of the pillbox was an anti ricochet wall built either as a Y or Cruciform shape. The concrete walls were normally 300mm (12") thick and most had a flat roof. Pillboxes seldom exceed 1.98m in height, and the entrance/exit was situated at the rear to allow for greater cover for the crew.

Today most of the 'loops' (or windows) and the doors remain concreted up. Former coastal defence authorities took action to seal them to prevent waves and spray from slopping through the openings during high Spring tides and scouring out the floor. As these were not generally concreted, the integrity of the seawall was at risk. As the seawalls have risen steadily higher since the



Pillbox at Shinglehead Point

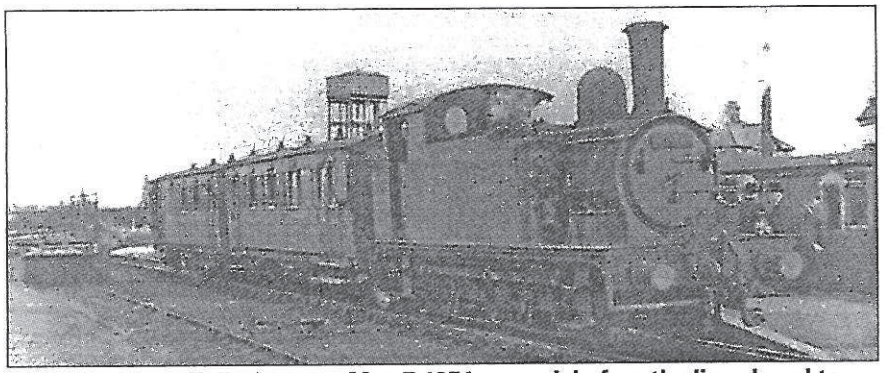
War, with each major maintenance programme, the pillboxes have seemingly sunk lower into their cores, so that even the top of the entrance doors are now buried out of sight. Although humans have been barred, wildlife certainly hasn't! Both swallows and shelduck have regularly used them as nesting sites. The latter species normally favours rabbit burrows, but one pair persists in choosing to nest amongst the accumulating generations of rubbish that now bedecks the floor of one of the pillboxes. Although a safe place to incubate the eggs, once hatched the baby shelducks are trapped, as they are unable to follow their mother out through the high window. The Warden has improvised a make-shift ramp that has had some limited success in overcoming this yearly tragedy, but a more permanent solution is needed opening up the pillboxes again.

Paul Mumford (Pillbox Study Group)

**STOP PRESS*:

possibly here or elsewhere around the Blackwater pillboxes may be opened up in the future to double as modest bird hides and shelters for walkers in winter, but closing them during the summer and leaving them to the birds.

Remembering great days of the Crab and Winkle line



A steam train at Tollesbury on May 7 1951, a week before the line closed to passengers.

by MICHAEL POWELL

ON the desolate and isolated shoreline of Tollesbury Wick, parallel rows of timber stumps stretch out across the mud flats of the Blackwater Estuary.

They are among the last sad remains of an ambitious scheme a century ago to turn Tollesbury into a major new fishing and yachting centre.

Key to the project was the development of a light railway from Kelvedon to Tollesbury and a 1,770ft (one third of a mile) long pier to enable boats on the River Blackwater to moor up and load or unload.

The Crab and Winkle railway – as it became known – from Kelvedon to Tollesbury was first proposed in 1896 after the Light Railways Act was passed.

The act was a reaction to the severe agricultural depression of the 1890s and allowed for the grant-aided construction of railways of a cheaper, lower standard of engineering than before.

This was so that deprived rural and fishing areas could benefit commercially from links to the outside world – other light railways in Essex were built to Thaxted and Coryton.

The Kelvedon to Tollesbury line and pier were the brainchild of landowners, farmers and businessmen including Arthur C Wilkin who stood to gain from linking his fruit preserves factory at Tiptree to the national rail network.

Construction began in 1902 – as well as Kelvedon and Tollesbury, there were stations at Feering, Inworth, Tiptree, Tolleshunt Knights, Tolleshunt D'Arcy and Tollesbury Pier.

But the anticipated fishing and yachting traffic never materialised, and from completion in 1907 the pier lasted barely a decade before being closed in 1921.

It gradually rotted away, was partly demolished in the Second World War to prevent invasion landings and was severely damaged in the disastrous 1953 floods.

But until the late 1950s British Railways still employed a man to row out in a boat and light a red lamp at the pier end to warn shipping at night.

The railway found it hard to ever make a profit and with increasing competition from road transport closed in 1951.

Back in time – Tollesbury station in 1951.

A last-ditch attempt to save it was launched in the House of Commons by Tom Driberg, the colourful Labour MP for Maldon and Braintree – who after his death was named as a KGB spy.

He suggested the line would make a popular tourist attraction as an Edwardian curiosity, but transport minister Arthur Barnes replied that with only five or six passengers a day the service was unsustainable.

After general closure a rail freight service from Kelvedon serving Wilkin's jam factory and other Tiptree industry lasted until 1962.

The characteristics of light railways such as the Kelvedon and Tollesbury line included combined passenger and goods trains, modified locomotives to deal with sharper curves and steeper gradients, and few engineering works such as buildings, bridges, embankments and cuttings.

Its light construction means that most of the route has now reverted to farmland and virtually no trace of the Crab and Winkle line remains – bar the appearance by one of its vintage passenger carriages in the classic Ealing comedy film The Titfield Thunderbolt.

Maldon & Burnham Standard, March 28, 2002

Tollesbury Yacht Stores

also known as The Sail Lofts

by
Joanne McAuley
CONSERVATION OFFICER,
MALDON DISTRICT COUNCIL
with thanks to Fellowship Afloat

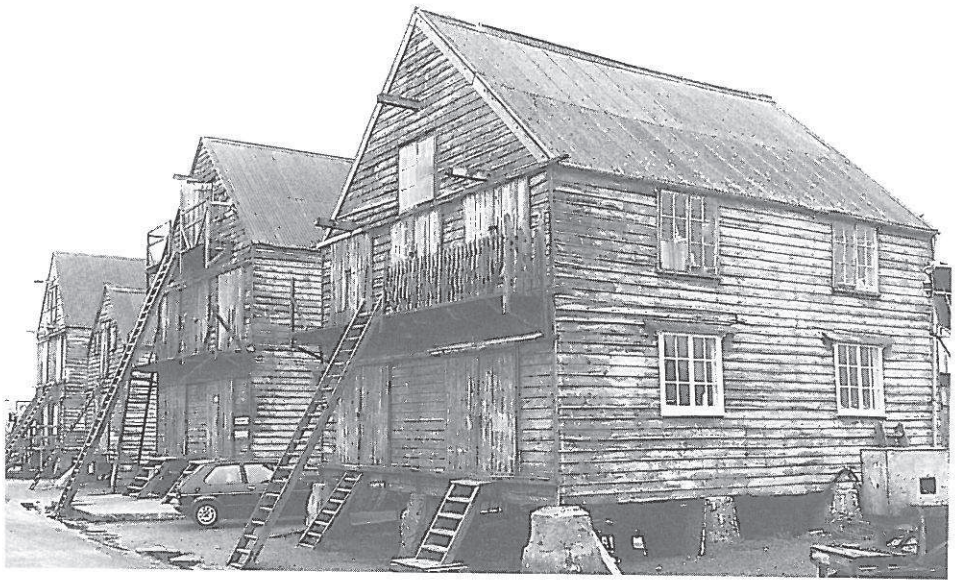


Photo: Fellowship Afloat

The Tollesbury 'Sail Lofts', or more accurately yacht stores, are an impressive local landmark in the Maldon District. They were certainly one of the first buildings I made a point of visiting as a newcomer to the area. Despite the utilitarian nature of the yacht stores, they are full of character and instantly appealing. In their unspoilt salt marsh setting, the buildings are evocative of a bygone era in Tollesbury when fishing and boatbuilding formed the lifeblood of the local community.

The stores are Grade II Listed buildings and were built from 1906-8 to accommodate gear and equipment from large Edwardian sailing yachts laid up on Tollesbury Saltings for the winter. Many Maldon and Tollesbury fishermen would join sailing crews on the south coast during the summer months. Famous people said to have wintered their yachts in Tollesbury include Lipton (tea), Bartrum (circus) and Prince Edward of Wales.

Each of the four sail lofts is slightly different in size and layout, having been built over a number of stages. Three have three stories and the other has two. The ground floor was used to store the gear associated with the large yachts whilst the upper floors were used by local fishermen. The stores are timber-framed and weatherboarded, constructed in sawn pine timber brought by barge from Maldon. They are all mounted on tapering square concrete piers which have saved the buildings from flood waters for many years. Originally, three of the stores had roofs of corrugated iron with the other in corrugated asbestos.

The yacht stores were at their height of use up to the 1920's and 1930's but the outbreak World War II brought large-scale yachting to an end. From the 1950's onwards the buildings were used by local fishermen and boat owners. However, the nature of their use became more commercial with some yacht brokers also moving in. Fellowship Afloat, a Christian Charitable Trust set up to provide education and holidays for young people, acquired one of the stores in the 1970's and used it as a workshop. Having grown very attached to their new home, Fellowship Afloat decided to buy the four stores with associated Nissan hut workshop and 147 acres of saltmarsh when it became available in 1980.

The stores were in a state of considerable disrepair in 1980 and it was decided that an extensive programme of repair and refurbishment was necessary to ensure their survival. With great assistance from the Manpower Services Commission, a six person community programme was established in 1983 to restore the buildings. Many local unemployed people and craftsmen carried out the work over an 18 month period with impressive results. This was no mean feat given that over forty fully jointed doors were made, two lofts were jacked up for structural repairs, three lofts were re-roofed, new concrete piers were cast and over one mile of weatherboarding was replaced. A commitment was made at the beginning of the project to bring the stores back to their original condition through careful research and assistance from local people.

The yacht stores received the 1984 Maldon District Council Conservation and Design Award. Not only have the buildings been beautifully restored and given a new lease of life but the local community has benefited through training and employment generation. The stores have a bright future thanks to their committed owners, Fellowship Afloat, and their subsidiary company Tollesbury Salting Ltd. For the most part, the ground floors of the buildings are in commercial and community use with the upper storeys still used by local yachtsmen and boatowners. The Yacht Stores have retained their essential character through their conservation and re-use as well as becoming a valuable community asset. The success of the project is there for us all to enjoy.

People on the Blackwater !
Maldon District Council's River Bailiff washing mud
photo: Graeme Smith

profiLe

Packingshed
on the Blackwater

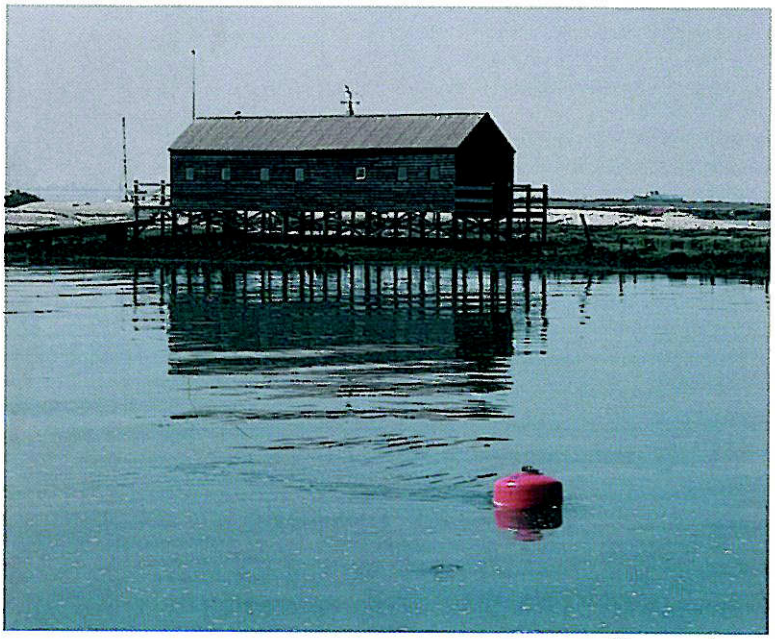


PHOTO - GRAEME SMITH

Probably one of Mersea Islands best known landmarks, the Packingshed, has stood on Packingmarsh Island in Mersea Quarters for over a century. Built in 1897, for the first 30 or so years of its life it was the hub of activity for the Tollesbury and Mersea Native Oyster Fisheries Co Ltd, which still own the Packingshed today.

The Company was set up to provide employment in Mersea and Tollesbury. These were dredgermen, or "drudgermen" whose work was hard and often poorly paid. They had to be stakeholders in the company and shares could only be passed to close relatives with apprentices having to produce documentary proof before being taken on.

Oysters were dredged from beds in the Blackwater and taken to the shed to be scraped, cleaned, sorted by size and packed in barrels for market. Prior to WW1 many were exported to France, whilst others were shipped to London via Whitstable. Some were also landed at Tollesbury and despatched by train via Tiptree to Colchester.

With all this activity poaching of oysters was rife and the industry had its own police force, the 'watchman'. There were three police boats to patrol the river and creeks, the last of which, the Rosetta, was beached on Packingmarsh in 1940 and gradually broke up.

During the inter-war years Native oysters were competing for food with the American Slipper Limpet. In an effort to clean up the river, loads of limpets were brought from the oyster beds and dumped on Packingmarsh Island. Pre 1914 there had also been a shell crushing factory at Peldon, supplying crushed shells to the poultry industry but this never really prospered.

The supply of oysters declined between the wars and by the 1930's the shed was mainly used for storage of fishing gear and gradually deteriorated. The shed survived the storm of 1987 but there was local concern that it wouldn't survive another such event.

A local trust was set up by Doug Powell of East Mersea to restore and protect this landmark and was granted a 25 year peppercorn lease on the island from the fishery company. Using local community labour, new support legs have been installed to replace the originals which had rotted, not due to salt water but seaworms. The walls and roof have been upgraded and the interior now houses displays and artefacts from the shed's working heritage.

The Blackwater Project has played its part: surveying the island; levering in funding from the Environment Agency for a new landing stage to make access easier; undertaking practical tasks to help maintain the shed; and through promotion with the island being featured on national television. The Project, which is represented on the management team of the Trust has also helped to secure grant funding towards the purchase of a second launch to service the island. This new craft is designed to enable disabled visitors to reach this unusual location.

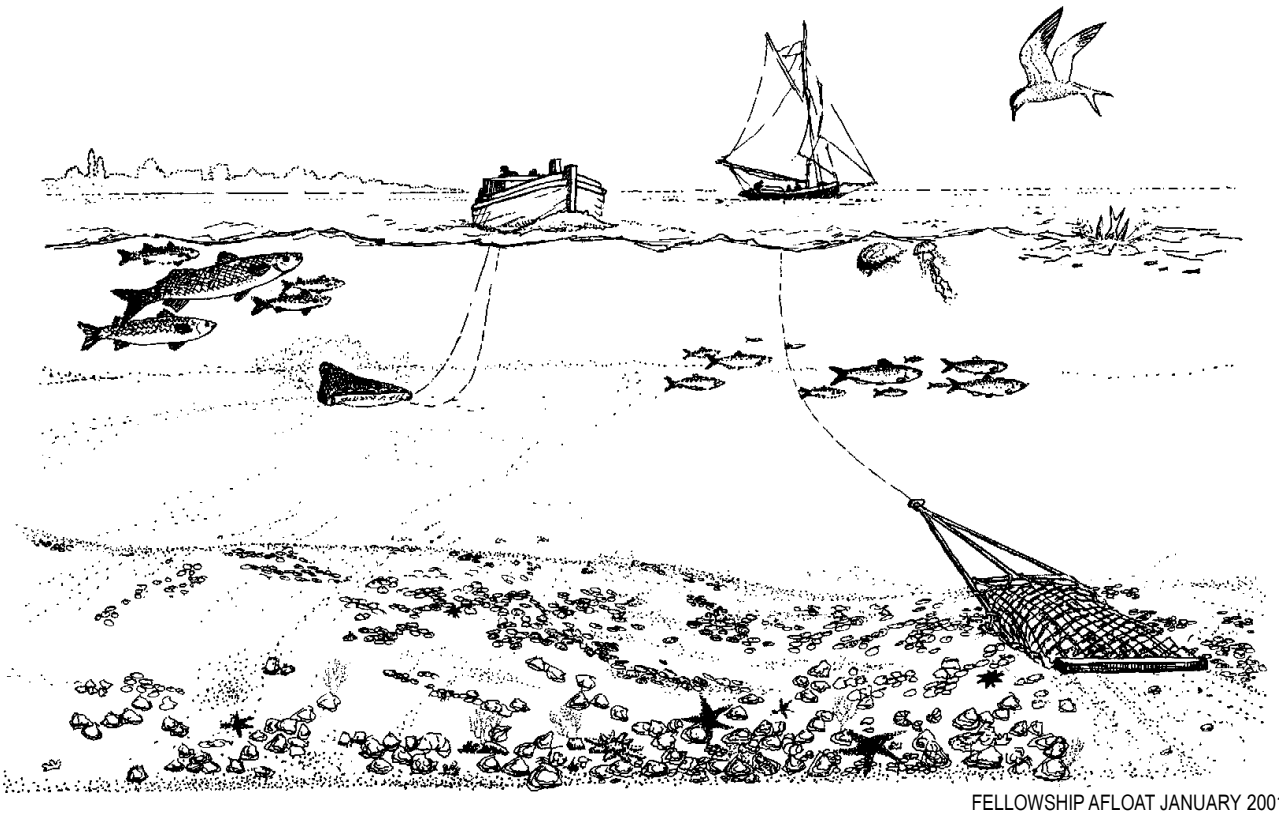
With the island almost totally submerged on large spring tides, the shed appears to be adrift on the open sea. This is a unique site which at low water reveals disused oyster pits, the skeletal wrecks of several boats, saltmarsh, the dumped slipper limpet shells (and more recently 1250 tonnes of fore-shore recharge materials to combat erosion) and several nationally important plant species.

THOSE WISHING TO VISIT SHOULD IN THE FIRST INSTANCE contact Doug Powell on 01206 383226.

working in shed 1912

DREDGING BENTHOS

(the life that lives on the river bed)



INTRODUCTION

Most Primary children have had the opportunity to experience Pond Dipping and many would have enjoyed rock pooling. Dredging takes these activities a little further by enabling children to dredge animals and plants from the bottom of the sea.

Part of a session is spent on the launch in the estuary near Tollesbury collecting specimens from the sea bottom by dredging.

We have to take great care when dredging that we don't disturb the sea-bed and that we don't dredge oyster beds, or layings, which belong to a person or company. The oysters in these laying will have been reared and placed out on the river bed by the owner.

On return to the classroom, children are able to observe their catch at close quarters and discuss what they have found. The animals must be treated with care and when the 'catch' is finished with, it is very important that it is returned to the creek.

Using this leaflet and identification books, children can identify the plants and creatures and use them as a stimulus for both written and close observational work.

Prior to the visit it would be useful for the children to have spent some time studying sea creatures and plants and the similarities and differences which they have when compared to freshwater life.

Six Animals that might be dredged up

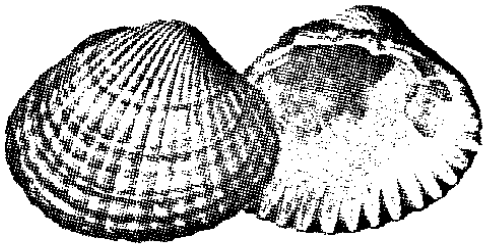
We can't guarantee what might be dredged up, but there is a good chance of finding most of the following and these could be used to look at the different 'families' that they represent.

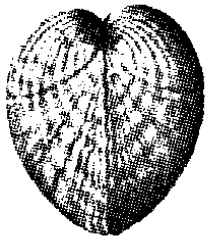
Brittle Stars	Echinoderms (spines or knobs on their skeletons)
Peacock Worms	Annelids (worms)
Sea Squirts	Tunicata (more complicated than a sponge)
Sea Anemones	Cnidaria (sac like animals)
Hermit Crab	Crustacea (animals with horny exoskeleton and body)
Slipper Limpet	Molluscs (animals with shells)

ANIMALS FOUND WHILE DREDGING NEAR TOLLESBURY

MOLLUSCS Animals with shells

COCKLES (Cardium edule)





Cockle closed up and looked at from the side

Colour - varies from white to blue grey

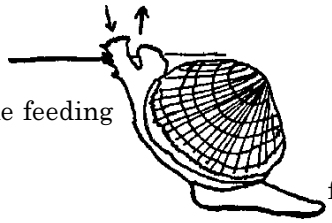
Size - up to 3cm across

Shape - a fat shell with two halves (valves) of the shell equal in size and serrated along the edge. When looked at from the side, they look heart shaped.

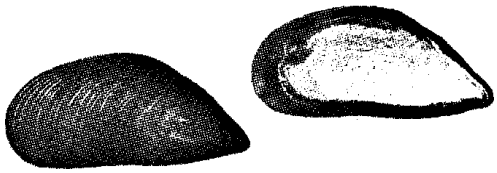
Cockles live just under the surface of the sand or mud to escape predators such as fish, gulls, crabs and starfish.

They have two short tubes (siphons) that they push up above the mud when the tide is in. Water is pumped into the lower siphon, the particles of food (very small plants and animals) are strained out and eaten and the water pushed out through the upper siphon.

It burrows using its large foot.



MUSSELS (Mytilus edulis)



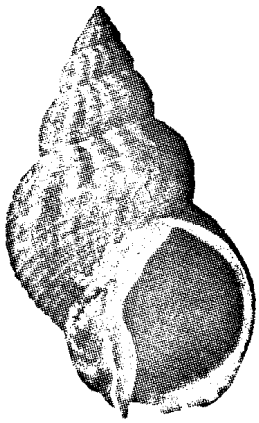
Colour - brown-blue-black

Size - 1 - 10 cm

Shape - long mouse-like with both shells (valves) alike.

It attaches itself to stones by its byssus threads - tough, brown hairs down the bottom of the shell. It is a filter feeder.

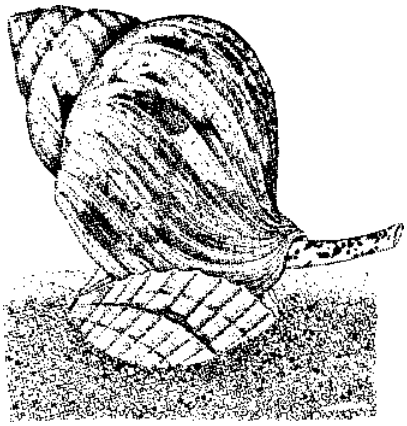
COMMON WHELK (Buccinium undatum)



Colour - brown

Size - up to 3cm high

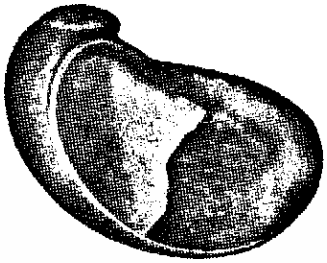
Shape - spiral shaped



An animal with only one part to the shell. Its spiral shape is made of ridged whorls. It has a large opening - look for the groove through which its siphon is pushed to act like a snorkel as the whelk crawls along with just the top part of the shell above the mud.

It is a carnivore, eating mostly mussels and cockles, which it opens by levering with the edge of its shell.

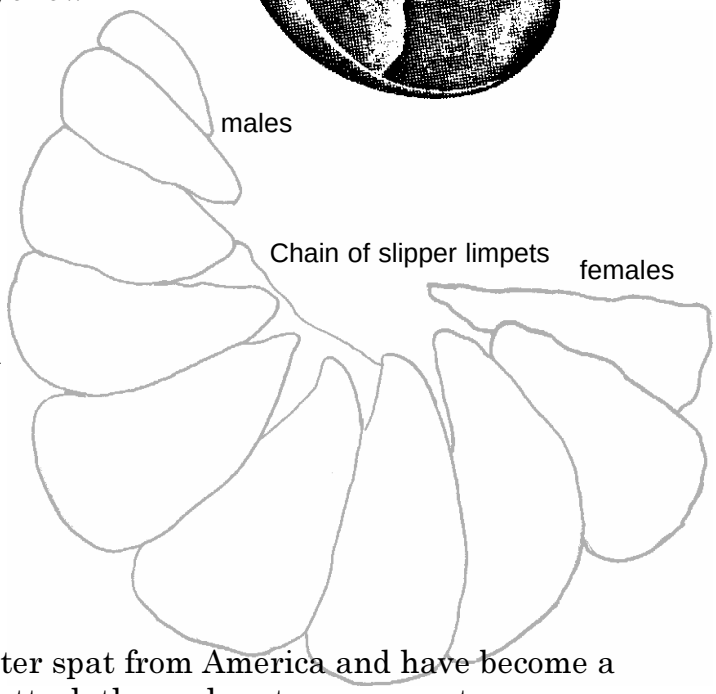
SLIPPER LIMPET (Crepidula fornicata)



Colour - white, green or brown or yellow

Size - up to 2.5cm wide

Shape - wide, oval shell



Look for the shelf inside. Often found in chains of many individuals living on top of each other. The animals at the bottom of the chain are the largest and are females. Those at the top start life as males, and as they get older they change into females. They are filter feeders like mussels and cockles.

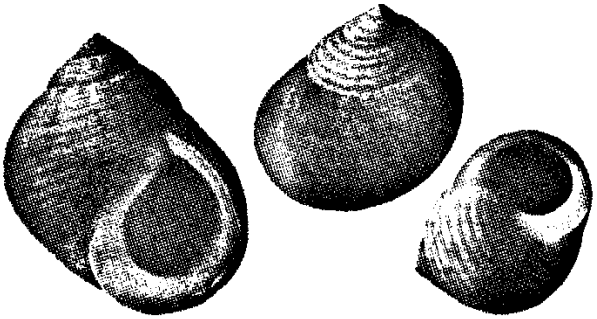
Slipper limpets were introduced with oyster spat from America and have become a serious pest of oyster beds, because they attach themselves to young oysters, competing for food and space, crowding out the slower growing oysters.

In Tollesbury, they have been brought ashore by fishermen and dumped, and their shells form a major part of the 'hards'.

PERIWINKLES (Littorina)

There are several species of periwinkles which are really rocky shore species, each type living at a different level on the shore. The most likely to be caught near Tollesbury is the

EDIBLE PERIWINKLE (Littorina littorea



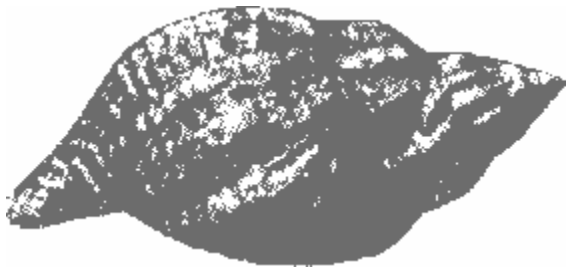
Colour - grey, black, brown or red. Always patterned with darker lines running round the shell. Inside the shell is white.

Size - about 2.5cm high

Shape - a squat shell which comes to a sharp point

The animal's foot is equipped with a horny operculum, which it uses as a front door to keep itself moist when the tide goes out. Periwinkles feed on seaweed.

AMERICAN WHELK TINGEL (Urosalpinx)



Colour - brown to black

Size - 2.5cm

Shape - spiral shape like a very small whelk with a very prominent siphonal canal. Its surface is uneven with knobs and whorls.

This animal was introduced to West Mersea and Brightlingsea oyster beds around 1920; it came with some American blue point oysters with which the oystermen were restocking their beds. It has since spread along the East Coast both north and south to the Thames.

It kills oysters by drilling a hole in the shell and sucking out the flesh. It was estimated that, in 1937, 50% of the oyster spat in Essex rivers were eaten by tingles. Luckily they do not move very far by themselves, and if the fishermen are careful to use spat that are free of tingles and their eggs, damage can be reduced.

Tingles like to lay their eggs under rocks, so by putting out roofing tiles, the tingles can be tricked into thinking they are safe and the tiles can later be collected and the eggs and tingles scraped off and killed.

LOWER SPIRE SHELL (Hydrobia ulvae)

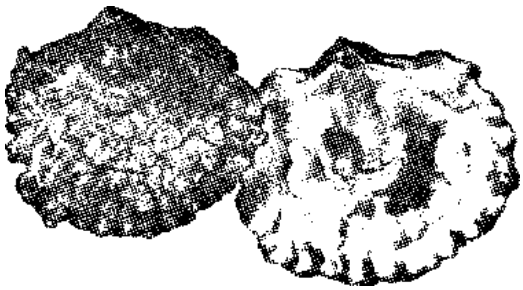
Colour - brown to yellow

Size - 0.6cm high

Shape - cone shape. The whorls do not bulge and the shell comes to a blunt point.

It lives on the lower to middle shore, mainly in estuaries. It feeds on algae and bacteria and can sometimes be so numerous as to literally carpet an area. It forms a major part of the diet of shelduck.

OYSTER (Ostrea edulis)



Colour - slate grey to grey brown

Size - up to 10cm

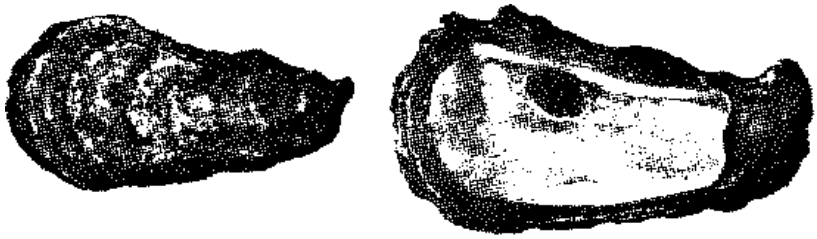
Shape - rounded, with thin frilly edges to the shells (valves). Flat with a very rough, ridged and irregular surface.

Oysters are filter feeders like cockles and over, on or just under the surface of the mud. Most oysters today are kept in private 'oyster beds' where they are planted as young shells (spat) on ground especially prepared by raking and firming with crushed shells (shram).

The oyster industry was badly damaged by the American Whelk Tingle, which was brought to Brightlingsea and West Mersea on American spat introduced in 1920. It eats oysters by drilling through the shell and sucking out the flesh.

Other enemies of the oyster include the starfish - they wrap their arms round the shell, squeeze until the shells (valves) part, and then turn their stomachs inside out into the oyster, digest the flesh, and take the resulting soup back inside their stomach as they turn it right side out again.

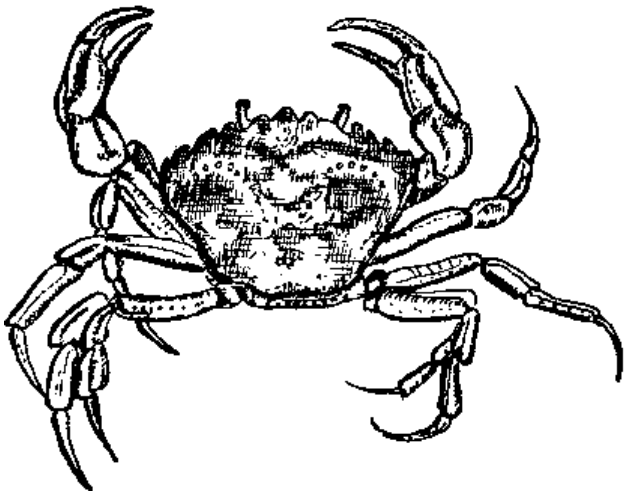
The Portuguese oyster has been introduced here for the commercial oyster culture. They are longer and thinner than the common oyster, and their shells (valves) are different - the lower one is trough-like and the upper one is much fatter.



ANIMALS FOUND WHILE DREDGING NEAR TOLLESBURY

CRUSTACEA Animals with horny exoskeleton and body, generally divided into a head, thorax and abdomen. The group includes crabs, lobsters, sandhoppers and barnacles.

SHORE CRAB (Carcinus maenas)



Colour - brown

Size - up to 4cm body front to back (up to half as wide again)

Shape - Typical crab shape with large pincers on first pair of legs, the second and third pairs are the longest and the last pair are the smallest, and are flattened for use as paddles when swimming.

The head and thorax are fused into one, and if you turn the crab over, you can see the abdomen folded tightly under the body. The male has a very thin abdomen - the female's is wider.

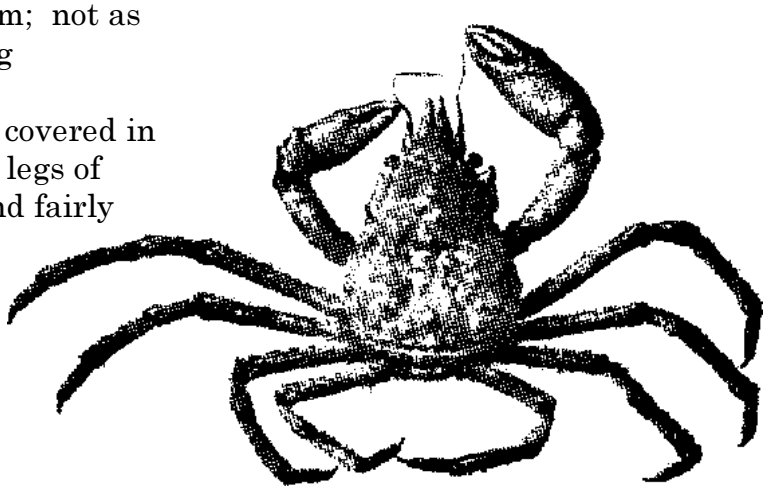
Shore crabs eat shellfish and any other animal they can scavenge or overpower.

SPIDER CRAB (Hyas araneus)

Colour - dull red to dull brown

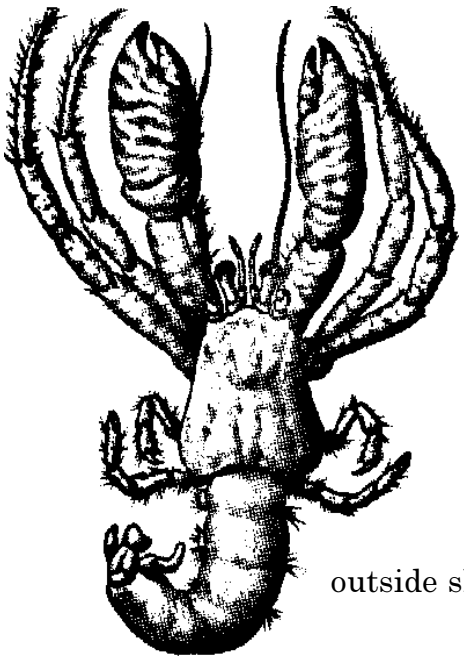
Size - length up to 11 cm; not as broad as it is long

Shape - pear shaped and covered in small knobs. All legs of similar length and fairly long.

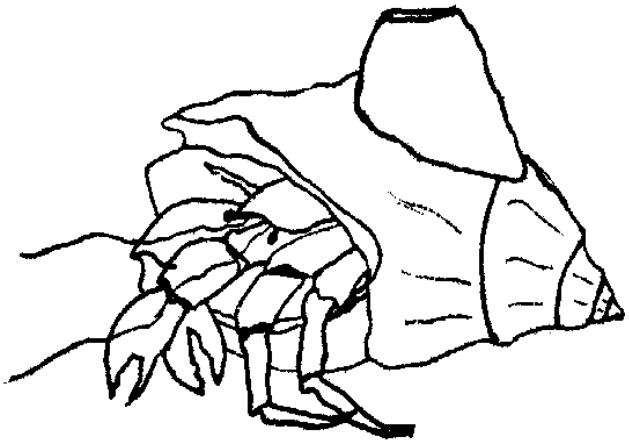


This crab feeds mainly on starfish which are a pest of oysters. It is therefore encouraged in oyster growing areas, unlike the shore crab, which is killed because it sometimes eats oysters.

HERMIT CRABS (Paguristes, Diogenes, Eupagurus and Anapagurus)



outside shell

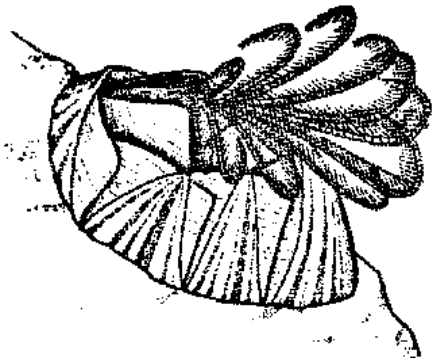


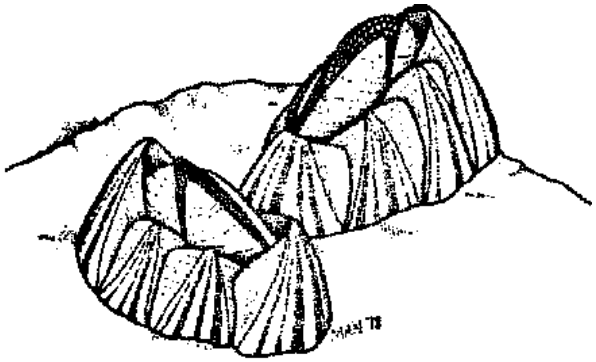
inside whelk shell

These crabs use empty mollusc shells to protect their soft abdomens. Unmistakable, as they do not look a bit like a whelk!

Crabs and hermit crabs often have sponges, sea anemones, hydroids and sea squirts living on them. These animals are all filter feeders and benefit by being able to catch the particles of food that float away from the crab's rather messy meal.

BARNACLES (Cirrepedia)





These crustacea have a shell which is made up of several chalky plates. They are of two main types:

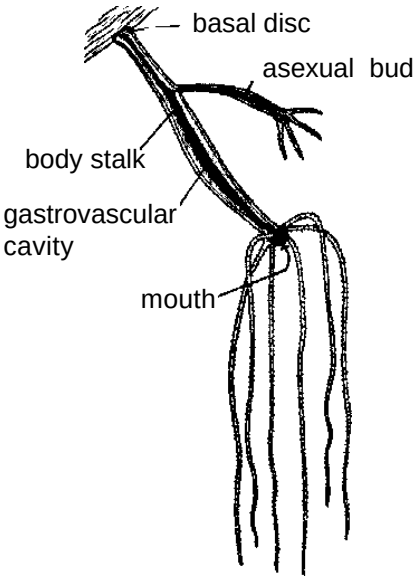
Those with stalks - these barnacles are larger and are usually attached to flotsam (floating rubbish) or make their own float.

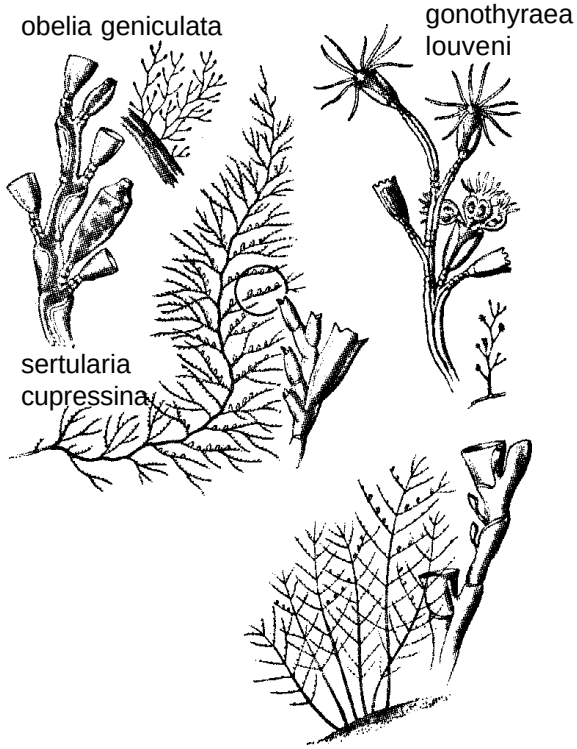
Those without stalks - these barnacles live attached to stones and weed on the bottom.

Barnacles are like little crabs on their backs, sticking their legs out of a hole in the top of their shells to filter small food particles from the water. The illustrations show some of the barnacles that might be found.

ANIMALS FOUND WHILE DREDGING NEAR TOLLESBURY

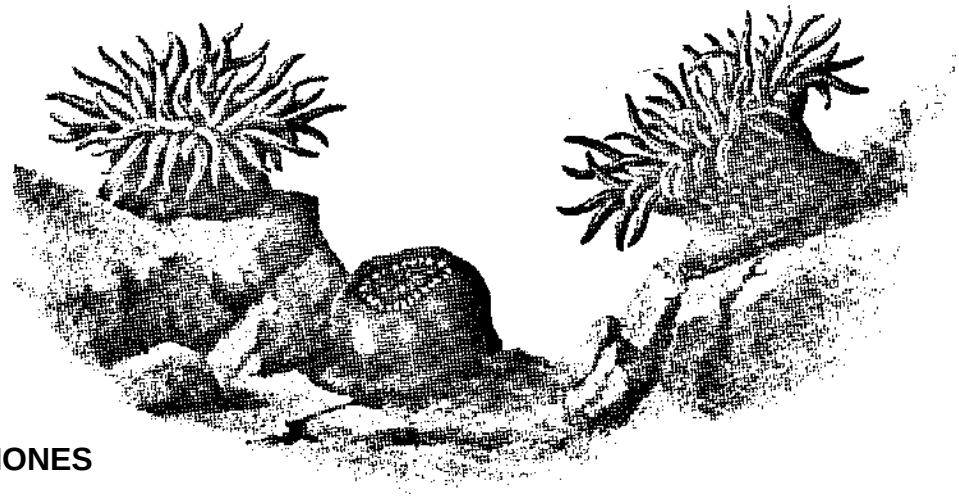
CNIDARIA Jellyfish, Anemones, Hydroids. These are simple sac like animals with three layers. An outer and inner layer of cells separated with a jelly like layer. They have a mouth surrounded by tentacles. At their simplest they are like the one shown in the diagram.





Five colonies showing the detail of each colony.

Many of them, however, are colonial and live inside a horny skeleton (eg. coral). small, horny tree-like colonies are often dredged up; at first sight they look like seaweed, but if you look at them under the microscope it is possible to see the cups where the flower-like animals (polyps) live.



SEA ANEMONES

Sea anemones look like blobs of jelly when they are out of the water but under water they spread their tentacles and look like any other polyp. They often attach themselves to the shells of hermit crabs.

Bydroids and sea anemones eat other animals that happen to bump into their tentacles. The tentacles are equipped with stinging cells which paralyse the prey. It is then pushed into the mouth and digested.

ANIMALS FOUND WHILE DREDGING NEAR TOLLESBURY

ECHINODERMS

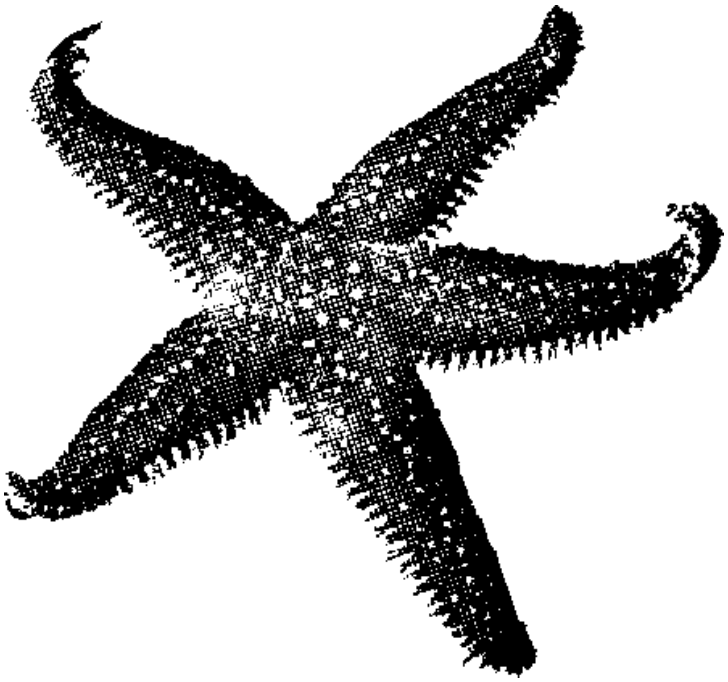
The name means 'spiny skin' and this group of animals have spines or knobs on their skeletons - hence their name. They usually have five parts of the body arranged in a circle. A particularly interesting point about them is their water-powered tube feet. They have water vessels which can contract, forcing water down into the tube feet, lifting them off the ground like an hydraulic jack.

COMMON STARFISH (Asterias rubens)

Colour - brown - yellow above, paler below

Size - up to 50cm across but frequently much smaller

Shape - like a star, with five arms, or rays as they are called



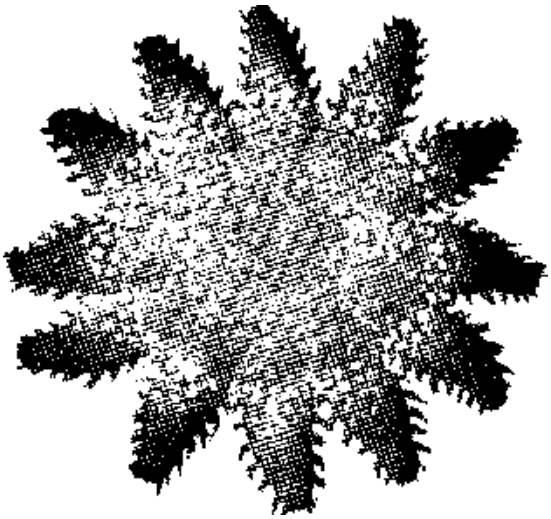
The body has five plump rounded arms covered by knobs. On the underside the suckered tube feet can be seen in a groove down the centre of each arm.

Their main diet is shellfish, which they open by wrapping their arms around the shell and pulling the halves apart. They then turn their stomach inside out into the shell, digest the flesh and eat the resulting soup.

Fishermen used to go 'five-fingering' and sell the starfish as fertilizer before the days when artificial fertilizers were widely available.

In some parts of the country oyster fishermen used to cut into pieces any starfish they found in their dredge, and throw them back again. Unfortunately if a piece has some of the centre it can grow a new set of legs, so this just multiplied the number of starfish.

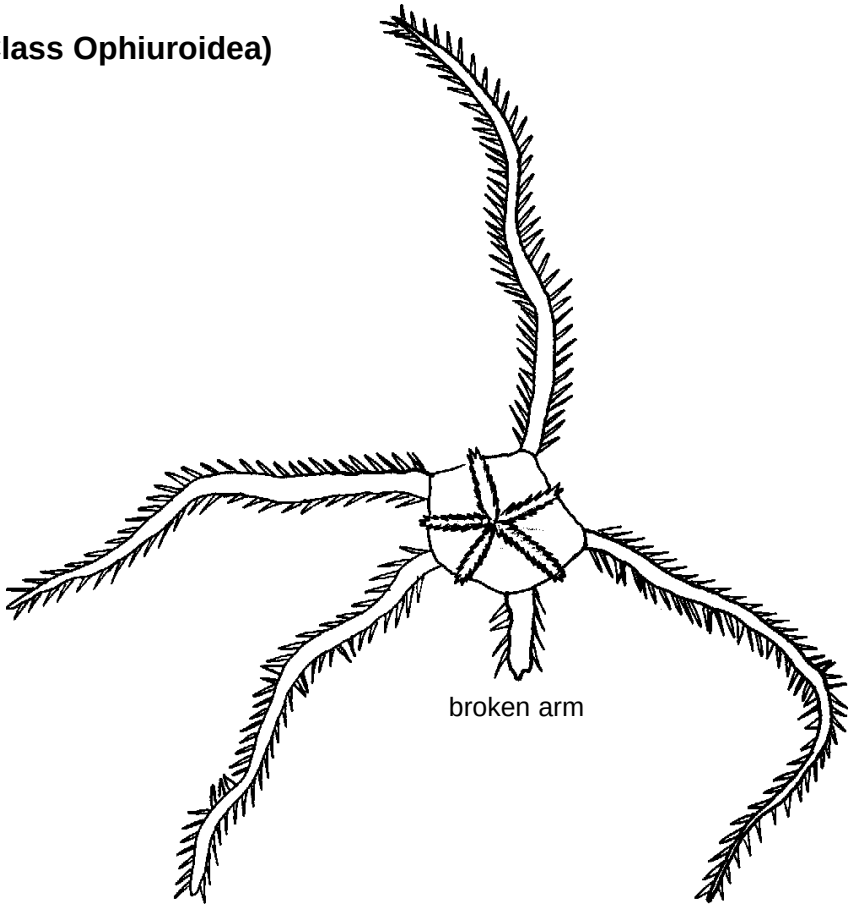
COMMON SUN STAR (Crossaster papposus)



Colour	-	variable - brown-red with white markings, lighter below, often patterned
Size	-	up to 25cm - frequently smaller
Shape	-	star-shape, but with larger centre and 8 - 13 blunt arms, or rays

The rays are rarely longer than half the width of the disc, and the surface is covered with small but distinct spines. These animals' diet includes the common starfish and it is therefore encouraged on oyster beds.

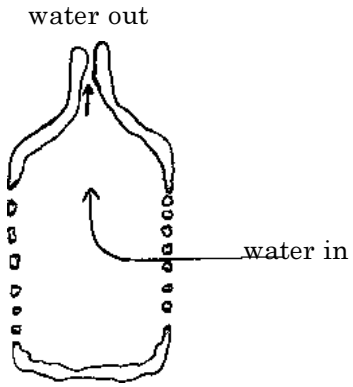
BRITTLE STARS (Class Ophiuroidea)



All brittle stars have a small central disc from which long, spiny arms radiate. They move rapidly by pulling themselves along with their arms. They can be scavengers or filter feeders. When filter feeding the arms are raised off the sea bottom and waved about. Food particles are trapped in mucus (slime) strands strung between the spines on its legs.

ANIMALS FOUND WHILE DREDGING NEAR TOLLESBURY

Sponges Sponges are very simple animals, like a large open rucked bag with small holes in the sides. Usually they are colonial with many of the 'bags' stuck together.



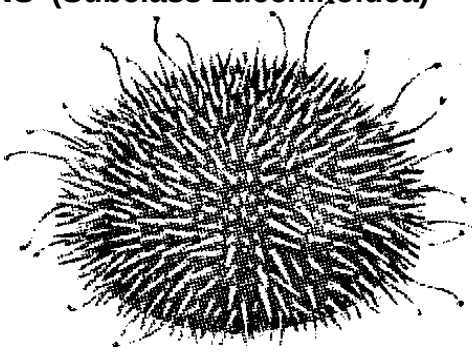
SPONGES (Porifera)

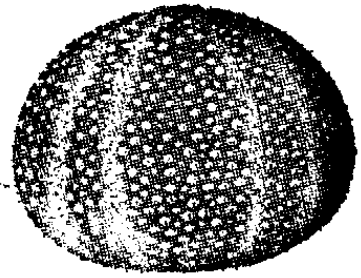
Water is drawn in through the small holes and any food particles are filtered out as the water passes through. Water is then expelled through the large openings.

Sponges may be hard and stony, or soft and springy. The way to identify a sponge is by its tattiness - it has lots of holes all over it.

There is one sponge that bores into shells. It sinks into the surface of the shell so all that can be seen of it is a small part around the many holes that it has made in the surface of the shell. If it attacks oysters, it weakens the shell and stunts the oyster's growth.

SEA URCHINS (Subclass Euechinoidea)





Sea urchins are like spiny balls. The mouth is on the underside and is equipped with moveable plates that help it chew its food.

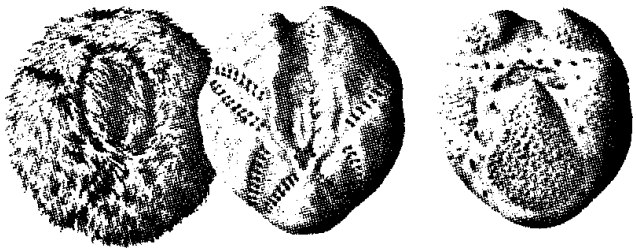
Among the several species of sea urchins, some graze on seaweed, while others are carnivorous and eat carrion. They have very long tube feet, but usually move by 'walking' on their spines.

The purple tipped sea urchin sometimes kills oysters when it chews through the shell - by mistake really because it will be feeding on barnacles, boring sponges that are living on the oyster shell.

HEART URCHINS

These are like heart-shaped sea urchins. They have the mouth and anus both on the underside (unlike sea urchins which have the anus on top). The mouth does not have chewing teeth. Often the spines are so fine that they look like fur. Usually they are burrowers.

SEA POTATO (Echoinocardium cordatum)

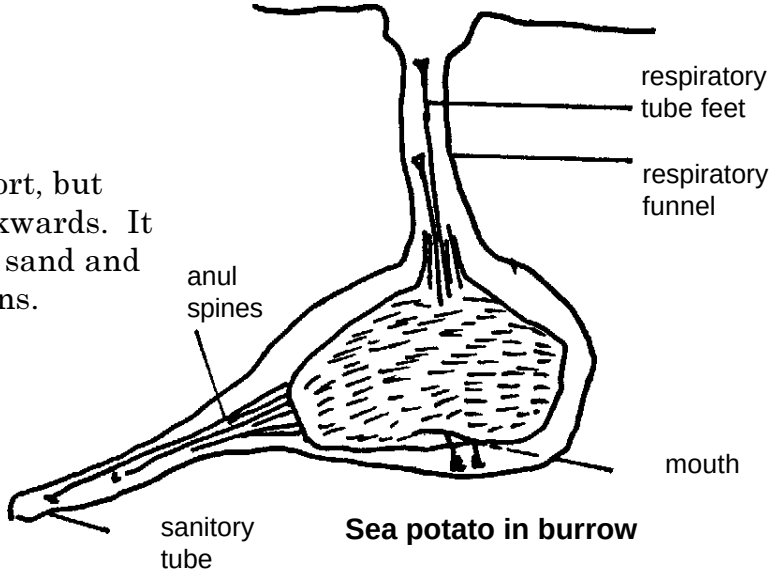


Colour - yellow brown

Size - up to 9cm

Shape - like a potato

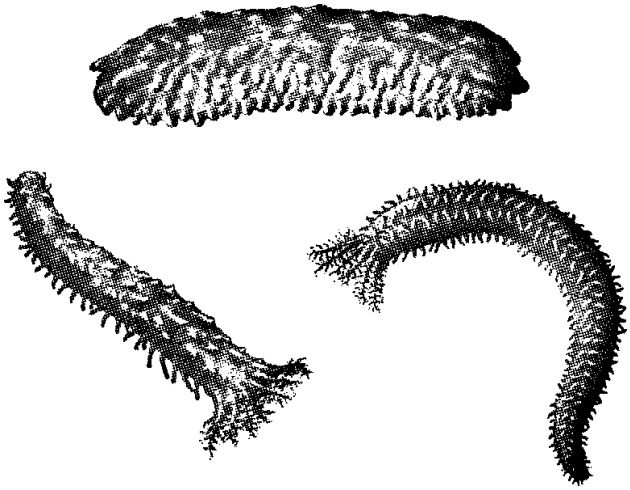
It is covered with spines, mostly short, but some long, curved and directed backwards. It lies buried under the surface of the sand and feeds by scraping food off sand grains.



Sea potato in burrow

SEA CUCUMBERS (Holothuroidea)

Sea cucumbers look, as their name suggests, like cucumbers. They have a crown of tentacles round the mouth which are used to filter feed or to scoop up food from the bottom. They do not move around very much, but when they do they use their tube feet.



The skeleton has become little more than lumps in the skin.

One species of sea cucumber - the Cotton Spinner (Holothuria forsjale) ejects sticky white threads from its anus when annoyed. These threads wrap around the attacker and give time for the sea cucmber to crawl away.

ANIMALS FOUND WHILE DREDGING NEAR TOLLESBURY

TUNICATES

SEA SQUIRTS

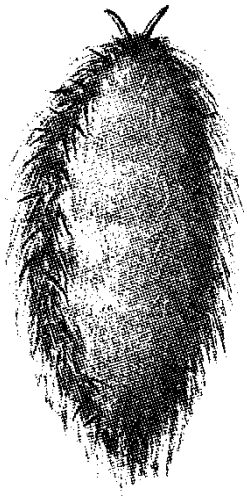
These may look at first sight like sponges, but really they are more complicated, with a proper mouth and intestine. They have two openings, one lower than the other. They are usually leathery to feel and if gently squeezed, will squirt water - hence their name.

ANIMALS FOUND WHILE DREDGING NEAR TOLLESBURY

ANNELIDS

Annelids are worms. Of the three groups of annelids, (Leeches, Earthworms, Bristleworms) only the Bristle worms (Ploychaeta) are marine worms. They are characterised by the possession of 'fleshy legs' which may change to aid feeding or breathing.

SEA MOUSE (Aphrodite aculeate)



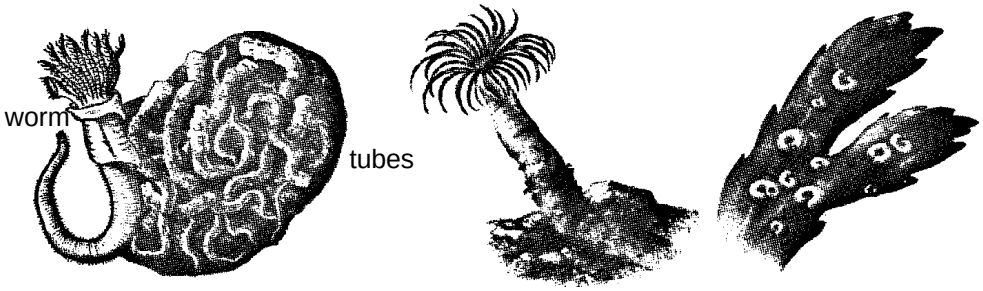
Colour - grey brown, gold brown underneath

Size - 10 - 20cm long 2cm think

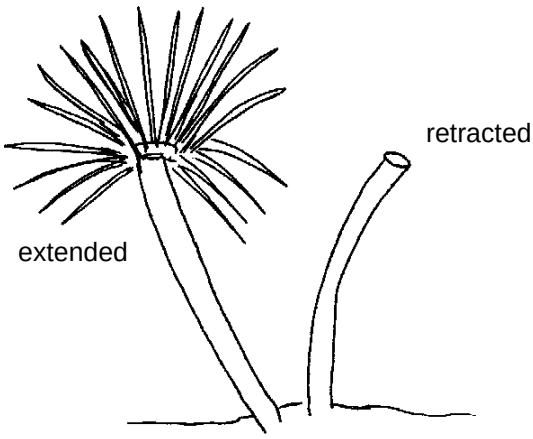
Unmistakable because of its large size. It is covered with a mat of grey-brown hairs above and gold brown hairs underneath. This covering of hairs keeps mud away from its skin ensuring the circulation of water next to its skin so that it can breath.

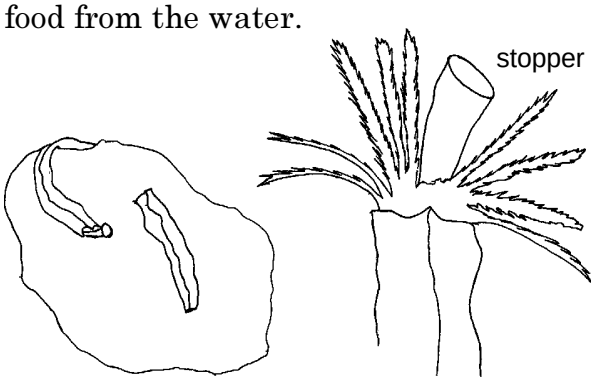
TUBE WORMS

Many worms live in tubes. At their simplest they may be just sand grains stuck together with mucus (slime), and at their most complex a colony of chalky tubes.



Those most likely to be dredged up near Tollesbury are serpulids: they make a chalky tube which they stick to tones, rocks etc. They have a stopper like a little trumpet so that they can close the tube. They feed by extending feathery gills to strain out food from the water.

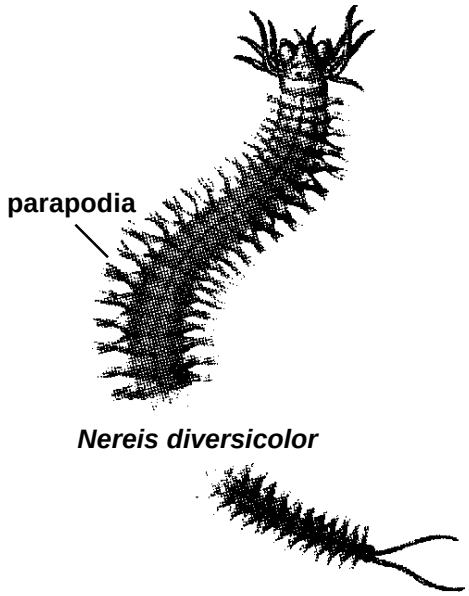




They are often found on oyster shells. This 'German writing' as it is called, can be an annoyance, as it spoils the looks of the oyster. They can also compete with young oyster (spat) for places to settle.

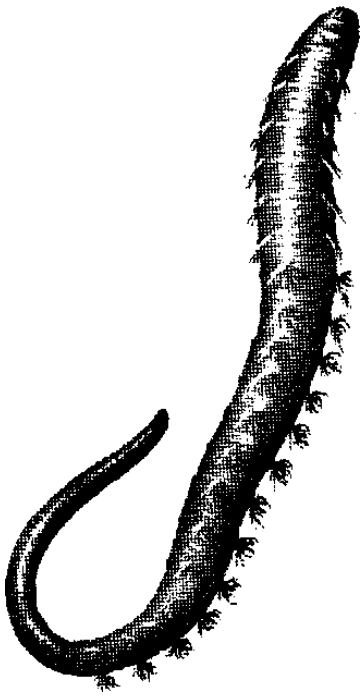
RAG WORMS (Family Nereidae)

These worms are often large. (King rag can be up to 20cm long and as thick as a finger). Well-developed fleshy legs (parapodia) are present, the head bears a number of tentacles and four eyes. They have large, pincer-like teeth which can be shot out to capture prey by turning their mouth inside out. They are active predators and scavengers, feeding on anything they can over power.



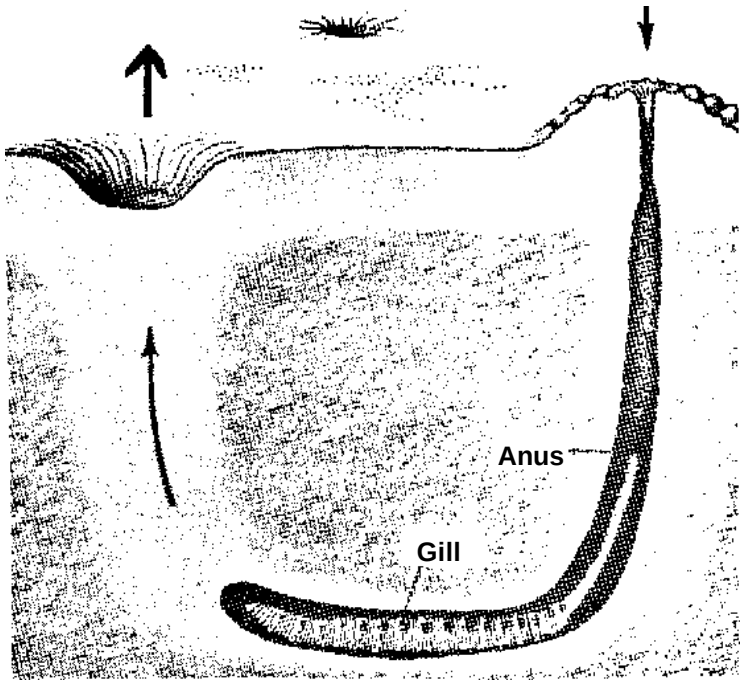
Nereis diversicolor

LUGWORM (Arenicola marina)

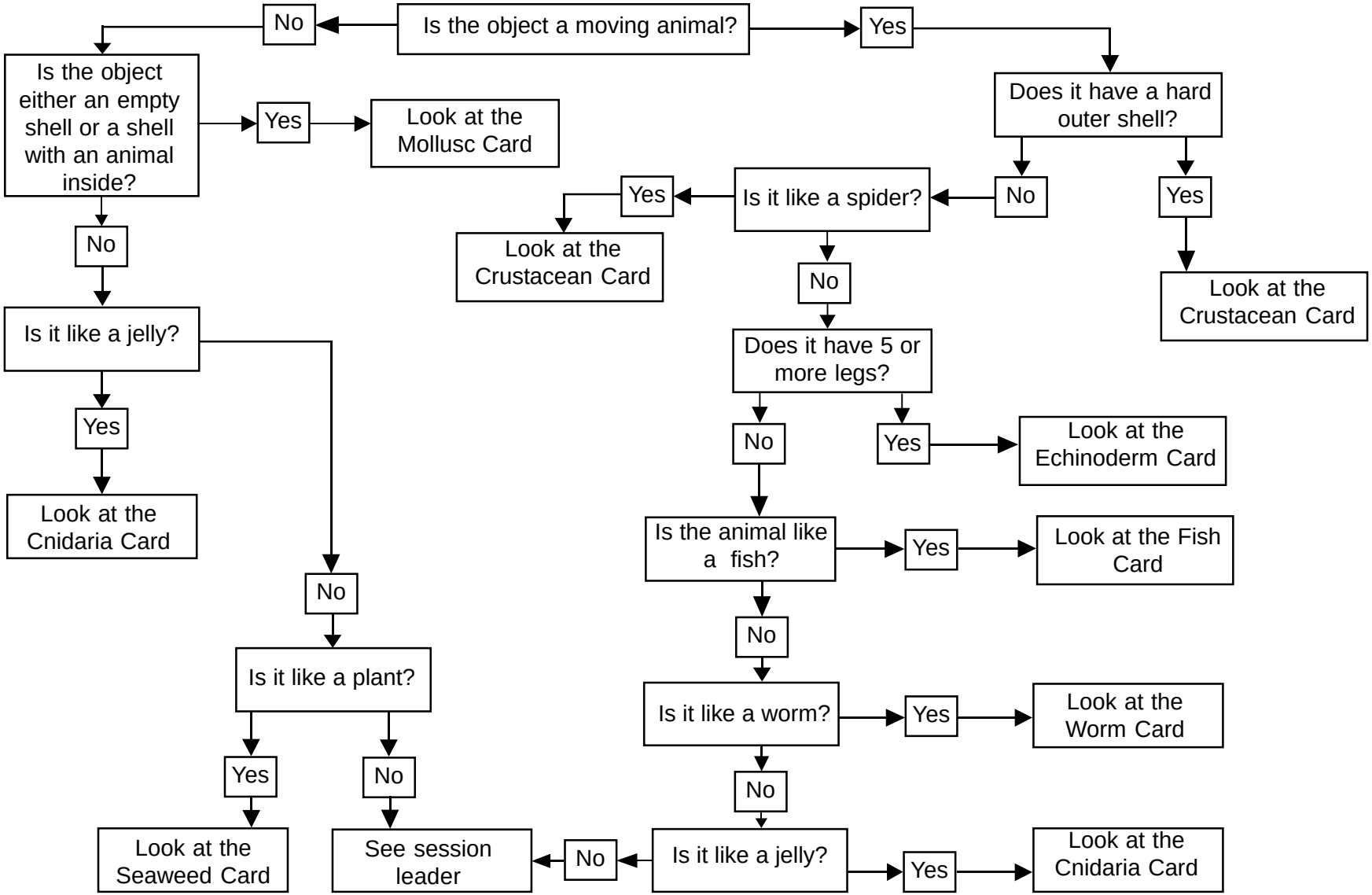


The first half of the body consists of 6 segments without gills, followed by 13 segments showing red, thread-like gills. The second half of the body is much less swollen and lacks gills.

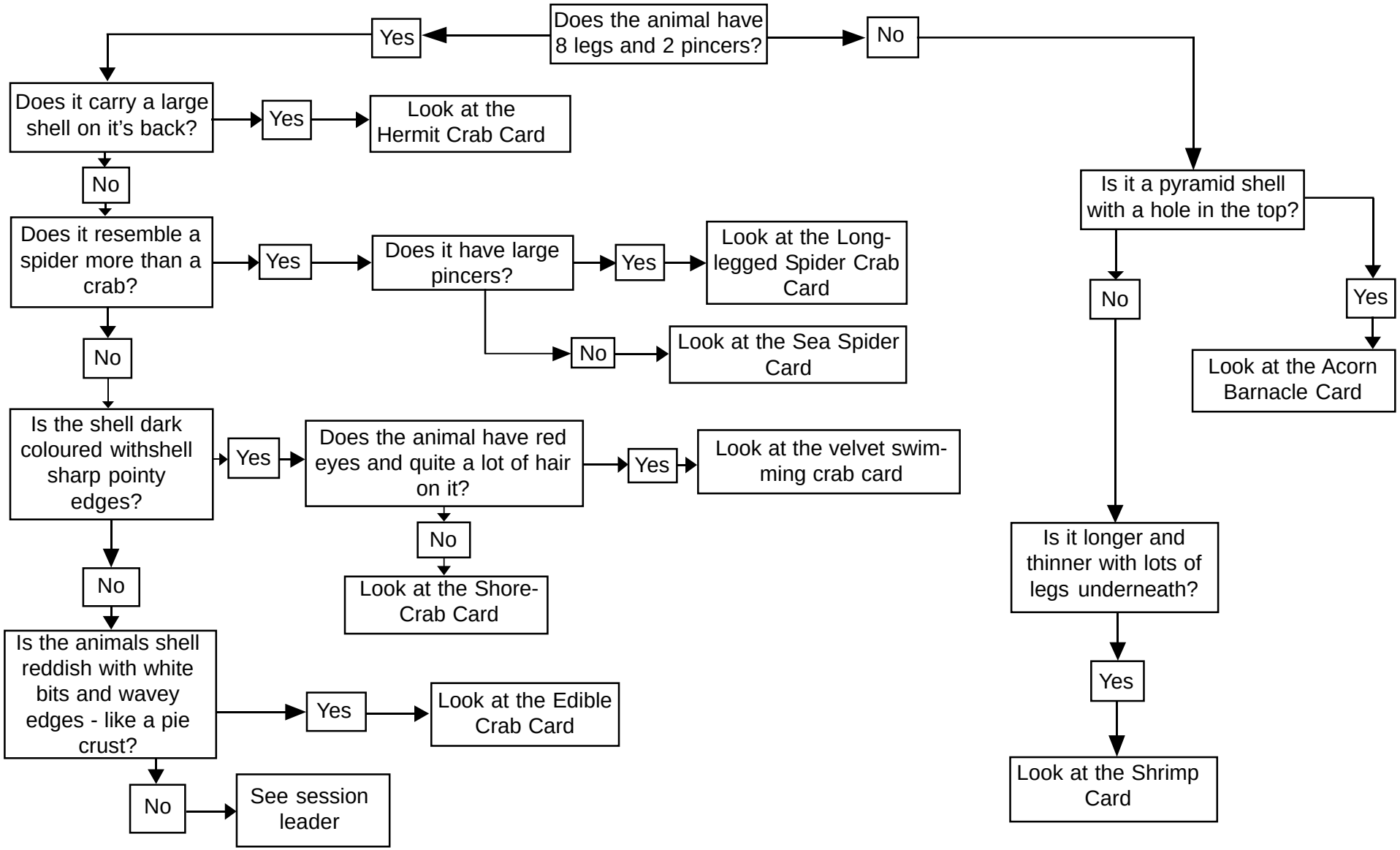
It live in U-shaped burrows where it feeds on the bits of debris which stick to the sand grains it is continually eating.



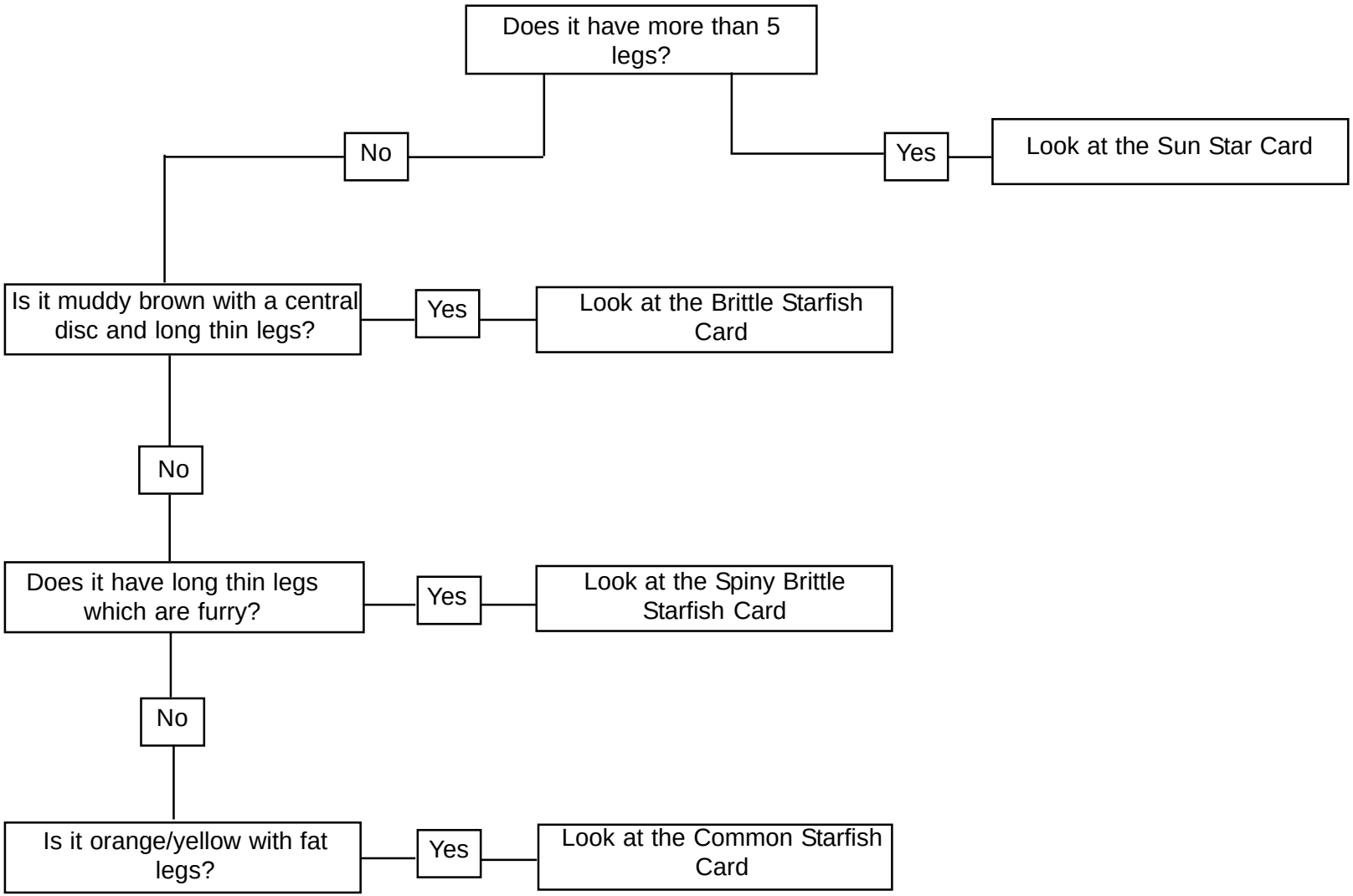
MAIN KEY


Is the object a moving animal?
No
Yes
Is the object either an empty shell or a shell with an animal inside?
Yes
Look at the Mollusc Card
No
Is it like a jelly?
Yes
Look at the Cnidaria Card
No
Is it like a plant?
Yes
Look at the Seaweed Card
No
See session leader
Does it have a hard outer shell?
No
Yes
Look at the Crustacean Card
Is it like a spider?
Yes
Look at the Crustacean Card
No
Does it have 5 or more legs?
No
Yes
Look at the Echinoderm Card
Is the animal like a fish?
Yes
Look at the Fish Card
No
Is it like a worm?
Yes
Look at the Worm Card
No
Is it like a jelly?
Yes
Look at the Cnidaria Card
No

CRUSTACEANS

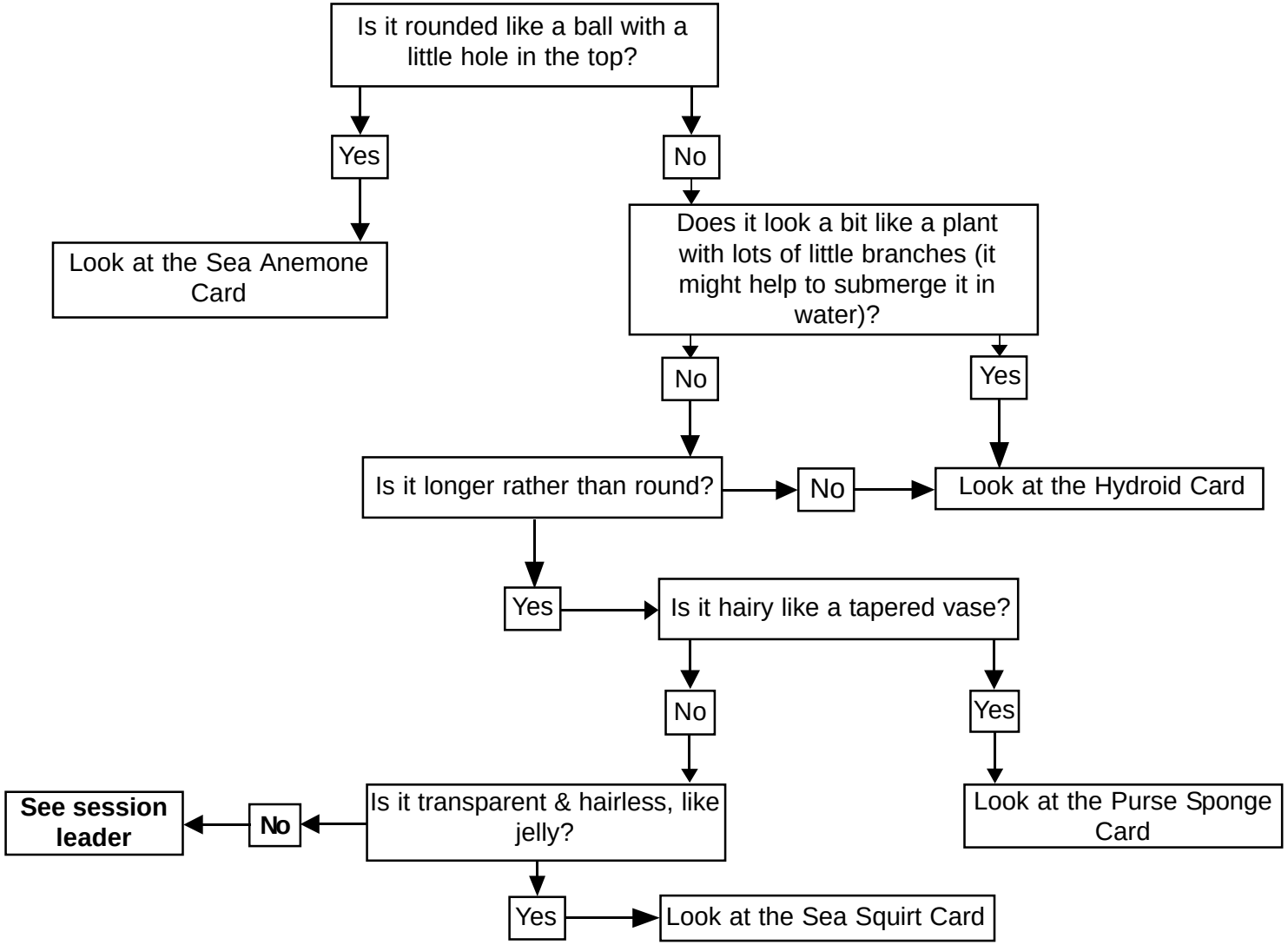


KEY ECHINODERMS

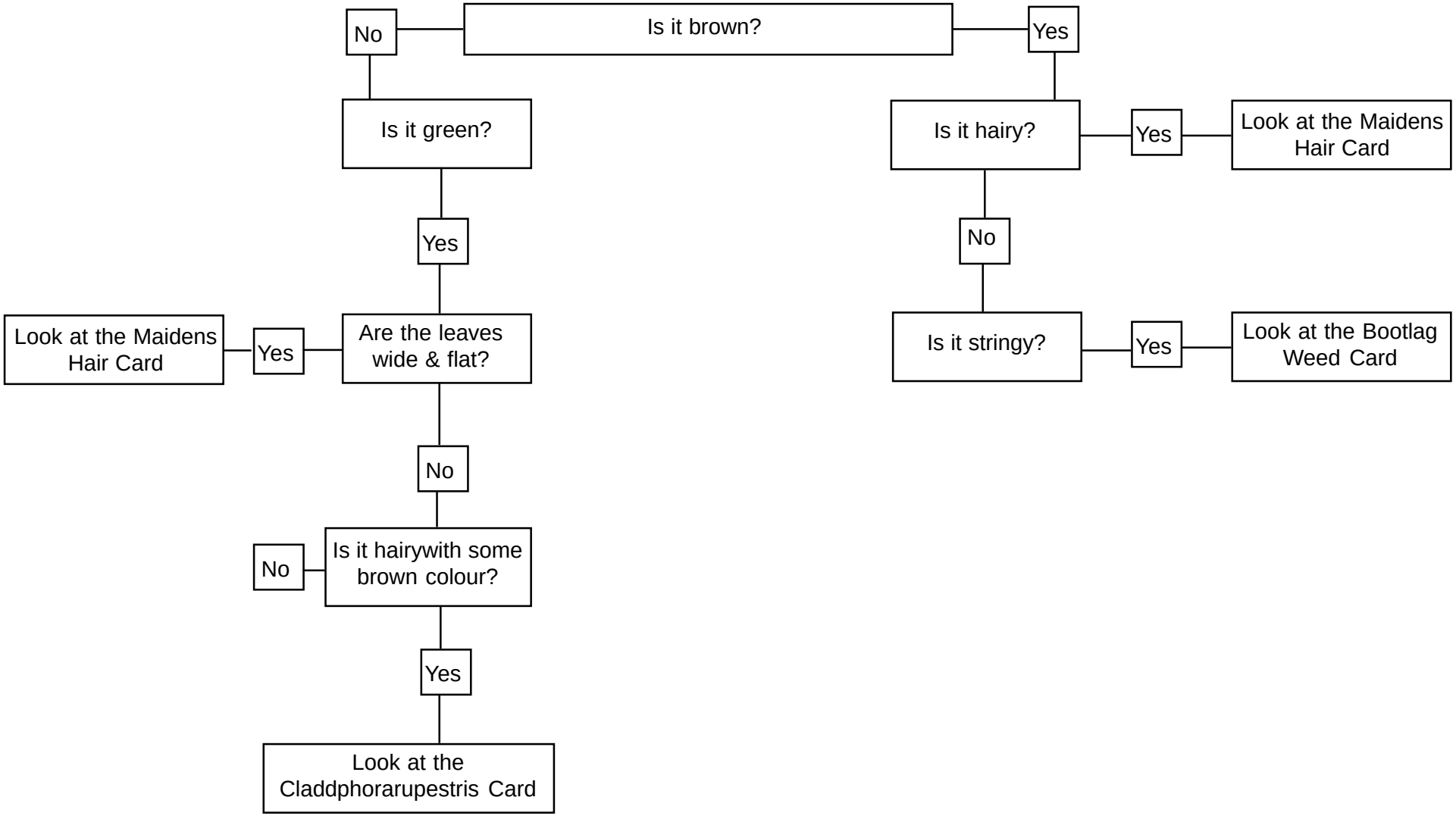


CNIDARIA -

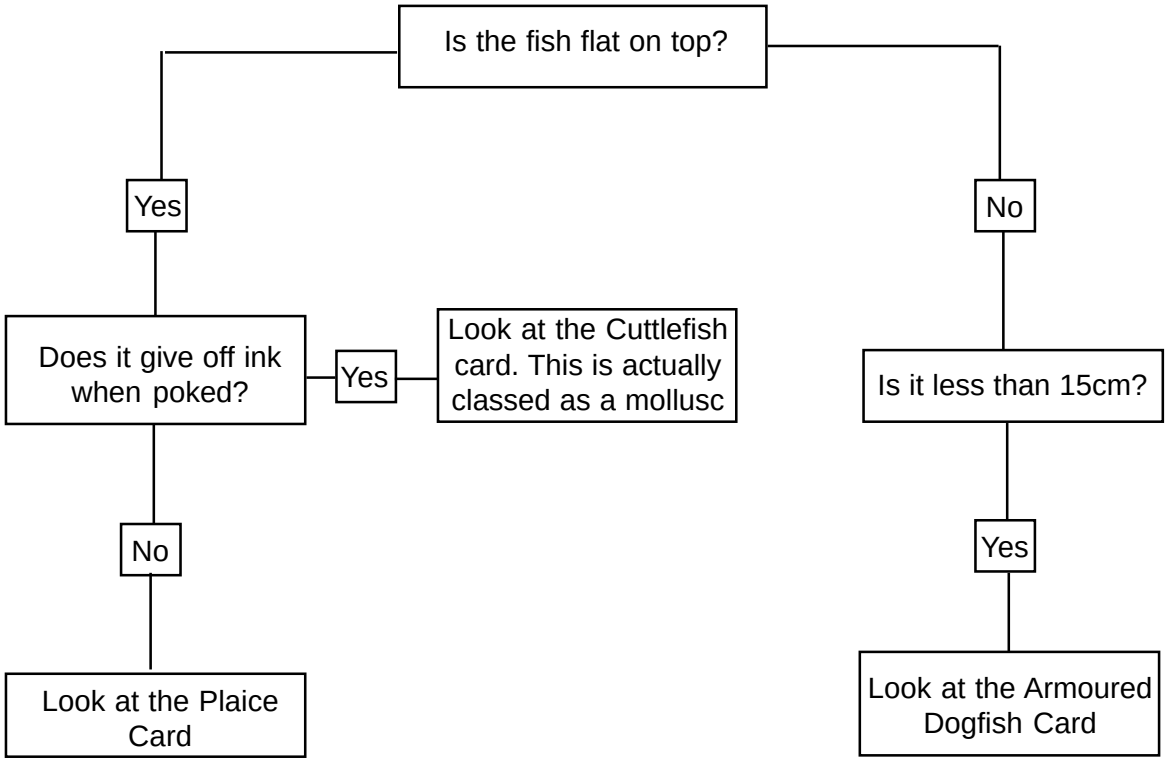
(Jelly type animals)



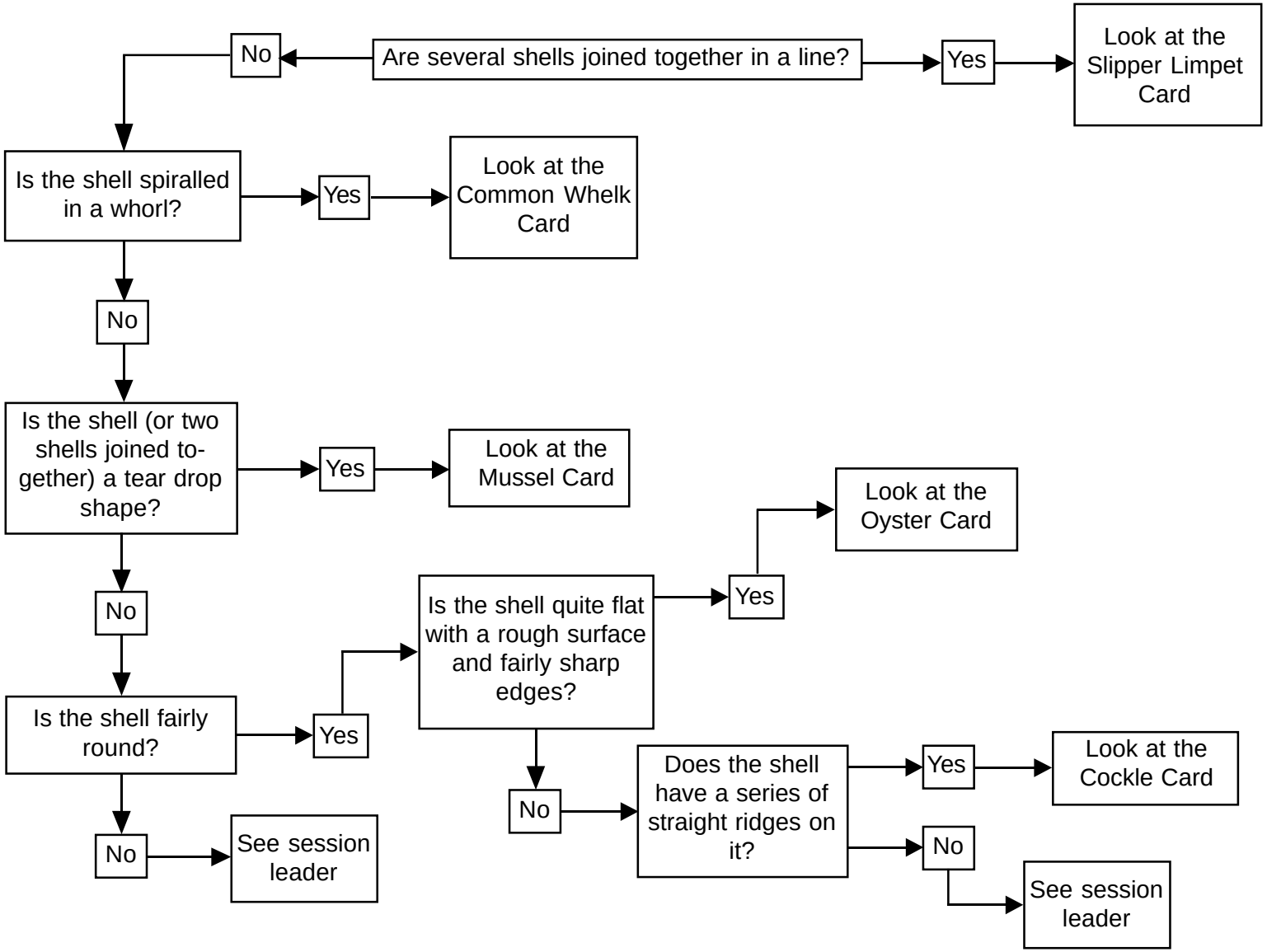
SEA WEED


Is it brown?
No
Yes
Is it green?
Is it hairy?
Yes
Look at the Maidens Hair Card
Yes
No
Look at the Maidens Hair Card
Yes
Are the leaves wide & flat?
Is it stringy?
Yes
Look at the Bootlag Weed Card
No
No
Is it hairywith some brown colour?
Yes
Look at the Claddphorarupestris Card

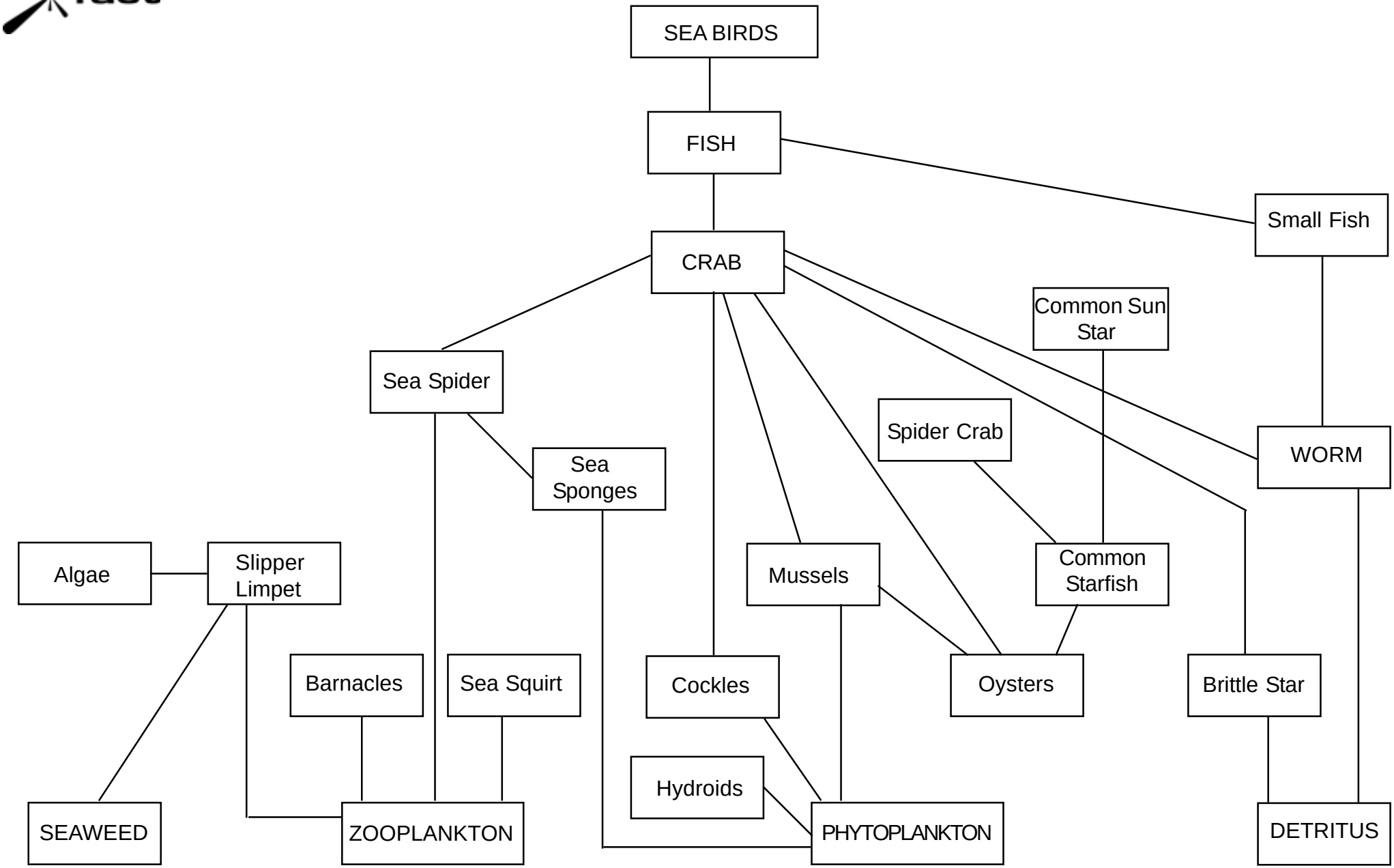
KEY FISH


Is the fish flat on top?
Yes
No
Does it give off ink when poked?
Yes
Look at the Cuttlefish card. This is actually classed as a mollusc
Is it less than 15cm?
No
Yes
Look at the Plaice Card
Look at the Armoured Dogfish Card

MOLLUSCS


Are several shells joined together in a line?
Yes
Look at the Slipper Limpet Card
No
Is the shell spiralled in a whorl?
Yes
Look at the Common Whelk Card
No
Is the shell (or two shells joined to-gether) a tear drop shape?
Yes
Look at the Mussel Card
No
Is the shell fairly round?
Yes
Is the shell quite flat with a rough surface and fairly sharp edges?
Yes
Look at the Oyster Card
No
Does the shell have a series of straight ridges on it?
Yes
Look at the Cockle Card
No
See session leader
No
See session leader

FOOD WEB


SEA BIRDS
FISH
Small Fish
CRAB
Common Sun Star
Sea Spider
Spider Crab
WORM
Sea Sponges
Algae
Slipper Limpet
Mussels
Common Starfish
Barnacles
Sea Squirt
Cockles
Oysters
Brittle Star
Hydroids
SEAWEED
ZOOPLANKTON
PHYTOPLANKTON
DETRITUS

TOLLESBURY VILLAGE STUDY

SUGGESTIONS FOR TOLLESBURY VILLAGE STUDY

PREPARATORY PRE VISIT WORK

Suggestions for preparatory work that can be done before coming to Tollesbury

1. MAP WORK

Study of Ordnance Survey Map of local area in order to familiarise with, grid references, map symbols etc. Use both Landranger 1:50,000 Series and Pathfinder 1:25,000 Series.

Study OS Sheet 168 with particular reference to location of Tollesbury in relation to major settlements of Colchester, Harwich, Clacton etc, to the Rivers Blackwater and Crouch and to the sea.

Plot route from home base to Tollesbury noting major features which will be seen along the route.

2. HISTORICAL BACKGROUND

Using home location study factors which influenced settlement - use this information later to compare with Tollesbury.

Study development of Village Life and the major factors - communications, land and drainage patterns, neighbouring settlements etc.

Look at important features i.e. The Church, Market Place, Local Trades and Industries.

Consider factors which influenced buildings and the material used in their construction. Look at ways to date age/period of buildings.

Look at your School Log Book and see what this shows about the school's history and that of the locality.

3. SKILLS

Expose children to the techniques of art skills which will help them in visual presentation of their observation whilst at Tollesbury - close observational work, sketching, use of variety of pencils, pen and ink, pastels, water colours.

Refine skills in printing, fabric printing, clay, constructional skills for model making etc.

Develop skills in measurement and the preparation of plans for the construction of scale model

TOLLESBURY FIELD STUDY

1. VILLAGE TRAIL

This can be used to familiarise the children with Tollesbury - it can be used as starting point.

2. INDIVIDUAL STUDIES

It is possible to study each area more closely - best done in small groups.

2.1 THE CHURCH

• OUTSIDE

Look at the various materials used in construction, are they the same, if not why not? Identify materials, consider reasons for their use.

Sketch areas of the building to show materials used, take rubbings.

Choose a gravestone to draw/rub

: Work out the age of the person.
: How long ago were they born, did they die?
: Are there any clues to the cause of the death?
: Look for graves of other family members - make a graph of families, periods of death

Find graves of young people - plot ages on a graph, look for periods of high infant mortality, consider reasons.

Choose a grave and write a short account of their life as you imagine it.

Look at the War Memorial

: Consider what it is made of, think about why.
: Sketch/rub
: Look to see if family members are on the Memorial.
: Look at the periods of death - make comparisons.
: Write a short story/poem of the final days of their life.

• INSIDE

Study the Font and its inscription

: sketch/rub
: Consider its use
: Write a short account of another 'crime' which could have been punished in the same way.
: Describe a Baptism set either today or in the past.

Look at the Stained Glass Windows

: Think about what is depicted in them.
: Draw with a view to using them later to do a water colour, paint or Batik.

Sit under the Bell Tower

: Sit quietly and LISTEN. Write down anything which comes into your head.
: Sketch what you can see.
: Arrange a visit to the Bell Loft.

2.2 THE VILLAGE SQUARE

Look at the different buildings

: Study different types of materials used in construction.
: Look at different materials used on roofs.
: Think of how the square might once have been and why it has changed.
: Consider what you feel about how it now looks and how you might prefer it to be.

Sketch
: One of the buildings
: A variety of chimney pots and stacks, doors and door frames, windows etc.

Measure the doors and windows of one of the buildings and compare with modern day proportions and consider the reasons.

Write
: A short story of the people who may have lived in one of the houses.
: A descriptive poem/piece of prose about one of the buildings.

Visit the Lockup/Cage

: Take measurements which can later be used to make a scale model.
: Make a note of the materials used.
: From the point of view of the prisoner write a short story of their time inside and how they came to be there.
: Describe a modern day crime which could result in being put in the Lockup.

2.3 HIGH STREET AND EAST STREET

Look at the different types of shops.

Plot their location on the map of the village - use a code to show each type.

Make a graph of the various types of shops to be found.

Make a tally over a period of ten minutes of the number of people using some of the shops.

Look for shops selling the same items and compare some of the prices - check later with the prices in your home town and in Supermarkets - consider reasons for the differences.

Choose some shops to draw. Take rubbings. Look for opportunities for modelling.

Take a traffic count and record different types of vehicles.

Stand at the junction of the main road and Station Road and plan a flow chart of traffic flow.

Make an age/sex graph of people in the High Street.

2.4 TRANSPORT

Consider various forms of transport used in Tollesbury and for getting to and from it.

Look at the bus stop in the village square.

- Find destinations
- Frequency of buses and journey times to termini.
- Do a time map of routes and with the help of the OS map do a sketch map of routes.

Look for clues for a form of transport which no longer comes to Tollesbury - consider why not.

Write an account of an earlier form of transport - use your memory of your journey here to help you.

Make a sketch of the bus stop - what information can you find there in addition to bus times?

2.5 THE VILLAGE SCHOOL

Look at the building and decide on its age. Look for any later additions.

What type of school is it and what age of children does it provide for?

Look for indications of uses of the building other than as a school.

Consider the different materials used in construction of the walls, roof, windows, doors, etc..

Make sketches of the roof, windows, door and door frames.

Make sketches of the building which could later be used to make a model - remember to note the materials used.

Ask if you could visit the inside and compare what you see with your own school.

Watch the children at playtime and record:

- the various activities
- the size of groups
- the composition of groups - i.e. boys/girls; young/older; individuals
- observe what the adults on duty are doing.

Observe the activity at home time:

- record the number of children who are met / go home without an adult.
- record the number who walk and those who cycle.
- record the number who travel by car, work out the average number of children in each car and consider the environmental implications of this.
- observe if any children travel by bus and count the number.

Find ways of recording your data and show this as a proportion of the whole number of children in the school.

FOLLOW UP WORK AT THE CENTRE

Complete and develop written work started during the day.

Use sketches to form basis for water colour paintings.

Complete graphs and prepare them for inclusion in later presentation.

Start work on aspects where there was insufficient time during the day.

N.B. These activities could be extended depending on both the materials provided by the centre and those brought by the school.

FOLLOW UP WORK AT SCHOOL

Make comparisons between home town and Tollesbury in the light of discoveries made and information gained.

Make models of important buildings, the High Street etc..

Develop art work and prepare for presentation to other children, parents etc..

Use it to record information and present data.

Use a variety of skills to present visual images i.e. models, batik, hand and machine embroidery, printing, water colours, pastels.

Include the work produced into the individual books which the children will be making as a record of the project.

Construct a three dimensional map of the High Street.

Make models of chimney stacks, War Memorial, graveyard, Lock Up etc., from sketches.

Use clay to make models of Church, houses etc..

Use sketches of doorways/windows to make prints on paper and fabric for drapes, and for hand and machine embroidery,

Develop written work and mount for inclusion in group display.

Each child make a book containing their personal work from the project.

Name:……..

TOLLESBURY VILLAGE STUDY

A look back at Tollesbury

Start on the Lightvessel and look out of the port side windows.

One hundred years ago, C1900, Woodrolfe Creek had over 100 fishing boats in and out of this small port.

Q. Are there any fishing boats still here?

A._____

Q. What sort of boats have replaced them?

A._____

Walk up the path and sketch the Sail Lofts (Yacht Stores)

They were built in 1904 and used to store gear off the racing yachts that over wintered in Tollesbury. They were divided into several stores.

Q. By counting the doors how many individual stores were there?

A. _____

Walk up Woodrolfe Road

Tollesbury has a small industrial estate,: many of the factory units produce items for boats.

Q. Name two of the factories and what they produce.

A. _____

There is a small workshop garage named after a Victorian engineer.

Q. Name the Garage and the engineer.

A. _____

Half way up Woodrolfe Road is a hump in the road. (clue – the hump continues left and right & it was a means of transport)

Q. Why is it there? A. _____

Continue up Woodrolfe Road taking care when crossing the road into East Street

Q. When was this terrace built? A.

Continue to the Village Square

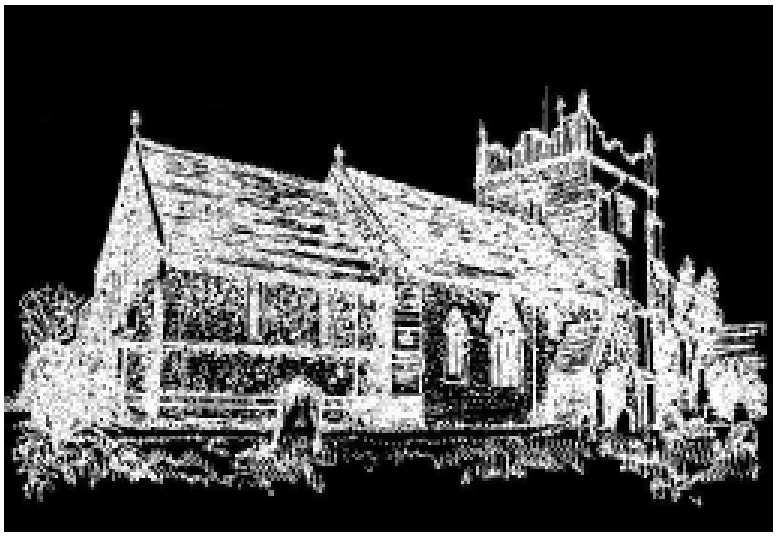
Complete the detail of this house

Continue towards St Mary's Church (with the Clock Tower)

Q. If you behaved badly and had to be punished, where would you be put? A. _____

Q. When was it built (approximately). A. _____

Continue to St Mary's Church - In the Church



Q. How many bells are there?

A. _____

Q. How old is the church?

A. _____

One of the stained glass windows has a boat with a number.

Q. What is the number?

A. _____

Q. What kind of fish does the window promise?

A. _____

Draw the Font

Q. What is it for?

A. _____

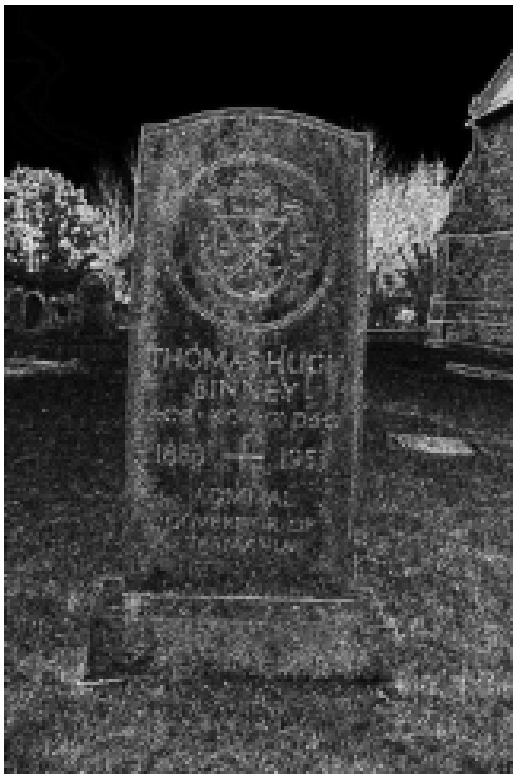
_____

Q. What must you not do?

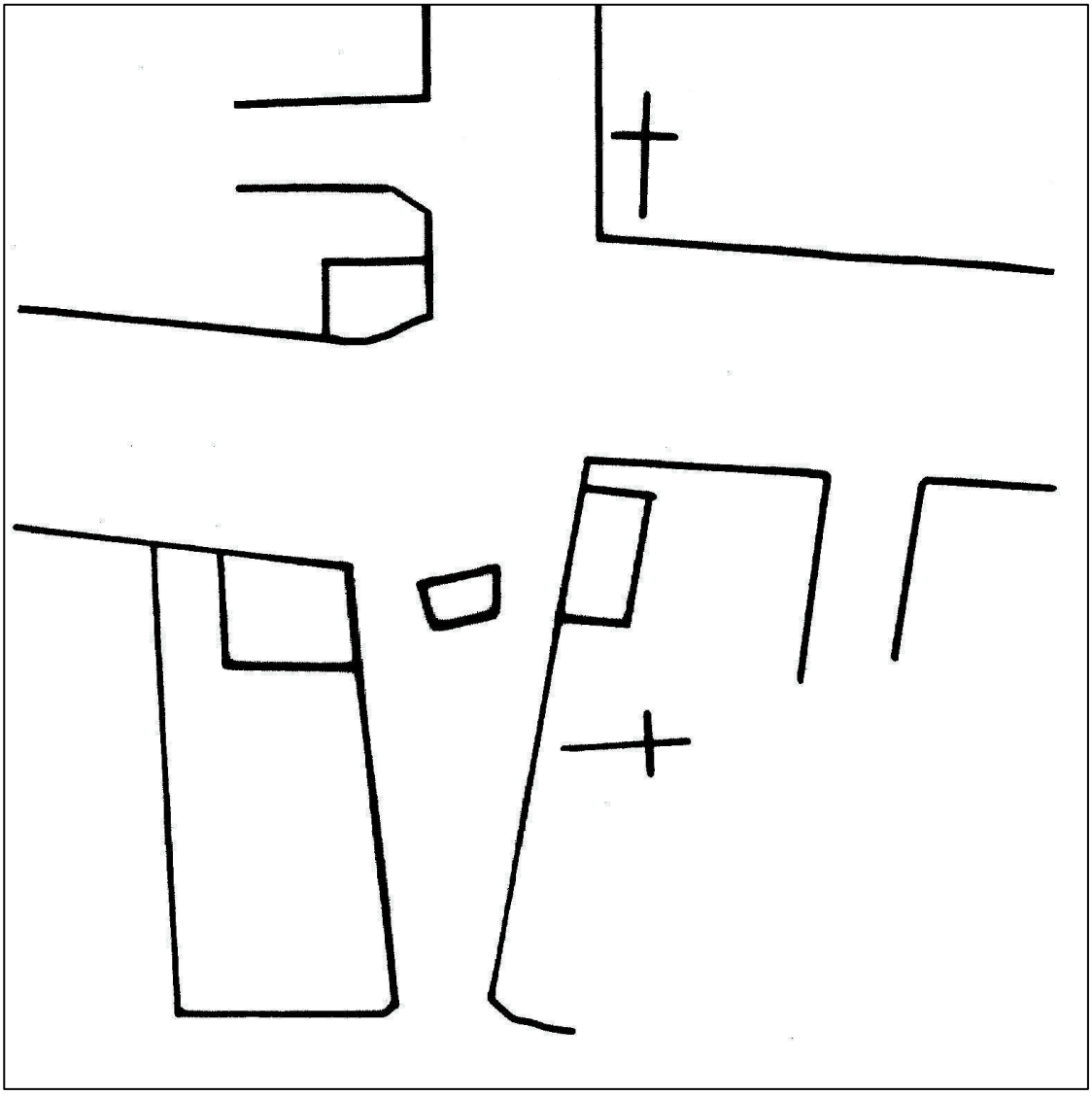
A. _____

Return to the Churchyard

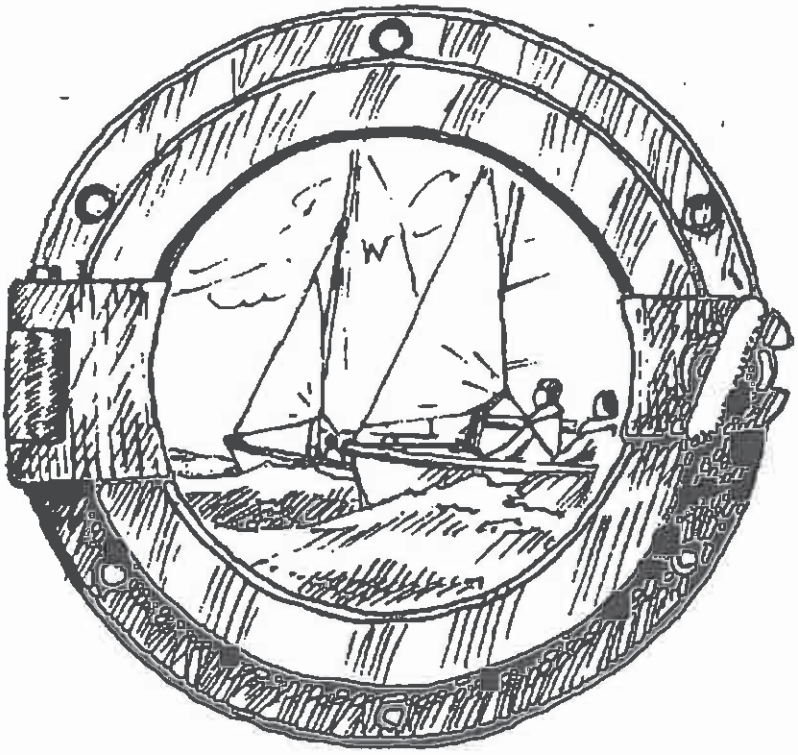
Find the grave of the Admiral Governor of Tasmania and complete the headstone with his name.



Return to the Square and complete the map – (it's a birds eye view).



BASIC PRINCIPLES OF SAILING



ELEMENTARY SAILING PRINCIPLES

INTRODUCTION

It would be useful for children who have never sailed before to have some idea of the basic principles of sailing before they experience it for themselves.

The following notes are designed to help children and teachers whose knowledge of sailing may be limited or non existent.

HOW BOATS WORK

The wind is our power - it affects everything we do when sailing.

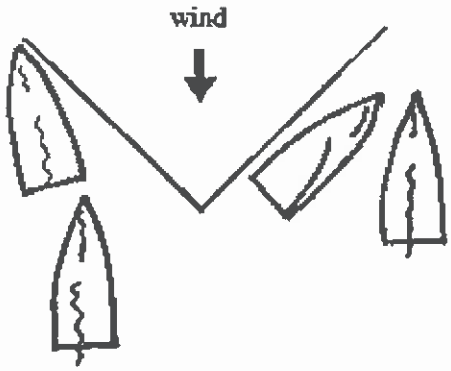
We can work out the direction of the wind by looking for clues around us - flags, smoke, feeling the wind on the back of the neck etc.

The boats' sails capture the power of the wind to drive the boat forward.

We can alter the direction in which we want to go by moving the rudder at the back of the boat.

The only direction in which we can't sail is directly into the wind. If we point the boat into the wind then the sails will just flap and not capture the wind.

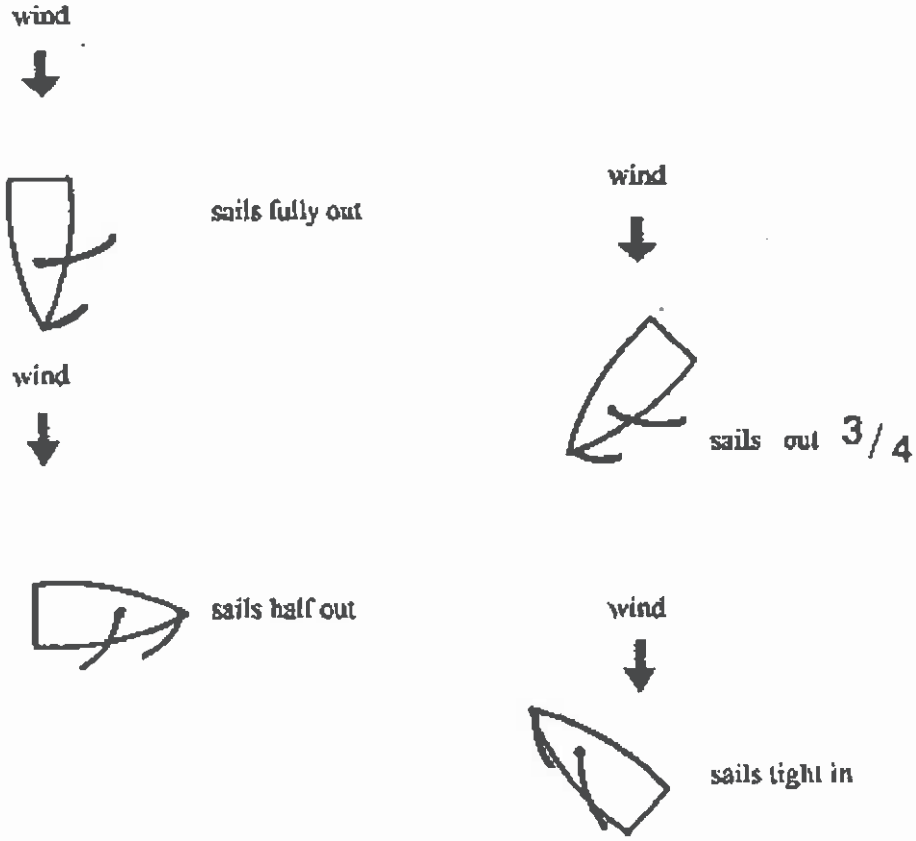
To keep the boat moving the boat and the sails must be kept at the correct angle to the wind. There is an area of 45 degrees either side of the wind into which we cannot sail. This is called the "NO GO ZONE"



Remember that the boat can sail in any direction except into the no go zone.

SAIL SETTING

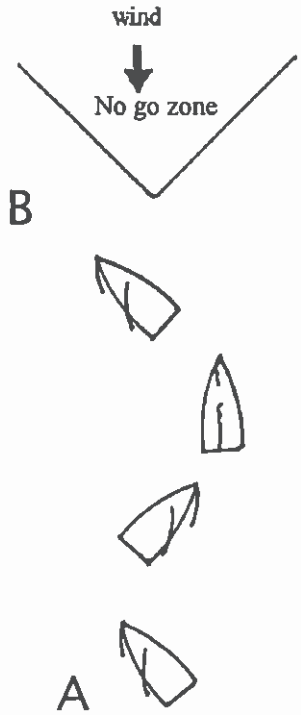
When sailing in any other direction the sails must be adjusted so that they are at the correct angle to the wind - not too tight and not too loose. The sails are set correctly when they are JUST NOT FLAPPING.



So by adjusting the sails and rudder the wind will move the boat in any direction except into the no go zone.

TACKING

To sail towards the wind the boat has to be steered in a zig zag course called TACKING:



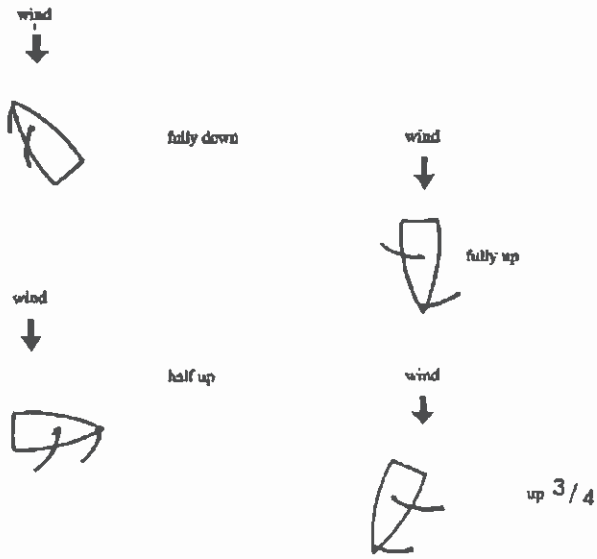
On each turn of the zig zag the front or bow of the boat has to turn through the no go zone. This is called "GOING ABOUT".

CENTRE BOARD

In the middle of the boat is the CENTRE BOARD which stops the boat from being pushed sideways.

When sailing towards the wind it should be fully down. When the wind is behind the boat the centre board should be fully up.

Between the two points of sailing it should be gradually raised or lowered depending on the direction of the boat and the wind.

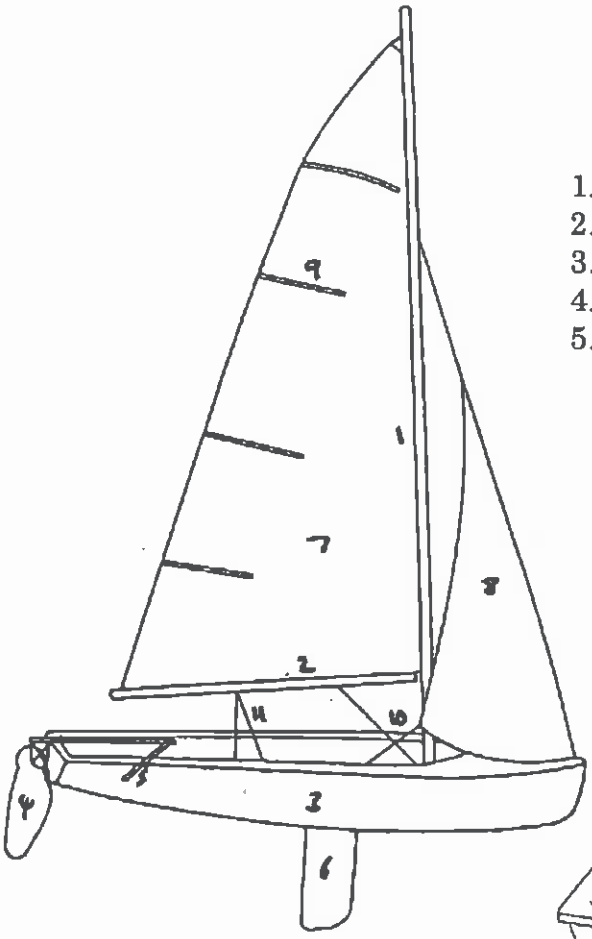


PARTS OF A SAILING DINGHY

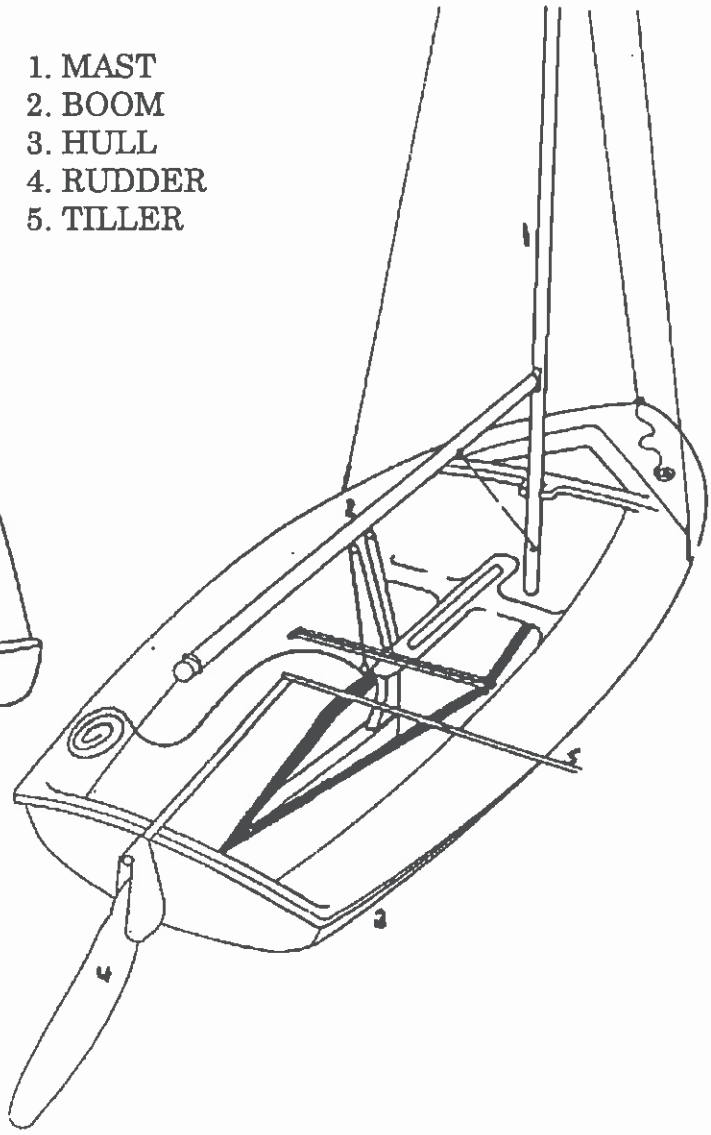
It would be useful and fun for children to familiarise themselves with the parts of a sailing dinghy and the names which they have.

Remember we have different names for left and right, front and back.

Left - Port: Right - Starboard: Front - Bow: Back - Stern:



1. MAST
2. BOOM
3. HULL
4. RUDDER
5. TILLER



6. CENTRE BOARD
7. MAIN SAIL
8. JIB
9. BATTEN
10. JIB SHEET
11. MAIN SHEET

The dinghies which children will sail at Tollesbury are Wayfarers. They are 16 feet long and very stable and reliable but able to go fairly fast if we want some extra fun.

Jobs of the crew

In order to sail the boat efficiently and safely it is necessary for the crew to carry out various jobs. Your instructor will help with these.

1. LOOK OUT - perhaps the most important job of the crew is to keep a good look out. Things to watch out for include other boats, moorings, withies (sticks) and the sea wall. If you notice any of these close by then tell the helmsperson (the person steering the boat).

2. BALANCE - boats sail best when they are kept flat. The crew's job is to move their weight to ensure the boat is kept level all the time. If you need to lean out to achieve this there are straps to put your feet under.

3. SAILS - As we have already seen, the sails need to be set to capture the power of the wind. Attached to the sails are ropes which allow us to pull in the sail or let it out. Always make sure they are JUST NOT FLAPPING.

4. CENTREBOARD - The crew's job also includes moving the centreboard. As we have already seen, sometime it should be up, sometimes down and sometimes inbetween. Your instructor will help you move it to the correct position.

5. HELMING - One person at a time will be the helmsperson. Their job is to steer the boat. Your instructor will tell you which way to steer and the rest of the crew will worn you of things to avoid. You will each get a go at helming.

CLOTHING

It is important to have correct clothing. It is essential for safety and very important to stay warm and dry. You should wear:

- Track suit trousers or leggings - not jeans
- Wool jumpers or man made fleece garments
- Waterproof and wind proof outer layer to keep off wind and spray - These are provided at Fellowship Afloat.
- Woolly hat (or cap in summer) - very important to keep the head warm to prevent heat loss.
- Soft soled flat footed shoes such as trainers - not ordinary wellington boots - because they could fill with water and become very heavy.

PERSONAL BUOYANCY

You should never go on the water without a personal buoyancy aid or life jacket. These will be issued to you whenever you do sailing or rowing or go on the launch.

SOME IDEAS BEFORE COMING SAILING

Use clues to determine the direction of the wind. Go outside and see what is happening to trees, litter, leaves, smoke etc.

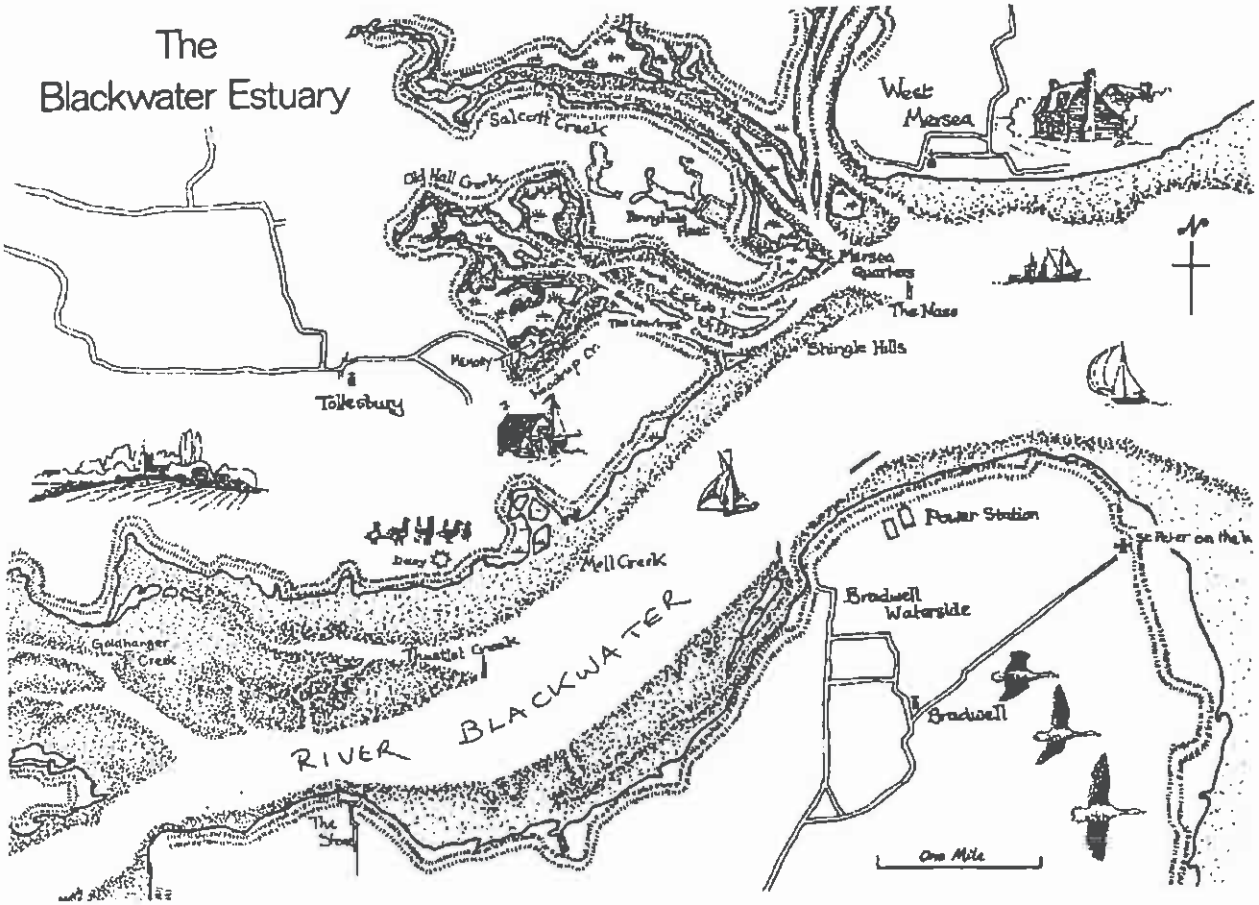
Make a wind vane.

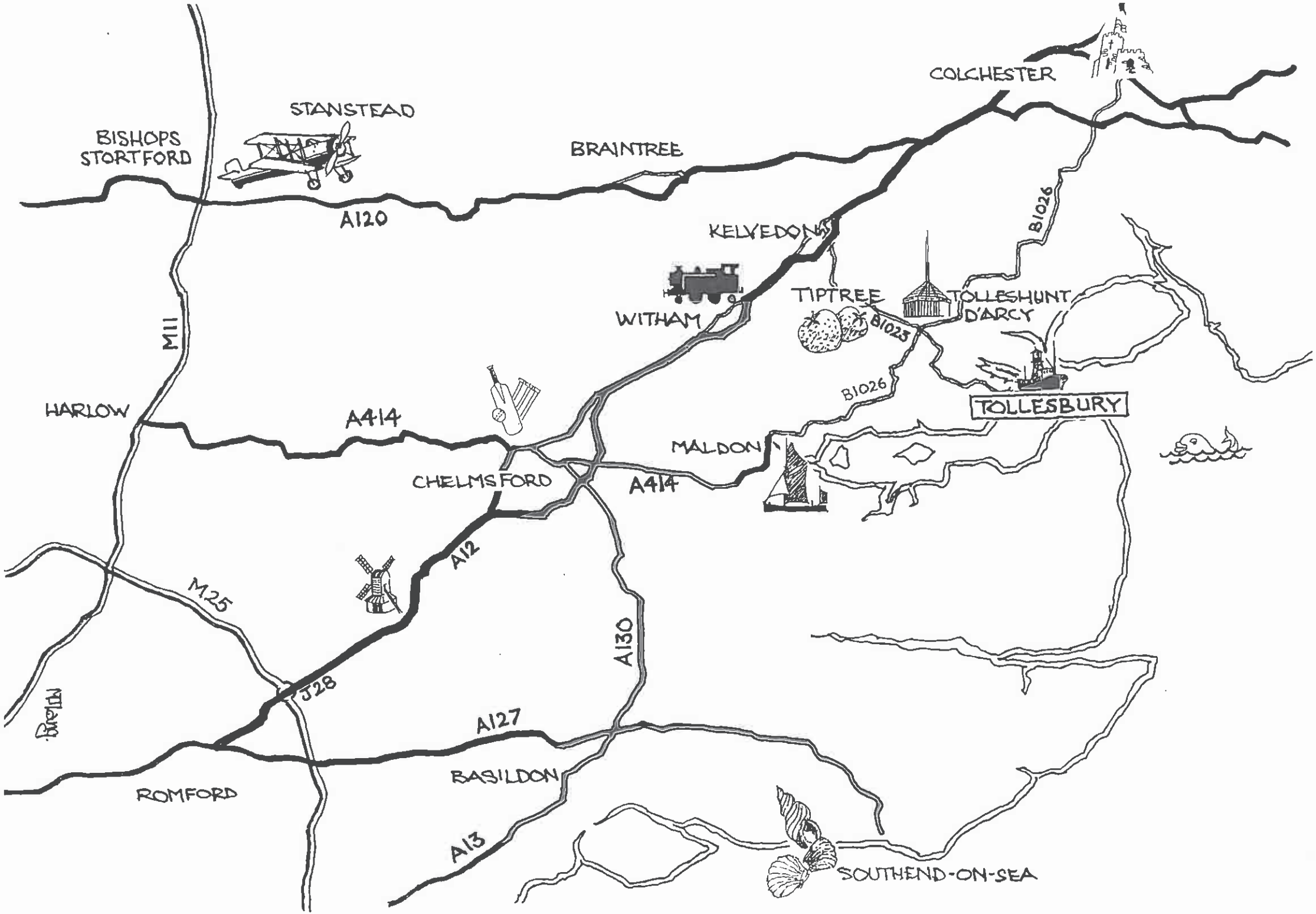
Do some work on wind strengths using a Beaufort Scale. Work out which wind strengths would be good for sailing and those which are too strong or too weak.

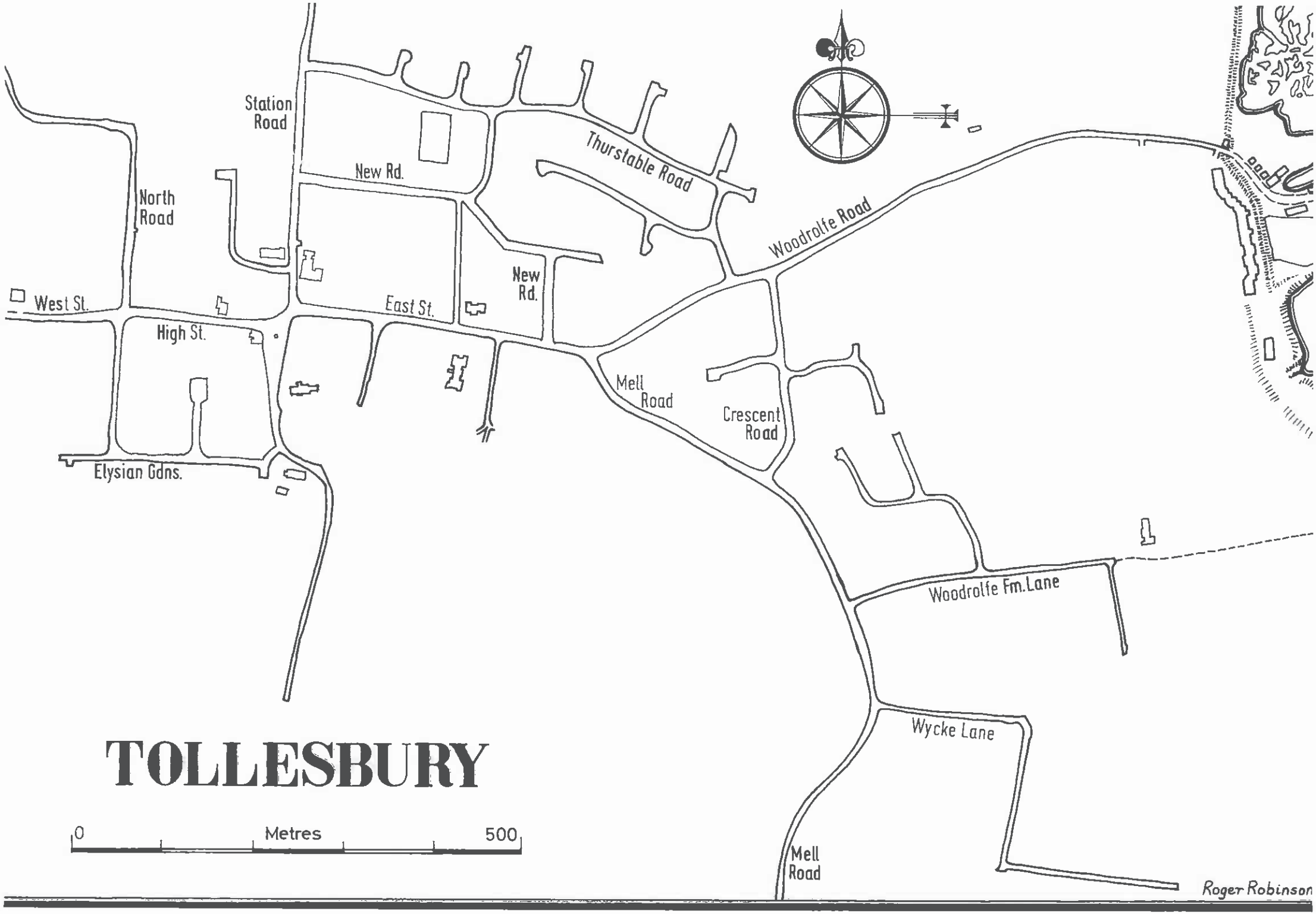
Make simple models of sailing dinghies with moveable booms which can be adjusted according to different wind directions.

Make larger models and label the different parts of the boat.

LOCAL MAPS CHARTS & WALKS



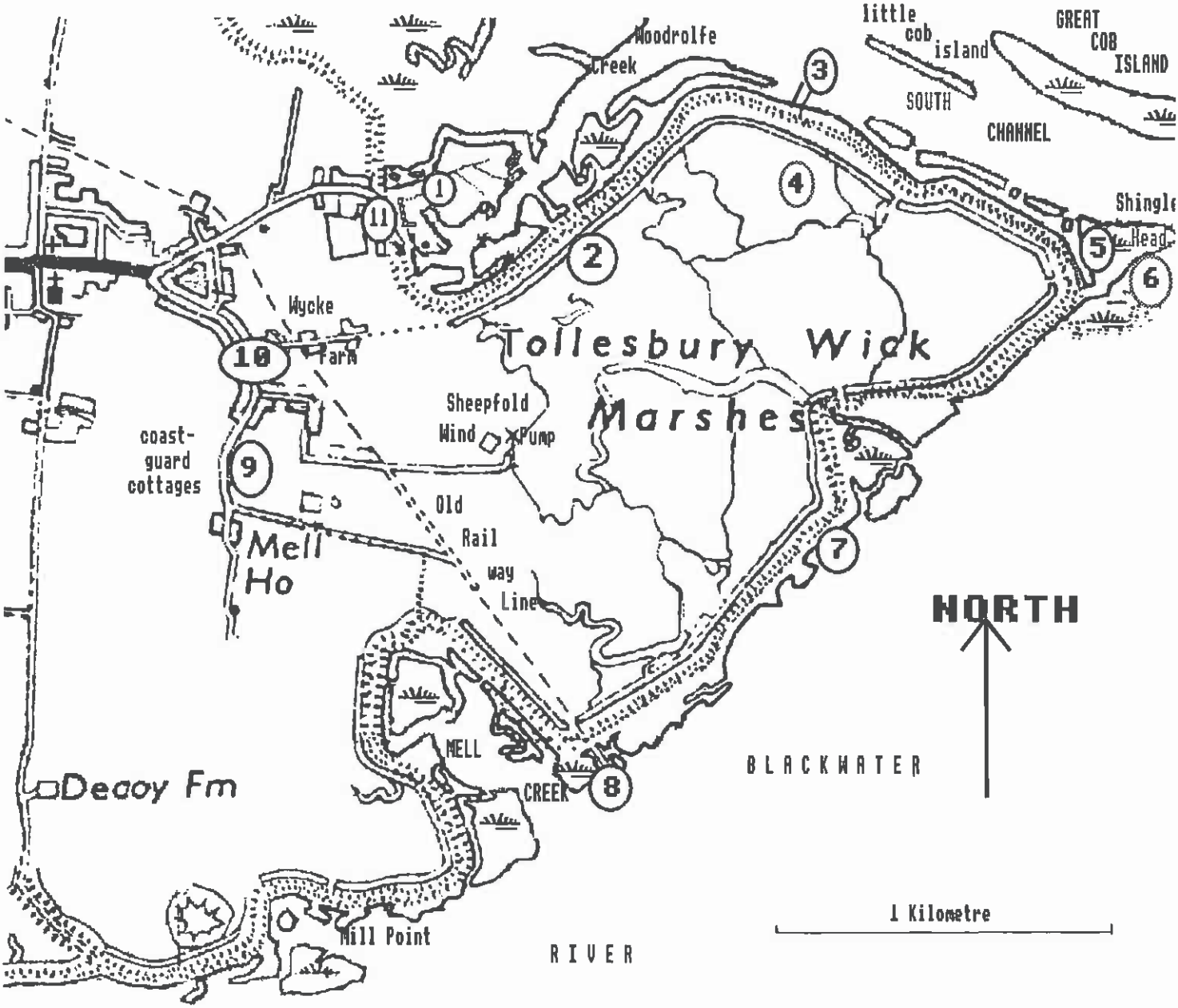

COLCHESTER
STANSTEAD
BISHOPS STORTFORD
BRAINTREE
A120
KELVEDON
B1026
WITHAM
TIPTREE
B1023
TOLLESHUNT D'ARCY
M11
B1026
TOLLESBURY
HARLOW
A414
MALDON
CHELMSFORD
A414
A12
M25
A130
J28
A127
BASILDON
ROMFORD
A13
SOUTHEND-ON-SEA


TOLLESBURY
Station Road
New Rd.
Thurstable Road
North Road
Woodrolfe Road
New Rd.
West St.
East St.
High St.
Mell Road
Crescent Road
Elysian Gdns.
Woodrolfe Fm.Lane
Wycke Lane
Mell Road
0
Metres
500
Roger Robinson

Fellowship Afloat

WALK 1

Tollesbury Wick Marshes



POINTS OF INTEREST

1) OYSTER PITS

The rectangular pits in the salt marsh were for cultivating oysters from spawn. When large enough the young shells (spats) would be released in the oyster beds.

2) SEA WALL and BORROWDYKE

All along the sea wall, on the landward side, is a ditch. This is called a BORROWDYKE because the soil for the sea wall came from (was Borrowed) the dyke.

3) FISHERMAN'S PATH

There is a path of sand bags leading out into the mud. By walking along this you can get ashore from your boat if you come back from fishing when the tide is low. Don't try it now. The path is very narrow and it is easy to slip into the deep mud. The stretch of water out here is called "The Leavings" because the fishermen left their boats here.

4) THE MARSHES

The land has been reclaimed for farming. Without the sea wall the whole area would be salt marsh of no use to man. Can you see the outlines of the old creeks? There is pressure to reclaim land more salt marsh which threatens wildlife species.

5) PILL BOX

In common with many places along the coast the Blackwater Estuary is lined with 'Pill Boxes'. These are concrete strongholds built during the second world war to defend the country.

6) SHINGLE HEAD

With all this mud it is a surprise to find a sandy beach. In fact Shingle Head is almost entirely made of sea shells. The shells of dead shell fish are washed up on this bank by the tide.

7) GROINS

While some areas of the estuary are silting up and land is being reclaimed, other areas are being washed away by coastal erosion. Groins have been put into the mud to try to stop this happening.

8) TOLLESBURY PIER

There used to be a pier at Tollesbury connecting with a railway line. Had it been more popular Tollesbury might have been as big at Harwich. As it was, the port was not well used and in 1940 it was blown up by the British during the war. Why did we blow up our own pier?

9) COASTGUARD COTTAGES

From these cottages the coastguard could see over to Mersea and across to Bradwell where there were also coastguards. They could keep in touch by semaphore. Note the weather vane, an old fishing boat. There is a similar one on the village church.

10) STREET WATER PUMP

From the days when houses did not have running water.

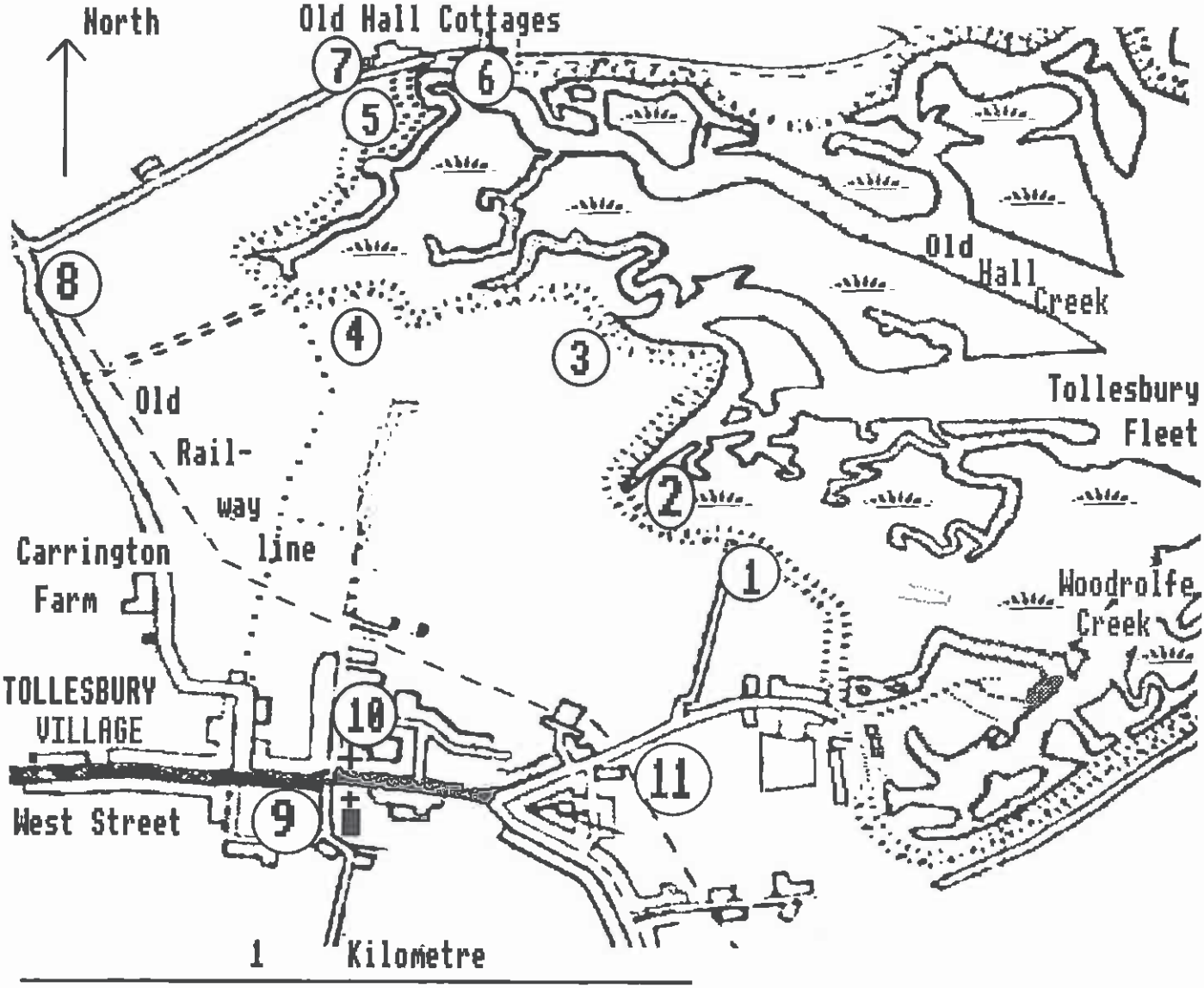
11) SAIL LOFTS

Built around 1904, the sail lofts were for storing the equipment from big sailing boats. In particular the sails, which were not made from non-rotting man-made fibre, had to be hung to dry. Note the stilts (piers) to keep the lofts out of the water at high tide.

Fellowship Afloat

WALK 2

OLD HALL



POINTS OF INTEREST

1) SEWAGE FARM.

Can you see the point where the light vessel sewage pipe enters the complex? How clean is the water leaving the plant.

2) RED-HILLS

If you look carefully you can see a low mound of reddish soil. This is the remains of Iron Age and Roman salt extraction industries resulting from the remains of clay pots and the fires used to evaporate sea water to obtain salt.

3) WATER SKI-ING

Water skiers use the little beach here. Water skiing is not popular with the wildlife. The noise, and the wash from the speed boats is disturbing to feeding birds.

4) SEA WALL and BORROWDYKE

All along the sea wall, on the landward side, is a ditch. This is called a BORROWDYKE because the soil for the sea wall came from (was Borrowed) the dyke. Does the reclaimed land look lower than the salt marsh?

5) OLD HALL WHARF

The old staging is still visible. This was a wharf where barges would tie up to load and unload cargo from the farms.

6) BARGES

If you are here at low tide you will be able to see the remains of some barges in the mud. How many barges ended their lives here?

7) "THE SHIP AHOY"

Old Hall Cottages used to be a public house. After sailing a large barge up the narrow Old Hall Creek I think you would deserve a good drink. It is a pity you can't still have one after walking all this way. Smuggling also went on from out of the way places like this.

8) THE RAILWAY LINE

The last train ran in 1951. Since then there is hardly anything left of the old line. What other evidence can you see of the railway line as you walk through Tollesbury.

8) FIRE MARK

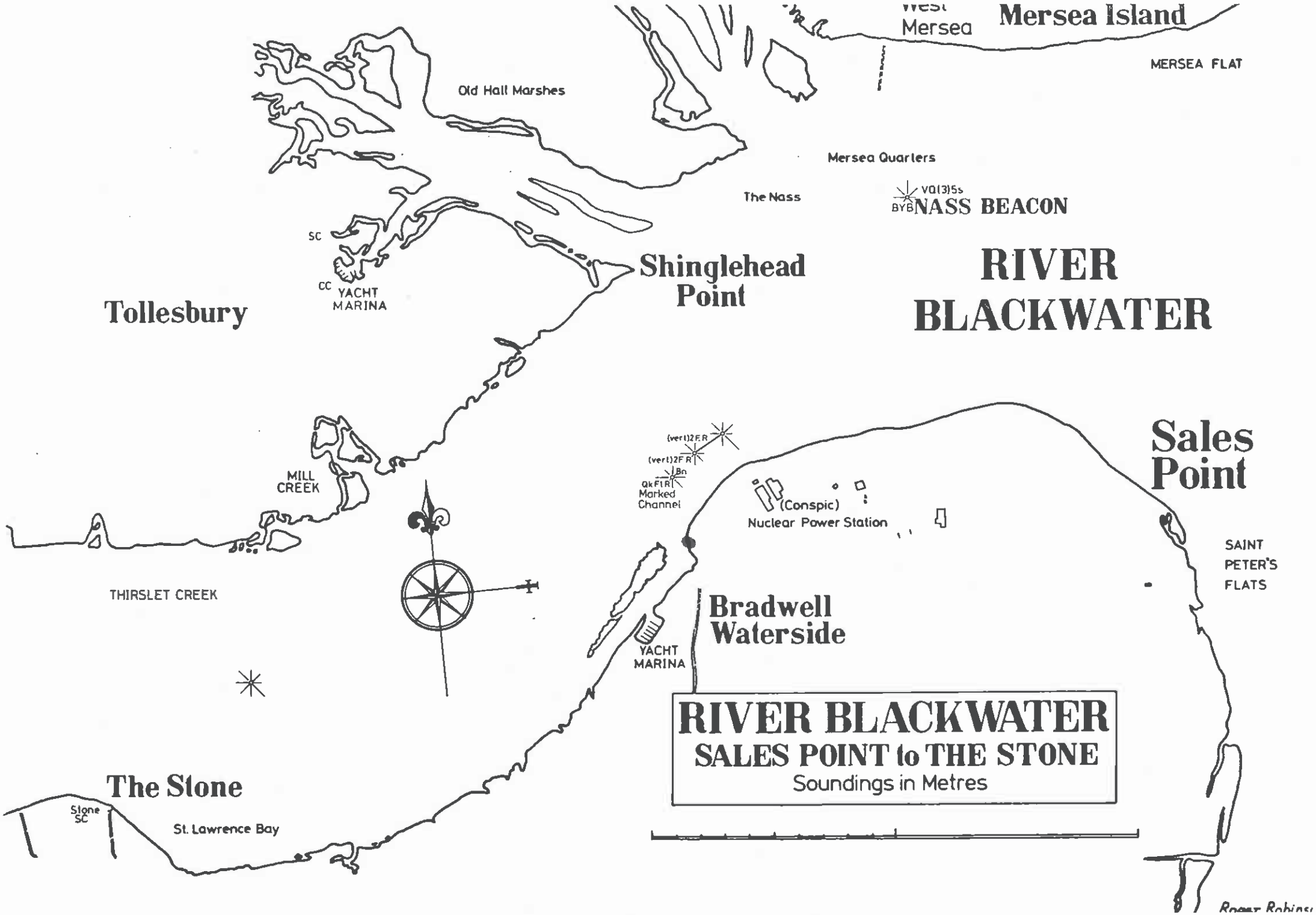
Over Rhymes Bakery is an oval crest. This is the mark of an early insurance company dating from the first fire engines. If you didn't have the crest then the fire company wouldn't put out the fire.

9) CONGREGATIONAL CHURCH

Spurgeon's father used to preach here. Also, there is a stained glass window with the light vessel on it.

10) THE RAILWAY LINE

Did you see any more evidence of the railway line? After stopping at the village station the train could continue to a pier on the sea wall. This is where the line crossed the road.


West Mersea
Mersea Island
MERSEA FLAT
Old Hall Marshes
Mersea Quarters
The Nass
VQ(3)5s
BYB NASS BEACON
SC
CC YACHT MARINA
Tollesbury
Shinglehead Point
RIVER BLACKWATER
(vert)2F.R
(vert)2F.R
Bn
QkFlR
Marked Channel
MILL CREEK
(Conspic)
Nuclear Power Station
Sales Point
SAINT PETER'S FLATS
THIRSLET CREEK
Bradwell Waterside
YACHT MARINA
RIVER BLACKWATER
SALES POINT to THE STONE
Soundings in Metres
The Stone
Stone SC
St. Lawrence Bay

IDEAS FOR LANGUAGE DEVELOPMENT

LANGUAGE DEVELOPMENT

The week provides a great deal of opportunity for Language Development. You may like to give attention to mood setting and creating the right sort of environment to enable children to use and develop skills of verbal and written expression,

Input can be given during each session to encourage children to experience what is going on around them, to reflect privately and with others - small groups and the whole class - and write down immediate reactions, words, phrases etc., which convey for them the spirit and emotion of the moment. A small private pocket notebook may be useful to jot down ideas - these notes can be used later when they are producing a written piece.

There should be plenty of opportunity for quiet private reflection and also for group discussion pulling together thoughts and ideas.

There is usually time for an evening story and this could be used to keep the theme of the week running. Material which makes good use of language and stimulates - this can be both heavy and light - can be used to excite children into enjoying language.

SOME IDEAS FOR STARTING POINTS

Before each experience, remind the children of what is being looked for and what the expected outcomes may be.

1. BOAT TRIP

With a bit of luck the weather will be a little lively! Try to keep the children thinking about the environment, the elements and all that is around them. Prime the adults to keeping the children alert to what is happening, but also give the children space to 'feel' what is happening. Lots of lovely discussion on return and then the opportunity to write.

2. DREDGING

Concentrate on descriptive work of the Benthos with less emphasis on the scientific.

3. SALTMARSH

Leave groups of children in different places - ask them to sit quietly and make use of all their senses. Make notes of what they are experiencing. Discussion afterwards could invite children to share thoughts.

4. LIGHT VESSEL

Give some input into what her purpose was and what life on board would have been like. Leave groups in different locations and ask the children to attempt a piece of imaginative writing based around where they are.

5. THE CHURCH

Some background on the purpose of the Church in its role as a special place. Emphasise the spiritual and peaceful nature and concentrate on the atmosphere - maybe avoid bellringing nights (Thursday). Set the mood outside the building, then ask the children to enter in silence and from that point on not to talk to anyone - including the staff who should observe the same rule. Ask them to wander around taking in the atmosphere. When each child feels ready they should find somewhere to settle and to write. At no time are they to interrupt or disturb each other; to keep the atmosphere is essential.

6. BELL RINGING

If a visit can be arranged, jump at it and use the experience.

Bibliography - Study Books on Trinity

Section	Book Title	Author	Publisher
Birds	Birds	Taylor, Barbara	Dorling Kindersley
	Birds	Bailey, Jill & Burnie, David	Dorling Kindersley
	Pocket Guide to British Birds	Fitter,R.S.R.	Collins
	Sea & Estuary Birds	Leigh-Pemberton, John	Ladybird Books Ltd.
	Spotter's Guide to Birds	Holden, Peter	Usborne Publishing
	The How & Why Wonder Book of Birds	Gooders, John	Transworld Publishers
Flowers	Field Guide to the Wild Flowers of Britain	Various	Reader's Digest Assoc.Ltd
	Flowers	Burnie, David	Dorling Kindersley
	The Concise British Flora in Colour	Keble-Martin, W	Ebury Press & Michael Joseph
	Wild Flowers	Pursey, Helen	Hamlyn
	Wild Flowers	Fitter, Richard	Harper Collins
	Wild Flowers by Colour	Blamey, Marjorie	Dorling Kindersley
	Wild Flowers of Britain & Northwest Europe	Grey-Wilson, Christopher	Dorling Kindersley
Sealife	Junior Nature Guides - Seashells	Abbott, R. Tucker	Dragon's World Children's Books
	Life at Sea	Sutton, Harry T.	Heritage Books & Longman
	Life in our Estuaries (2 copies)	Angel, Heather	Jarrold Colour Publications
	Marine Aquariums in the Research Laboratory	King J & Spotte, S	Aquarium Systems Inc.
	Ocean - The Living World	Various	Dorling Kindersley
	Ocean Life	Parker, Steve	Parragon Book Services Ltd.
	Popular British Freshwater Fish	Smith, Ken	Jarrold Colour Publications Ltd
	Saltwater Life & Great Britain & Europe	Jackman, Leslie	Dragon's World Children's Books
	Sea and Seashore	Evans, I.O.	Frederick Warne & Co.Ltd.
	Sea Life	Various	Dorling Kindersley
	Seashore (publ.1994)	Burnie, David	Dorling Kindersley
	Seashore (publ.1999)	Burnie, David	Dorling Kindersley
	Seashore	Parker, Steve	Dorling Kindersley
	Seashore Life of Britain & Europe	Gibbons, Bob	New Holland (Publishers) Ltd.
	Seashore, Adventures in the Natural World	de Panafieu, Jean-Baptiste	Harper Collins
	Seashores & Shallow Seas	Campbell, Andrew	Hamlyn
	Seashores of Britain & Northern Europe	Baxter, John	Mitchell Beazley
	Seawatching	Soper, T & Cusa, N.	Dinosaur Publications Ltd
	Secrets of the Seashore	Various	Reader's Digest Assoc.Ltd
	Shells (2 copies)	Coldrey, Jennifer	Dorling Kindersley
	Shoreline	Taylor, Barbara	Dorling Kindersley
	The How & Why Wonder Book of the Seashore	Lamb, F.F.	Transworld Publishers
	The NatureTrail book of Seashore Life	Swallow, Su	Usborne Publishing
	The Seashore	Lambert, David	Concertina Publications Ltd.
	The Shell Book of the Shore	Soper, Tony	David & Charles
	The Young Specialist Looks at... Seashore	Kosch, Frieling & Janus	Burke Publishing Co.Ltd
	Whales, Dolphins & Porpoises	Carwardine, Mark	Dorling Kindersley
	Younger Spotter's Guide - Seashore	Swallow, Su	Usborne Publishing
Wildlife	Junior Nature Guides - Butterflies	Various	Dragon's World Children's Books
	Nature Facts	O'Hara Scarlett	Dorling Kindersley
	Sharing Nature with Children	Cornell, Joseph Bharat	Exley Publications
	Wild Essex	Gunton, Tony	Essex Wildlife Trust
	Wildlife in Britain	Various	The Automobile Association
Other	Lighthouses and Lightships	Chadwick, Lee	Dennis Dobson
	Lighthouses of England & Wales	Jackson, Derrick	David & Charles (Holdings) Ltd.
	Tollesbury to the Year 2000	Various	Tollesbury Millennium Publ.Grp.

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